

UC Berkeley

Contributions of the Archaeological Research Facility

Title

The Archaeology and Ethnohistory of Fort Ross, California . Volume 2: The Native Alaskan Neighborhood A Multiethnic Community at Colony Ross

Permalink

<https://escholarship.org/uc/item/59h1s55j>

ISBN

1-882744-05-3

Authors

Lightfoot, Kent G
Schiff, Ann M
Wake, Thomas A

Publication Date

1997

Supplemental Material

<https://escholarship.org/uc/item/59h1s55j#supplemental>

Data Availability

The data associated with this publication are in the supplemental files.

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

**THE ARCHAEOLOGY AND ETHNOHISTORY OF FORT ROSS, CALIFORNIA
VOLUME 2**

THE NATIVE ALASKAN NEIGHBORHOOD

A MULTIETHNIC COMMUNITY AT COLONY ROSS



KENT G. LIGHTFOOT, ANN M. SCHIFF, AND THOMAS A. WAKE, EDITORS



Bone bed deposit and rock rubble excavated at the Native Alaskan Village Site.

Cover Photo:
Fort Ross Region - Fort Ross Cove,
Native Alaskan Neighborhood, and
Stockade Complex. Fort Ross Beach
Site in foreground; Native Alaskan
Village Site on terrace.

THE ARCHAEOLOGY AND ETHNOHISTORY OF FORT ROSS,
CALIFORNIA • VOLUME 2

The Native Alaskan Neighborhood
A Multiethnic Community at Colony Ross

KENT G. LIGHTFOOT, ANN M. SCHIFF,
AND THOMAS A. WAKE

Number 55
Contributions of the University of California
Archaeological Research Facility
Berkeley

Available open-access at:
www.escholarship.org/uc/item/59h1s55j

Library of Congress Catalog Card Number 91-77906
ISBN 1-882744-05-3

© 1997 by the Regents of the University of California
Archaeological Research Facility
University of California at Berkeley

Printed in the United States of America.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage or retrieval system, without written permission of the publisher.

Table of Contents

<i>List of Figures</i>	v
<i>List of Tables</i>	viii
Foreword	
<i>E. Breck Parkman</i>	x
Editors' Preface	xi
1 Interethnic Relationships in the Native Alaskan Neighborhood: Consumption Practices, Cultural Innovations, and the Construction of Household Identities <i>Kent G. Lightfoot and Antoinette Martinez</i>	1
2 Archaeological Field Investigations at the Fort Ross Beach Site <i>Kent G. Lightfoot and Ann M. Schiff</i>	23
3 Archaeological Field Investigations at the Native Alaskan Village Site <i>Kent G. Lightfoot, Ann M. Schiff, and Lisa Holm</i>	42
4 Site Formation Processes at the Native Alaskan Neighborhood <i>Heather A. Price</i>	96
5 Sensing the Past and the Remoteness of the Future: A Soil Resistivity Survey at the Native Alaskan Village Site <i>André Tschan</i>	107
6 Historical Archaeology of the Native Alaskan Village Site <i>Glenn Farris</i>	129
7 European Origins and Native Destinations: Historical Artifacts from the Native Alaskan Village and Fort Ross Beach Sites <i>Stephen W. Silliman</i>	136
8 Glass and Ceramic Trade Beads from the Native Alaskan Neighborhood <i>Lester A. Ross</i>	179
9 Lithic Assemblage at the Fort Ross Beach and Native Alaskan Village Sites <i>Ann M. Schiff</i>	213
10 Slate Artifacts and Ethnicity at Fort Ross <i>Peter R. Mills</i>	238
11 Bone Artifacts and Tool Production in the Native Alaskan Neighborhood <i>Thomas A. Wake</i>	248

12	Mammal Remains from the Native Alaskan Neighborhood	<i>Thomas A. Wake</i>279
13	Bird Remains from the Fort Ross Beach and Native Alaskan Village Sites	<i>Dwight D. Simons</i>310
14	Fish Remains from the Early 19th Century Native Alaskan Habitation at Fort Ross	<i>Kenneth W. Gobalet</i>319
15	Shellfish Remains at the Fort Ross Beach and Native Alaskan Village Sites	<i>Ann M. Schiff</i>328
16	Chronology of Archaeological Deposits from the Fort Ross Beach and Native Alaskan Village Sites	<i>Kent G. Lightfoot and Stephen W. Silliman</i>337
17	Culture Change and Persistence in the Daily Lifeways of Interethnic Households	<i>Kent G. Lightfoot, Ann M. Schiff, Antoinette Martinez, Thomas A. Wake, Stephen W. Silliman, Peter R. Mills, and Lisa Holm</i>355
18	Conclusion	<i>Kent G. Lightfoot, Ann M. Schiff, and Thomas W. Wake</i>420

Three appendices occur in the text—appendix 1.1 (p. 17); appendix 6.1 (p. 135); and appendix 8.1 (p. 211). All other appendices are contained in microfiche, 278+ pages.....on inside back cover

ERRATA

The Archaeology and Ethnohistory of Fort Ross, California. Vol. 2: The Native Alaskan Neighborhood

In the following figures:

Figure 3.28, page 74

Figure 3.29, page 75

Figure 3.30, page 76

Figure 3.42, page 87

Figure 3.43, page 88

Figure 3.44, page 89

The scale and orientation of the direct-overhead photographs of the bone bed deposits are:

Scale: 15.2 cm (6 inch) ruler in each photo = 2 m

1 cm of the ruler = 13.16 cm

Orientation: 15.2 cm (6 inch) ruler oriented north/south

Top of the page is north

Bottom of page is south

Figures

P.1 Spatial Layout of Colony Ross	xii
P.2 The Fort Ross Beach Site and the Native Alaskan Village Site in 1989	xiii
2.1 Fort Ross Beach Site Map	25
2.2 Photo of the Fort Ross Beach Site from the East, Showing 30 m Long Profile and Bench in 1989	26
2.3 Photo of East and Middle Profile Units in 1988	28
2.4 East Profile Units	29
2.5 Middle Profile Units	30
2.6 The Fort Ross Beach Site Pit Feature	31
2.7 Close-Up of Stone Bench in the Fort Ross Beach Site Pit Feature	32
2.8 Possible Post-Mold in front of Stone Bench in the Fort Ross Beach Site Pit Feature	33
2.9 Plan Map of Floor of the Fort Ross Beach Site Pit Feature	34
2.10 Photo of West Profile Units	35
2.11 West Profile Units	36
2.12 Profile of North Wall of East Bench (0N, 12W)	37
2.13 Profile of North Wall of Southwest Bench	38
2.14 Profile of West Wall of Southwest Bench	40
2.15 West Wall of Southwest Bench. Note Bedrock in Lower Left Corner.	41
3.1 Native Alaskan Village Site Map	43
3.2 Native Alaskan Village Site Surface Collection Units	45
3.3 Surface Distribution of Flake/Core/Biface	48
3.4 Surface Distribution of Fire-Cracked Rocks	49
3.5 Surface Distribution of Glass Beads	50
3.6 Surface Distribution of Window/Bottle Glass	51
3.7 Surface Distribution of Ceramics	52
3.8 Surface Distribution of Metal Artifacts	53
3.9 Surface Distribution of Fish Remains	54
3.10 Surface Distribution of Bird Remains	55
3.11 Surface Distribution of Marine Mammal Remains	56
3.12 Surface Distribution of Artiodactyl Remains	57
3.13 Surface Distribution of All Mammal Remains	58
3.14 Surface Distribution of Shellfish Remains	59
3.15 Three Areas of the Native Alaskan Village Site Showing their Relationship to the "Village Core" in the 1817 Map .	61
3.16 Native Alaskan Village Site Excavation Units	63
3.17 East Central Area Excavation	65
3.18 South Area Excavation	65
3.19 South Wall Profile of South Central Test Unit	67
3.20 South Wall Profile of West Central Test Unit	67
3.21 North Wall Profile of East Central Trench	69
3.22 West Wall Profile of the East Central Extension Trench	70
3.23 Close-up of Worked Antler in 75S, 0E: East Central Bone Bed, Level 1	71
3.24 Close-up of Artiodactyl Remains and Abalone Shells in 75S, 1E: East Central Bone Bed, Level 1	72
3.25 Close-up of Fire-Cracked Rocks, Ground Stone, Turban Snail, and Abalone Shells in 75S, 0E: East Central Bone Bed, Level 1	72
3.26 Photo of 75S, 0E: East Central Bone Bed, Level 1	73
3.27 Photo of SW Quad of 75S, 0E: East Central Bone Bed, Level 1	73
3.28 Photo of the First Section (74S, 3E) of the East Central Area Excavation	74
3.29 Photo of the Second Section (74S, 0E) of the East Central Area Excavation	75
3.30 Photo of the Third Section (75S, 2W) of the East Central Area Excavation	76
3.31 Close-up of Artiodactyl Remains, Ground Stone, and Fire-Cracked Rocks in 74S, 1W: East Central Bone Bed, Level 1	78
3.32 Outline of the East Central Bone Bed in the East Central Trench and Area Excavation	78
3.33 Basemap for the East Central Bone Bed and Adjacent Deposits, Level 1 (East Central Trench and Area Excavation)	79
3.34 Basemap for the East Central Bone Bed and Adjacent Deposits, Level 2 (East Central Trench)	79
3.35 Basemap for the Floor of the East Central Pit Feature (East Central Trench)	79
3.36 South Wall Profile of South Trench	81
3.37 Outline of the South Bone Bed, Abalone Dump, Wooden Posts, Linear Clay Feature in the South Trench and Area Excavation	82
3.38 Close-up of Whale Bone Core and Mollusk Remains in 125S, 22W: South Bone Bed, Level 1	83
3.39 Photo of 125S, 22W and 125S, 23W: South Bone Bed Level 1	84

3.40	Photo of 125S, 21W and 125S, 22W: South Bone Bed Level 2	84
3.41	Photo of First Section (124S, 19W) of the South Area Excavation	86
3.42	Photo of Second Section (124S, 22W) of the South Area Excavation	87
3.43	Photo of Third Section (124S, 24W) of the South Area Excavation	88
3.44	Photo of Fourth Section (124S, 26W) of the South Area Excavation	89
3.45	Basemap for the South Bone Bed and Adjacent Deposits, Level 1 (South Trench and Excavation Area)	90
3.46	Basemap for the South Bone Bed, Level 2 (South Trench)	91
3.47	Basemap for the South Bone Bed, Level 3 (South Trench)	91
3.48	Basemap for the South Bone Bed, Level 4 (South Trench)	91
3.49	Close-up of Abalone Shell, Ground Stone, and Iron Axe Head in 121S, 26W: Abalone Dump, Level 1	92
3.50	Close-up of Iron Spike, Mollusk Shells, and Artiodactyl Remains in 122S, 25W: Abalone Dump, Level 1	92
3.51	Close-up of Worked Bone Tools, Abalone Shells, Ground Stone, and Fire-Cracked Rocks in 121S, 26W: Abalone Dump, Level 1	93
3.52	Close-up of Linear Clay Feature on Rock Rubble in 125S, 23W: (NW to SE - Photo Center)	93
5.1	Contact Resistance and Polarization Problems When Taking Ground Resistance Measurements (Text/Graph: Clark 1990:28)	109
5.2	a) A Resistivity Measuring Circuit (used in the Martin-Clark meters) b) The Detection Hemisphere Resulting from a Wenner Configuration (Text/Graph: Clark 1990:28)	109
5.3	a) Simulating a Wenner Configuration Cross Section of the Current and Potential Distribution b) The Potential Gradient between C1 and C2 Represented as a Plot (Text/Graph: Clark 1990:29)	110
5.4	a) A Centrally Located High Resistivity Feature Causes Marginal Interference of the Current Flow (Text/Graph: Clark 1990:28) b) The Percentage Difference in Potential between P1 and P2 Increases Due to the Feature Being Located Directly beneath P2 and C2 (Text/Graph: Clark 1990:28) c) A Centrally Located Conducting Feature Interferes to a Greater Extent Than its Counterpart Depicted in Figure 5.4a (Text/Graph:Clark 1990:28)	111
5.5	Geoplot Resistivity Map of the Native Alaskan Village Site	112
5.6	Survey Reference Stations	114
5.7	Survey Grid Sizes	115
5.8	1817 Russian Map of Fort Ross	118
5.9	Site Reconstruction of Native Alaskan Village Site Based on the 1817 Map	119
5.10	Middle Section Map Indicating the Dominant Resistivity Survey Features	120
5.11	6/1/64 Department of Water Resources Map of Fort Ross	122
5.12	North Section Map Indicating the Dominant Resistivity Survey Features	123
5.13	1892 Veasey Map of Fort Ross	124
5.14	South Section Map Indicating the Dominant Resistivity Features	125
5.15	Entire Site Map Indicating the Dominant Resistivity Survey Features	127
6.1	Russian Cross Fragment from the Native Alaskan Village Site	131
7.1	Counts of Refined Earthenware Types per Stratigraphic Layer for the South Central Test Unit	142
7.2	Counts of Refined Earthenware Types per Unit in the West Central Trench	142
7.3	Counts of Refined Earthenware Types per Unit in the East Central Trench	148
7.4	Counts of Refined Earthenware Types per Unit for the South Trench	148
7.5	Ceramic Density for Excavation Units and Trenches at the Native Alaskan Village Site	149
7.6	Vessel Counts per Excavation Area at the Native Alaskan Village Site	149
7.7	Historic Ceramics	152
7.8	Counts of Refined Earthenware Types for the East Bench, East Profile, Middle Profile, West Profile, and Southwest Bench at the Fort Ross Beach Site	158
7.9	Glass Density for Excavation Units and Trenches at Native Alaskan Village Site	158
7.10	Glass and Worked Glass	162
7.11	Metal Artifacts	165
8.1	Drawn, Cut, Undecorated Beads from the Native Alaskan Neighborhood (n = 12)	181
8.2	Drawn, Faceted Beads from the Native Alaskan Neighborhood (n = 6)	182
8.3	Drawn, Hot-Tumbled, Undecorated Opaque and Translucent, Monochrome Beads from the Native Alaskan Neighborhood (n = 153)	184
8.4	Drawn, Hot-Tumbled, Undecorated Transparent, Monochrome Beads from the Native Alaskan Neighborhood (N = 115)	186
8.5	Drawn, Hot-Tumbled, Undecorated Polychrome Beads from the Native Alaskan Neighborhood (n = 224)	187
8.6	Wound, Spheroidal, Undecorated Beads from the Native Alaskan Neighborhood (n = 10)	188
8.7	Wound, Ovoidal, Undecorated Beads from the Native Alaskan Neighborhood (n = 29)	189
8.8	Wound, Decorated Beads from the Native Alaskan Neighborhood (n = 5)	190
8.9	Wound-and-Shaped Beads from the Native Alaskan Neighborhood (n = 7)	190
8.10	Blown Beads from the Native Alaskan Neighborhood (n = 2)	191
8.11	Prosser-Molded Ceramic Bead from the Fort Ross Beach Site (n = 1)	191

8.12 Percentage Comparisons of Bead Colors and Manufacturing Types for the Native Alaskan Village Site	193
9.1 Fort Ross Beach Site Lithic Assemblage: Raw Material Types	215
9.2 Fort Ross Beach Site Lithic Assemblage: Functional Groups	217
9.3 Fort Ross Beach Site Projectile Points	218
9.4 Fort Ross Beach Site Ground Stone	219
9.5 Fort Ross Beach Site Ground Stone	220
9.6 Fort Ross Beach Site Ground Stone	221
9.7 Native Alaskan Neighborhood Gun Flints	222
9.8 Native Alaskan Village Site Lithic Assemblage: Raw Material Types	226
9.9 Native Alaskan Village Site Lithic Assemblage: Functional Groups	228
9.10 Native Alaskan Village Site Projectile Points	229
9.11 Native Alaskan Village Site Ground Stone	230
9.12 Native Alaskan Village Site Ground Stone	231
10.1 Slate Artifacts from the Native Alaskan Neighborhood	243
11.1 Bone Projectile Points from the Native Alaskan Neighborhood	252
Plate 11.1 Bone Harpoon Shaft Elements from the Native Alaskan Neighborhood	255
11.2 Bone Harpoon Shaft Elements from the Native Alaskan Neighborhood	257
11.3 Bone Fishing Gear from the Native Alaskan Neighborhood	257
Plate 11.2 Utilitarian Worked Bone Items from the Native Alaskan Village Site	259
Plate 11.3 Elk Antler Baton (top) and Whale Bone Platter (bottom) from the Native Alaskan Village Site	260
Plate 11.4 Bird Bone Tubes from the Native Alaskan Neighborhood	262
11.4 Bird Bone Tube Fragments from the Native Alaskan Neighborhood	263
Plate 11.5 Elk Antler Core (NAVS-8/14/91-34-WB-1) from the Native Alaskan Village Site	264
Plate 11.6 Whale Rib Core (NAVS-8/15/91-159-WB-1) from the Native Alaskan Village Site	264
Plate 11.7 Grizzly Bear Ulna (left) and Radius (right) from the Native Alaskan Village Site	266
Plate 11.8 Chopping Flakes (left) and Carving Flakes (right) from the Native Alaskan Village Site	267
Plate 11.9 Sawn Sea Lion Femur (NAVS-8/8/91-28-WB-1) from the Native Alaskan Village Site	269
11.5 Hand Holds from the Native Alaskan Neighborhood	269
Plate 11.10 Hand Holds from the Native Alaskan Neighborhood	270
12.1 Frequency of Pinniped Skeletal Elements in the Native Alaskan Neighborhood	286
12.2 Identified Artiodactyl Skeletal Elements from the East Central Trench	296
12.3 Pinniped Skeletal Elements from the East Central Trench	296
12.4 Pinniped Skeletal Elements from the South Trench	299
12.5 Identified Artiodactyl Skeletal Elements from the South Trench	299
15.1 Fort Ross Beach Site Shellfish Assemblage	330
15.2 Native Alaskan Village Site Shellfish Assemblage	333
17.1 Spatial Distribution of Deer and Elk Elements in Level 1, East Central Bone Bed	365
17.2 Spatial Distribution of Domesticated Mammal Elements in Level 1, East Central Bone Bed	365
17.3 Spatial Distribution of Marine Mammal Elements in Level 1, East Central Bone Bed	366
17.4 Spatial Distribution of Fish Elements in Level 1, East Central Bone Bed	366
17.5 Spatial Distribution of Abalone Shells in Level 1, East Central Bone Bed	368
17.6 Spatial Distribution of Mussel, Clam, and Turban Shells in Level 1, East Central Bone Bed	368
17.7 Spatial Distribution of Worked Bone Artifacts in Level 1, East Central Bone Bed	369
17.8 Spatial Distribution of Ceramic Pieces in Level 1, East Central Bone Bed	369
17.9 Spatial Distribution of Glass Sherds in Level 1, East Central Bone Bed	370
17.10 Spatial Distribution of Nails and Spikes in Level 1, East Central Bone Bed	370
17.11 Spatial Distribution of Other Metal Artifacts in Level 1, East Central Bone Bed	371
17.12 Spatial Distribution of Chipped Stone Artifacts in Level 1, East Central Bone Bed	371
17.13 Spatial Distribution of Cobbles in Level 1, East Central Bone Bed	372
17.14 Spatial Distribution of Fire-Cracked Rocks in Level 1, East Central Bone Bed	372
17.15 Spatial Distribution of Ground Stone "Other" Artifacts in Level 1, East Central Bone Bed	373
17.16 Spatial Distribution of Ground Stone Tools in Level 1, East Central Bone Bed	373
17.17 Spatial Distribution of Deer Elements in Level 2, East Central Bone Bed	374
17.18 Spatial Distribution of Domesticated Mammal Elements in Level 2, East Central Bone Bed	374
17.19 Spatial Distribution of Marine Mammal Elements in Level 2, East Central Bone Bed	374
17.20 Spatial Distribution of Fish Elements in Level 2, East Central Bone Bed	376
17.21 Spatial Distribution of Abalone Shells in Level 2, East Central Bone Bed	376
17.22 Spatial Distribution of Mussel, Clam, and Turban Shells in Level 2, East Central Bone Bed	376

17.23 Spatial Distribution of Worked Bone Artifacts, Ceramic Pieces, Glass Sherds, and Shell Beads in Level 2, East Central Bone Bed	377
17.24 Spatial Distribution of Nails in Level 2, East Central Bone Bed	377
17.25 Spatial Distribution of Other Metal Artifacts in Level 2, East Central Bone Bed	377
17.26 Spatial Distribution of Chipped Stone and Ground Stone Artifacts in Level 2, East Central Bone Bed	378
17.27 Spatial Distribution of Cobbles in Level 2, East Central Bone Bed	378
17.28 Spatial Distribution of Fire-Cracked Rocks in Level 2, East Central Bone Bed	378
17.29 Spatial Distribution of Deer and Elk Elements in Level 1, South Bone Bed	382
17.30 Spatial Distribution of Domesticated Mammal Elements in Level 1, South Bone Bed	383
17.31 Spatial Distribution of Marine Mammal Elements in Level 1, South Bone Bed	384
17.32 Spatial Distribution of Fish Elements in Level 1, South Bone Bed	386
17.33 Spatial Distribution of Bird Elements in Level 1, South Bone Bed	387
17.34 Spatial Distribution of Abalone Shells in Level 1, South Bone Bed	388
17.35 Spatial Distribution of Mussel, Clam, and Turban Shells in Level 1, South Bone Bed	389
17.36 Spatial Distribution of Worked Bone Artifacts, Ceramic Pieces, Glass Sherds, and Shell Beads in Level 1, South Bone Bed	390
17.37 Spatial Distribution of Nails and Spikes in Level 1, South Bone Bed	391
17.38 Spatial Distribution of Other Metal Artifacts in Level 1, South Bone Bed	392
17.39 Spatial Distribution of Chipped Stone Artifacts in Level 1, South Bone Bed	394
17.40 Spatial Distribution of Cobbles in Level 1, South Bone Bed	395
17.41 Spatial Distribution of Fire-Cracked Rocks in Level 1, South Bone Bed	396
17.42 Spatial Distribution of Ground Stone Artifacts in Level 1, South Bone Bed	397
17.43 Spatial Distribution of Deer Elements in Level 2, South Bone Bed	398
17.44 Spatial Distribution of Domesticated Mammal Elements in Level 2, South Bone Bed	398
17.45 Spatial Distribution of Marine Mammal Elements in Level 2, South Bone Bed	398
17.46 Spatial Distribution of Fish Elements in Level 2, South Bone Bed	399
17.47 Spatial Distribution of Bird Elements in Level 2, South Bone Bed	399
17.48 Spatial Distribution of Abalone, Mussel, Clam, and Turban Shells in Level 2, South Bone Bed	401
17.49 Spatial Distribution of Worked Bone Artifacts in Level 2, South Bone Bed	401
17.50 Spatial Distribution of Ceramic Pieces in Level 2, South Bone Bed	401
17.51 Spatial Distribution of Metal Artifacts in Level 2, South Bone Bed	402
17.52 Spatial Distribution of Chipped Stone Artifacts in Level 2, South Bone Bed	402
17.53 Spatial Distribution of Cobbles in Level 2, South Bone Bed	403
17.54 Spatial Distribution of Fire-Cracked Rocks in Level 2, South Bone Bed	403
17.55 Spatial Distribution of Ground Stone Artifacts in Level 2, South Bone Bed	403
17.56 Spatial Distribution of Mammal Elements from the Floor of the East Central Pit Feature	411
17.57 Spatial Distribution of Worked Bone Artifacts, Ceramic Pieces, Glass Sherds, Glass Beads, and Lithic Artifacts from the Floor of the East Central Pit Feature	411
17.58 Spatial Distribution of Metal Artifacts from the Floor of the East Central Pit Feature	411

Tables

1.1 Composition of Interethnic Households, 1820-1821 (from Istomin 1992:14-37)	5
2.1 Field/Publication Designations for Profile Units	27
3.1 Counts and Density Figures for Materials from the Thirty-eight 2-by-2 m Units	46
3.2 Artifact Densities for Surface Features	47
4.1 Color Values of Native Alaskan Neighborhood Sediment Samples	102
4.2 pH Values for Native Alaskan Neighborhood Sediment Samples	103
4.3 Organic Carbon Content of Native Alaskan Neighborhood Sediment Samples	103
4.4 Calcium Carbonate Content of Native Alaskan Neighborhood Sediment Samples	104
5.1 Geoplot Processing of the NAVS Dataset	116
7.1 South Central Test Unit - Ceramics	140
7.2 West Central Trench - Ceramics	143
7.3 East Central Trench and Extension - Ceramics	143
7.4 East Central Trench - Ceramics: Topsoil	143
7.5 East Central Trench and Extension - Ceramics: Dark Sandy Loam	144
7.6 East Central Trench and Extension - Ceramics: Pit Fill	145
7.7 South Trench and Extension - Ceramics	145
7.8 South Trench - Ceramics: Topsoil	145

7.9 South Trench and Extension - Ceramics: Dark Sandy Loam	146
7.10 South Trench - Ceramics: Pit Fill	146
7.11 Sherds from Native Alaskan Village Site	151
7.12 Profile and East Bench - Ceramics	151
7.13 Southwest Bench - Ceramics	154
7.14 South Central Test Unit - Glass	154
7.15 West Central Trench - Glass	154
7.16 East Central Trench and Extension - Glass: Topsoil	154
7.17 East Central Trench and Extension - Ceramics: Dark Sandy Loam	156
7.18 East Central Trench and Extension - Glass: Pit Fill	156
7.19 South Trench and Extension - Glass	156
7.20 South Trench - Glass: Topsoil	
7.21 South Trench and Extension - Glass: Dark Sandy Loam	157
7.22 South Trench - Glass: Pit Fill	157
7.23 Worked Glass at the Native Alaskan Village Site	161
7.24 Worked Glass at the Fort Ross Beach Site	163
7.25 Ceramic Comparisons: Frequencies of Ceramic Types for Other Areas Inside and Outside the Fort Ross Stockade (compiled from O'Connor 1984:table 2)	169
8.1 Glass and Ceramic Beads from the Fort Ross Beach Site	192
8.2 Glass Beads from the Native Alaskan Village Site	194
9.1 Fort Ross Beach Site Lithic Assemblage: Raw Material Type Counts	215
9.2 Fort Ross Beach Site Lithic Assemblage: Artifact Category Counts	216
9.3 Fort Ross Beach Site Diagnostic Projectile Points	216
9.4 Fort Ross Beach Site Lithic Assemblage	217
9.5 Native Alaskan Village Site Lithic Assemblage: Raw Material Type Counts	226
9.6 Native Alaskan Village Site Lithic Assemblage: Artifact Category Counts	227
9.7 Native Alaskan Village Site Diagnostic Projectile Points	227
9.8 Native Alaskan Village Site Lithic Assemblage	228
12.1 Identified Mammals from the Native Alaskan Neighborhood	282
12.2 All Mammals from the Native Alaskan Neighborhood	282
12.3 Identified California Sea Lion (<i>Zalophus californianus</i>) Skeletal Elements from Colony Ross (NISP)	285
12.4 Identified Harbor Seal (<i>Phoca vitulina</i>) Skeletal Elements from Colony Ross (NISP)	287
12.5 Identified Cow (<i>Bos taurus</i>) Skeletal Elements from Colony Ross (NISP)	289
12.6 Identified Sheep (<i>Ovis aries</i>) Skeletal Elements from Colony Ross (NISP)	290
12.7 Black-Tailed Deer (<i>Odocoileus hemionus</i>) Skeletal Elements from Colony Ross	291
12.8 Identified Mammals from the Native Alaskan Village Site	294
13.1 Bird Remains from the Native Alaskan Neighborhood	311
13.2 Habitat Preferences of Birds from the Fort Ross Sites	312
13.3 Major Groupings of Birds from the Native Alaskan Neighborhood	312
14.1 Summary of Fish Remains from the Native Alaskan Neighborhood and Humboldt County Coastal Sites	321
14.2 Summary of Fish Remains from Monterey County Sites (listed from north to south)	322
14.3 Comparative Frequency of Total Elements Identified of Top Species Represented from the Native Alaskan Neighborhood Excavations and from 10 Archaeological Sites on the Humboldt County Coast and 19 Archaeological Sites on the Monterey County Coast	323
15.1 Fort Ross Beach Site Shellfish Assemblage MNIs	330
15.2 Native Alaskan Village Shellfish MNIs	333
16.1 Fort Ross Beach Site Obsidian Hydration Summary Statistics	340
16.2 Hydration Readings for the East Profile by Source, Deposit, and Artifact Type	340
16.3 Hydration Readings for the Middle Profile by Source, Deposit, and Artifact Type	341
16.4 Hydration Readings for the West Profile by Source, Deposit, and Artifact Type	342
16.5 Hydration Readings for the Southwest Bench by Source, Deposit, and Artifact Type	343
16.6 Hydration Readings for the East Bench by Source, Deposit, and Artifact Type	344
16.7 Native Alaskan Village Site Obsidian Hydration Summary	345
16.8 Hydration Readings for the West Central Trench by Source, Deposit, and Artifact Type	345
16.9 Hydration Readings for the East Central Trench by Source, Deposit, Feature, and Artifact Type	346
16.10 Hydration Readings for the South Central Test Unit by Source, Deposit, and Artifact Type	348
16.11 Hydration Readings for the South Trench by Source, Deposit, Cultural Feature, and Artifact Type	348
17.1 Counts, Percentages, and Densities of Artifacts and Faunal Remains from Native Alaskan Village Site and Fort Ross Beach Site	358
17.2 Cultural Constituents by Weight and Percentage in the Bone Bed Deposit of the East Central Trench	363
17.3 Cultural Constituents by Weight and Percentage in the Bone Bed of the South Trench	380

Foreword

THE HUMAN STORY weaves together the histories of both the famous and the forgotten, those important few who remain illuminated on center stage, and the many others whom history has pushed toward the edges of visibility. Upon this scene comes archaeology, the detective science that sleuths its way through the back alleyways and corners of the past, searching out clues to the events that transpired there, and from those clues, retelling the forgotten acts of humanity. Fort Ross is one of the more interesting stages on which this drama has been played.

Fort Ross State Historic Park is one of the oldest and most unique of California's state parks. Established in 1906, the Park now measures 3,000 acres in size and contains a diversity of archaeological resources. Since 1988, archaeologists from the University of California, Berkeley, under the direction of Professor Kent Lightfoot, have conducted ongoing investigations of Fort Ross. Their work has revealed important details concerning life at the Russian settlement, thus allowing the Park to better manage its cultural resources, and to enhance its interpretive program.

During the Russian occupation of Fort Ross, a large number of Native Alaskans were brought to work there. Most of the Alaskans were Alutiiq men from Kodiak Island. For many of them, life at Ross was a bittersweet adventure. Leaving their families and friends behind, the Alaskans endured long stays in California. While at Ross, they lived in their own Village on a point of land between the Russian enclosure and the sea. This Village has been the focus of Berkeley's recent investigations.

In the past, interpretation at Fort Ross focused on the ethnic Russians who were perceived to have dominated the settlement. We now know that the Russians played a much smaller role in the settlement's daily affairs, and that the Native Alaskans (and the Native Californians) carried out the brunt of the work. The story of the Native Alaskans at Fort Ross is not unlike that of the Native Californians who built and nourished nearby Mission San Francisco Solano. Although they formed the largest

population of both settlements, the Alaskans and Californians were relegated to the edges of history and public interpretation for many years, and consequently became "invisible" people in the public's eye.

Today, at Mission San Francisco Solano, we are seeking to illuminate the Native Californians who were part of the Mission community, including the approximately 900 individuals buried in the Mission's unmarked cemetery. There are plans to build a memorial on which we will etch the names of the deceased. A similar project has been undertaken at Fort Ross. During 1990-1992, archaeologists from the University of Wisconsin, Milwaukee, under the direction of Professor Lynne Goldstein, located approximately 143 graves in the Fort Ross cemetery. As part of the project, the archaeologists compiled the names of the deceased, many of whom were Native Alaskans. In 1994, the graves were marked with crosses in a solemn Russian Orthodox ceremony. Eventually, the names of the deceased will be commemorated, thus helping to further restore the dignity and honor of those buried there.

The series, *The Archaeology and Ethnohistory of Fort Ross, California*, is itself a fitting commemoration of the people of Fort Ross. Volume 1 of this series provides an overview of the ethnohistory of Fort Ross, and the results of an archaeological survey of the Park, while a future volume will report on the results of the cemetery project. The current volume is an examination of the Native Alaskan Village. Like the volume before it, this report contributes greatly to the study of California archaeology and history. It helps to illuminate the edges of Fort Ross, and to drive away the shadows that have long obscured our perception of the past. In this new light, history's "invisible" people are seen again.

E. Breck Parkman
Associate State Archaeologist
California State Parks

Preface

WHEN IVAN KUSKOV and his workers first began digging the foundations for the impressive redwood palisade walls of Fort Ross in March 1812, they initiated a distinctive chapter in California history—Russian colonial expansion and settlement north of San Francisco Bay that continued for the next twenty-nine years. The Russian-American Company was a mercantile monopoly that represented Czarist Russia's interests in the lucrative North Pacific fur trade. It established Colony Ross as a staging area for sea otter and fur seal hunts along the coast of California; as an agricultural community for raising crops and livestock primarily for the Company's North Pacific colonies; and as a small shipyard and crafts production center. Fort Ross was one of California's earliest pluralistic communities where peoples recruited from across Europe and the Pacific lived, worked, and socialized with one another. The Company's rosters at Fort Ross included an international work force of Europeans, Native Siberians, Creoles (people of mixed Russian/Native American ancestry), Native Hawaiians, Native Alaskans, and Native Californians.

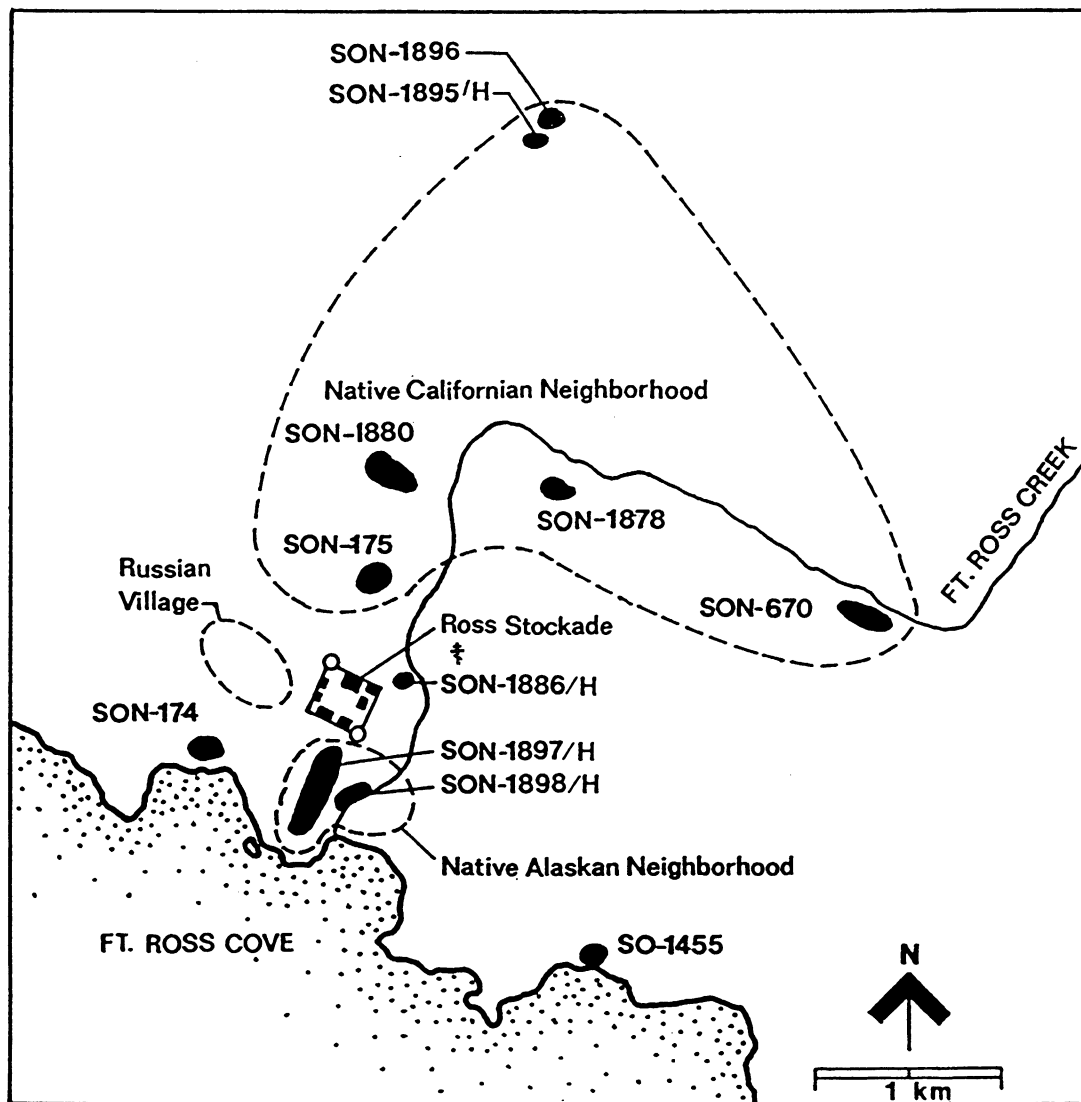
In the first volume of *The Archaeology and Ethnohistory of Fort Ross, California* series, we introduced the research objectives of the ongoing Fort Ross Archaeological Project, outlined the historical background and natural history of the region, and synthesized archaeological research up to 1991, including the results of a recent survey of the Fort Ross State Historic Park. The primary purpose of the Fort Ross Archaeological Project is to consider how Pacific Coast hunter-gatherers responded to Russian colonialism in northern California. We initiated a study of long-term cultural change that is examining the economies, gender relations, sociopolitical organizations, and religious practices of native peoples before, during, and after the colonization of Fort Ross.

One finding of our investigation is that the Ross Colony was organized into four ethnic residential areas or

neighborhoods: 1) the Stockade compound, 2) the Russian Village, 3) the Native Californian Neighborhood, and 4) the Native Alaskan Neighborhood (figure P.1). We focused our initial investigation on the Native Californian Neighborhood, and used careful readings of ethnohistorical documents and interpretations of surface survey data to outline diachronic changes in native subsistence and settlement systems. Archaeological investigations are now underway at selected Kashaya Pomo village locations in the greater Fort Ross Region that will greatly refine and modify this preliminary study (e.g., Martinez 1995).

This second volume of *The Archaeology and Ethnohistory of Fort Ross, California* series details the results of the archaeological investigation of two sites that constitute the material remains of the Native Alaskan Neighborhood (figure P.2). The Native Alaskan Village Site, or NAVS, was the primary residential area for single Native Alaskan men, Native Alaskan families, and interethnic households composed of Native Alaskan men and local Native Californian women. This site, whose official trinomial number is CA-SON-1897/H, sits on an uplifted marine terrace directly south of the Ross Stockade walls. The extensive archaeological deposit, measuring over 8000 sq. m in size, was investigated by archaeologists from the California Department of Parks and Recreation (State Parks) and U.C. Berkeley in the summers of 1989, 1991, and 1992. The second site, the Fort Ross Beach Site, or FRBS, extends approximately 30 meters along an eroding cliff face directly below NAVS at the base of the marine terrace. Assigned the state trinomial of CA-SON-1898/H by the Northwest Information Center at Sonoma State University, FRBS is a midden deposit associated with the nearby Village and with other mercantile activities that took place in Fort Ross Cove. Excavations by State Parks and U.C. Berkeley crews took place in the summers of 1988 and 1989.

Figure P.1 *Spatial Layout of Colony Ross*



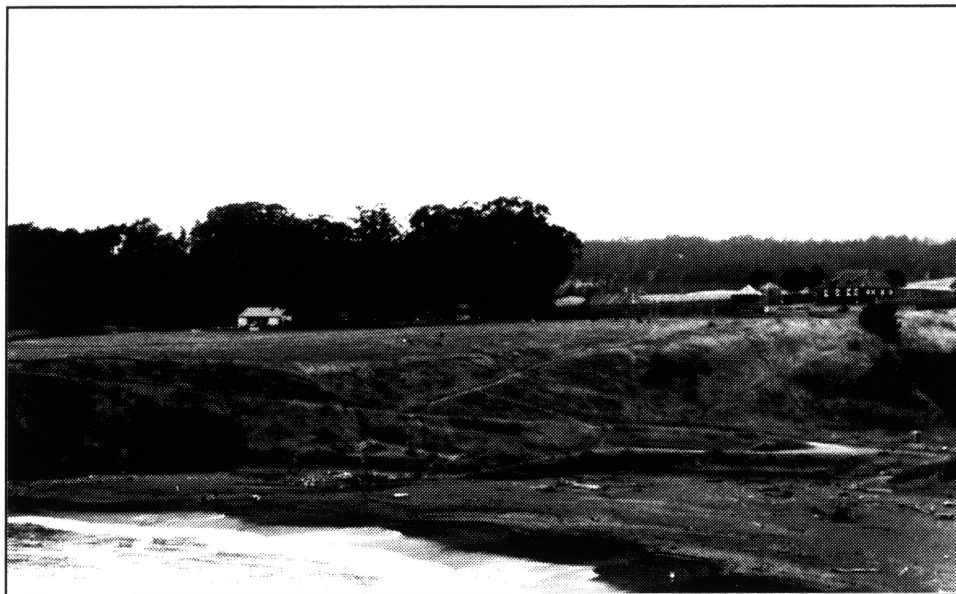
(Note that this is a revised version of the plan map published in Volume 1. The southern boundary of the Russian village is redrawn to reflect the results of recent subsurface testing of the foundation of the Call Ranch House where very few Russian materials were unearthed.)

The archaeological investigation of the Native Alaskan Neighborhood is being conducted for several reasons. It generates essential information for the cultural resource management program in the Fort Ross State Historic Park, provides background research for the further development of the public interpretation program in the State Park, and addresses two research objectives of the Fort Ross Archaeological Project.

1) Cultural Resource Management. The investigation of the Native Alaskan Neighborhood was initiated when it became apparent that winter storms were destroying a significant portion of FRBS. Breck Parkman, Associate State Archaeologist of the California State Parks, concerned about the continued destruction

of coastal archaeological resources in the State Park, requested that archaeologists from U.C. Berkeley investigate the site to determine the historical significance of the archaeological deposit and to evaluate the overall effects of coastal erosion on exposed archaeological materials. It soon became evident in the 1988 field season that materials in the Fort Ross Beach Site were associated with NAVS directly upslope, and permission was granted to investigate the Native Alaskan Village Site as well. Since a detailed archaeological study had never been conducted at NAVS, very little was known about the site, including the depth and stratigraphy of the archaeological deposits, the integrity of architectural features, and the overall diversity and preservation of

Figure P.2 *The Fort Ross Beach Site and the Native Alaskan Village Site in 1989. The 30 meter profile of the Fort Ross Beach Site is visible in the lower left of the photo. The Native Alaskan Village Site is situated directly above on the marine terrace in front of the Stockade wall.*



faunal specimens, floral remains, and artifacts. Our investigation provides pertinent data about the nature and complexity of the archaeological remains that will be used in State Parks planning to make informed decisions on how best to manage the two sites in future years.

2) Public Interpretation Program. Another important goal of the study is contributing to the public interpretation program in the State Park (see Murley 1994; Parkman 1994a, 1994b). The reconstructed Stockade complex, as it now exists, provides a wealth of information on the lifeways, architecture, and material culture of the Russian employees who were stationed at Ross. In contrast, there is little opportunity for Park visitors to view the house sites, work areas, and material objects of the native laborers who toiled at Ross and made up the greatest portion of its population. The archaeological investigation of NAVS and FRBS is undertaken to heighten awareness of the Native Californian and Native Alaskan workers' many indispensable contributions to the Ross Colony, and to provide details of their day-to-day lifeways to the public through the State Park's active interpretation program. This successful program includes ranger talks, on-site interpreters, and the annual reenactment of the Ross Colony on "Living History" day. The archaeological investigation is also undertaken to plan and promote a proposed "culture" trail in the State Park that will complement existing displays on the Russians by taking the public beyond the reconstructed Stockade

complex to view the archaeological remains of the multiethnic Ross community.

3) Research Objectives. In considering native responses to Russian mercantile practices at Colony Ross, we outline two research objectives of the Fort Ross Archaeological Project in Volume 1 (Lightfoot et al. 1991:5-6). These research objectives guide the archaeological investigation of the Native Alaskan Neighborhood.

The first objective concerns the participation of native laborers in a commercial enterprise. Native workers in mercantile colonies participated in a market economy either by exchanging their labor directly for trade commodities and/or food, or by selling their labor for scrip which was used to purchase goods in the company store. In principle, native laborers at Colony Ross should have had access to a diverse range of products from the broader world system in which the Russian-American Company participated. In the first decade of the 19th century, the Russian-American Company established a trade network with American merchants and greatly expanded the range of manufactured goods and luxury foods offered for sale to Company employees. Most of the manufactured commodities were believed to have been destined for native consumption (Gibson 1976:172). Furthermore, employees could purchase "European" foods (wheat, beef, pork) raised at Ross or shipped in from Spanish California (Gibson

1976:186-87). One question we address in this volume is the degree to which participation in the broader world system is represented in the material culture of the native employees in the Native Alaskan Neighborhood. Moreover, did increased access to manufactured goods and domesticated foods serve as sources of cultural change among the Native Alaskan and Native Californian workers?

The second objective examines the implications of recruiting a multiethnic labor force for mercantile colonies like Colony Ross. These trade outposts were pluralistic entrepôts where people of diverse backgrounds and nationalities lived, worked, socialized, and procreated. The close interaction of ethnic groups from many different homelands may have stimulated the cultural exchange of architectural styles, material goods, methods of craft production, subsistence techniques, diet, dress, and ceremonial practices. Residents of Colony Ross may have modified and adopted cultural practices from European, Creole, Siberian, Native Hawaiian, Native Alaskan, and Native Californian peoples. Cultural innovations may have been created in these pluralistic social environments by combining or modifying traditional cultural elements with those from other ethnic groups. Another question we address in this volume is the degree to which interethnic interaction and cohabitation in the Native Alaskan Neighborhood promoted cultural change as evident in the archaeological remains. Did the synergistic interplay of interethnic households in the Neighborhood produce significant changes in the material culture of Native Alaskan and Native Californian residents?

Volume 2 is divided into four sections. The first section (chapters 1-5) introduces the reader to the Native Alaskan Neighborhood and outlines the field investigations undertaken at NAVS and FRBS. Chapter 1 begins with ethnohistorical observations of the Village, including census data on the occupation, gender, and ethnicity of its residents and the spatial layout of houses and work space. Lightfoot and Martinez then examine the two research problems in more detail and describe the research design employed to address them. They consider how the identities of Native Californians and Native Alaskans were constructed and transformed through daily practice and interaction in interethnic households. In chapters 2 and 3, Lightfoot, Schiff, and Holm describe the specific field methods employed at FRBS and NAVS, respectively, and detail the stratigraphic units observed, the kinds of features recorded, and the diverse materials recovered. The field program was designed specifically to delineate the organization of space and daily domestic practices of interethnic households in the Village. Price presents the results of her geoarchaeological study of FRBS and NAVS in chapter

4, concluding with several important observations on formation processes in the creation of both NAVS and FRBS archaeological deposits. Finally, Tschan presents the results of his geophysical survey of NAVS in chapter 5, outlining a spatial model for the Village that independently supports many of the conclusions in chapter 3.

The second section (chapters 6-15) describes in detail the diverse material culture of the Native Alaskan Neighborhood. Farris introduces the European artifact assemblages in chapter 6. Silliman follows with a thorough overview of the ceramic, glass, and metal artifacts in chapter 7. Ross then presents his detailed analysis of the glass beads in chapter 8. Schiff describes the chipped stone and ground stone assemblages in chapter 9, while Mills details the ground slate artifacts in chapter 10. Wake then reports on the extensive worked bone assemblage that includes both diagnostic tools and workshop debris in chapter 11. The next four chapters present analyses of the rich faunal assemblages, including Wake's study of the terrestrial and marine mammal remains (chapter 12), Simon's identification of bird bones (chapter 13), Gobalet's consideration of the fish assemblage (chapter 14), and Schiff's investigation of the many shellfish remains (chapter 15).

The third section of the volume (chapters 16-18) addresses the two research problems through a synthetic analysis of the artifacts, refuse deposits, and architectural features. Lightfoot and Silliman begin by detailing the chronological sequence of specific archaeological deposits in chapter 16. The spatial organization of household refuse disposal, the maintenance of house structures, and the layout of the Native Alaskan Neighborhood are then considered in chapter 17. This chapter addresses whether significant cultural changes or synergistic developments were taking place among the residents of the Native Alaskan Neighborhood through a comparison of traditional Native Californian (Kashaya Pomo) and Native Alaskan (Alutiiq) lifeways. In chapter 18, we conclude by evaluating the degree to which the residents of the Native Alaskan Neighborhood participated in the broader world system through the consumption of nonlocal goods and domesticated foods. We also consider the organizational principles and world views of the women and men who made up the interethnic households and whether evidence exists of new cultural constructs.

The fourth section includes twenty-six appendices that complete the volume. These include seventeen tables presenting the provenience, count, and type of European goods, lithics, mammal bones, bird bones, fish bones, and shellfish remains. Finally, nine data tables detail the results of obsidian hydration and sourcing, and the spatial provenience of materials in the bone bed deposits.

ACKNOWLEDGEMENTS

The Fort Ross Archaeological Project research is supported by grants and funds from the National Science Foundation (BNS-8918960 and SBR-9304297); the California Department of Parks and Recreation; the American Home Shield Corporation, a Subsidiary of ServiceMaster Consumer Services L.P.; McDonald's Restaurant, 1198 San Pablo Avenue, Berkeley, California; the Committee on Research, University of California, Berkeley; and the Lightfoot, Lightfoot, and Lightfoot Group of Ophthalmologists of Santa Rosa, California. We thank each funding source for their generous contribution to the study of the Native Alaskan Neighborhood at Fort Ross.

The Fort Ross Archaeological Project is a collaborative program involving the full support and assistance of the California Department of Parks and Recreation. Glenn Farris and Breck Parkman serve as co-directors of the program, and we thank them both for their unceasing generosity in mentoring many Berkeley students, for their continual advice and support in the field and laboratory, and their contributions to the diverse interpretations and conclusions resulting from these investigations. The archaeological research would not be possible without the ongoing assistance of many people at the Fort Ross State Historic Park. They provide camping facilities and logistical support during the field seasons, critical scholarly and strategic contributions, and much appreciated friendship. Special thanks are reserved for the Fort Ross Ranger staff—Daniel Murley, Michael Stephenson, and Bill Walton—who went beyond the call of duty in their special attention to the campground facilities and archaeological resources of the Park, by providing details on the history of Fort Ross, by working in the field with us, and by presenting lectures to students on the history and ecology of the greater Ross Region. The past and present maintenance staff at Fort Ross, especially Bill Mennell, Jens Shelby, and Doug Warren, have been a tremendous help to us over the years. In addition to maintaining the camping facilities and park grounds in pristine condition, they have provided many innovative solutions to excavation problems. On many occasions, they have also come to our rescue when Lightfoot miscalculated the time it would take to backfill excavation units, or when he ignored gale force storms that were about to shut down the excavation and tear apart the tent camp. We appreciate greatly Robin Joy and Caerleon Safford of the Interpretive staff at Fort Ross who assisted us in working with park visitors and setting up public tours of the field excavations. We are also indebted to the Board of Directors and members of the Fort Ross Interpretive Association for their part in facilitating our research. Lyn Kalani has been of tremendous assistance to Berkeley students, staff, and faculty using the Fort Ross Library. We miss very much the

many insights on the history and past lifeways of Fort Ross enthusiastically provided by the late Kaye Tomlin.

Important contributions to the Fort Ross project have also been provided by California Departments of Parks and Recreation personnel in the Russian River/Mendocino District Office and the Archaeology Laboratory in Sacramento. We are very grateful for the continued promotion of archaeological research and public interpretation in the Russian River/Mendocino District by Bob LaBelle, District Superintendent, and Lee Banks, Maintenance Chief. John Foster, Peter Schulz, Christina Savitski, and the entire State Parks archaeological staff in Sacramento are to be thanked for their continued support of the Fort Ross project and the assistance they provide Berkeley students who use maps, reports, and artifact collections in the Archaeology Laboratory.

The Archaeological Research Facility at the University of California, Berkeley has provided critical support to our endeavors. We thank the current Director Meg Conkey and ARF administrator Sherry Parrish, and the past Director Pat Kirch, for their promotion of California archaeology, their camaraderie, and assistance in managing the field program. We are most appreciative for the continued support of archaeology on the Berkeley campus by Joseph Cerny (Vice Chancellor for Research), Linda Fabbri (Assistant Vice Chancellor for Research), and Jeanne Segale (Senior Administrative Analyst). The administrative staff of the Department of Anthropology and Summer Sessions at the University of California deserve our special thanks. We are especially indebted to Sandy Jones, Sherry Parrish, Sally Senior, and M. J. Tyler. William Simmons, Dean of Social Sciences, has been a critical supporter of California anthropology and archaeology at U.C. Berkeley and we appreciate his help and friendship. One of the greatest pleasures in participating in the Fort Ross Archaeological Project is to work closely with U.C. Berkeley students in the field and laboratory. In Volume 1 of *The Archaeology and Ethnohistory of Fort Ross, California* series we thanked individually the field crews, staff, and laboratory assistants who worked many hours in excavating and analyzing materials from the Fort Ross Beach Site in the 1988 and 1989 field seasons. Here we wish to thank them again collectively and to express our deep gratitude to the individuals involved in the excavation of the Native Alaskan Village Site in the 1991 and 1992 field seasons and in subsequent analyses of archaeological materials. In both the 1991 and 1992 field seasons, Kent Lightfoot led the field and laboratory investigations and Ann Schiff served as Field Coordinator and Laboratory Director. Adele Baldwin served as the field "chef" and kept the crews content and looking forward to dinner. Lewis Somers of GeoScan Inc. provided technical assistance in geophysical methods involving magnetometer and soil resistance surveys. Robert Schiff, a key supporter of the

Fort Ross project, volunteered his efforts in setting up and closing down the field camps each season. Roberta Jewett also provided logistical support, counseled many Berkeley students, contributed to the development of the research design, and provided critical editorial guidance. We thank both Robert Schiff and Roberta Jewett for their instrumental roles in maintaining the emotional stability of the senior staff.

In the 1991 summer field season, the graduate student staff included James Allan, Maria Franklin, Richard Hitchcock, Beth Prine, Jan McHargue, and Thomas Wake. The Anthro 133S field school class participants consisted of Ron Aizen, Heidelore Artega, Diane Askew, Paul Auday, Adele Baldwin, Elizabeth Carson, Allison Cohen, Jason Coleman, Michelle Day, Julie Firestone, Danielle Green, Carmen Hernandez, Mark Kern, Emily Landsverk, Robin Mantius, Doreen Ferguson, Stephen Midgley, Darren Moore, Ellen Moore, James Mulvihill, Tanya Rekow, Craig Roth, Sean Rozell, Philip Schofield, Hilary Sortor, Judy Stevenson, Joseph Vincent, Laura Wayne, and Derek Wheeler. Students enrolled in the Anthro 134 lab class in the fall of 1991 that processed and analyzed NAVS materials were Heidelore Artega, Mitchell Carlin, Elizabeth Carson, Allison Cohen, Jason Coleman, Lourdes Cuevas, Christopher Doty, Danielle Green, Emily Landsverk, Stephen Midgley, Darren Moore, Ellen Moore, James Mulvihill, Michelle Pyun, Tanya Rekow, Stephanie Rose, Craig Roth, Nicholas Sasson, Philip Schofield, Hillary Sorter, Judy Stevenson, Laura Wayne, and Jennifer Weinkam.

In the 1992 summer field season, the graduate student staff consisted of James Allan, Antoinette Martinez, Peter Mills, Robin Sewell, and Thomas Wake. The excavation support staff included Allison Cohen, Dave Makar, Daniel Murley, Darren Moore, Ryan Mounds, and Philip Schofield. The students who participated in the Anthro 133S summer field school were Dave Abilgaard, John Anderson, Adele Baldwin, Hannah Ballard, Tina Choy, Lourdes Cuevas, Rebecca Custer, Andréw Garcia, Lisa Holm, Joanna Kong, Angela Pearce, Aimee Plourde, Anne Retamal, Karri Sakai, Janet Sargent-Tracy, André Tschan, Helen Wahbeh, Laura Willman, Judy Wong, and Irma Zepeda.

In 1992 through 1995, laboratory analysis and data entry, supervised by Ann Schiff, were conducted in the California Archaeology Laboratory at U.C. Berkeley by Dave Abilgaard, Adele Baldwin, Hannah Ballard, Julie Cooper, Susan Goddard, Lisa Holm, Joanna Kong, Antoinette Martinez, Peter Mills, Aimee Plourde, Anne Retamal, Karri Sakai, and André Tschan. Computer data base assistance was provided by Leslie Nelson, Lisa Holm, André Tschan, and Colleen Tschan.

We are grateful for the support and friendship of the Pedotti family during our field seasons at Fort Ross.

They introduced many of the Berkeley students to ranching as a way of life and the importance of beef in a well-balanced diet. We wish Alex, Dave, Renie, Lucas, and Ty all the best in their new ranch in Oregon.

A large number of scholars have contributed to the Fort Ross Archaeological Project. We are particularly grateful to the following individuals. Thomas Origer and the Obsidian Hydration Laboratory at Sonoma State University analyzed the hydration rims of obsidian artifacts from both FRBS and NAVS. Steven Shackley assisted us in the chemical sourcing of glass and obsidian artifacts. Margie Purser helped us in the study of historical artifacts and provided much needed guidance in the analysis of 19th century ceramic and glass materials. Jim Quinn assisted in the identification of fish remains from the Fort Ross Beach Site. David Fredrickson has continued to provide much needed assistance, advice, and support since the inception of the Fort Ross project in 1988. Lynne Goldstein and Sannie Osborn have remained important collaborators and friends since they investigated the Fort Ross cemetery. Jay Noller, Lisa Wells, and Robert Brinkmann have contributed much to our understanding of the geoarchaeological context of the broader Fort Ross Region. Gene Prince, Lee Brumbaugh, and Therese Babineau of the Phoebe Hearst Museum of Anthropology and Archaeological Research Facility have been very gracious in giving photographic expertise, equipment, and assistance to the Fort Ross project. We appreciate the assistance of Daniel Foster, John Holson, Rene Peron, and Thomas Layton who have contributed in various ways to the Fort Ross Archaeological Project. We are very grateful for the insights and constructive comments provided by three anonymous reviewers, who graciously critiqued sections of this publication.

Several Russian scholars have provided invaluable information on Russian history, Russian translations of primary sources, and the material culture and organization of space in Russian-American Company outposts. They include Oleg Viktorovich Bychkov, Director of the Ethnographic Bureau, Irkutsk; Alexei Istomin, Research Fellow of the Institute of Anthropology and Ethnology, Russian Academy of Sciences, Moscow; and Valerii Shubin, Deputy Director of Sakhalin Region Museum, Sakhalin.

We are especially thankful for the kind assistance of Donald Clark of the Archaeological Survey of Canada, Aron Crowell of the Smithsonian Arctic Studies Center, and Rick Knecht of the Kodiak Area Native Association for answering questions concerning Alutiiq archaeology and ethnohistory, village layout, features, and lifeways.

We are most grateful for the continued interest of the Kashaya Pomo, Coast Miwok, and Alutiiq peoples in our project. We appreciate the continued assistance of various members of the Kodiak Area Native Association who

have visited Fort Ross and who spent time talking with us about Fort Ross on our trips to Kodiak Island, Alaska. We are also indebted to the members of the coastal Pomo communities at Point Arena and Stewarts Point who have assisted us in the Fort Ross project. We are especially thankful for the expertise and consultation on Pomo lifeways and organization of space provided by Violet Parrish Chappell, George Frank, Vana Lawson, the late Ben Lucas, Otis Parrish, Warren Parrish, Alice Poe, and Vivian Wilder.

Finally, we wish to thank the editorial staff of the Archaeological Research Facility who spent many hours producing this volume. Tanya Smith, editor of the

monograph series, designed this volume's format, copy edited the text, and produced camera ready copy. Lisa Holm also provided assistance with text and illustration production, as well as much needed consultation and work on the computer graphics in the volume. We would also like to thank Kira Blaisdell-Sloan for her efforts in getting this publication to press. Judith Ogden prepared all the art work illustrations for this volume. We thank them for their patience and dedication in working with us. Funding for publication of this volume was provided by the Stahl Endowment Fund of the Archaeological Research Facility and McDonald's Restaurant at 1198 San Pablo, Berkeley.

Kent G. Lightfoot
Ann M. Schiff
Thomas A. Wake

REFERENCES

Gibson, James R.

1976 *Imperial Russia in Frontier America: The Changing Geography of Supply of Russian America, 1784-1867*. Oxford University Press, Oxford.

Martinez, Antoinette

1995 *Blurred Boundaries of the Nineteenth Century Kashaya Pomo*. Paper presented at the 29th Annual Meeting of the Society for California Archaeology, Eureka.

Murley, Daniel F.

1994 Peopling Ross' Past. In *Proceedings of the Society*

for California Archaeology, M. Rosen, S. Hector, and D. Laylander, eds., pp. 61-65. Society for California Archaeology, San Diego.

Parkman, E. Breck

1994a Preserving the Fort Ross Archaeological Record. In *Proceedings of the Society for California Archaeology*, M. Rosen, S. Hector, and D. Laylander, eds., pp. 47-60. Society for California Archaeology, San Diego.

1994b The News Media and the Curious: Interpreting Archaeology at Colony Ross. In *Proceedings of the Society for California Archaeology*, M. Rosen, S. Hector, and D. Laylander, eds., pp. 227-34. Society for California Archaeology, San Diego.

Interethnic Relationships in the Native Alaskan Neighborhood: Consumption Practices, Cultural Innovations, and the Construction of Household Identities

KENT G. LIGHTFOOT AND ANTOINETTE MARTINEZ

THIS CHAPTER CONSIDERS the research problems and theoretical approaches that guided the investigation of the Native Alaskan Neighborhood. We first synthesize archival accounts on the residents of the Neighborhood, including labor and compensation practices, ethnic and gender composition, residential patterns, and socio-political organization. This ethnohistorical section also includes firsthand observations on the settlement layout and architecture of the Neighborhood. Next two related research problems outlined in the first volume of *The Archaeology and Ethnohistory of Fort Ross, California* are addressed—how nonnative goods and foods were used and what cultural innovations took place in interethnic households. We argue that both research problems are closely related to the construction of “public” identities of households, and outline three strategies that may have been used in the Native Alaskan Neighborhood. Informed by practice theory and the *Annales* historical perspective, the final section summarizes the research design used to define the organizational principles of interethnic households and to evaluate whether different strategies of native resistance, upward mobility, and/or the creation of new cultural identities were being implemented in daily practice.

NATIVE OCCUPATIONS AND COMPENSATION

NATIVE ALASKANS

Similar to other Russian-American Company outposts, Native Alaskan workers made up the largest portion of the Fort Ross community from 1812 to 1841. As detailed in Volume 1, the population ranged from about 80 to 125 individuals, composed mostly of Alutiiq

peoples who were part of a broader cultural and linguistic community drawn from Kodiak Island, the upper Alaska Peninsula, sections of the Kenai Peninsula, and Prince William Sound. The majority of the Alutiiq workers at Ross were from Kodiak Island, referred to in this volume as the Kodiak Island Alutiit or Alutiiq (its singular form). Other designations used in anthropological studies for Kodiak Islanders are Koniag (derived from Russian usage) and Qikertarmiut (see Crowell in press). The other Alutiiq workers identified at Ross were Chugach most likely from Prince William Sound. Still other Native Alaskans stationed at Colony Ross in relatively few numbers were Unangan (or Aleut) peoples from the Aleutian Islands, Tanaina workers from Cook inlet, and the Tlingit laborers from southeastern Alaska (Istomin 1992). The Native Alaskans served in the colony as general laborers, porters, fishermen, commercial sea mammal hunters, and skilled craftsmen (see Lightfoot et al. 1991:16-20; Murley 1994).

The labor practices and compensation system for Native Alaskan workers at Colony Ross grew out of earlier policies and conventions of Russian merchants in the North Pacific. As Crowell (1994:14) succinctly summarizes, sea otter furs were obtained on Kodiak Island in the late 1700s and early 1800s through “a strategy that combined coercion by force of arms, agreements made with native leaders allowing the exploitation of the labor of commoners and slaves, tribute collection, and some payment with trade goods.” The recruitment of Alutiiq laborers was accomplished in the following ways.

First, the Company drafted at least half the male

population between 18 and 50 into compulsory service for set periods of time to serve on hunting expeditions and to work in *artels* (hunting camps). These men were compensated for hunting sea otters, foxes, and other marketable pelts, although Davydov (1977:193 [1802-1803]) observed that the Company “rarely pays them in European goods (i.e. tobacco, axes, knives, needles, nankeens, varicolored stones, silks or other trinkets). In the main they are rewarded with *evrashka* or birdskin parkas, *kamleikas*, seal skins, nets, various objects woven from gut and even sometimes with fat” (see also Lisiansky 1814:194 [1805]). Davydov (1977:194 [1802-1803]) went on to report that the Russian leaders of hunting expeditions collected the sea otter pelts, then paid the native hunters directly with goods during the trip or gave them promissory notes that could be exchanged later for goods on Kodiak Island.

The majority of old men, women, and children on Kodiak Island were also subjected to mandatory service for the Company. Families of native leaders or *toions* were the only major exceptions to this practice. Old men and boys harvested sea birds for parkas, fished for cod and halibut, carried food to the harbor, harvested salmon, and helped prepare foods for winter storage (Davydov 1977:195 [1802-1803]). Women harvested and dried fish and berries, helped prepare foods for winter storage, and produced craft goods, such as sewing *kamleikas* (gut or intestine outer garments) and sea bird parkas (Clark 1984:187; Davydov 1977:196 [1802-1803]). Davydov (1977:195-6 [1802-1803]) reports that old men, boys, and women laboring for the Company were not compensated for their efforts.

Another method for recruiting laborers was to demand service from people who had perpetrated crimes against the Company. When the Russian-American Company colonized Kodiak Island and subjugated its inhabitants, all former slaves or war captives were turned over to become part of their work force. As these former slave laborers, called *kaiurs* (a Kamchatka word for hired laborer) by Company officials, began to decline in number, their ranks were filled with people who had committed offenses against the Russian-American Company (Davydov 1977:190-91 [1802-1803]). The *kaiurs* were sent to all the Company’s settlements in the North Pacific, and it appears that most Russians had several assigned to them. Davydov (1977:193) described the duties of the *kaiurs* as follows:

The *kaiurs* catch fish in fish-ponds, trap foxes for fur, work in the salteries and brick works, cut wood, carry supplies to the harbor, are used as rowers when Russians travel in three-seater baidarkas and, in a word, are used for all kinds of work. If a *kaiur* goes lame or loses an arm, or in some other way becomes unfit to carry on working, then he is found work scaring away the crows from the *iukola* hung out to dry, or some other such task. Almost every married

hunter has several *kaiurs* in his service. The company uses them for work until old age or the money raised by relatives, or a replacement, buys them out.

A final observation about early labor organization on Kodiak Island is that native families were responsible for feeding themselves. The majority of the food stores collected during the year by *kaiurs* and laborers performing mandatory service were used to support Company employees and Company activities, such as hunting expeditions. As a consequence, food shortages were very common on Kodiak Island, especially during the winter months. Since the Alutii spent most of their time working for the Company, they had little opportunity to lay in winter stores for themselves. Davydov (1977:175, 196 [1802-1803]) observes that many families went hungry in the winter. Russian managers would occasionally assist them if they were starving, but they were still required to do Company work such as sewing birdskin parkas and making nets. Shubin (1994:338-39) contends that when the sea otter season ended on the Kurile Islands, the Native Alaskans stationed at this Russian-American Company outpost had to fish, hunt sea lions, and shoot sea birds to replenish their food supply.

The compulsory service policy of the Company was probably exercised to recruit Native Alaskans to work at Colony Ross. California must have seemed at the end of the earth to both Russians and Native Alaskans alike, situated thousands of kilometers from friends, families, and familiar landscapes. Drafting a labor force would have been a monumental task. Shubin (1994:339) notes that the Russian-American Company rotated Native Alaskan workers, mostly Alutiiq men, to the Kurile Islands by recruiting young volunteers and by offering debtors to the Company a chance to pay off their obligations. Khlebnikov (1990:94 [1820-1824]) stated that some *promyshlenniks* (Russian laborers) were sent to Ross “for the sole purpose of enabling them to pay their debts more easily.” Some *kaiurs* could have been dispatched to the Golden State as well.

Under the terms of its Charter, the Russian-American Company was supposed to compensate Native Alaskans for their labors (Dmytryshyn et al. 1989:xlvi). When Fort Ross was established in 1812, they were either paid on commission or received daily or yearly salaries in scrip, a parchment token that could be exchanged for goods in the Company store (Tikhmenev 1978:144). In the early 1820s, daily compensation for unskilled laborers was about 50 kopeks per person (Khlebnikov 1990:99, 186 [1820-1824]). Those who participated in joint Mexican and Russian sea otter hunts at this time were credited at the rate of two piasters per adult pelt, one piaster per yearling, and four reals per pup (Khlebnikov 1990:182 [1820-1824]). Native Alaskan craftsmen, who served as coopers, blacksmiths, and tanners at Ross, were paid an annual wage of between

120 and 200 rubles in the early 1820s (Khlebnikov 1990:100, 182 [1820-1824]).

NATIVE CALIFORNIANS

Native Californians were recruited primarily from nearby Kashaya Pomo, Coast Miwok, and Southern Pomo villages to live and work at Colony Ross. The number who participated in the Ross economy is not well documented. The early Kuskov censuses of 1820-1821 (described in detail below) listed primarily women who cohabited with Russian, Creole, and Native Alaskan men, as well as some Native Californian male prisoners (Istomin 1992).

It is unclear, based on available archival sources, to what degree Native Californian women were involved in sea mammal hunts, the preparation of sea otter pelts, the sewing of *baidarkas* (skin kayaks), and other critical support work for their Native Alaskan mates. Whether or not the Native Californian women who lived at Ross in interethnic households were drafted into mandatory service for the Company is also uncertain. We suspect they were. Native Californian women appear to have been stationed on the Farallon Islands *artel*, where sea lions, sea birds, and other marine resources were harvested for food and raw materials for Colony Ross (Corney 1896:74a; Istomin 1992:5, 25; Riddell 1955). There is also some evidence that Native Californian women in interethnic households learned to make "Aleut handicrafts, such as sewing the whale gut *kamleika* [waterproof outer garment] and other things" (Lutke 1989:278 [1818]). Company officials in 1818 were also teaching the "Indian wives of the Aleuts" to weave wool in the production of cloth at Ross (Golovnin 1979:166 [1818]).

Not unlike the early years on Kodiak Island, compensation for native women at Ross appears to have been minimal. In the early 1820s, women and children left behind at Ross while their Native Alaskan mates were hunting received no assistance from the Russian-American Company. In a letter to Kirill Khlebnikov in June 1820, Karl I. Schmidt, manager of the Ross Colony from 1821-1825, wrote:

When the Aleut hunting party was sent to the port of San Francisco the second time, the men all asked me not to keep them for the hunt once the agreement had expired, because the last time that they had been separated from their families, their wives and children had received no assistance and had gone hungry; therefore, they begged me to help them this time to feed their families. Notwithstanding the shortage of supplies at Ross, I tried to supply them with food as much as possible, but several of the women nevertheless ran away out of hunger, and the others endured terrible privation. (Khlebnikov 1990:131-32 [1820-1824]).

The Native Californian men listed on the Kuskov censuses were serving time for crimes committed against the Colony (e.g., murder of Native Alaskan men, horse theft) (Istomin 1992). These records strongly suggest that some Native Californians who got on the wrong side of the Company were conscripted as *kaiur* laborers at Ross. They were probably compelled to perform hard, demanding work as were the *kaiurs* on Kodiak Island. Istomin (1992:5) notes that at least one Coast Miwok man was serving his time (with his Kashaya Pomo wife) on the Farallon Islands *artel*.

By the early 1820s, Company officials had resolved to intensify agricultural productivity and manufacturing activities at Fort Ross, such as shipbuilding and brick making. To meet these new demands, Ross managers stepped up efforts to recruit Native Californians as laborers (Lightfoot et al. 1991:16-20). As more land went into agricultural production in the 1830s, one hundred to "several hundred" local Indians were employed as agricultural workers during the harvest season (Gibson 1976:119; LaPlace 1986:65 [1839]). The Russians primarily paid these workers in kind for their services, giving them food, tobacco, beads, and clothing (Khlebnikov 1990:193-94 [1820-1824]; Kostromitinov 1974:9 [1830-38]; Wrangel 1969:211 [1833]).

Access to manufactured goods and nonnative foods by both Native Alaskan and Native Californian workers may have been somewhat restricted because of high prices and limited availability, similar to the situation on Kodiak Island. Generally, the wages paid by the Russian-American Company were low in relation to the price of goods in the Company store. Wrangel observed in 1833 that Company employees on annual salaries were spending more at the Russian-American Company store than they earned, and many were heavily in debt. He illustrated his point by showing the expenditures of a Russian *promyshlennik*, Vasily Permitin, who received an annual salary of 350 rubles. Mr. Permitin, his wife, and five children purchased food (wheat, millet, dried meat, fresh beef), lard, tallow candles, copper utensils, tobacco, soap, tea, sugar, and various textile goods (calico, Flemish linen, flannel, soldier's broadcloth) that totaled over 728 rubles for the year (Wrangel 1969:211 [1833]). Khlebnikov (1990:66, 99, 137) made similar observations in the early 1820s, noting that many Russian workers were requesting higher salaries in order to survive at a very meager level at Ross.

Yet compared to the Russian *promyshlenniks*, the salaries paid to most Native Alaskan workers were paltry. For example, in 1824 they were paid half the salaries of their Native Alaskan counterparts in Sitka, an inequality that Khlebnikov (1990:186) justified because of the "advantages of the climate: here [Fort Ross] they can work all day in their shirt-sleeves and without shoes, where in Sitka, owing to the bad weather, clothing and

shoes wear out faster.” Needless to say, Mr. Khlebnikov’s explanation did not go over well with the native workers. In 1824, “a number” of Native Alaskans stationed at Ross had amassed a total debt of 1465 rubles and 26 kopeks to the Russian-American Company (Khlebnikov 1990:133 [1820-1824]). Khlebnikov (pp. 133-34) indicates that many of the Native Alaskan workers remained in debt to the Company until they died. Native Californian laborers fared even worse. Wrangel notes that the “bad food and negligible pay” given to Indian laborers had discouraged many from coming to the Colony to work (1969:211 [1833]).

Khlebnikov’s (1990:70-4) detailed account of the Ross Colony in the early 1820s indicates that a diverse range of goods was shipped to the settlement (see chapter 6 for a complete list). Many of the goods listed by Khlebnikov appear, however, to have been earmarked primarily for trade with Mexican California missions and ranchos and not for consumption in the Ross Colony. Khlebnikov (1990:131-32 [1820-1824]) also describes food shortages in the Colony when supplies of European grains and domesticated meats ran low. The principal food for both Russian and Native Alaskan workers at Ross in the early 1820s was sea lion meat (much of it harvested on the Farallon Islands), and considerable hunting of elk, deer, and “goats” was also taking place in the hinterland of Ross (Golovnin 1979:163 [1818]; Khlebnikov 1990:59,193 [1820-1824]; Kotzebue 1830:124). Similar to the situation on Kodiak Island, we strongly suspect that native workers were largely responsible for supporting themselves at Ross. Food could be bought at the Ross store, but it appears to have been expensive, and many of the Native Alaskan workers were already in debt to the Company. It is very likely that native laborers were compelled to lay in their own supplies, a point we will return to in later chapters.

ETHNIC AND GENDER COMPOSITION

The most detailed known account of the ethnic and gender composition of the Native Alaskan Neighborhood was made by Ivan Kuskov, first manager of the Ross Colony. The original 1820-1821 census figures and text describing the Native Californians were translated by Alexei Istomin and published in 1992 by the Fort Ross Interpretive Association. These data indicate that the great majority of the two-person or larger households in the Neighborhood were composed of Alutiiq men and Pomo/Miwok women. While 114 Alutiiq men of adult age (108 Kodiak Island Alutiit, 6 Chugach) and 48 Native Californian women were counted at Ross in 1820, only 18 Kodiak women and 1 Chugach woman were present (Istomin 1992:10-11). The only Native Californian men listed in either the 1820 or 1821 censuses were 8 convicts from “the Great Bodega (Bay)” and 1 man from “the vicinity of Ross” who came to the settlement of his own

free will.

Of the 57 Native Californian women listed for either the 1820 and/or 1821 censuses, 15 are listed as “Bodegan,” one from the “Cape Barro Dearena” (Point Arena), 31 from the “vicinity of Ross,” and 10 from the “Slavianka River” (Russian River). Kuskov was cognizant of the different Indian languages spoken at Ross, and the homelands of the people who spoke them (Istomin 1992:6). It appears that his designations of “Bodegan, Cape Barro Dearena, vicinity of Ross, and Slavianka River” referred to Coast Miwok, Central Pomo, Kashaya Pomo, and possibly Southern Pomo peoples, respectively. All but 1 of the 57 women were residing in interethnic households, the greatest number made up of Kodiak Island Alutiiq men and Kashaya Pomo women (n=25), Kodiak Island Alutiiq men and Coast Miwok women (n=10), and Kodiak Island Alutiiq men and Southern Pomo women (n=8) (table 1.1). While the numbers are small, there was a tendency for Coast Miwok women to have lived with both Chugach and Kodiak Island men, while Kashaya Pomo women apparently preferred Kodiak Island Alutiiq, Russian, and Creole spouses. The interethnic households listed in the 1820 and 1821 censuses had produced 28 children—17 daughters and 19 sons.

FORMATION AND DISSOLUTION OF INTERETHNIC HOUSEHOLDS

The Kuskov censuses of 1820 and 1821 document the residence pattern for mixed ethnic couples in the Neighborhood. Native Californian women left their Indian villages at Bodega Bay, along the Russian River, and in the nearby hinterland of Ross, and joined their common-law husbands’ households in the Native Alaskan community (Istomin 1992). It appears that local Indian leaders, such as Valenila of Bodega Bay and Chu-gu-an, Amat-tan, and Gem-le-le from the vicinity of Ross, “willingly” offered their daughters as mates to Ross employees (Golovnin 1979:163 [1818]; Kotzebue 1830:124), an action probably calculated to cement alliances with the Russian-American Company and to establish kinship ties among the foreign colonists. The Native Californians extended full family ties to their alien in-laws, and reciprocal obligations due to kin relations were observed (Golovnin 1979:163 [1818]). These obligations may have extended to the construction of houses for the mixed ethnic couples, the sharing of food, and participation in local ceremonies. In turn, it was traditional for Alutiiq men of the day to give presents to the father and mother of the bride, and to bring their in-laws choice portions of meat and other goods (Davydov 1977:182 [1802-1803]; Merck 1980:108 [1790]).

Marriage practices in both Alutiiq and Kashaya Pomo villages in their respective homelands were relatively flexible and somewhat spontaneous. Among

Table 1.1 *Composition of Interethnic Households, 1820-1821 (from Istomin 1992:14-37)*

	Men				
	Creole	Chugach	Kodiak	Russian	Tanaina
<i>Women</i>					
Coast Miwok	0	4	10	1	0
Central Pomo	0	0	1	0	0
Kashaya Pomo	1	0	25	4	0
Southern Pomo	0	1	8	0	1

the Alutiit, women often chose their own husbands and wielded considerable power at home, although they were usually excluded from important village councils (Davydov 1977:165 [1802-1803]). Spouses often separated by mutual consent and remarried, with the children divided among the parents or granted to the mother (Bolotov 1977:86 [1805]; Clark 1984:192; Davydov 1977:167 [1802-1803]; Merck 1980:108 [1790]). Kostromitinov (1976:10 [1830-1838]) described marriage rites among the Kashaya Pomo as relatively informal, with separations not uncommon if the couples were unsuited to each other. Children usually accompanied their mothers during separations.

It is not surprising that interethnic households at Ross were also relatively fluid domestic units, with couples often separating after only a short time together. Khlebnikov (1990:194) observed in 1824, that

all the Aleuts have Indian women, but these relationships are unstable, and the Aleuts and the Indians do not trust each other. An Indian woman may live for a number of years with an Aleut and have children, but then, acting on a whim, will drop everything and run off to the mountains.

When husbands were transferred to Sitka and other Russian-American colonies in the North Pacific, the Indian spouses frequently remained behind. In the 1820 and 1821 censuses, which listed 11 husbands (2 Russian, 1 Creole, 8 Native Alaskan) who were transferred to the North Pacific, 2 Native Californian women (Kashaya Pomo, Southern Pomo) accompanied their Alutiiq spouses to Sitka, 2 established new interethnic households at Ross, and 7 returned to their "homeland or native place."

The Russian managers maintained some control over the release of Native Californian women from the Ross settlement. This pattern suggests that they were obligated to perform some kind of compulsory service for the Company while residing at Ross. In the Kuskov censuses, it explicitly states that women were either "allowed" or "released" to return to their native place (Istomin 1992:6-7). A total of 11 women (including the 7 mentioned above) were "allowed" or "released" from the Ross settlement in 1820 and 1821 after their husbands moved

to the North Pacific, died, or took up with other women (in one case with another Kodiak woman). It is not known how many Pomo and Miwok women moved to the North Pacific with Native Alaskan spouses between 1812 to 1841, or how long they stayed in this foreign environment. In addition to the two women noted above in the Kuskov censuses, Jackson's (1983:240) analysis of the San Rafael Mission Baptismal Register identifies one Coast Miwok woman from Bodega, Talia Unuttaca, who accompanied her Alutiiq husband, Andres Aulancoc, and their daughter to Sitka between 1815 and 1819. When her husband died in 1819, Talia and her daughter returned home to Bodega where she established a union with a local Coast Miwok man from Bodega in 1819 to 1820, bearing another daughter about 1820 (see also Farris, appendix 1.1).

Istomin (1992:7) suggests that in cases of divorce or separation the status of children from mixed ethnic marriages was decided by the men, with male offspring frequently returning to Alaska to join their father's relatives, and the female offspring remaining behind with their mothers in California. The Kuskov censuses of 1820 and 1821 listed four interethnic families whose children were separated from their mothers when their fathers were recalled to Sitka or died. In the first case, the Kashaya Pomo woman, Agachpuchiye, "stayed with her relatives," while her son and Kodiak Island husband, Malihknak Savva, returned to Sitka. In the second case, the Kashaya Pomo woman, Katyya, "was allowed to go back to her native place with the daughter," while her son and Alutiiq husband, Alalyakin Danila, returned to Sitka. In the third case, the Kodiak husband, Agchyaesikok Roman, drowned in March 1821, and his wife, a Southern Pomo woman known as Kobbeya, "was allowed to go to her motherland." However, her son, Kiochan Mitrofan, was left at Ross and raised by an Alutiiq man, Alexey Chaniguchi. In the final case, the Southern Pomo woman, Chubaya, apparently left her Chugach husband, Ithoshknak Maksim, for another man. While her son, Alexandr, took up residence with Chubaya in the new household, her daughter, Marfa, was sent to Sitka on a Russian ship.

Some Native Alaskan men did run away from Ross to join Native Californian spouses who moved back

home. Lutke (1989:275 [1818] reported one “Kodiak Aleut” who had run away from Ross to live in a nearby Pomo village for a year. Kotzebue (1830:125) observed in 1824 that many “Aleuts” did not want to leave California because they “find their abode here so agreeable.” Khlebnikov (1990:194) also noted in 1824 that “there have been cases in which Aleuts have run off to the mountains with their lovers or in which Russians have given everything they owned to Indian woman, who then proceeded, with complete indifference, to give these gifts to other friends.”

SOCIOPOLITICAL ORGANIZATION

The sociopolitical organization of the Native Alaskan Neighborhood is not described in any detail in available eyewitness accounts. Two observations, however can be gleaned from journal entries and census records. First, the Russian administrators recognized status differences among the ranks of the Native Alaskan workers. On Kodiak Island, traditional chiefs held authority over one or a group of villages. These positions were inherited by a relative or filled by someone of noble blood and maintained through mutual respect, gift giving, and by hosting ceremonies, dances, and feasts (Clark 1984:193; Crowell 1992:19; Jordan 1994:148-49). The Company worked closely with traditional chiefs, exempting their families from work, inducing them with gifts, and granting them special access to imported goods. In turn, the chiefs or *toions* made sure that work quotas for the Company were filled by the men, women, and children of their villages. By at least the early 1800s, the Company would choose new *toions* if they became dissatisfied with the traditional leadership of villages (Davydov 1977:190 [1802-1803]).

Several *toions* were distinguished in the Native Alaskan community at Ross. In his 1822 travel entry, Khlebnikov (1990:99) noted that three *toions* had negotiated with him about the poor salaries paid to the Native Alaskan workers. Khlebnikov (1990:143 [1820-1824]) later observed that the oldest *toion* was recognized as the senior leader and spokesman for the Native Alaskan community. When the elder *toion*, Matvei, died in 1824, Khlebnikov requested that the native community select another “chief” *toion* who would act as “an intermediary between the Aleuts and the Company managers.” The Kuskov censuses listed two Kodiak Island Alutiiq “*toions*” who resided with Native Californian women. In the first case, *Toion* Nanehkun Vasiliy from Ezopkinskoe Village on Kodiak Island was married to the Kashaya Pomo, Kelyaymin. In the second case, *Toion* Kumyk Moisei, whose Kodiak Island village is not listed, lived with the Kashaya Pomo woman, Uyamin, until 1821, when he departed to Sitka.

The second observation is that Kodiak Island and Chugach men raised in the same villages in their home-

lands tended to live with Native Californian women who spoke the same or related languages. For example, ten Alutiiq men are listed in the Kuskov censuses as hailing from the Kodiak village of Kilyudinskoe (also Kiliudinskoe). Six of them cultivated interethnic relationships with Kashaya Pomo women, while three established households with Southern Pomo (Slavianka River) women. Only one man from Kilyudinskoe lived with a Coast Miwok woman. In contrast, the two Kodiak Island Alutiiq men from the village of Mysovskoe entered unions with Coast Miwok women. Four of the five Chugach men from Chinikatskoe (Chiniyatskoe) and Katmaiskoe villages lived with Coast Miwok women, while the fifth married a Southern Pomo woman.

The above observations suggest that some of the sociopolitical practices of the North Pacific were reproduced at Ross. Tribal *toions* were recognized by both the Russian administrators and the Native Alaskan community. These *toions* were probably leaders who represented different villages and kin-based groups back home. While admittedly speculative, it is possible that the Native Alaskan Neighborhood was organized into several different household groups under specific *toions*. These household clusters would probably have represented men from the same or related villages in Alaska who tended to live with Native Californian women who spoke the same Pomo or Miwok languages. While the census records do not list the home villages of the Pomo and Miwok women, it is highly probable that Native Alaskan men from the same or related homeland villages were cohabiting with women from the same or related villages from Bodega Bay, the vicinity of Ross, or the Russian River.

SPATIAL LAYOUT AND ARCHITECTURE

The first known description of NAVS was in 1816, when the Spanish official, Gervasio Arguello, counted thirty-seven huts for the “Aleuts” and forty-seven *baidarkas* (Bancroft 1886:631, footnote 3). The village is identified on the 1817 map of Ross, the only known cartographic rendition of the settlement undertaken by the Russian-American Company. Reproduced by Fedorova (1973:353, 358-60), the map caption describes the village as “14 Aleut Yurts made of planks.” The village map illustrates four or five clusters of buildings that were tightly packed 140 to 240 m from the southeast blockhouse on a 210 degrees bearing. No structures were depicted in the area of FRBS, although the brig *Rumiantsov*, under construction in the Ross shipyard, was located nearby.

Interestingly, the first known painting of Ross in 1817 by an unknown Russian artist portrays no visible standing structures in NAVS (Dmytryshyn et al. 1989:308). Either the Russian painter deliberately censored the depiction of non-Russian architecture in the

work, or only semi-subterranean native structures were in use at this time and are not visible in the picture.

In 1820, Khlebnikov (1990:102) observed that many Indians lived under the same roof with Native Alaskan men in very crowded conditions. A barracks building was built near the "Aleuts' huts" that could accommodate fifty Native Californians during the winter months.

Mariano Payeras (1979:2-3), a Mexican-Californian visitor, described the Ross settlement in 1822. In addition to his observations of the Stockade complex, he reported that the outlying houses of the Russians, the "Kodiaks," and "Christian Indians" were built of squared beams set upon one another, with roofs made of planks joined by fillets, and gutters to ward off the rain. He also stressed that the houses had "good" glass in their windows. In the Fort Ross Cove area, he viewed a blacksmithy and a shop used to store and work wood as part of the Ross shipyard, as well as garden plots under cultivation up the Fort Ross Creek. In the "back" of the Fort Ross Creek, he viewed a forge and a bathhouse.

Duhaut-Cilly (1946:10-11), a French visitor to Ross in 1828, describes the "pretty little houses of 60 Russian colonists, the flattened cabins of 80 Kodiaks, and the cone shaped huts of as many indigenous Indians." He noted that all buildings were of wood, "but well built and taken care of." Before leaving Ross, Duhaut-Cilly sketched the settlement, illustrating several structures in the vicinity of NAVS.

Wrangel's 1833 account of Fort Ross stresses the dilapidated conditions of the buildings, especially the Stockade complex. He briefly describes several outbuildings and the Fort Ross Cove area:

On this hill, outside the fortress, facing and paralleling its sides, are located two Company cattle barns with pens, spacious and kept in excellent cleanliness, a small building for storing milk and making butter, a shed for Indians, a threshing floor, and two rows of small Company and private houses with gardens and orchards, occupied by employees of the Company. On a cleared spot beyond this outskirt stands a windmill. Below the hill by a landing for baidarkas [kayaks] have been built a spacious shed and a cooperage, a blacksmithy, a tannery, and a bathhouse. Everything is situated conveniently and in accordance with the purposes of the settlement and its local circumstances; but as stated above, most buildings have deteriorated (Wrangel 1969:207 [1833]).

In 1839, Edward Belcher, a British Naval Captain, made the following observations on the Native Alaskan Village and the Fort Ross Cove area:

Besides these buildings, there are on the slope of the hill, about twenty huts for the Kodiak Indians, of whom the establishment generally employ about fifty to sixty, in their skin boats, some of which are capable of containing one hundred men, and carrying about

seven tons. They are constructed similarly to the old English coracle, viz., of strong boat-shaped frames, sharp at each end, over which the skins of the sea-lion are tightly stretched. Those to the northward of the Aleutian chain are covered with the skin of the walrus.

On the N.W. are situated the stables for cattle, a large granary, with a threshing machine capable of cleaning one hundred bushels of corn per day; a windmill; and to the southward, in a deep ravine which partly forms the bay, are three large tiled buildings, containing forges, carpenters' shops, and storehouses for boats and fishing craft (Belcher 1843:315).

Iliia G. Voznesenskii, a naturalist from the Zoological Museum of the St. Petersburg Academy of Sciences who was making collections in Russia-America, painted a well-known watercolor of the Ross settlement in 1840-41 (see Watrous and Tomlin 1993:12b-12c). His painting, made from a hill to the north of the Stockade complex, shows several structures near the southeast side of the Stockade that may have been part of the Native Alaskan Village Site. Blomkvist (1972:107), in describing Voznesenskii's painting, identifies these structures as small Native Alaskan dwellings "constructed in the Russian manner from logs of a red pine that resembles larch, the same material used in the construction of all the dwellings of the Company at Ross." Dmytryshyn and Crownhart-Vaughan (1976:106b), in examining the details of Voznesenskii's painting, suggest that the "Aleut" community had "given up their traditional *iurts* in favor of Russian-style log cabins."

After the abandonment of Fort Ross, G. M. Wasseurtz of Sandel, a Swedish traveler, produced a rather crude line drawing of the settlement in 1843 (see Watrous and Tomlin 1993:12d). Several low-lying buildings, appearing as barracks, are depicted outside the eastern wall of the Stockade complex. As Watrous and Tomlin (1993) note, the perspective of the drawing is skewed, but it appears that some of these outbuildings were remnants of the Russian village, agriculture structures, and dwellings in the Native Alaskan Village Site.

Tikhmenhev, who wrote the official history of the Russian-American Company using primary company sources in 1861-1863, many of which have been subsequently lost, makes the following observations on the NAVS and the Fort Ross Cove area.

The fort, armed with ten cannons, was situated on a small hill 110 feet above sea level. The hill inclined toward the sea and ended in a 70-foot cliff. On the slope the Aleuts built their houses, imitating the Russians in their usually careful construction, so that there were very few simple mud huts. Red pine (chaga, a wood similar to larch [redwood]) was used for all structures. So that the Aleuts might have what, in their opinion, were the best possible living quarters,

Kuskov permitted them to place their houses wherever they wished, disregarding a regular street layout and allowing structural eccentricities.

The landing was located in a small bay south of the fort. At the landing were built a dockyard (where in 1818 and 1819 Kuskov built the brigantine *Rumiantsov* and the brig *Buldakov*) and a large shed for storing baidaras and building ships in bad weather. The smithy was a short distance away. The hollow between the landing and the fort was bordered with garden plots, most of which belonged to the settlement (Tikhmenhev 1978:134).

Hubert Bancroft's study of the Ross Colony provides another description of the settlement derived largely from primary sources.

Outside the stockade on the plateau were the huts of the Aleuts and natives, which they built for themselves mostly of redwood, and which they even made more or less effort to keep clean in imitation of the Russians; and scattered in the immediate vicinity were a windmill, farm buildings, granaries, cattle-yards, a tannery, and work-shops for the various industries carried on. Beyond lay the vegetable gardens. Down at the foot of the cliff on the beach at mouth of the southern barranca was a small wharf and boat-landing, a shed for the protection of the skin boats, another for storing lumber and for work connected with building of vessels, a blacksmith's shop, and finally a bathhouse where the Russian might steam himself as was the custom in his country (Bancroft 1886:630).

SUMMARY

In the Native Alaskan Neighborhood resided single Native Alaskan men, some Native Alaskan families, and many interethnic households, the majority made up of Alutiiq men and Kashaya Pomo, Southern Pomo, and Miwok women, and their children. Other Native Californian people, including *kaiur* laborers and relatives of the Pomo and Miwok women, were probably housed there as well, possibly in a large barracks building. Some vestiges of traditional Native Alaskan sociopolitical practices were probably recognized at NAVS, and Kodiak Island and Chugach men from related village units appear to have cohabited with Native Californian women from the same or similar homelands. Eyewitness accounts suggest that a diverse range of architectural structures may have been constructed in the Native Alaskan Village, and that changes in architectural styles were probably taking place over time. However, most paintings and observations, especially after the late 1820s and 1830s, indicate that small wood houses or Russian plank houses were being built. The houses were reportedly not laid out in planned streets or lots, as was the Russian Village, but were constructed on top of the marine terrace in front of the Stockade, and possibly down the terrace slope

descending into the Fort Ross Cove. The Fort Ross Cove was an industrial area containing buildings associated with the shipyard, a blacksmithy, storage sheds for the *baidarkas* and related hunting and fishing equipment, a forge, and a bathhouse. Most of these structures were probably built to the northeast of FRBS where the cove opens up along the Fort Ross Creek terrace.

RESEARCH OBJECTIVES

Two primary objectives directed our investigation of the Native Alaskan Neighborhood. First, to examine the participation of native laborers in the broader world system of the early 19th century and whether access to manufactured goods and domesticated foods served as sources of cultural change. The second objective concerns the implications of establishing a commercial colony with pluralistic communities in which people from many different homelands worked and lived together.

THE CONSUMPTION OF MASS-PRODUCED GOODS AND NONNATIVE FOODS

How was the broader world system represented in the material culture of the native employees in the Native Alaskan Neighborhood? Schiff (1994) suggests that Fort Ross was on the "far" periphery of the Russian-American Company's supply and distribution system in North America. How many and what kinds of goods shipped to Ross were designated specifically for trade with the Franciscan missions in order to obtain food for the Russian-American Company colonies in the North Pacific is not clear. It is also difficult to distinguish which goods were earmarked for local consumption in the Ross community, especially by native workers. Given the Ross Colony's obligations to provision Company ships and supply goods for trade to Spanish/Mexican communities in California (see detailed accounts in Klebnikov (1990 [1820-1824]), the kinds and quantities of manufactured goods and domesticated foods available to local workers may have been quite limited.

Access to nonlocal goods was most certainly exacerbated by the poor compensation of the Native Alaskan and Californian (as well as Russian) workers. As detailed above, many of the native laborers were in debt to the Company because of their paltry salaries. Even though Ross was a mercantile colony that participated in the broader world system, the limited purchasing power of the native workers restricted their access to some goods. What kinds of store-bought goods were accessible to these workers and their families at Ross and whether these goods were catalysts that stimulated further changes in their material culture and daily lifeways remains to be seen.

Finally, it is important to consider the experiences of

natives who had participated previously in the Russian-American Company world system. While Kashaya Pomo, Southern Pomo, and Coast Miwok natives were experiencing their first sustained contact with European and North Pacific peoples at Ross, most of the Native Alaskan workers had grown up under Russian colonial jurisdiction for three decades or more on Kodiak Island, the Aleutian Islands, and in southeastern Alaska. Some had worked previously for the Russian-American Company in other North Pacific commercial operations before their transfer to Ross (see Murley 1994). Whether the same consumption patterns as those practiced in other North Pacific colonies were reproduced at Ross or not, and whether differences in the social and physical environment of the California colony led to innovations in the use of mass-produced goods and nonnative food have yet to be determined.

INTERETHNIC HOUSEHOLDS

Did the synergistic interplay of interethnic households in the Native Alaskan Neighborhood promote significant cultural change in the material culture of Native Alaskan and Native Californian residents? These households may have been pivotal in the creation and transmission of cultural innovations between peoples from different homelands at Ross. Each spouse brought to a household his or her own perspective on the technologies, social relations, ceremonies, and belief systems they had learned in their respective homelands. Cultural innovations could have taken place when one spouse modified and adopted ideas and practices from the other or when synergistic fusions took place involving the recombination of elements from both spouses' homelands into new cultural forms. These cultural innovations, in turn, may have been disseminated well beyond the local household through kinship relations and friends. Viewed from this perspective, interethnic households may have been at the forefront of both creating and transmitting cultural innovations in this pluralistic community.

The investigation of the Native Alaskan Neighborhood presents an ideal case study for examining this proposed process of cultural innovation. The cohabitation and close interaction of Kodiak Island and Chugach men with Kashaya Pomo, Coast Miwok, and Southern Pomo women generated social settings that were well suited for the creation and transmission of cultural innovations.

On one hand, Native Alaskan men, as well as women in related Alutiiq families, could have passed along knowledge of traditional lifeways that revolved around a sophisticated maritime technology (*baidarka* construction, bone arrow harpoon and dart points, deep sea fishing), construction of semi-subterranean houses, and a range of ceremonies and belief systems from the North Pacific. One firsthand report, mentioned above, de-

scribes a Coast Miwok woman who learned how to produce the whale gut *kamleika* (Lutke 1989:278 [1818]). A study of loanwords in the Kashaya language indicates that some Alutiiq origin words were borrowed, including "women's dress" (*taqhma*) and "double pronged fish-hook" (*cicakh*) (Kari 1983:3; Oswalt 1988).

Since the Native Alaskans had grown up under Russian jurisdiction, they may have also introduced their own version or interpretation of European "culture" to Native Californian peoples. Oswalt's (1957, 1988) analysis of Russian loanwords in the Kashaya Pomo language suggests that some words were derived from Unangas or Alutiiq speakers who had learned Russian as a second language. The "Russian" culture most familiar to Native Californians may have been those Russian elements that had been incorporated previously into Alutiiq life long before Ross was colonized.

Close collaboration with Unangas, Alutiiq, and Tanaina peoples in the Native Alaskan Neighborhood also may have fostered the maintenance and elaboration of some local Pomo and Miwok cultural practices, especially those elements held in common with North Pacific peoples. Practices such as subsistence pursuits focused on coastal and maritime resources, the manufacture and use of stone and bone tools, and some native ceremonies may have been encouraged. Okladnikova (1983) suggests that the Kuksu Cult, a ceremony of the Pomo and Miwok people involving the Great Raven Kuksu as one of the creators of earth and humans, was similar to cults of predator birds (eagles, condors, hawks, falcons, ravens) observed among North Pacific peoples from Siberia to Alaska. While some of Okladnikova's statements are provocative (see Craig Bates's notes in the 1983 article), it appears that Native Alaskan workers at Ross would have been familiar with elements of the Kuksu Cult, and perhaps even encouraged its practice there, depending upon their conversion and level of commitment to the Russian-Orthodox faith.

On the other hand, the Native Alaskan workers at Ross were stationed many hundreds of kilometers from their homelands in an alien environment. Pomo and Miwok spouses and relatives likely were important sources of information for learning about new kinds of raw materials, weather conditions, flora, and fauna. The intermarriage of Alutiiq men with Native Californian women would have linked the former into broader kinship networks that extended into the hinterland of Ross, ties that would have facilitated the movement of interior resources into the Neighborhood. We expect that Native Alaskan workers were exposed to new foods, new elements of material culture, new views on how to organize and maintain the household, and new child rearing practices.

The creation and adoption of new cultural practices in the Neighborhood would have been facilitated by

support groups of Native Alaskan men and Native Californian women who came from the same homelands. When Kodiak Island and Chugach men arrived at Ross and initiated relationships with local Indian women, they apparently maintained a pre-existing support network made up of men from their own or related villages. When Pomo and Miwok women moved to the Native Alaskan Neighborhood they were not isolated or alone, but were probably integrated into a larger support group of women who spoke the same language from their homelands. The transmission of cultural innovations developed in one or more households to others in the Neighborhood would have been facilitated by the social networks that cross-cut the interethnic community. There is also the strong possibility that men and women from related villages created factional groups in the Neighborhood that may have had implications for native sociopolitical relationships at Ross and the creation and adoption of new cultural constructs (see Lightfoot and Martinez 1995).

The broader transmission of cultural innovations beyond the local neighborhood would have been facilitated by the constant flow of men, women, and children who moved back and forth between Ross and their homelands. Pomo and Miwok women who were "released" by the Company from interethnic households went back to their traditional home villages with some or all of their children, especially young girls. The continuous movement of women and girls back to villages in the Kashaya Pomo, Coast Miwok, and Southern Pomo homelands must have had significant impacts on such small-scale societies that numbered only a few hundred people. These women may have served as both mediators and translators in their home villages in negotiations and interactions with the Native Alaskan community, the Russian-American Company, and even other European visitors (see Lutke 1989:278 [1818]). Women and children from interethnic households, as well as Native Alaskan men who ran away from Ross with Native Californian spouses, may have disseminated cultural innovations across the homelands of the Pomo and Miwok peoples (Martinez 1994).

Native Alaskan workers were typically stationed at Ross for several years before rotation back home or to other North Pacific colonies. Cultural innovations from Ross could have been regularly disseminated to native villages and commercial outposts in Alaska by Alutiiq and Unangas workers who were redeployed by the Company, and by some Native Californian women and their children who moved north with their husbands and fathers. In one example, Kari (1983:3) describes how a Native Californian hand game, involving marked and unmarked sticks held or hidden in the hands, was dispersed from Fort Ross to the native peoples of the Aleutian Islands, Kodiak Island, and Southeastern Alaska in the early 1800s. This gambling game was still being

played by Unangas, Kodiak Island Alutiiq, Chugach, and Tanaina peoples at multiethnic gatherings in Alaska in the 1920s. Again, the transmission of cultural innovations may have been facilitated by the relatively small size of these societies. The Alutiiq peoples numbered less than 6000 in the early 1800s and only about 3000 by the time Fort Ross was sold by the Russians (1841) (Clark 1984:187).

HOUSEHOLD IDENTITIES IN THE NATIVE ALASKAN NEIGHBORHOOD

Up to this point, we have stressed the great potential for cultural transformations to occur in multiethnic colonies and how these innovations may be carried back home. We recognize, however, that change does not occur simply because people are exposed to new ideas, goods, and cultural practices. In fact, encounters with other peoples, especially when coupled with policies of "directed acculturation" by the dominant society, can result in the defiant entrenchment of traditional practices and the deliberate rejection of material innovations (e.g., Ferguson 1991; Linton 1940; Kennedy 1955). Any culture contact study of interethnic relationships must consider the issues of *both* culture change and persistence.

In this section, we argue that an understanding of change and persistence in the material culture of the Native Alaskan Neighborhood should consider interethnic and gender relations in NAVS households. Specifically, we contend that the degree to which nonnative goods and foods were consumed and cultural innovations created and/or adopted may be related to the construction of "public" identities in NAVS households. In a recent paper (Lightfoot and Martinez 1995), we stress the naiveté of viewing Kashaya, Alutiiq, Unangas, Russian, and other ethnic groups at Ross as homogeneous entities, in which individuals pursued similar interests and shared objectives. Rather these groups were embedded with structural cleavages oriented along lines of kin, gender, age, political affiliations, social relations, and homeland villages. Individuals could have implemented very different identity strategies that maintained, manipulated, or recreated their ethnic backgrounds for various social, political, and/or economic benefits (e.g., McGuire 1982:160; Roosen 1989:13; Shennan 1989:12). Three strategies are discussed below: cultivation of native identities, upward mobility, and the creation of new identities.

CULTIVATION OF NATIVE IDENTITIES

One identity strategy is to resist culture change by preserving traditional values and maintaining distinctive ideologies and cultural practices (see Bragdon 1988:128; Ferguson 1991:28-29; Spicer 1962:567; Stevenson 1989:288). For example, Ferguson (1991) describes how African-American slaves in the south manifested a separate subculture in the actions of their daily lives (diet,

tools, furnishings), since it was in the domestic sphere that they had some control. In this strategy, cultural practices that distinguish group members from “other” peoples are often amplified and exaggerated, becoming recognizable symbols for group membership and participation (Spicer 1962:578; Stevenson 1989:292-93). The retention of mundane cultural practices, such as traditional ways of preparing food or the care of household space, often take on new meaning as they become “invested with a significance which they may have lacked in earlier incarnations” (Cohen 1987:96).

In the Native Alaskan Neighborhood, there may have been many reasons for enacting strategies of resistance. Elite Native Californian families and their followers may have perceived few advantages in the breakdown of traditional value and prestige systems in which they played a favored role. Consequently, they may have become strong advocates for maintaining the status quo. Some Pomo or Coast Miwok women may have resented their arranged marriages with Native Alaskan men and pursued a deliberate tactic that cultivated their Native Californian identity in all aspects of their day-to-day life. Still other non-European laborers may have been responding to Russian domination at Ross by steadfastly supporting their traditional practices, a strategy that was probably not uncommon on Kodiak Island where many of the Alutiit detested the Russian presence in the early 19th century (see Davydov 1977:163 [1802-1803]).

If separate native identities were cultivated at NAVS, then Native Alaskan men and Native Californian women may have maintained distinct ethnic and gender identities within interethnic households. Men and women would embrace traditional native ideologies and cultural practices that set them apart from other people in the Ross Colony. The cultivation of native identities in NAVS households would not preclude the acceptance of cultural innovations. Rather people would be highly selective in the kinds of practices, foods, and goods they adopted, modified, or created, making sure they fit within perceived concepts of what constituted proper “native” behavior (see Kardulias 1990:29; Wilson and Rogers 1993:5). By this method, Alutiit men and Kashaya women could maintain their distinct identities while reacting to new conditions and undergoing transformations themselves (e.g., Simmons 1988:8). With this identity strategy, we expect that the consumption of European goods or the creation of synergistic innovations in NAVS households would probably be minimal, except those that were perceived as compatible with the cultural practices of either the Alutiit or Kashaya.

UPWARD MOBILITY

NAVS residents may have consciously manipulated their ethnic identities to assimilate into another group for perceived social, political, or economic advantages. McGuire (1982:164, 174) notes that the attainment of

higher status positions by members of lower ranking ethnic groups often entails the adoption of symbols, behaviors, and ideologies that characterize a higher ranking group. This strategy also involves the discard of cultural practices that do not conform with the higher status group. The creation of new identities to gain higher status positions within the colonial hierarchical structure may have taken two forms.

Native Alaskan Imitators

Native Californians were clearly at the bottom of the Russian-American Company’s socioeconomic hierarchy in both compensation and status (Lightfoot et al. 1991:21-22). The formation of interethnic households provided a convenient social context for some Native Californian women, especially those from nonelite families, to alter their identities and to distance themselves from other Native Californian peoples. Women could have adopted the material trappings of Native Alaskan wives, and relinquished conventions that were incompatible with Native Alaskan ideology. In this scenario, the few Native Alaskan women at Ross may have served as teachers of Native Alaskan customs to local Native Californian women.

If this strategy was implemented, then we expect the archaeological remains of native imitators in interethnic households to follow largely the organizational principles of Native Alaskan households, and the archaeological remains of such households to be largely congruent with those of Native Alaskan families at Ross. We suspect that distinguishing these interethnic households from those of Native Alaskan families in the archaeological record would be difficult. These interethnic households would probably contain similar kinds of nonlocal goods and “European” foods as those consumed by other Native Alaskan families. We further suspect that the creation of cultural innovations would not differ markedly from other Native Alaskan families.

Colonial Russian Imitators

As a consequence of Russian colonial policies, and/or perceived social and economic advantages, one or both spouses may have imitated Russian cultural practices. Available archival sources suggest that the Russian-American Company at Ross was permissive in indulging its native workers the right to construct their own homes, to harvest and to consume their own foods, and to practice their traditional ceremonies and feasts (see Lightfoot et al. 1991:9). While there is no evidence that Company officials overtly dictated lifestyle changes, subtle persuasion may have taken place to reward native workers who embraced Russian cultural practices.

If this strategy was implemented, then we expect the archaeological remains of colonial imitators in interethnic households to approximate, to some degree, the organization of houses in the Russian Village. We expect to find

similar kinds of architectural features, tools, and foods to those used by Russian families at Ross, and a diverse range of mass-produced goods and "Russian" foods associated with these houses. While goods in the Company store were expensive and probably limited in availability, we believe that these families would have sacrificed or gone into debt to purchase those nonlocal goods that were accessible.

CREATION OF NEW IDENTITIES

Native interethnic households, similar to the Creole class at Ross, may have constituted a separate, rather fluid, identity group that was perceived as neither purely Native Alaskan or Native Californian, but something new and different. This separate identity may have been most pertinent to children produced from mixed marriages who may have recognized advantages in creating their own separate identities or had little choice but to do so. The "creolization" of interethnic households would have facilitated the mutual sharing and transformation of cultural practices from both Native Alaskan and Native Californian homelands.

If this strategy was implemented, then we expect the archaeological remains of interethnic households to follow distinctive organizational principles that were neither Native Alaskan nor Native Californian in character. That is, we should find archaeological evidence for the organization of space and material culture that deviated from those of traditional Native Alaskan or Native Californian households. Mass produced goods and "European" foods would probably be present, especially in combination with other Native Alaskan and Native Californian materials. We argue that the creation of new cultural innovations in these households would be high, involving the recombination of Native Californian, Native Alaskan, and even Russian elements.

THE ARCHAEOLOGICAL INVESTIGATION OF THE NATIVE ALASKAN NEIGHBORHOOD

A research design is implemented in the Native Alaskan Neighborhood that examines strategies of identity construction employed by NAVS households, and how these "public" identities are expressed in the consumption patterns of material goods and the creation and adoption of cultural practices. Our theoretical approach incorporates ideas from both practice theory (Bourdieu 1990; Giddens 1979; Ortner 1984; Roscoe 1993) and the *Annales* historical perspective (Duke 1992; Le Roy Ladurie 1979; Moreland 1992) that considers the relationship between structure and event in culture contact settings (see especially Kirch 1992; Sahlins 1985, 1991, 1992).

Two theoretical concepts particularly pertain to this study. First, the organizational principles, world views, and ideological canons of individuals are continually

reproduced and transformed during social interactions or events. These cultural constructs (structures) would be both the conditions and outcomes of daily practices and social relations in NAVS households. As Ortner (1984:154) notes, all cultural practices "are predicated upon, and embody within themselves, the fundamental notions of temporal, spatial, and social ordering that underlie and organize the system as a whole." The dialectical relationship between structure and action is perpetually being reproduced as individuals constantly respond to new situations and problems (Bourdieu 1990: 55-56; Giddens 1979:53). Sahlins (1985) demonstrates how cultural categories that are actualized in daily practice can become transformed during the process of social encounters with "others."

Second, the focus of analysis is on the practice of day-to-day living (Bourdieu 1977; Giddens 1979:123; Moreland 1992:125; Ortner 1984:154). People are constantly recreating structural principles and playing out ideological constructs in their daily routines. The focus on habitual practices is well suited to archaeological investigation, as they entail the "little routines people enact, again and again, in working, eating, sleeping, and relaxing, as well as little scenarios of etiquette they play out again and again in social interactions" (Ortner 1984:154). Material items in daily practice take on special significance as they become active symbols in broadcasting and even negotiating identity—a person's social relations, political affiliations, and broader world views (Lightfoot and Martinez 1995; Moreland 1992:116).

The identity strategies employed by NAVS households should be observable in their daily practices—how they organized space, how they conducted domestic tasks, and how they disposed of refuse. A key consideration is the organization and use of space over time—the construction, maintenance, and abandonment of house structures, extramural space, and trash deposits across the landscape. The floor plans of houses, the placement of internal features, the construction materials employed, and the layout of public and private space are all very pertinent to understanding the organizational principles of households and communities (see Donley 1982; Donley-Reid 1990; Fletcher 1992; Lawrence 1990; Moore 1986; Sanders 1990). Food remains, cooking residues, and other by-products of domestic tasks are very useful in defining ethnic, social, and gender expressions in the archaeological record (see Gust 1983; Schulz and Gust 1983; Wake 1995). Refuse disposal practices involving the spatial association of different kinds of materials can also provide many insights into the identities and cultural constructs of households (Moore 1986:102).

In implementing the research program, the purpose is not to assign ethnic attributions to the residents per se, since we already know the ethnic composition of the

community. Rather, the purpose is to consider how the identities of these Native Californians and Native Alaskans were being constructed and transformed through daily practice and interaction. By considering the organizational principles of NAVS households, we evaluate whether different strategies of native resistance, upward mobility, and/or creolization were being followed in day-to-day actions.

The fieldwork undertaken in the Native Alaskan Neighborhood, including topographic mapping, systematic surface collections, geophysical survey, and the excavation of extensive profile units and blocks, was designed to delineate the organization of space and daily practices at NAVS and FRBS. The specific goal of the field investigation was to detect and expose architectural features, extramural work areas, communal assembly places, and refuse dumps across the Native Alaskan Neighborhood. Employing this program, the spatial layout of the Neighborhood was defined and the partial remains of three architectural structures and related extramural space, and three discrete trash deposits composed of dense concentrations of animal bones, marine shells, fire-cracked rocks, and artifacts were unearthed.

A critical component of the study of interethnic household identities is the comparison of NAVS and FRBS archaeological remains to Kodiak Island Alutii and Kashaya Pomo daily practices as recorded in ethnohistorical sources and observed in archaeological contexts (e.g., Lightfoot 1995). The Kodiak Islanders and Kashaya are highlighted for two reasons. They made up the largest proportion of the Neighborhood's population and their daily practices are well documented in their respective homelands. Native life in nearby Kashaya Pomo villages and Alutiiq settlements on Kodiak Island are employed as baselines for examining change and continuity in the use of space, domestic tasks, and refuse disposal practices in the Native Alaskan Neighborhood. The goal of the comparative analysis is to identify similarities and differences in the organizational principles of households in the Neighborhood when compared to other pertinent case studies of Kashaya Pomo and Alutiiq villages.

While the original intent was to focus on the internal spatial arrangement of house structures in the Native Alaskan Village, the discovery of dense bone bed deposits in the fill of abandoned structures precluded the full excavation of house features. As outlined in subsequent chapters, the bone beds are viewed as discrete dumping episodes of domestic refuse from nearby interethnic households. As a consequence, the emphasis of the project shifted from the organization of household space to the study of household refuse practices. The delineation of household identities, as outlined in chapter 17, is based on refuse disposal conventions, the domestic tasks that contributed to the trash deposits, and the

overall settlement layout of the Neighborhood in comparison to nearby Kashaya Pomo villages and Alutiiq settlements on Kodiak Island.

CONCLUSION

In the first volume of *The Archaeology and Ethnohistory of Fort Ross, California* series, it is suggested that pluralistic colonial communities may have served as important sources of cultural change, ultimately affecting the architectural styles, subsistence practices, diet, and material culture of non-European workers. In the shadows of the Ross Stockade, Kodiak Island Alutiiq and Chugach men took up residence with Kashaya Pomo, Southern Pomo, and Coast Miwok women. These couples shared their houses, conducted daily domestic and subsistence-related chores, participated in ceremonies and dances, cultivated their own social networks and political alliances, deposited considerable amounts of trash, and produced many children. The investigation of this Neighborhood examines the consequences of these interethnic relationships and critically considers the construction of different identity strategies in NAVS households as manifested in their daily practices.

REFERENCES

- Bancroft, Hubert Howe
1886 *The Works of Hubert Howe Bancroft, History of California*, vol. 19. The History Company, San Francisco.
- Belcher, Edward
1843 *Narrative of a Voyage Round the World, Performed in Her Majesty's Ship Sulphur, During the Years 1836-1842*, vol. 1. Henry Colburn, London.
- Blomkvist, E. E.
1972 A Russian Scientific Expedition to California and Alaska, 1839-1849. Article translated by B. Dmytryshyn and E. A. P. Crownhart-Vaughan. *Oregon Historical Quarterly* June 1972, pp. 101-70.
- Bolotov, Iosaf
1977 The Konyag (Inhabitants of the Island of Kodiak) by Iosaf [Bolotov] (1794-1799) and by Gideon (1804-1807). Translated and edited by Lydia Black. *Arctic Anthropology* 14 (2):79-108.
- Bourdieu, Pierre
1977 *Outline of a Theory of Practice*. Cambridge University Press, Cambridge.
1990 *The Logic of Practice*. Translated by Richard Nice. Stanford University Press, Stanford.
- Bragdon, Kathleen J.
1988 The Material Culture of the Christian Indians of New England, 1650-1775. In *Documentary Archaeology in the New World*, edited by M. C. Beaudry, pp. 126-31. Cambridge University Press, Cambridge.

- Clark, Donald W.
1984 *Pacific Eskimo: Historical Ethnography*. In *Handbook of North American Indians*, edited by David Damas, vol. 5, Arctic, pp. 136-48. Smithsonian Institution, Washington D.C.
- Cohen, A. P.
1987 *Whalsay: Symbol, Segment and Boundary in a Shetland Island Community*. Manchester University Press, Manchester.
- Corney, Peter
1986 *Voyages in the Northern Pacific. Narratives of Several Trading Voyages from 1813 to 1818, Between the Northwest Coast of America, the Hawaiian Islands and China, With a Description of the Russian Establishments on the Northwest Coast*. Thomas G. Thrum, Publisher, Honolulu, Hawaii.
- Crowell, Aron
1992 Postcontact Koniag Ceremonialism on Kodiak Island and the Alaska Peninsula: Evidence from the Fischer Collection. *Arctic Anthropology* 29:18-37.

1994 *World System Archaeology at Three Saints Harbor, An 18th Century Russian Fur Trade Site on Kodiak Island, Alaska*. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Berkeley.

In Press. *Archaeology of the Capitalist World System: A Study from Russian America*. Plenum Press, New York.
- Davydov, G. I.
1977 *Two Voyages to Russian America, 1802-1807*. Translated by Colin Bearne. Edited by Richard A. Pierce. Materials for the Study of Alaska History no. 10. Limestone Press, Kingston, Ontario.
- Dmytryshyn, Basil, and E. A. P. Crownhart-Vaughan
1976 *Colonial Russian America: Kyrill T. Khlebnikov's Reports, 1817-1832*. Oregon Historical Society, Portland.
- Dmytryshyn, Basil, E. A. P. Crownhart-Vaughan, and Thomas Vaughan
1989 *The Russian American Colonies Three Centuries of Russian Eastward Expansion 1798-1867, vol. 3, A Documentary Record*. Oregon Historical Society, Portland.
- Donley, Linda W.
1982 House Power: Swahili Space and Symbolic Markers. In *Symbolic and Structural Archaeology*, edited by I. Hodder, pp. 63-73. Cambridge University Press, Cambridge.
- Donley-Reid, Linda W.
1990 A Structuring Structure: The Swahili House. In *Domestic Architecture and the Use of Space*, edited by S. Kent, pp. 114-26. Cambridge University Press, Cambridge.
- Duhaut-Cilly, Auguste Bernard
1946 *An Episode from the Narrative of Auguste Bernard Duhaut-Cilly*. Translation of 1828 account by Charles F. Carter. Silverado Press, Bohemian Grove, CA.
- Duke, Philip
1992 Braudel and North American Archaeology: An Example from the Northern Plains. In *Archaeology, Annales, and Ethnohistory*, edited by A. Bernard Knapp, pp. 99-111. Cambridge University Press, Cambridge.
- Fedorova, Svetlana G.
1973 *The Russian Population in Alaska and California Late 18th Century-1867*. Translated and edited by Richard A. Pierce and Alton S. Donnelly. Limestone Press, Kingston, Ontario.
- Ferguson, Leland
1991 Struggling with Pots in Colonial South Carolina. In *The Archaeology of Inequality*, edited by Randall H. McGuire and Robert Paynter, pp. 28-39. Basil Blackwell, Oxford.
- Fletcher, Roland
1992 Time Perspectivism, *Annales*, and the Potential of Archaeology. In *Archaeology, Annales, and Ethnohistory*, edited by A. Bernard Knapp, pp. 35-49. Cambridge University Press, Cambridge.
- Gibson, James R.
1976 *Imperial Russia in Frontier America: The Changing Geography of Supply of Russian America, 1784-1867*. Oxford University Press, Oxford.
- Giddens, Anthony
1979 *Central Problems in Social Theory: Action, Structure and Contradiction in Social Analysis*. University of California Press, Berkeley.
- Golovnin, Vasilii M.
1979 *Around the World on the Kamchatka 1817-1819*. Translation of the original 1822 edition (Part 1) by Ella L. Wiswell. The Hawaiian Historical Society and the University Press of Hawaii, Honolulu.
- Gust, Sherri M.
1983 Problems and Prospects in Nineteenth Century California Zooarchaeology. In *Forgotten Places and Things: Archaeological Perspectives on American History*, edited by Albert E. Ward, pp. 341-48. Contributions to Anthropological Studies no. 3. Center for Anthropological Studies, Albuquerque, New Mexico.
- Istomin, Alexei A.
1992 *The Indians at the Ross Settlement According to the Censuses by Kuskov, 1820-1821*. Fort Ross Interpretive Association, Fort Ross, California.
- Jackson, Robert
1983 Inter-marriage at Fort Ross: Evidence from the San Rafael Mission Baptismal Register. *Journal of California and Great Basin Anthropology* 5:240-41.
- Jordan, Richard H.
1994 Qasqiluteng: Feasting and Ceremonialism among the Traditional Koniag of Kodiak Island, Alaska. In *Anthropology of the North Pacific Rim*, edited by William W. Fitzhugh and Valerie Chaussonnet, pp. 147-73.

- Smithsonian Institution Press, Washington D.C.
- Kardulias, P. N.
1990 Fur Production as a Specialized Activity in a World System: Indians in the North American Fur Trade. *American Indian Culture and Research Journal* 14(1):25-60.
- Kari, James
1983 Kalifornsky, the Californian from Cook Inlet. *Alaska in Perspective* 5:1-11.
- Kennedy, Mary Jean
1955 *Culture Contact and Acculturation of the Southwestern Pomo*. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Berkeley.
- Khlebnikov, Kirill
1990 *The Khlebnikov Archive, Unpublished Journal (1800-1837) and Travel Notes (1820, 1822, and 1824)*. The University of Alaska Press, Fairbanks.
- Kirch, Patrick
1992 *The Archaeology of History. Anahulu: The Anthropology of History in the Kingdom of Hawaii*, Vol. 2. University of Chicago Press, Chicago.
- Kostromitinov, P.
1974 Notes on the Indians in Upper California. In *Ethnographic Observations on the Coast Miwok and Pomo by Contre-Admiral F. P. Von Wrangel and P. Kostromitinov of the Russian Colony Ross, 1839*, pp. 7-18. Translation and editing of original 1839 publication by Fred Stross and Robert Heizer. Archaeological Research Facility, University of California, Berkeley.
- Kotzebue, Otto Von
1830 *A New Voyage Round the World, in the Years 1823, 24, 25, and 26*. volumes 1 and 2. Henry Colburn and Richard Bentley, London.
- LaPlace, Cyrille
1986 Description of a Visit to an Indian Village Adjacent to Fort Ross by Cyrille LaPlace, 1839. Translation and editing of 1854 original French publication by Glenn Farris. Appendix B in Cultural Resource Survey at the Fort Ross Campground, Sonoma County, California, by Glenn Farris, pp. 65-80. On file, Cultural Heritage Section, Archaeology Laboratory, California Department of Parks and Recreation, Sacramento, California.
- Lawrence, R. J.
1990 Public Collective and Private Space: A Study of Urban Housing in Switzerland. In *Domestic Architecture and the Use of Space*, edited by S. Kent, pp. 73-91. Cambridge University Press, Cambridge.
- Le Roy Ladurie, E.
1979 *The Territory of the Historian*. University of Chicago Press, Chicago.
- Lightfoot, Kent G.
1995 Culture Contact Studies: Redefining the Relationship between Prehistoric and Historical Archaeology. *American Antiquity* 60:199-217.
- Lightfoot, Kent G., and Antoinette Martinez
1995 Frontiers and Boundaries in Archaeological Perspective. *Annual Review of Anthropology* 24:471-92.
- Lightfoot, Kent G., Thomas A. Wake, and Ann M. Schiff
1991 *The Archaeology and Ethnohistory of Fort Ross, California, Vol. 1: Introduction*. Contributions of the University of California Archaeological Research Facility no. 49, Berkeley.
- Linton, Ralph (ed.)
1940 *Acculturation in Seven American Indian Tribes*. Peter Smith, Gloucester, Mass.
- Lisiansky, Urey
1814 *A Voyage Round the World in 1803, 4, 5, and 6; Performed By Order of his Imperial Majesty, Alexander the First, Emperor of Russia, in the Ship Neva*. John Booth, London.
- Lutke, Fedor P.
1989 September 4-28, 1818. From the Diary of Fedor P. Lutke during his Circumnavigation Aboard the Sloop *Kamchatka*, 1817-1819: Observations on California. In *The Russian American Colonies, Three Centuries of Russian Eastward Expansion 1798-1867, vol. 3, A Documentary Record*, edited and translated by Basil Dmytryshyn, E. A. P. Crownhart-Vaughan, and Thomas Vaughan, pp. 257-85. Oregon Historical Society Press, Portland.
- Martinez, Antoinette
1994 Native Women as Cultural Mediators. *Proceedings of the Society for California Archaeology*, 7:41-46.
- McGuire, Randall H.
1982 The Study of Ethnicity in Historical Archaeology. *Journal of Anthropological Archaeology* 1:159-78.
- Merck, Carl Heinrich
1980 *Siberian and Northwestern America 1788-1792: The Journal of Carl Heinrich Merck, Naturalist with the Russian Scientific Expedition Led by Captains Joseph Billings and Gavriil Sarychev*. Translated by Fritz Jaensch. Edited by Richard A. Pierce. Limestone Press, Kingston, Ontario.
- Moore, Henrietta L.
1986 *Space, Text and Gender: Anthropological Study of the Marakwet of Kenya*. Cambridge University Press, Cambridge.
- Moreland, John F.
1992 Restoring the Dialectic: Settlement Patterns and Documents in Medieval Central Italy. In *Archaeology, Annales, and Ethnohistory*, edited by A. Bernard Knapp, pp. 112-29. Cambridge University Press, Cambridge.
- Murley, Daniel F.
1994 The Travels of Native Alaskan Marine Mammal Hunters in the Service of the Russian-American Company. Paper presented at the XXVII Annual Chacmool Conference, University of Calgary, Calgary, Alberta.

- Okladnikova, E. A.
1983 The California Collection of I. G. Voznesensky and the Problems of Ancient Cultural Connections Between Asia and America. *Journal of California and Great Basin Anthropology* 5:224-39.
- Ortner, Sherry B.
1984 Theory in Anthropology Since the Sixties. *Comparative Studies in Society and History* 26:126-66.
- Oswalt, Robert L.
1957 Russian Loanwords in Southwestern Pomo. *International Journal of American Linguistics* 23:245-47.

1988 History Through the Words Brought to California by the Fort Ross Colony. *News from Native California* 2:20-22.
- Payeras, Mariano
1979 (entry for October 11, 1822) Diary of Mariano Payeras, Travels of the Canon Fernandez de San Vincente to Ross. Translated by Michael S. Tucker and Nicholas Del Cioppo. Submitted for distribution at the Conference on Russian America at Sitka, Alaska in 1979. Copy on file, Fort Ross Interpretive Association Library, Fort Ross, California.
- Riddell, Francis
1955 *Archaeological Excavation on the Farallon Islands, California*. Reports of the University of California Archaeological Survey 32:1-18.
- Roosens, Eugene
1989 *Creating Ethnicity: The Process of Ethnogenesis*. Sage Publications, Newbury Park, California.
- Roscoe, Paul B.
1993 Practice and Political Centralisation: A New Approach to Political Evolution. *Current Anthropology* 34:111-40.
- Sahlins, Marshall
1985 *Islands of History*. University of Chicago Press, Chicago.

1991 The Return of the Event, Again: With Reflections on the Beginnings of the Great Fijian War of 1843 to 1855 Between the Kingdoms of Bau and Rewa. In *Clio in Oceania: Toward a Historical Anthropology*, ed. by A. Biersack, pp. 37-99. Smithsonian Institution Press, Washington D.C.

1992 *Historical Ethnography. Anahulu: The Anthropology of History in the Kingdom of Hawaii*, Vol. 1. University of Chicago Press, Chicago.
- Sanders, D.
1990 Behavioral Conventions and Archaeology: Methods for the Analysis of Ancient Architecture. In *Domestic Architecture and the Use of Space*, edited by S. Kent, pp. 43-72. Cambridge University Press, Cambridge.
- Schiff, Ann M.
1994 Native/Russian Encounters at Fort Ross, California in (World-Systems) Perspective. Paper presented at the 59th Annual Meeting of the Society for American Archaeology, Anaheim, California.
- Schulz, Peter D., and Sherri M. Gust
1983 Faunal Remains and Social Status in 19th Century Sacramento. *Historical Archaeology* 17(1):44-53.
- Shennan, Stephen
1989 Introduction: Archaeological Approaches to Cultural Identity. In *Archaeological Approaches to Cultural Identity*, edited by S. Shennan, pp. 1-32. Unwin Hyman, London.
- Shubin, Valerii O.
1994 Aleut in the Kurile Islands: 1820-1870. In *Anthropology of the North Pacific Rim*, edited by William W. Fitzhugh and Valerie Chaussonnet, pp. 337-45. Smithsonian Institution Press, Washington DC.
- Simmons, William S.
1988 Culture Theory in Contemporary Ethnohistory. *Ethnohistory*. 35:1-14.
- Spicer, Edward H.
1962 *Cycles of Conquest: the Impact of Spain, Mexico, and the United States on the Indians of the Southwest, 1533-1960*. University of Arizona Press, Tucson.
- Stevenson, Marc G.
1989 Sourdoughs and Cheechakos: The Formation of Identity-Signaling Social Groups. *Journal of Anthropological Archaeology* 8:270-312.
- Tikhmenev, P. A.
1978 *A History of the Russian-American Company*. Translation and editing of original 1861-1863 publications by Richard A. Pierce and A. S. Donnelly. University of Washington Press, Seattle.
- Wake, Thomas A.
1995 Mammal Remains from Fort Ross: A Study in Ethnicity and Culture Change. Ph.D. dissertation, Department of Anthropology, University of California, Berkeley.
- Watrous, Stephen, and Kaye Tomlin
1993 *Outpost of an Empire. Fort Ross: The Russian Colony in California*. Fort Ross Interpretive Association, Fort Ross.
- Wilson, S. M., and J. D. Rogers
1993 Historical Dynamics in the Contact Era. In *Ethnohistory and Archaeology: Approaches to Postcontact Change in the Americas*, edited by J. D. Rogers and S. M. Wilson, pp. 3-15. Plenum Press, New York.
- Wrangel, F. P. Von
1969 Russia in California, 1833, Report of Governor Wrangel. Translation and editing of original 1833 report by James R. Gibson. *Pacific Northwest Quarterly* 60:205-15.

APPENDIX 1.1

LIFE AT FORT ROSS AS THE INDIANS SAW IT; STORIES FROM THE KASHAYA. BY GLENN J. FARRIS.

History is generally seen through the eyes of the dominant class in a society. Rarely is the viewpoint of the underclass, stated in their own words, expressed. In his compilation of the oral history and folktales of the Kashaya Pomo, linguist Robert Oswalt provides some fascinating accounts of life with the Russians and Native Alaskan peoples from the vicinity of Fort Ross. Such things as new foods, marital experiences including domestic violence, suicide of a spouse, at least one industrial accident, the marvel of a passing Hudson's Bay party, and more are woven into these tales. Some are in the form of folk history, others are cautionary tales. Together they form a remarkable body of history for a people typified as being ahistorical. In this paper I will sift through a number of the relevant Kashaya texts and try to place into perspective the observations of everyday life contained in them.

The Russian settlement at Fort Ross, California, which existed for nearly thirty years (1812-41), was made up of a small number of ethnic Russians, Finns, and Siberians, as well as a sizable contingent of "Aleuts," (actually, a mixture of Unangan, Kodiak Islanders or Alutiit, Tana'ina from Kenai Peninsula, and other Native Alaskans), and an ever-growing number of Creoles (as the mix of Russian and Native American was called). Since they brought few women with them, a number of these men took the local Kashaya, Bodega Miwok, and other Pomo women as wives. At least forty-five California women are named in censuses of Fort Ross by Ivan Kuskov in 1820 and 1821 as living with the settlers (Fedorova 1975; Istomin 1992). The distribution mentioned includes: 4 Indian women "from the region of Ross" and 1 "Bodegin" Indian woman (married to Russians); 1 Indian woman "from the region of Ross" (married to a Creole); and "17 common-law wives from the region of Ross." Ten of these common-law wives were "from the river Slavianka," and nine were "Bodegin" (married to Native Alaskan men) (Fedorova 1975:12). By 1833 Creoles, augmented by the children born at the settlement, had become the largest part of the population. In that year there were 63 Creole children under the age of 16 (Gibson 1969:210).

Although there are numerous European observations of life at Fort Ross: Russian, Spanish, German, English, and French (cf. Kostromitinov 1839; LaPlace 1854; Lutke 1989; Payeras 1822; and Von Wrangel 1839), these, quite naturally, only give us the European perspective on life in the settlement. One of the most extensive descriptions of domestic activities within a Kashaya village is provided by Cyrille LaPlace (1854:145-47; Farris 1988:22-23) during a visit in August 1839. The

manager of Fort Ross, Alexander Rotchev, invited LaPlace to accompany him on a visit to the neighboring Kashaya village (Métini):

the habitations of these poor people consisted without exception of miserable huts formed of branches through which the rain and wind passed without difficulty. It was there that all the family, father, mother, and children, spent the nights lying pell-mell around the fire, some on cattle hides, the majority on the bare ground, and each one enveloped in a coverlet of wool which served equally as a mantle during the day, when the weather was cold or wet.

The majority [of the women] were busy with the housekeeping, preparing meals for their husbands and children. Some were spreading out on the embers some pieces of beef given as rations, or shell fish, or even fish which these people came to catch either at the nearby river [the Gualala or possibly even the Russian River] or from the sea; while the others heated seeds in a willow basket before grinding them between two stones. In the middle of this basket there were some live coals that they shook constantly, on which each seed passed rapidly by an ever more accelerated rotating movement until they were soon parched, otherwise the inner side of the basket would be burned by the fire. Some of these baskets (paniers), or more accurately, these deep baskets (vases [cooking baskets]), seemed true models of basketmaking, not only by their decoration but by the finishing touches of the work. They are made...so solidly held together by the threads, that the fabric was water-resistant, as efficiently as baked clay and earthenware....

It should be noted that LaPlace was seeing the people of Métini as they were after twenty-seven years of association with Fort Ross and that their society and social structure had probably undergone a variety of changes over that time. In addition, Kashaya had suffered severely from epidemics that occasionally raged in the vicinity of the Russian settlement. One of the most disastrous of these was the smallpox epidemic of 1837-1838 which was apparently introduced at Fort Ross and then spread throughout northern California killing many tens of thousands of people (Smilie 1975:67). Even so, a certain amount of LaPlace's negative observation was based on his European background as well as his comparisons to people he had seen on the Northwest Coast of America and in the Hawaiian Islands.

Accounts from the viewpoint of indigenous peoples are far rarer. A few aspects of life show up in the recollections of Peter Kalifornski (Kalifornski 1991; Kari 1983) whose Tana'ina great grandfather, Nikolai Kalifornsky, lived at Fort Ross from approximately

1812-1820.

However, the richest trove comes from the *Kashaya Texts*, transcribed and translated by linguist Robert Oswalt (1964). These include accounts touching on various aspects of life at Fort Ross during the Russian occupation. In a very matter-of-fact manner, a number of activities and situations of everyday life are either directly described or form the backdrop of these stories. The overwhelming majority derive from a woman named Lukaria which was quite appropriate, as the Kashaya women were more likely to become deeply involved in the life of the people living at Fort Ross.

Round-the-world traveler, Fedor Lutke (1989:278), in 1818 describes unions of Russians and Alutii and Californian women, which illustrate the adaptability of the Kashaya women:

Some of the Promyshlenniks and Aleuts have married these Indian women. Our interpreter, whose wife is one of these people, told us that she had learned his language very quickly and well, and that she had also learned Aleut handicrafts, such as sewing the whale gut kamleika [waterproof outer garment] and other things. In one hut I saw a rather comely young woman preparing food, and when I approached her I was surprised that she spoke easily and in clear Russian. She invited me to eat her acorn porridge, and then complained about the rain. When I inquired I found that she had lived for some time in the Ross settlement with a promyshlennik, and then had returned to her people.

In an article on Russian and Alutiiq words that have been absorbed into the Kashaya language, Robert Oswalt (1988:20-22) gives not only examples of Russian words that apparently came directly from the ethnic Russians, but also numerous Russian words that the Kashaya learned from the Alutii. These are distinguished by certain pronunciation peculiarities of the Alutii that were taken by the Pomo even though they would have been perfectly able to render the correct Russian form (for instance, the Alutiiq replacing the Russian *b* with a *p*, whereas the Kashaya have no trouble with the *b* sound).

A brief biography of Talia Unuttaca, a Bodega Miwok woman who married Andres Aulancoc, a Alutiiq at Fort Ross, tells us that they had a daughter Maria in 1815. Talia then travelled with her husband to Sitka where she was baptized by a Russian Orthodox priest named Malancoc. When her husband died in 1819 she returned to Bodega Bay. There she established a relationship with a Bodega Miwok man named José and had a second daughter about 1820 named Rafaela (Jackson 1983:240). The original mission records for San Rafael show that the man she married was named José Talio (SBMA—San Rafael marriages). This is very likely the same “José Talis” mentioned by Bancroft (1886:718) as being the “captain of the Tamalles” ca. 1838.

KASHAYA ACCOUNTS

Among the many stories in the *Kashaya Texts*, nine of them clearly touch on the lives of the Kashaya at Colony Ross. The overwhelming majority of the accounts come from Herman James who learned them from his grandmother, Lukaria. This woman was said to have been born eight years before the Russians came, which would have been about 1804. By contrast, only one of the stories told by Essie Parrish, who also learned them from her maternal grandmother, relates to the Russian Period. Brief synopses and commentaries follow.

THE FIRST WHITE FOOD [ESSIE PARRISH]

The new arrivals offered the Indians food. At first the Indians feared this food would be poisonous and so dumped it out, buried it at times and kept to their traditional foods (Oswalt 1964:251).

This followed a pattern among the Pomo of fear of poisoning by strangers, which is still found to a small degree today. However, over time the Indians became used to many of the introduced foods, especially as many of their own native foods were becoming harder to obtain.

THE BIG EXPEDITION [HERMAN JAMES]

When a Hudson's Bay Company expedition consisting of 163 men, women, and children passed Fort Ross on April 19, 1833 both the Indians and the Aleuts were puzzled by and fearful of it. When the expedition came close to where the Undersea people [Kashaya name for the men of Colony Ross] were living, a few people straggled out and gave the HBC some of what they [Indians and Russians (sic)] had to eat. They gave flour, being afraid. The strangers took it willingly at that time. After three or four days had passed, some Indians, having gone northwards, saw what they had given had been all dumped out on the ground. The HBC members hadn't known what it was for. Everything the strangers had received from the Undersea people, all of the food, had been dumped out. They had apparently just left it there on the trail.... After the expedition had passed, the Indians and Aleuts asked one another who they had been. When they asked the Russians, they received the response, "How come you don't know that the people you are asking about are your kind of people." "No, we don't recognize those people," said the Kashaya (Oswalt 1964:253-55).

Elsewhere (Farris 1989) I have dealt with this story at greater length. One of the telling points is the gulf between the native peoples (Californian and Alaskan alike) and the Russian authorities, who seemed to have had the attitude that all Indians could be lumped together. Another point is that the food that was offered by the Native Alaskans and Californians to these strangers was

flour, possibly in the form of a gruel (*kasha*), which was the staple food provided to the Indians by the Russians at this time (a point which was brought up to the managers of the Russian-America Company by Baron Ferdinand Von Wrangel who visited a short time later [Gibson 1969]). It is confusing to most English readers to read that the Indians were subsisting on flour when it was likely a coarser form of ground seed, not unlike their normal staple, the *pinole*.

THE LAST VENDETTA [HERMAN JAMES]

This story begins by relating a tale of a feud between two groups of Kashaya; feuds are suggested to have been common before the coming of the Russians. However, on this occasion, an "Undersea boy," mounted and armed with a rifle, interrupted Kashaya rejoicing over the vengeance killing. The old people then decreed that they were done with the feuding. Some of the Indians then began going into the "cross-house" [the Fort Ross chapel] which belonged to the Undersea people. Thereafter there was no more enemy killing (Oswalt 1964:255-59).

This is a tribute to the Russian attempt to keep peace among the peoples with whom they associated by suppressing an age-old form of vengeance feuding which was not infrequently found among the Native Californians. It also suggests that some Kashaya became interested in the orthodox religion. Late in the 19th century, when Orthodox Bishop Nikolai (1897) visited Fort Ross, he was told of Lukaria who evidently still retained an affection for the Russians.

HUNTING SEA OTTER AND FARMING [HERMAN JAMES]

This is a somewhat confused tale of the comings and goings of the Aleuts and Russians to Alaska and elsewhere. Somehow the story became reversed, with colony people initially at Fort Ross and then going to Alaska with the intention of hunting sea otters. The Indians came to realize how valuable the sea otters were to them. The Aleuts would pursue the hunt despite the considerable danger and privations (Oswalt 1964:261-65).

The only occupation described in this story for the Russians and Alutiit was the hunting of sea otter. This next story suggests that when the rigors of sea otter hunting became too great, the "Undersea people" turned to growing crops in the vicinity of Fort Ross, aka Métini.

GRAIN FOODS [HERMAN JAMES]

Wheat was planted in all the flat lands near Métini [Colony Ross]. When ripe, the people cut it by hand, tied it up, and lay it there. Then they packed the sheaves in sea lion skins and dragged it to their houses. The grain was taken to a threshing floor "of earth packed down hard by wetting." The sheaves were placed there and horses driven in to trample the grain. When it was threshed, they loaded it in sacks which were taken off to

their warehouse. To make it into flour, they took it to a big machine called a "flour grinder." The sacks were tossed up and the grain was poured into the grinder. The resulting flour was then poured into sacks which were piled in a building to provide food for winter. An accident occurred when a woman got too close to the machinery and her hair was caught. She was spun around and killed. The woman was then taken home to be cremated in her traditional way. The story then compares the Indian way of gathering grain [knocking it into a tightly woven pack basket when it was ripe]. This they would store in their own houses to use as pinole during the winter. The Indians observed the Russian methods and used the ground flour but also continued to use their pinole in their traditional way (Oswalt 1964:267-69).

The continuity of Kashaya methods of harvesting grain and those used by the agricultural Russians was evidently appreciated by the Kashaya. Their description of the threshing floor being of beaten earth differs from the tightly laid plank floors said to be used for this purpose in all the European accounts. The description of the use of stampeding horses to thresh the grain is substantiated by numerous other accounts of observers both at Fort Ross and in Spanish California. The story of the woman who got her hair caught and was killed brings up an intriguing comparison with a story of a similar tragic death related by the late-19th century romantic author, Gertrude Atherton (1894). The year before Atherton published this story, she wrote an article about a visit to Fort Ross in which she describes meeting with an old woman who was "half Indian, half Russian" (Atherton 1893). This woman told Atherton many stories of Fort Ross at the time of the Russians. Although Atherton does not give the woman's name, it is almost certainly Lukaria. Atherton's story of the Russian heroine decapitated by the windmill is clearly fiction, but finding an antecedent in the Kashaya folk history enhances the impression that some such event actually occurred.

The sense of cultural continuity is echoed in the observations of Cyrille LaPlace (1854; Farris 1988) who visited in August 1839, toward the end of the Russian Period. LaPlace even remonstrated to his host, Alexander Rotchev, that the Russians were having very little obvious effect on the customs of the local Indians. Rotchev's reply was that they were, perhaps in more subtle ways, because the Indians were becoming increasingly sedentary and attached to the Fort.

THE WIFE BEATER [HERMAN JAMES]

This is the tale of a man [not specified whether Russian, Creole, or Aleut] and an Indian woman living together. He awakes one day very angry and gets mean, eventually striking his wife with an axe. A sheriff then took the husband away and locked him up. He was shut

in a "place where a little house was standing," locked up for a week. Hazel switches were brought to the settlement. The man was then brought out with his hands and feet tied and was whipped for a long time—"half a day"—until he fell down unconscious. When he recovered, he repented and said that he now saw the "path of righteousness." He told a public gathering that he had done wrong and would be good from then on. Even so, the Indian woman left the man. Interestingly, she continued living in the settlement, but stayed alone, as did the man (Oswalt 1964:269).

It appears that ill-treatment of the Kashaya wives was not at all condoned and that wife-beating was severely dealt with. The description of the jail as a little house standing by itself is very interesting. Current interpretation at Fort Ross has a cell within the Official's Quarters inside the Stockade, which I believe grew out of an unfortunate misreading of some documents describing the buildings at Fort Ross. A closer reading showed that what was actually stated was that the jail was adjoining one of the warehouses inside the Stockade. The severity of the whippings obviously made a deep impression on the Kashaya (see also the next story), and they were undoubtedly impressed with the sense of justice of the Russians to punish one of their own in such a fashion.

THE SUICIDE OF A WIFE [HERMAN JAMES]

An Indian woman was married to an "Undersea man." They had been quarrelling. The man walked out of the house threatening to kill his wife if she was still there upon his return. He then left for work. The Indian woman finished eating, fed her children, went into the bedroom, and put on good new clothes. She then went off on a walk to the coastal cliff, but was followed by her child. When asked what she was doing, the mother said she was going "to die today." Although the child tried to grab her dress, the mother threw herself down onto the gravel beach. The child ran home. Others then came and carried her body back to her house. She was buried rather than cremated [this change in custom is particularly noted in the story]. When the husband returned home he was taken to the whipping place and whipped for a very long time—"almost a whole day." He fell unconscious and died. He, too, was buried (Oswalt 1964:271).

This story also seems to impress one with the view that wrongs against the Indian wives were taken very seriously. This woman was evidently well on her way to being acculturated. She was apparently living in one of the Russian style houses in the *sloboda* (village) adjacent to the Stockade. The mention of her going into her bedroom to put on good new clothes, evidently a dress, before committing suicide is noteworthy. Also, there is the statement that after her death she was buried rather than cremated. It is not clear where she would have been buried. Presumably it would have been in the cemetery

across the gulch from the Stockade, but this is mere conjecture. If so, she had clearly separated from her peoples' ways.

TWO UNDERSEA YOUTHS FREEZE TO DEATH [HERMAN JAMES]

This was said to have occurred about ten years after the Russian arrival [i.e., circa 1822]. It speaks of what must be Creole children growing up. Two young men decide to go hunt coots and travel a long way down to the mouth of the Russian River [11 miles from Fort Ross]. They get soaking wet in their endeavor, and a heavy, cold rain worsens their situation. It appears that the boys become exhausted and ultimately die of exposure in the middle of the night (Oswalt 1964:273ff).

This could be seen as a cautionary tale against the dangers of wearing too much clothing. The Kashaya were said to have worn very little clothing. A modern-day Kashaya, Otis Parrish, son of Essie Parrish, explains that the Indian view of cold was that one learned to ignore it, that it affected only the outer layer of one's body, but did not penetrate. Considering the frequency with which the lack of clothing is noted among the Native Californians, it is evident that they were capable of withstanding very cold weather and had ways of psychologically dealing with the cold rather than resorting to heavy clothing.

TALES OF FORT ROSS [HERMAN JAMES]

A boat with a white sail appeared off Métini. A boat landed and the "Undersea people" appeared. It was on this occasion that they got this name. When they landed they built houses close to where the Indians were. After awhile the Indians began working for them but after 30 years living there they returned home (Oswalt 1964:277ff).

Since the Russians would have initially arrived at the beach at Fort Ross in *baidarkas* or perhaps long boats, the image of the people appearing to come out of the sea would certainly have contributed to the name given them (the Undersea People). This story continues on through the period of the next occupants, a German immigrant and his family named Benitz (1843-67), and the eventual forced departure from Fort Ross of the Indians under a subsequent owner. It paints a broad, though sketchy, picture of Kashaya history from just before the arrival of the Russians and Alutiit and carries it beyond as if to demonstrate the enduring nature of the Kashaya people in their homeland. Despite many comings and goings, the Kashaya remain.

CONCLUDING REMARKS

The series of nine stories paraphrased above give a rare vision of life in a Russian settlement as experienced by Native Californians and as related by their decedents. In an earlier paper (Farris 1989), I was able to demonstrate the validity and accuracy of at least two stories told

about Fort Ross, even to pinning down the event (the passing of a Hudson's Bay expedition). This would lend credence to the accuracy of other parts of the Kashaya oral history. It is hoped that as we delve more deeply into the archival material related to Fort Ross, we may find additional corroboration of some of the events portrayed, particularly the deaths, and perhaps the whippings. It may even be possible to ferret out the names of the individuals featured in these stories. The point of the exercise is to deepen our knowledge of the everyday lives of the people living in this settlement. This will supplement the move towards expanding our archaeological search beyond the walls of the Stockade and see "Fort" Ross as it really was, a village of many cultures learning to live together.

REFERENCES

- Atherton, Gertrude
1893 The Romance of Fort Ross. *The Californian Illustrated Magazine*, December 1893, pp. 57-62.
- 1894 Natalie Ivanhoff: A Memory of Fort Ross. In *Before the Gringo Came*. J. Selwin Tait & Sons, New York.
- Bancroft, Hubert Howe
1886 History of California, vol. III, 1825-40. In *The Works of Hubert Howe Bancroft*, vol. XX. The History Company, San Francisco.
- Farris, Glenn J.
1988 A French Visitor's Description of the Fort Ross Rancheria in 1839. *News from Native California* 2(3):22-3.
- 1989 Recognizing Indian Folk History as Real History: A Fort Ross Example. *American Indian Quarterly* 13(4):471-80.
- Fedorova, Svetlana Gr.
1975 *Ethnic Processes in Russian America*. Translated by Antoinette Shalkop. Occasional Paper, no. 1. Anchorage Historical and Fine Arts Museum.
- Gibson, James
1969 Russia in California, 1833: Report of Governor Wrangel. *Pacific Northwest Quarterly* 60(4):205-15.
- Istomin, Alexei
1992 *The Indians at the Ross Settlement according to the Census by Kuskov in 1820 and 1821*. Fort Ross Interpretive Association.
- Jackson, Robert H.
1983 Intermarriage at Fort Ross: Evidence from the San Rafael Mission Baptismal Register. *Journal of California and Great Basin Anthropology* 5(1&2):240-41.
- Kalifornsky, Peter
1991 *A Dena'ina Legacy, K'Tl' egh'i Sukdu: The Collected Writings of Peter Kalifornsky*. Alaska Native Language Center. University of Alaska, Fairbanks.
- Kari, James
1983 Kalifornsky, the Californian from Cook Inlet. *Alaska in Perspective* 5(1):1-10.
- Kostromitinov, Peter
1839 Bemerkungen über die Indianer in Ober-Kalifornien. In *Beitrage zur Kenntniss des Russischen Reiches und der angranzenden Lander Asiens*, edited by K. E. v. Baer and Gr. v. Helmersen, pp. 80-96. Saint Petersburg, Russia.
- LaPlace, Cyrille
1854 *Campagne de Circumnavigation de la Frégate l'Artémise pendant les années 1837, 1838, 1839, et 1840 sous le commandement de M. LaPlace, capitaine de vaisseau*, vol. 6. Firmin Didot Frères, Paris.
- Lightfoot, Kent G., Thomas A. Wake, and Ann M. Schiff
1991 *The Archaeology and Ethnohistory of Fort Ross, California, Vol. 1: Introduction*. Contributions of the University of California Archaeological Research Facility no. 49, Berkeley.
- Lutke, Fedor
1889 September 4-28, 1818. From the Diary of Fedor P. Lutke during his Circumnavigation Aboard the Sloop *Kamchatka*, 1817-1819: Observations on California. In *The Russian American Colonies, Three Centuries of Russian Eastward Expansion 1798-1867*, vol. 3. *A Documentary Record*, edited and translated by Basil Dmytryshyn, E. A. P. Crownhart-Vaughan, and Thomas Vaughan, pp. 257-85. Oregon Historical Society Press, Portland.
- Nikolai, Bishop
1897 Trip to Fort Ross. *Orthodox Russian Messenger*, March 2/14, 1897. English translation by Waldemar Aktsinov. Ms. on file at Fort Ross Visitor's Center.
- Oswalt, Robert
1964 *Kashaya Texts*. University of California Publications in Linguistics, no. 36.
- 1988 History through the words brought to California by the Fort Ross Colony. *News from Native California* 2(3):20-2.
- Payeras, Mariano
1822 *Diario de su Caminata con el Comisario del Imperio, Noticias sobre Ross, 1822*. Ms. at Bancroft Library, Berkeley.
- SBMA—San Rafael Marriages
n.d. Marriage Register of the Mission San Rafael Arcangel. Copy at Santa Barbara Mission Archives, Santa Barbara.
- Smilie, Robert S.
1975 *The Sonoma Mission, San Francisco Solano de Sonoma*. Fresno: Valley Publishers.

von Wrangel, Ferdinand P.

1839 Statische und ethnographische Nachrichten über die Russischen Besitzungen an der Nordwestküste von Amerika. In *Beiträge zur Kenntniss des Russischen Reiches und der Angränzenden Länder Asiens*. Edited by K. E. v. Baer and Gr. v. Helmersen, pp. 66-79. Saint Petersburg, Russia.

Archaeological Field Investigations at the Fort Ross Beach Site

KENT G. LIGHTFOOT AND ANN M. SCHIFF

THIS CHAPTER DESCRIBES the field program employed in the investigation of the Fort Ross Beach Site (CA-SON-1898/H). The program involved topographic mapping, the profiling of exposed erosional surfaces, and subsurface testing. Below, we outline the field methods utilized, the profile and excavation units investigated, and the stratigraphy, features, and kinds of cultural materials uncovered in archaeological deposits.

SITE DESCRIPTION

The first apparent description of the Fort Ross Beach Site (FRBS) occurred in July, 1953, when U.C. Berkeley archaeologists were excavating the foundations of the Stockade walls and undertaking limited reconnaissance in the nearby hinterland. Treganza (1954:18) discusses "Indian Site No 5"—

located in the rear of the cove directly below the southeast Bastion. Early illustrations suggest that the Russian boat house and tannery must have been built over the surface of this site.

Whether Treganza is referring to FRBS or to archaeological deposits farther northeast in the cove area is not clear. John McKenzie recorded midden deposits at the base of the terrace in his 1963 map of archaeological sites in the State Park (McKenzie 1963).

A detailed study of FRBS did not take place until the summers of 1988 and 1989 when we initiated our field program. The Northwest Information Center (Sonoma State University) assigned FRBS the permanent trinomial number, CA-SON-1898/H, in 1990.

The site is located at the base of an uplifted marine terrace on the northwest side of Fort Ross Cove along the

channel of the Fort Ross Creek (see figure P.1). The marine terrace is composed of sandstones and siltstones of the Monterey Formation, dating to the Tertiary, that have been tilted and raised 20 to 30 m above the Fort Ross Cove. Erosional processes, bioturbation, and downward transportation of parent materials from the marine terrace have created an extensive colluvial formation along the base of the terrace. The formation processes of the site are described more fully by Price in chapter 4. The colluvial formation of angular siltstone and sandstone fragments, abraded chert pieces, and finer-grained sands, silts, and clays contains archaeological remains.

Subsequent erosion of the lower colluvial formation has taken place through the combined forces of high-energy tidal waves crashing across the Fort Ross Cove during winter storms and of high-water discharge from Fort Ross Creek during seasonal floods. The creek, whose channel has meandered across the northern half of the cove over time, has begun to cut extensively into the colluvial formation at the base of FRBS. The colluvial "toe" has been completely removed along this stretch of the creek, destroying a sizable section of the site, and exposing archaeological materials along the creek bed.

Repeated winter and spring storms pounded Fort Ross Cove in the late 1980s, resulting in severe damage to FRBS. As a consequence of accelerated erosion, Breck Parkman requested that a full-scale investigation of the site be undertaken on behalf of the Department of Parks and Recreation. Archaeological investigations to assess the significance and extent of the archaeological deposits that remained began in the summer of 1988. On the north side of the creek channel where the colluvial "toe" had been removed, archaeological materials are

exposed along a 30 m stretch. No colluvial deposits remain on the south side of the creek—only sand and gravel deposits of the Fort Ross Cove beach. The erosional scar on the north side of the creek is a slumped bank that rises 2 to 3.5 m above the creek bottom. The slope of the bank varies in angle, depending largely on the presence of an underlying stratum of consolidated clay sediments that proves to be relatively resistant to wave action, periodic floods, and trowels. In contrast, the upper strata of loosely aggregated sandstone, chert, and siltstone colluvium are very susceptible to erosion.

The topography and dimensions of the site are best defined in three profile sections running east to west along the erosional scar (figure 2.1).

1) East Profile. The easternmost 10 m section of the bank of the erosional scar is lowest in elevation (2 to 2.3 m above the creek bed) and relatively steep in profile. The uppermost colluvium is poorly sorted and unconsolidated, while the bottom stratum of consolidated clay sediments creates a slight slump at the very bottom of the erosional cut. A bench exists between the upper bank of the erosional scar and the steep incline of the marine terrace, creating a relatively level area within the site that measures about 10-by-10 m in area. This low bench extends beyond the site to the east where the Ross shipyard, blacksmith shop, and storage sheds were probably located. We arbitrarily define the eastern boundary of the site area by a shallow ravine created by storm run-off from the Old Russian Road.

2) Middle Profile. The next westward 10 m section of the bank of the erosional scar is higher in elevation (3 to 3.5 m above the creek bed), but less vertical in profile. The bank slumps two or more meters into the creek bed where an extensive stratum of consolidated clay sediments is found. The top of the bank forms the southwestern edge of the aforementioned bench, beyond which the topography becomes very steep along the cliff face of the marine terrace.

3) West Profile. The remaining 10 m section of the bank of the erosional cut is similar in elevation to the Middle Profile, but much more precipitous in profile. This entire section is characterized by a very steep slope that continues up the cliff face of the marine terrace. No level areas exist in the third section of the site.

The dimensions of FRBS, as defined in the field, follow. The East Profile consists of a 10-by-10 m area formed by the erosional scar and bench. The Middle Profile is oblong in shape, 10 m in length along the erosional scar and narrowing in width from 10 to 2 m as the bench becomes more constricted from east to west. The West Profile is defined by a 10 m stretch along the erosional scar and a 2-m-wide strip extending into the steep terrace slope.

FIELD PROCEDURES

The field program for investigating FRBS involved excavating and profiling the 30-m-long erosional scar, and excavating in two areas of the bench (figure 2.2). We believed this was the most judicious strategy for delineating the overall spatial organization of archaeological materials in the site.

1988 FIELD SEASON

We began by establishing a site datum above the erosional cut, slightly east of the site proper (figure 2.1). From this reference point, a topographic map was produced using a transit and stadia rod, with all elevations converted to meters *above sea level* (asl). Site datum is 4.77 m above sea level. We then laid-out eighteen profile units in the East and Middle profiles, and a 2-by-.5 m unit in the eastern side of the bench.

PROFILE UNITS

The profile units, each measuring 1 m in length, were staked along the upper edge of the erosional scar. Since the orientation of the erosional scar was between 60 to 70 degrees, the unit corners do not conform to typical north/south oriented 1-by-1 m grid squares. Each profile unit was laid-out from the two corner stakes in the upper bank to the creek bottom at an angle perpendicular (150 to 160 degrees) to the orientation of the erosional face. The west corner stakes were designated as unit datums, and the coordinates of these corners, measured in meters south and west from the site datum, were used to label profile units in the field (e.g., 4.5S, 4.9W; 6.2S, 8.5W). We collected artifactual materials from the surface of each profile unit prior to excavation. The tenth profile unit (8.3S, 12.9W), counting from the east, which separated the East and Middle profiles of the site, served as a balk and was not excavated.

The excavation of the profile units was undertaken to produce a clean, vertical surface that delineated the natural and cultural stratigraphy, as well as associated archaeological materials. Elevations for all profile stakes were shot from site datum and converted into asl readings. Separate levels were maintained for each natural or cultural stratum defined in the field. When natural or cultural strata extended more than 10 cm in depth, we divided them into arbitrary 10 cm levels. Trowels were used to excavate upper colluvial deposits, and picks and shovels had to be used to remove the underlying consolidated clay sediments. All sediments were screened through 1/4" mesh. Materials were point provenienced in relation to the unit datum (horizontal and vertical readings). Soil and pollen samples were taken from each natural or cultural stratum defined in the field. The above procedures were employed in the excavation of the East

Figure 2.1 Fort Ross Beach Site Map

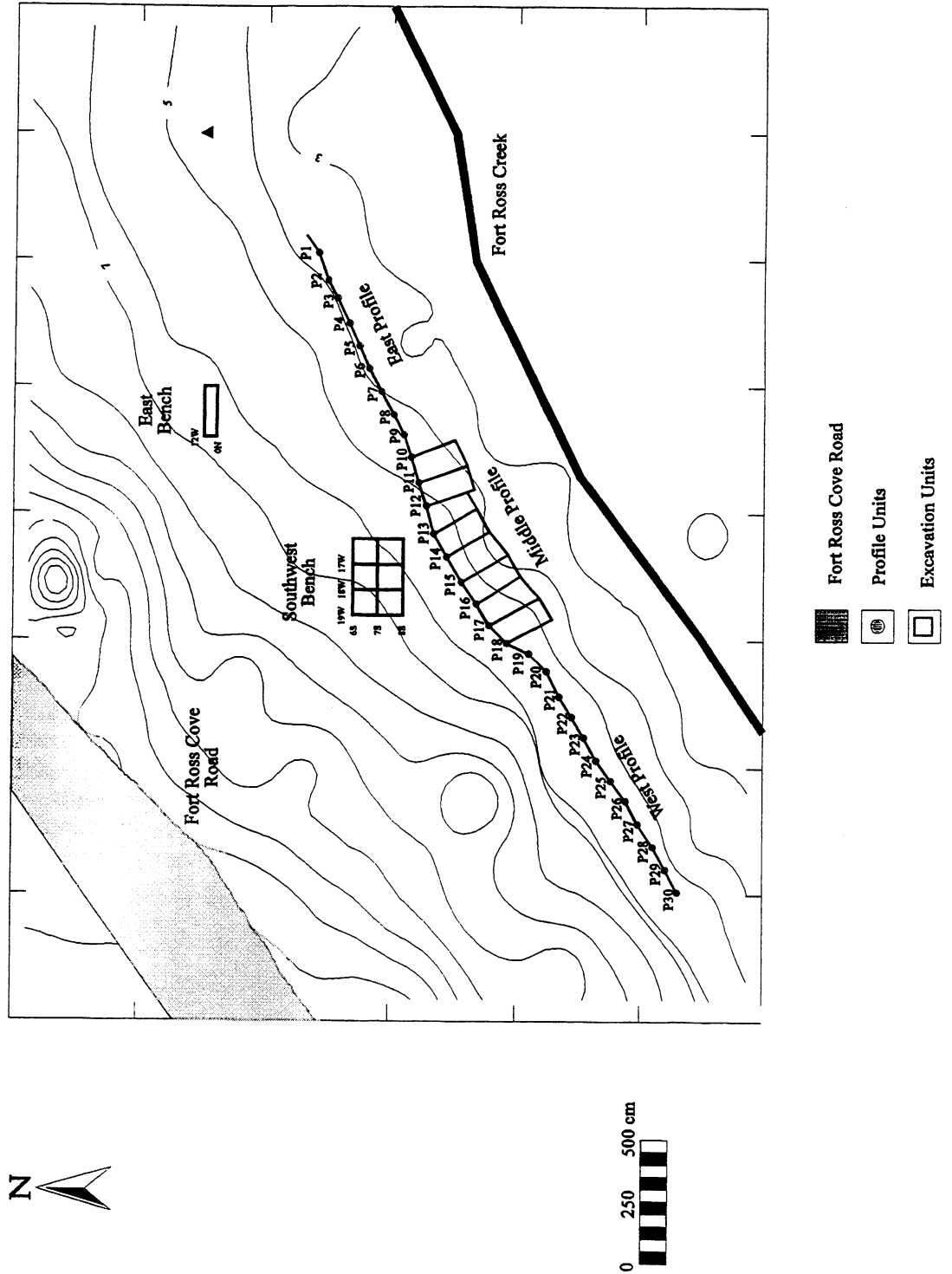


Figure 2.2 *Photo of the Fort Ross Beach Site from the East, Showing 30 m Long Profile and Bench in 1989*

Profile units (4.5S, 4.9W to 8S, 12W). These units required relatively minimal removal of sediments to produce clean, vertical faces. While the widths of the deposits varied, none of the profile units in the East Profile were greater than 1 m in length and .5 m in width, while depth varied with height of the upper bank.

The Middle Profile units were more complicated to excavate since they required the removal of a 2-m-wide slump to produce clean, vertical faces. The slump was excavated in the following manner. Profile units were laid-out from the upper corner stakes perpendicular to the erosional scar on either a 150 or 160 degree bearing. Along this bearing, stakes were placed at .5 m intervals from the upper corner stakes. The slump was removed in four separate steps, each measuring 1-by-.5 m. The northwest corner of each 1-by-.5 m step became the step datum. We employed a rather involved provenience system in the field. The first step (0 to .5m) was designated by the western stake of the profile unit (e.g., 8.9S, 14.8W); the second step (.5 to 1 m) by the .5 m stake (e.g., 8.9S, 14.8W—.5m on a 160 degree bearing); the third step (1 to 1.5 m) by the 1 m stake (e.g., 8.9S, 14.8W—1 m on a 160 degree bearing); and the fourth step (1.5 to 2 m) by the 1.5 m stake (8.9S, 14.8W—1.5 m on a 160 degree bearing).

Although the steps were complicated to excavate, they proved effective in the field when we fortuitously uncovered an intact pit feature in profile units 9.7S, 16.8S; 10.3S, 17.6W; and 10.9S, 18.4W. With the able assistance of John Holson, an archaeologist now with Pacific Legacy Inc., we designated the northwest corner

of the second step (.5 m stake) in profile unit 10.3S, 17.6W as the feature subdatum. The 12 steps in the three profile units comprising the pit feature were then excavated concurrently, with elevations taken in relation to the feature subdatum. We attempted to point provenience all artifactual materials larger than the excavator's thumbnail within the feature. Archaeological remains recovered in the screen were lot provenienced by level and by step. We maintained separate lot bags for materials recovered within and outside the feature within the same step. Soil and pollen samples were taken throughout the pit feature.

EAST BENCH (ON, 12W)

In testing the upper bench area, we placed a 2-by-.5 m unit on the east side of the bench, 10 to 12 m west of the site datum. In designating unit datums, we normally chose the southwest corners unless surface topography was marked. In the latter cases, corners with the highest elevation were selected as unit datums. The East Bench exhibited enough topographic variation to designate the northwest corner (ON, 12W) as the unit datum. We employed the same basic excavation procedures as outlined for the profile units above.

1989 FIELD SEASON

We excavated twelve additional profile units in the West Profile, and a 2-by-3 m block in the Southwest Bench (figure 2.1). The same methods outlined above were employed in the excavation with two exceptions.

First, we no longer collected pollen samples.

Professor Roger Byrne, a palynologist at U.C. Berkeley, assisted us in collecting pollen samples in 1988. An analysis of these samples in his laboratory during the winter and spring months prior to the 1989 field season yielded no discernible pollen. These results indicated that the sedimentary context of FRBS was not conducive to the preservation of pollen.

Second, we recognized that a significant shortcoming in our 1988 excavation strategy was the use of only 1/4" mesh for sediment screening. Continued reliance on this screen size would bias the diversity and quantity of "micro" materials in our excavation. In the 1989 field season, Thomas Wake constructed a wet screening procedure, with the assistance of State Park maintenance personnel, that pumped water from the nearby Fort Ross Creek at a high velocity into 1/16" mesh. The wet screening of sediments greatly enhanced our ability to recover small faunal remains, beads, and chipped stone debitage.

PROFILE UNITS

The profile units were laid-out along the upper bank of the erosional scar using the methods described above. Since the vertical slope was quite steep in the west section, separate excavation steps were not necessary to produce a clean, vertical face in any profile unit. We modified the previous field provenience system, and simply designated each profile unit with a letter, beginning with A for the easternmost unit (adjacent to the last unit excavated in 1988), and L for the westernmost. Since unit A separated the Middle and West profiles, it served as a balk and was not excavated. Unit H was chosen for water screening. All sediments excavated from this unit were water screened in 1/16" mesh. The sediments from all the other profile units were dry screened through 1/4" mesh.

SOUTHWEST BENCH (6S, 19W)

The reasons for excavating this block were twofold. First, by placing it in the bench's southwest corner, it provided a good comparison to the East Bench (0N, 12W). Second, the excavation block was placed directly behind and upslope of the pit feature detected in 1988. We could then evaluate whether the pit feature was connected to or associated with a larger structure constructed into the terrace slope. The 2-by-3 m block was divided into six 1-by-1 m units, each designated by the coordinates of their southwest corner stakes in relation to site datum. The excavation units included 7S, 17W; 7S, 18W; 7S, 19W; 8S, 17W; 8S, 18W; and 8S, 19W. The northwest corner of the block (6S, 19W) the highest point of all the excavation units, served as the block subdatum for taking elevations (figure 2.1). We began wet screening sediments through 1/16" mesh from four units (7S, 17W; 7S, 19W; 8S, 17W; 8S, 19W), and dry screening sediments

through 1/4" mesh from two (7S, 18W; 8S, 18W). However, in the lowermost mottled-clay sediments that contained primarily lithic artifacts, we wet screened sediments through 1/16" mesh from only 7S, 17W and 8S, 19W.

After the 1989 field season, we standardized the labeling of all profile units and steps, and will employ this simplified provenience system for the remainder of the volume. Each profile unit is assigned a 'P' (profile) number, counting consecutively from east to west, beginning with P1, P2, P3, to P30. Excavation steps are assigned letters, 'a' for step 1, 'b' for step 2, 'c' for step 3, and 'd' for step 4. For example, step four (1.5 m along the 150 degree bearing) of unit 9.7S, 16.8W is simply P14 step d. Table 2.1 correlates the proveniences used in the field with those in publications. We present this table primarily for scholars who may use the original field notes, excavation forms, and provenience information for archaeological materials that will be archived in the State Parks archaeological facilities in Sacramento.

Table 2.1 *Field/Publication Designations for Profile Units*

Field	Publication	Field	Publication
4.5S, 4.9W	P1	10.9S, 18.4W	P16
4.9S, 5.8W	P2	11.4S, 19.3W	P17
5.4S, 6.6W	P3	12.1S, 20.0W	P18
5.8S, 7.6W	P4	A	P19
6.2S, 8.5W	P5	B	P20
6.6S, 9.4W	P6	C	P21
7.1S, 10.3W	P7	D	P22
7.5S, 11.2W	P8	E	P23
8.0S, 12.0W	P9	F	P24
8.3S, 12.9W	P10	G	P25
8.6S, 13.9W	P11	H	P26
8.9S, 14.8W	P12	I	P27
9.2S, 16.0W	P13	J	P28
9.7S, 16.8W	P14	K	P29
10.3S, 17.6W	P15	L	P30

STRATIGRAPHY AND ASSOCIATED CULTURAL MATERIALS

In this section, we describe the stratigraphy, features, and overall distribution of artifacts and faunal remains observed in five areas of FRBS: 1) East Profile, 2) Middle Profile, 3) West Profile, 4) East Bench, and 5) Southwest Bench.

EAST PROFILE (P1-P9)

The upper bank of the erosional scar rises slightly in elevation from east (3.77 m asl) to west (4.3 m asl). The entire section was cleaned and excavated to an elevation of 2.9 to 3.0 m asl (figure 2.3). Three deposits are

Figure 2.3 *Photo of East and Middle Profile Units in 1988*

defined (figure 2.4).

1) Topsoil. The dark brown (10YR 2/2) soil is dry, not well compacted, and contains unsorted colluvial materials, including angular sandstone, siltstone, and chert pieces. Most of the colluvial materials are small in size, less than 5 cm in diameter. The soil is thin, no deeper than 10 cm in depth, and in some units (P3, P7) has been completely removed by erosion. Archaeological materials are sparse, including one historic ceramic, a few lithic specimens, and some mollusk remains (abalone, snail), and mammal bones. Charcoal is not common, and no features are observed.

2) Midden. The dark brown to black (10YR 2/1) deposit is relatively loose and non-compact, containing some unsorted colluvial sandstone, siltstone, and chert pieces. The colluvial materials vary greatly in size, from 10 cm in diameter to under 1 cm; most are the latter size. The soil matrix is organically rich, including many fragments of bone, shell, and charcoal. The deposit ranges in thickness from 20 to 50 cm, increasing in depth in the western units (P8, P9). Evidence of rodent disturbance is common. A diverse range of artifacts has been recovered, including glass artifacts, ceramic sherds, metal remains, and lithics. An assortment of mollusk, fish, bird, and mammal remains also has been identified. No features are observed.

3) Clay. The underlying stratum is a consolidated brownish-yellow (10YR 6/6), clay-rich soil that contains angular sandstone and siltstone pieces, and large clumps of clay. The clay-rich sediments are first encountered at

elevations of 3.8 to 3.3 m asl, and continue to the bottom of the profile units. The clay matrix contains no glass, metal, or ceramic artifacts and few mollusk and mammal remains. However, a large number of lithic artifacts have been recovered. Charcoal is very sparse. No features are observed.

MIDDLE PROFILE (P11-P18)

The upper bank of the erosional scar rises sharply from the eastern corner of unit P11 (4.42 m asl) to the western corner of P18 (5.9 m asl). All units are excavated into the underlying clay stratum. The final depths of the units vary from 3.24 to 3.0 m asl in P11, P12, and P13; 3.6 to 3.4 m asl in P14, P15, and P16 (which contain the FRBS Pit Feature); and 3.8 m asl in P17 and P18. Five stratigraphic units are defined (figure 2.5).

1) Topsoil. The dark grayish-brown (10YR 3/2) soil is composed of angular sandstone, siltstone, and chert inclusions. The stratum is about 10 to 30 cm thick. Recent slope wash has removed the upper stratum from some of P11. P14 contains an unusually large number of angular siltstone fragments. Relatively few artifacts and some mollusk fragments were recovered.

2) Fill. The dark brown (10YR 3/3) deposit, dry and very loose in texture, is composed of many large angular siltstone rocks, a result of widening the Fort Ross Cove Road in the 1920s. The dirt road, located directly above FBRS, was cut into the marine terrace, producing a considerable amount of rock refuse that overlies some areas of this site. The road-building debris serves as a

Figure 2.4 East Profile Units

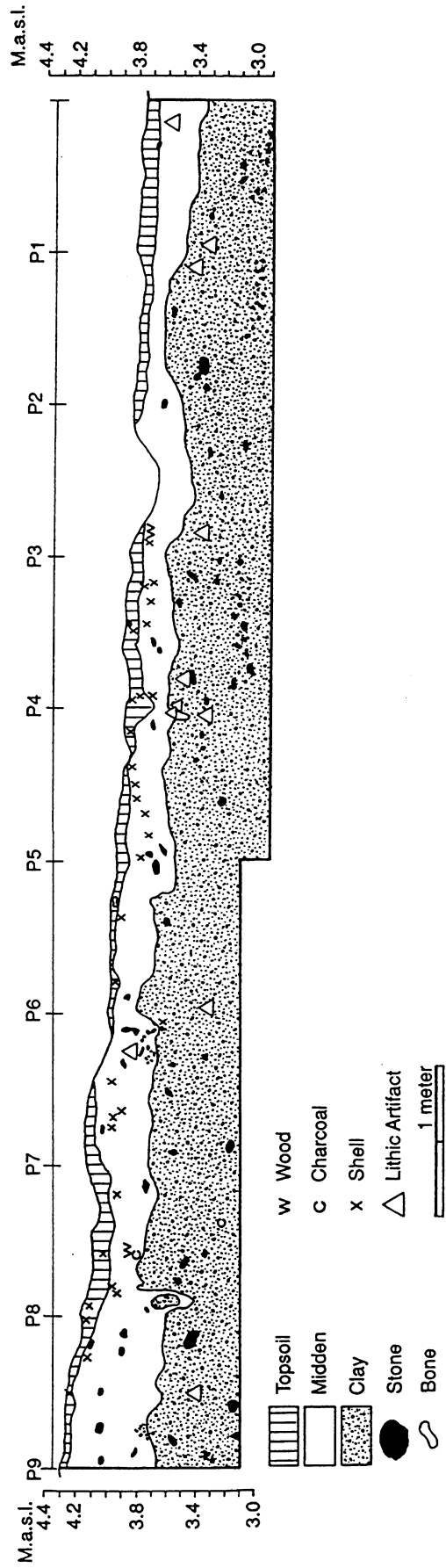
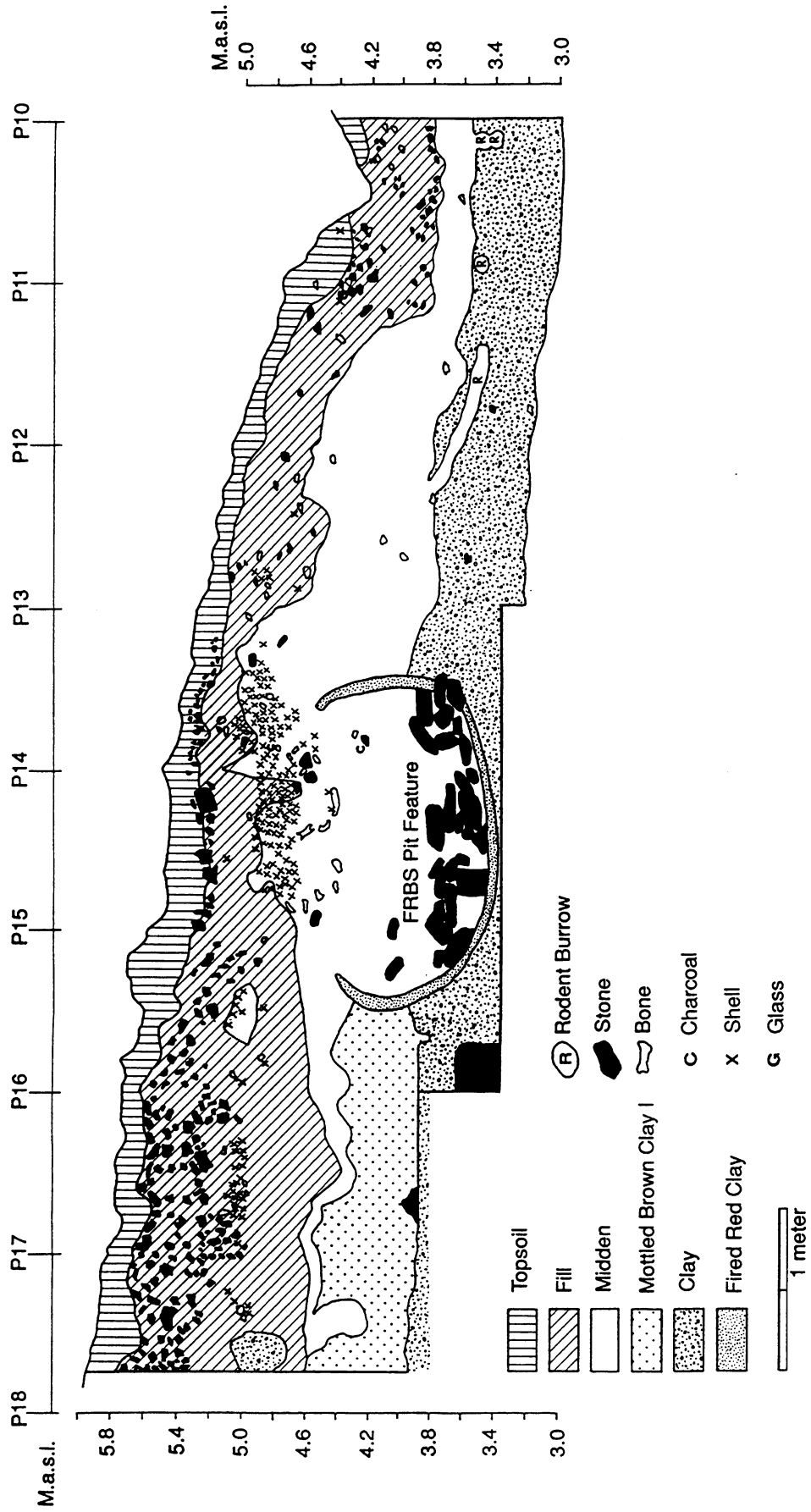


Figure 2.5 Middle Profile Units



stratigraphic marker in the westernmost units (P15, P16, P17, P18). The fill stratum, as defined in the field, is almost 1.1 m thick in P16, P17, and P18, and only .1 to .6 m thick in the other units. A sparse distribution of lithic tools, mollusk remains, and mammal bones is observed in the fill.

3) Midden. The dark brown (10YR 2/2) deposit contains a shell and animal bone-rich matrix, not very well compacted, with inclusions of smaller-sized angular sandstone and siltstone rocks. Most colluvial materials are less than 3 cm in diameter. The deposit is only .2 to .3 m thick in P11, then increases in depth in P12 to P16, where it is almost 1 m thick in places. In P17 and P18, the midden tapers to only 10 to 20 cm in size before disappearing. A diverse range of glass, ceramic, and lithic artifacts has been recovered as well as an impressive assemblage of mollusk shells and animal bones, especially above the FRBS Pit Feature described in more detail below. Charcoal particles are distributed throughout most profile units, and evidence of rodent burrowing is noted in some units.

4) Mottled Brown Clay I. The brown (10YR 4/3) deposit, fairly compact in hardness, is marked by a clay-rich matrix containing small decomposing red and yellow sandstone pieces, most measuring less than 3 cm in diameter. It underlies the midden stratum west of the pit feature, and ranges from .4 to .6 m in thickness. It is absent east of the pit feature. Charcoal fragments are sparse, and only a few mollusk and lithic specimens were uncovered.

5) Clay. The brownish-yellow (10YR 6/6) clay-rich

sediments comprise the lowermost stratum in all profile units. It contains yellow and red decomposing sandstone rocks, large clay fragments, and some angular siltstone pieces. While few mollusk remains, animal bones, charcoal, or ceramic, metal, and glass artifacts were recovered, lithic artifacts are common.

FRBS PIT FEATURE

The FRBS Pit Feature in P14, P15, and P16 was originally dug into the underlying clay soil and the brown mottled clay of its west side (figure 2.6). The upper portion of the feature appears to have been dug into the lowermost levels of the midden soil in P14 and P15 (see figure 2.5). The pit, shaped like the hull of a ship, is constructed with its sides sloping concavely toward the bottom. It measures 2 m at its widest point on the 60 degree axis, 1.75 m along its 150 degree axis (extending out from the profile face), and 1 m in depth from the top edge of the pit to the bottom. The wall of the pit is lined with clay, 5 to 8 cm thick.

A stone bench is built on the clay surface in the bottom of the pit (figure 2.7). This bench is constructed of large flat rocks, many measuring 25 to 30 cm in length and about 10 cm in width. These are laid down on the clay surface, in three or four courses, at a height that probably reached 45 to 50 cm above the pit floor. The bench was not intact when excavated, and the angle and position of many rocks suggest they had been disturbed from their original position. The bench is built across the width of the pit (along the 60 degree axis). It is not clear how far it extended out from the profile wall, although

Figure 2.6 The Fort Ross Beach Site Pit Feature



Figure 2.7 *Close-Up of Stone Bench in the Fort Ross Beach Site Pit Feature*

intact foundation stones indicate it protruded at least .9 m. A possible post-mold, measuring 20 by 25 cm and surrounded by four rocks, is located in front of the bench about 1.5 m from the profile wall (figures 2.8, 2.9).

The pit feature had been subjected to very hot temperatures. The clay used to construct the pit exhibits signs of thermal alteration, most marked by bright red, orange, and purple colors that radiate out from the interior to exterior surfaces, and fine charcoal powder along the interior surface. In addition, some of the rocks in the bottom of the pit show evidence of fire-cracking. We surmise that a very hot fire was generated in the pit, probably around the stone bench on the floor of the feature. However, while the interior clay surface contains charcoal powder, larger chunks of charcoal were not recovered on the floor or in the pit fill. The paucity of evidence for an internal source of fire suggests the feature may have been cleaned prior to abandonment or that rocks were heated nearby and then placed inside the pit. The floor of the feature appears to have been swept out. Few artifacts were recovered on or near the floor surface.

A dense aggregate of mollusks and large mammal bones is observed in the midden deposit directly above the FRBS Pit Feature (figure 2.5). These materials are probably concentrated above the pit, possibly as trash near or on the roof of a structure associated with this feature. When the structure was abandoned, the roof appears to have collapsed inward, and the faunal remains were deposited on top of the already filled-in pit feature.

WEST PROFILE (P20-P30)

The upper bank of the erosional scar undulates considerably, a product of recent landslides and slope wash (figure 2.10). The surface slopes down from P20, P21, P22, and P23 (5.62 to 5.0 m asl) on the east side, bottoms out in P24, P25, P26, and P27 (5.14 to 4.78 m asl), and rises again in P28, P29, and P30 (5.34 to 5.1 m asl) on the western end. The topsoil is absent in all units. Either it has been removed by recent erosion and/or the upper bank has not been stable enough for its formation. All profile units are excavated to a depth of 3.7 to 3.4 m asl. Four deposits are defined (figure 2.11).

1) Fill. The dark brown (10 YR 3/3) deposit is dry and crumbly, a loose aggregate of colluvial materials, including angular siltstone rocks that are a product of road construction activities above the site. The presence and depth of fill varies significantly across the section. The deposit is over .5 m thick in the eastern units, absent in the middle units, and variable in depth in the western units where slippage scars from previous soil movements are evident. The deposit contains few artifacts and almost no faunal remains.

2) Mottled Brown Clay II. Similar to units P17 and P18, the grayish-brown (10YR 3/2) deposit is relatively compact, clay-rich, and contains inclusions of decomposing red and yellow sandstone. However, it differs in the size range of the colluvial materials by including very large angular siltstone rocks similar to those found in the fill. While most sediments are dry and easy to excavate,



Figure 2.8 Possible Post-Mold in front of Stone Bench in the Fort Ross Beach Site Pit Feature

moist soil was observed in units P28, P29, and P30 throughout the summer of 1989, suggesting that a spring may be located nearby. The stratum is very thick in most units, in several cases greater than 1 m deep. It contains a diverse range of artifactual and faunal remains. Most of the large angular rocks; ceramic, metal, and glass artifacts; mollusk specimens, and animal bones, however, are found in the upper .3 to .4 m level. Charcoal and lithics are found throughout the deposit.

3) Yellow Clay. Two separate lenses of yellowish-brown (10YR 5/6) clay extend along the lower levels of units P20 to P26. This clay-rich matrix is marked by many large angular siltstone rocks, no shell or animal remains, and only a few lithic artifacts.

4) Beach Gravel. Beach gravel underlies all the units except P20 on the east, and P29 and P30 on the west. It is likely, however that had these units been excavated to a deeper level, then beach gravel would probably have been found. This stratum is associated directly with the beach deposits in the Fort Ross Cove. As Price notes in chapter 4, this finding indicates that colluvial sediments were deposited directly on top of older beach deposits that once extended along the base of the marine terrace.

No shell specimens, animal remains, or European goods were recovered in this stratum, but lithic artifacts were collected.

EAST BENCH (0N, 12W)

The surface of this unit slopes downward from west to east 42 cm, from 6.98 m asl in the northwestern corner to 6.56 m asl in the northeastern corner. The unit is excavated at the angle of the slope, following the natural stratigraphy, to a maximum depth of about 90 cm below surface. Three deposits are defined (figure 2.12).

1) Topsoil. The dark brown (10YR 3/3) soil, dry and crumbly, is composed of unsorted colluvial materials, including sandstone, siltstone, and chert pieces, some over 10 cm in length. The deposit covers the entire unit to a depth of 20 to 30 cm below surface. The topsoil was not screened in this unit.

2) Mottled Brown Clay II. The grayish-brown (10YR 3/2), compact, clay-rich deposit is composed of small decomposing red and yellow sandstone fragments, as well as many large angular siltstone rocks. The deposit is 40 to 45 cm thick in the west end of the unit, and tapers to a wedge only 10 to 15 cm thick in the east end. Archaeological materials include glass, ceramic, and lithic artifacts, and some mollusk shells.

3) Midden. The dark (10YR 2/1) deposit is characterized by a high carbon content, a dense concentration of shell and animal bone fragments, decomposing red and yellow sandstone, and a few large angular rocks. The midden covers the entire unit beginning at a depth of about 6.4 m asl. Time constraints only allowed sampling of this deposit. We sampled a 20-to-40-cm thick stratum of the midden, within which we found a diverse range of ceramic, metal, glass, and lithic artifacts, mollusk shells, and animal bones. Along the northern wall, red clay or

Figure 2.9 Plan Map of Floor of the Fort Ross Beach Site Pit Feature

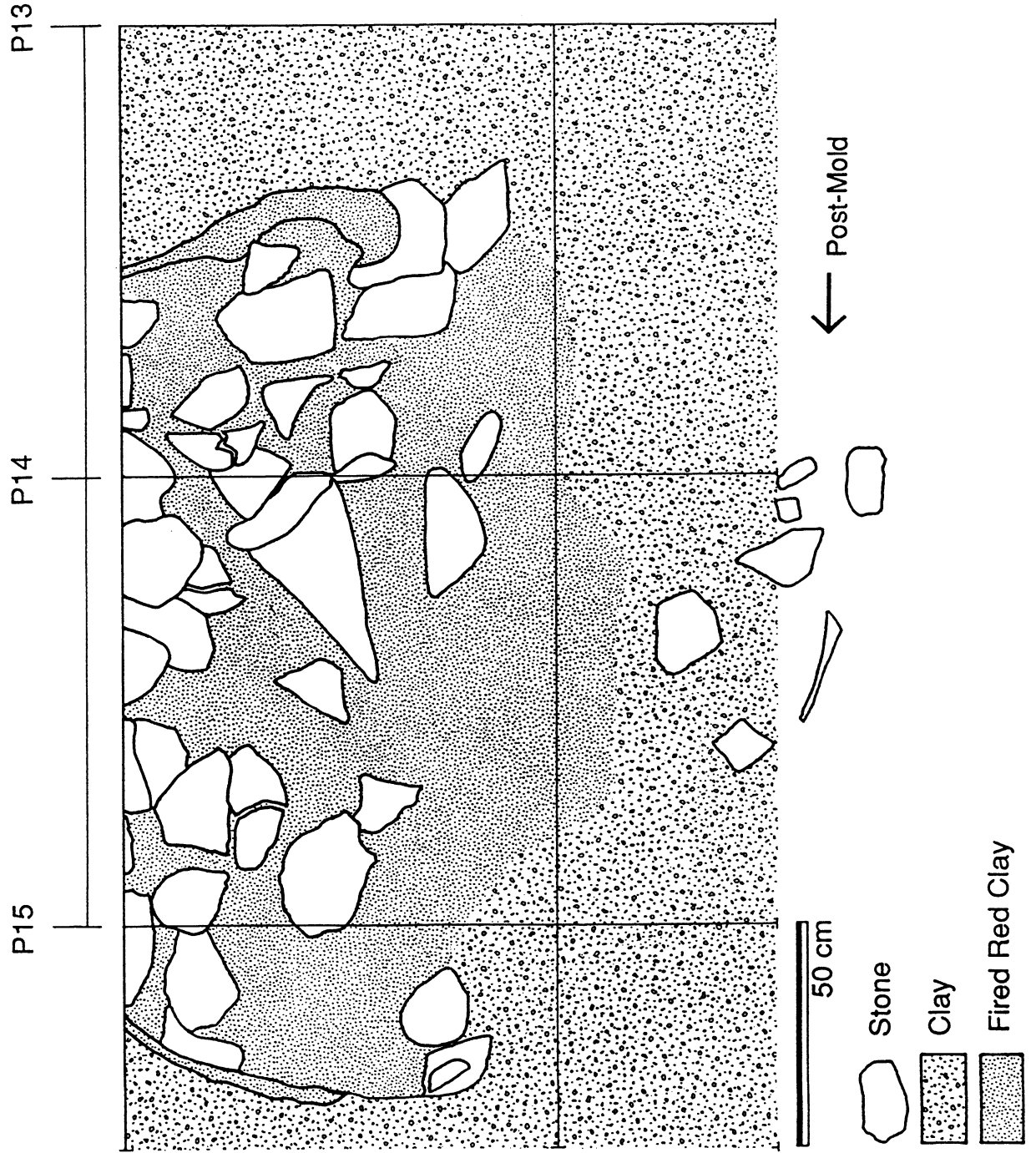


Figure 2.10 Photo of West Profile Units



daub was observed and collected, indicating possible *in situ* burning. Directly west of the discolored soil is a concentration of charcoal, shell, and animal bone. Augering in the bottom of the unit indicates that the midden stratum is at least 1.95 to 2.0 m thick, extending to a depth of 4.33 m asl.

SOUTHWEST BENCH (6S, 19W)

The surface slopes steeply downward across the six 1-by-1 units from west to east and from north to south. From the northwestern corner, 6S, 19W (7.7 m asl), the highest point in the block, the surface drops 1.26 m in the three meter distance to the northeastern corner, 6S, 16W (6.44 m asl) (figure 2.13). From 6S, 19W to the southwestern corner, 8S, 19W (7.08 m asl), the drop is .62 cm in the two-meter distance (figures 2.14 and 2.15). Excavation follows the slope of the natural stratigraphy. Most of the units are excavated between .97 and 1.33 m below surface: 7S, 17W (1.22 m); 7S, 18W (1.33 m); 7S, 19W (1.32 m); 8S, 17W (.97 m); and 8S, 18W (1.11 m). However, we excavated 8S, 19W to the underlying bedrock, about 1.46 m below surface. Five deposits, including the bedrock in 8S, 19W, are described below (figures 2.13 and 2.14).

1) Topsoil. The dark brown (10YR 3/3) soil is dry, crumbly, and highly organic (grass roots) with small colluvial inclusions. Topsoil covers the entire block, ranging in depth from about 10 to 25 cm. The deposit was not screened.

2) Fill. In the western units of the block, a dense

deposit (10YR 3/3) of angular siltstone rocks exists to a depth of about 40 to 60 cm below surface. The deposition of this rock fill is associated with the construction of the road above the site in the 1920s. The rock fill tapers in depth in the eastern units, disappearing completely in unit 7S, 17W and the eastern edge of 8S, 17W. The deposit was not screened.

3) Mottled Brown Clay II. Underlying the fill is a grayish-brown (10YR 3/2) deposit of clay-rich sediments that contains red and yellow decomposing sandstone fragments, some large angular rocks, and many fragments of shell and charcoal. The soil varies in compactness across the units, depending largely on rodent activity. The stratum is most extensive in the northwest units (7S, 19W; 8S, 19W) where it is almost .6 to .7 m deep. It is less than .5 m thick in the other units. A varied assemblage of ceramic, metal, glass, and lithic artifacts was collected, as well as a diverse range of mollusk and animal remains. Charcoal fragments are common throughout the stratum. No features were detected.

4) Highly Mottled Clay. No distinct separation exists between this deposit and the mottled brown clay II. Excavators note that the lowermost stratum is more compact and characterized by a higher clay content, and more decomposing red and yellow sandstone fragments. The thickness of this stratum varies inversely with the depth of the mottled brown clay. A thin layer, .1 to .2 m thick, is exposed in the bottom of 7S, 19W; while 7S, 17W and 8S, 17W exhibit a stratum .3 to .5 m deep. In 8S, 19W, the only unit excavated to bedrock, the highly

Figure 2.11 West Profile Units

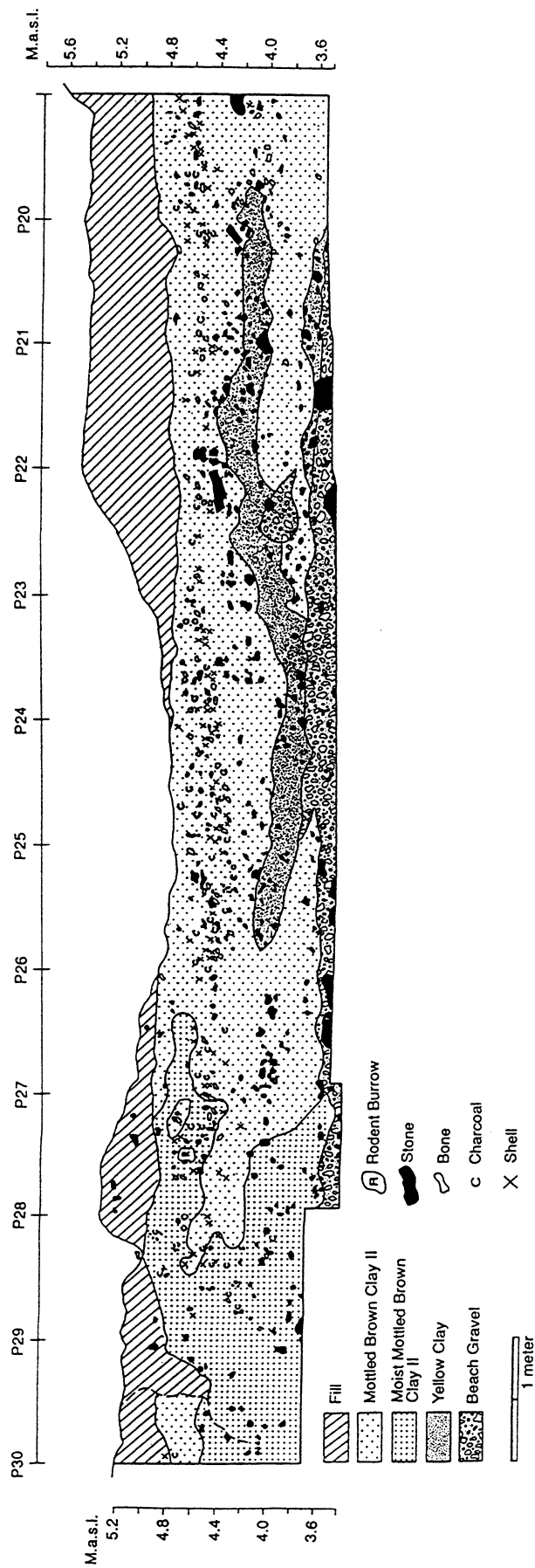


Figure 2.12 Profile of North Wall of East Bench (ON, 12W)

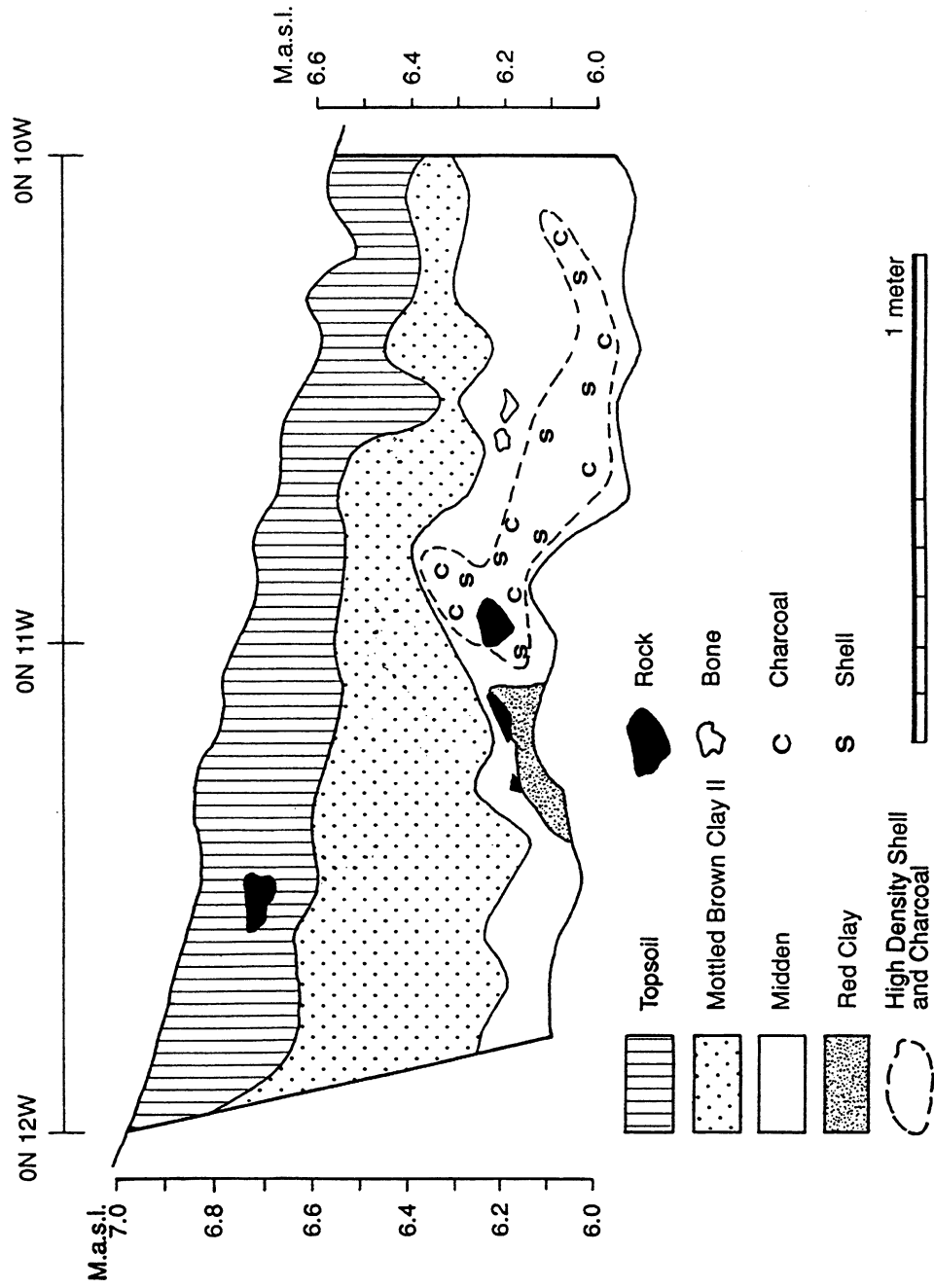
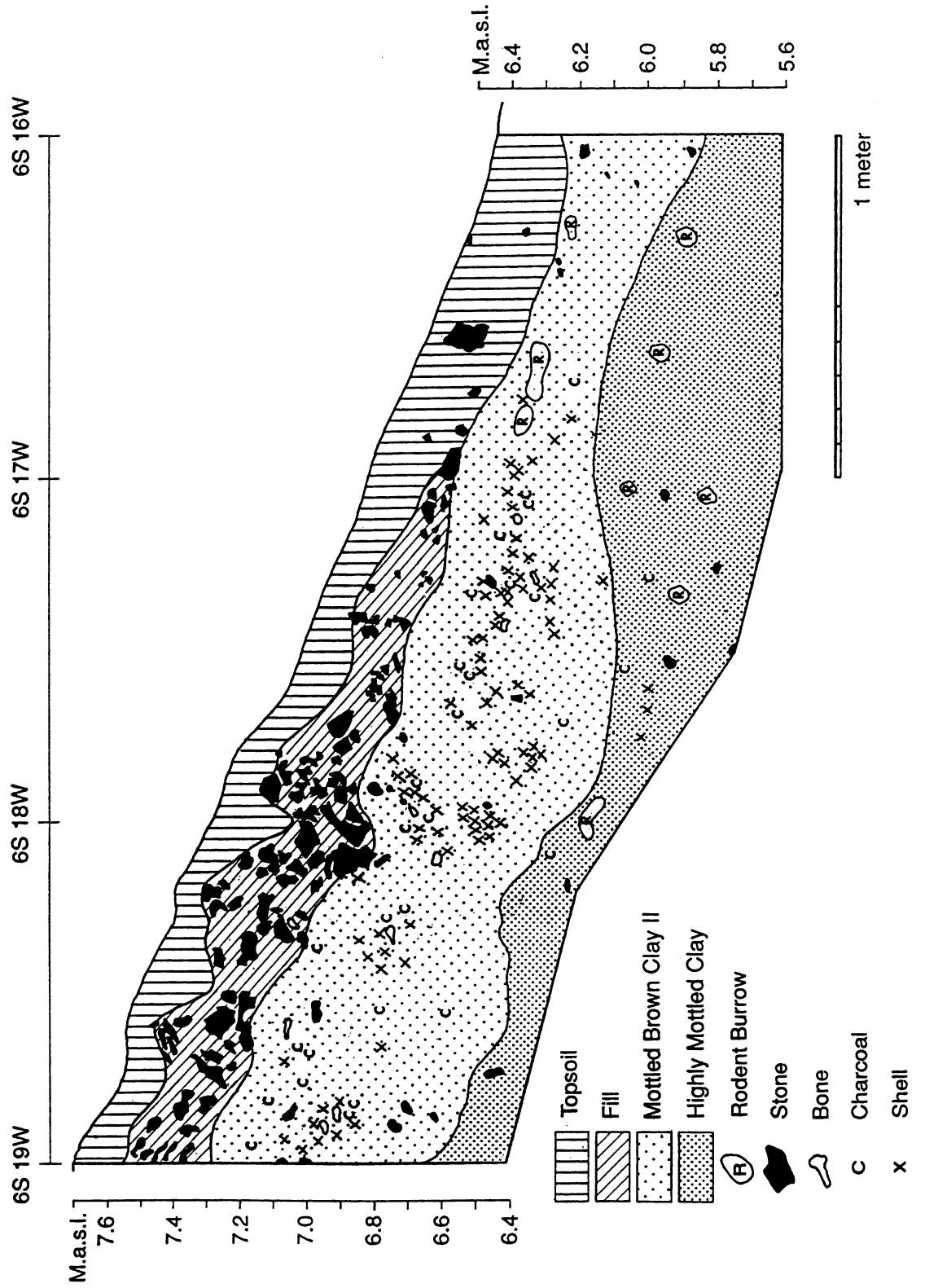


Figure 2.13 Profile of North Wall of Southwest Bench



mottled clay stratum is .3 to .4 m thick (figure 2.14). The density and diversity of historic ceramic, metal, and glass artifacts decrease dramatically, as well as the quantity of charcoal, shell and animal bone fragments in this highly mottled clay stratum. However, a large number of lithic artifacts was recovered. No features were detected.

5) Bedrock. The bedrock in the northwest corner of 8S, 19W is a brownish-yellow (10YR 6/6) sandstone (figures 2.14 and 2.15). Many angular, decomposing fragments of sandstone are noted on the contact surface of the bedrock in unit 8S, 19W.

CONCLUSION

The archaeological investigation of FRBS involved the cleaning and excavation of 28 profile units along the erosional face of the marine terrace, and the excavation of two areas on the bench. Archaeological materials were uncovered in a colluvial formation along the base of the marine terrace. The site is an active landscape. Wave action and floods have removed the colluvial "toe"; slope wash and landslides are continually modifying the steep slope of the West Profile; rodent activity is common; and past road building activities are clearly evident in the stratigraphy. We recognize that some archaeological materials, especially in the West Profile, were probably not recovered in contexts in which they were originally deposited, but have been transported downhill, probably from NAVS upslope, and mixed with other material culture over time.

While dynamic processes have been at work, several lines of evidence suggest an organizational structure to FRBS.

1) The Bench. The excavation of the 2-by-3 m block in the Southwest Bench unearthed sandstone bedrock relatively close to the surface. This finding indicates the bench was not created entirely from colluvial deposition, but that its underlying structure is part of the base of the marine terrace. The marine terrace would have been extant when people first began to use the Ross Region, at least 8,000 to 6,000 years ago (Lightfoot et al. 1991:110-12). The thick midden deposits on the bench could have resulted from long-term *in situ* use of this topographic place, with some mixing of colluvium materials deposited down the slope of the marine terrace, including archaeological materials from NAVS.

The Native Alaskan workers may have used the bench as a work area that overlooked the sheds where their *baidarkas* and fishing/hunting equipment were stored. Eyewitness accounts also suggest that houses may have been constructed down the slope of the marine terrace into Fort Ross Cove. Since the sides of the marine terrace have been extensively modified by road construction and erosion, the bench represents one of the few enduring places where intact house structures may

still be found. Our excavation of the 2-by-3 m block in the Southwest Bench indicates it will be very difficult to discriminate archaeological materials deposited *in situ* from those transported downhill from NAVS given the steep slope and mottled nature of the strata. However, there does appear to be some vertical sorting of materials. Historical materials and lithic artifacts are found in the upper levels of the block, while only lithics are in the lower. This vertical distribution may indicate the presence of both prehistoric and historical components on the bench.

The most likely place to find *in situ* deposits is in the East Bench, an area conspicuous by its relatively gentle slope. The topsoil and mottled brown clay soils in ON, 12W appear to have been formed, at least in part, by colluvial action. However, the underlying thick midden stratum may have been created primarily by *in situ* cultural deposition. This observation is supported by the presence of a possible feature associated with shell and animal bone refuse. It is likely that materials associated with cove activities or local households may still be buried here. However, our testing of the midden is too limited to evaluate this proposition at this time.

2) East and Middle Profiles. The lowest consolidated clay stratum in the East and Middle profiles of the site is solid and relatively resilient to erosion. This stratum may have formed on top of the bedrock that extended into Fort Ross Cove. A similar clay stratum is deposited on bedrock in the Southwest Bench and on top of the marine terrace at NAVS. The recovery of primarily lithic artifacts and very few ceramic, glass, and metal artifacts suggests the clay was laid down prior to the construction of Fort Ross.

The midden deposit overlying the clay in the East and Middle profiles is an extension of the midden materials found on the bench. The common occurrence of historic ceramic, glass, and metal artifacts throughout this stratum suggests it was deposited during and after the Russian settlement of Ross. The FRBS Pit Feature, excavated into the clay stratum and part of the midden deposit, may not be an isolated structure. While no features are found directly behind it, other structures may have been constructed on the nearby bench during the Ross occupation.

3) West Profile. The beach gravel underlying the West Profile indicates that colluvial materials are deposited directly on the beach. The bench does not appear to have extended along this area of the site. There is a good chance that most materials found here were transported down the steep slope of the marine terrace from NAVS. However, despite this mixing, there appears to be some vertical separation of materials. Mollusk shells, animal bones, ceramic, glass, and metal artifacts are found primarily in the upper 30-40 cm levels, while lithics are found throughout, even in the beach gravels.

Figure 2.14 Profile of West Wall of Southwest Bench

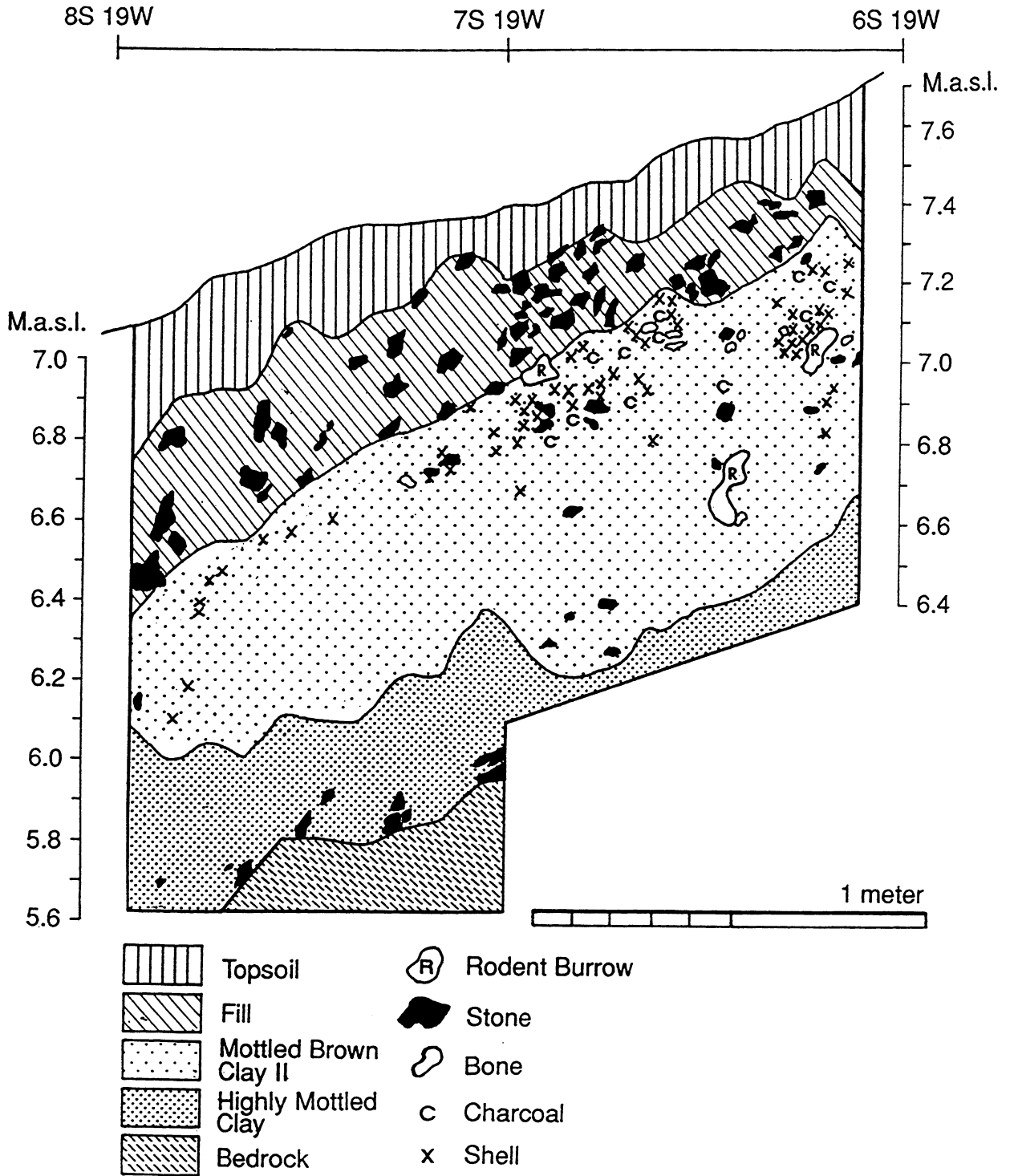
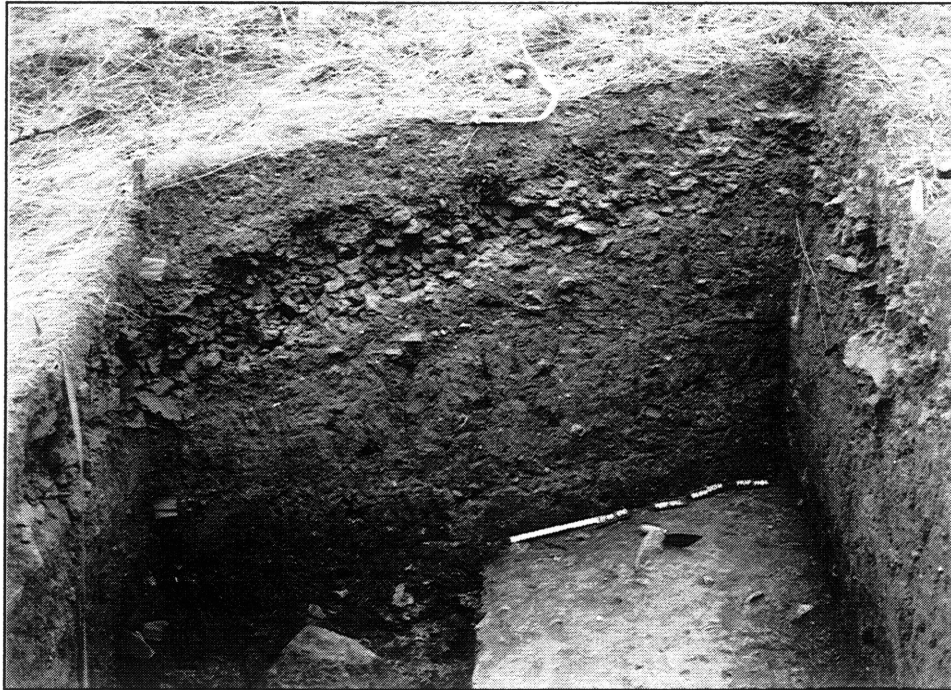


Figure 2.15 West Wall of Southwest Bench. Note Bedrock in Lower Left Corner.



Again, it is possible that a prehistoric component underlies this section of the site.

REFERENCES

McKenzie, John
1963 Historic Resources and Indian Sites at Fort Ross State
Historic Park as Identified by John McKenzie, August 20,

1963. Manuscript on File, Cultural Heritage Section,
Archaeology Laboratory, California Department of Parks
and Recreation, Sacramento.

Treganza, Adan E.
1954 *Fort Ross a Study in Historical Archaeology*. Reports of
the University of California Archaeological Survey No.
23:1-26.

3

Archaeological Field Investigations at the Native Alaskan Village Site

KENT G. LIGHTFOOT, ANN M. SCHIFF, AND LISA HOLM

IN THIS CHAPTER, we outline the field program used in the investigation of the Native Alaskan Village Site (CA-SON-1897/H). The program involved topographic mapping, systematic surface collection, geophysical survey, subsurface testing, and broadscale areal excavation. We discuss the field methods utilized, the surface and excavation units investigated, the overall site structure, and the stratigraphy, features, and kinds of cultural materials uncovered in archaeological deposits.

SITE DESCRIPTION

Perhaps Adan Treganza first identified the Native Alaskan Village Site in 1953 when U.C. Berkeley archaeologists were investigating the foundations of the north Stockade wall. He reported "Indian Site No. 4" that "overlooks the sea from a high bluff directly above the cove which formerly contained a landing pier supported on large boulders" (Treganza 1954:18). However, the main landing pier used by American loggers and ranchers was about 500 m west of NAVS. It is possible that Treganza observed NAVS materials extending significantly beyond the area we investigated or that he was describing the location of either CA-SON-174 or CA-SON-1854/H (see Lightfoot et al. 1991:61). Treganza (1954:18) also indicated that the area "which housed the Aleut otter hunters and their families" had not yet been discovered and that "this will make an interesting study for the future."

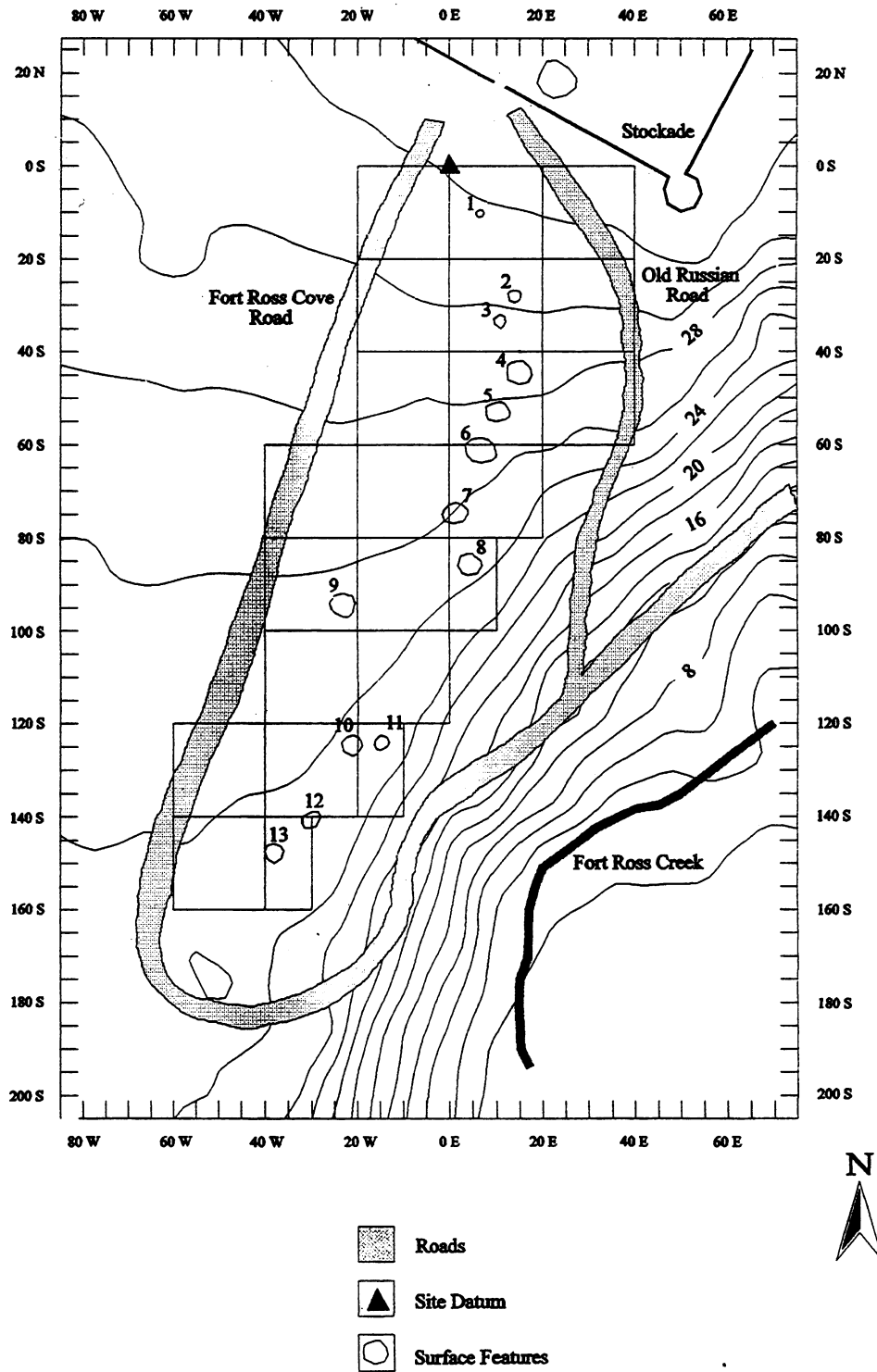
The location of NAVS was illustrated by John McKenzie in his 1963 map of archaeological remains in the State Park (McKenzie 1963). The site was also described in the 1976 Resource Management Plan of Fort Ross Historic State Park (Carlson 1976:11-13). In 1973, Fedorova's book, *The Russian Population in Alaska and California*, which reproduced and described the 1817

map showing the location of NAVS, was published in English. By the mid-1970s most American scholars of Russian-California were cognizant of the location of the Native Alaskan Village.

We initiated the first detailed archaeological investigation of NAVS in the summers of 1989, 1991, and 1992. The site was recorded in 1989, and in 1990 the Northwest Information Center assigned NAVS the permanent trinomial, CA-SON-1897/H.

NAVS is situated on the marine terrace south of the southern portal of the Stockade complex, directly above FRBS (figure 3.1). The topography of the terrace top is relatively flat, sloping slightly upward from south to north, from about 22 to 32 m asl over a 200 m distance. The eastern and southern edges of the terrace are steep cliff faces that drop precipitously into Fort Ross Cove. Exposed bedrock in road cuts along the eastern side of the marine terrace shows parallel beds of siltstone, varying in thickness, that have been raised and tilted upward at a steep angle from west to east. As Price describes in chapter 4, the contact points between the parallel beds along the upper surface is where much of the weathering and fracturing of the bedrock takes place. The decomposition of the bedrock produces sharp angular siltstone rocks and smaller subangular and angular debitage, materials that were described previously in the colluvial formation at the base of the terrace at FRBS. A shallow topsoil, approximately 10 to 15 cm deep, covers the bedrock along the eastern edge of the terrace where it is visible in the road cut. The soil is composed of both aeolian sediments and decomposing siltstone and sandstone sediments derived from the bedrock, the latter transported upward by bioturbation, especially by burrowing rodents and earthworms. The marine terrace is presently covered by a thick coastal

Figure 3.1 Native Alaskan Village Site Map



prairie of mostly introduced annual grasses, such as fescue and wild oats.

When we first investigated the site in May 1989, the surface consisted of an extensive scatter of ceramic, glass, metal, and lithic artifacts, shellfish remains, and animal bones covering an area about 200 by 40 m. Evidence of recent rodent burrowing was common across the entire site, and many of the archaeological remains we observed had been brought to the surface by these tireless creatures. The artifact scatter began about 15 m south of the Stockade wall, paralleled the eastern side of the marine terrace, and terminated on the southern edge of the terrace. Shallow pit depressions or leveled platform areas were visible along the eastern edge of the site.

FIELD PROCEDURES

We employed a three-phase field strategy to define the overall site structure, and to investigate in detail several areas of NAVS. Phase One, initiated in the summer of 1989, was a detailed surface investigation including contour mapping, the surface collection of archaeological remains, and geophysical survey using remote sensing techniques. The results of Phase One were used to make informed decisions about the placement of subsurface test units in Phase Two, which we began in the summer of 1991. The second phase involved limited excavations of 1-by-1 m units and trenches. Phase Three was initiated in the 1992 field season when two large excavation areas were laid out along the trenches first exposed in 1991. The purpose of this broadscale excavation was to delineate features and the spatial organization of archaeological materials.

PHASE ONE (1989 FIELD SEASON)

TOPOGRAPHIC MAP OF NAVS

The site datum was established 1 m east of a large boulder south of the Stockade. The datum was placed at a 208 degree bearing 20 m from the western post of the southern portal of the reconstructed Stockade. Using a transit, stadia rod, and metric tapes, we generated a 20-by-20 m grid system across the site, shot topographic elevations of the terrace top and eastern edge, and mapped in the south side of the Stockade, the Old Russian Road, the Fort Ross Cove Road, and the north-west side of Fort Ross Cove (figure 3.1). We also shot in the site datum of FRBS, and transposed the profile and excavation units of FRBS on to the broader scale topographic map of NAVS. After the 1989 field season, the enhanced NAVS map became the master map for the Native Alaskan Neighborhood showing the spatial relationship of the Stockade, NAVS, FRBS, and the Fort Ross Cove.

A detailed inspection of the contour features along the terrace top revealed thirteen shallow surface depressions or leveled platforms. These surface features were distributed in a linear pattern from north to south, parallel to the eastern edge of the marine terrace. These were mapped and numbered consecutively from 1 to 13 beginning with the northernmost surface feature (figure 3.1). The surface features ranged in size from 3 to 6 m in diameter. All the features but one (#9) were located within 20 m of the eastern edge of the terrace.

SURFACE COLLECTION

We employed a systematic, judgmental sampling design to collect artifacts and faunal remains from the NAVS surface. The purpose was to place collection units across the site and to sample several of the surface features. The sampling design involved the stratification of the site into fifty-seven 10-by-10 m blocks, extending from site datum to about 140 m south, and the selection of at least one 2-by-2 m collection unit from within each block. In implementing the design, only about 65% of the 10-by-10 m blocks in the original sample were tested because either thick grass obscured the ground surface or steep slopes hindered the placement of units along the eastern edge of the terrace. Thirty-eight 2-by-2 m units were surface collected (figure 3.2). The location of the collection units within blocks was arbitrary, based primarily on surface visibility. We now recognize the biased placement of the collection units since many were situated in areas of recent gopher activity.

In addition to the systematic sampling of 10-by-10 m blocks, we collected archaeological materials from the surfaces of five features (5, 7, 8, 9, 10) using collection crosses similar to those described in Volume 1 for the hinterland survey of Fort Ross (Lightfoot et al. 1991:62). We chose a central point within each feature and laid out 2-by-1 m collection units along the four cardinal directions. The collection units extended beyond the boundaries of each surface feature so that we sampled areas of both internal and extramural space (figure 3.2). Eight 2-by-1 m units were collected from Features 5, 7, and 10, while seven and nine 2-by-1 m units were collected, respectively, from Features 9 and 8.

We undertook analyses of the surface assemblage of materials in the 1989-1990 academic year, and the results played an important role in decisions concerning the placement of excavation units in the 1991 field season. We sorted the surface materials into broad categories, calculated density figures, and used a spatial mapping program (SURFER) to compute isopleths of expected artifact densities. The SURFER maps were generated using the inverse distance method for calculating nearest neighbor statistics and were based only on the areal sample of thirty-eight 2-by-2 m units. The materials

Figure 3.2 Native Alaskan Village Site Surface Collection Units

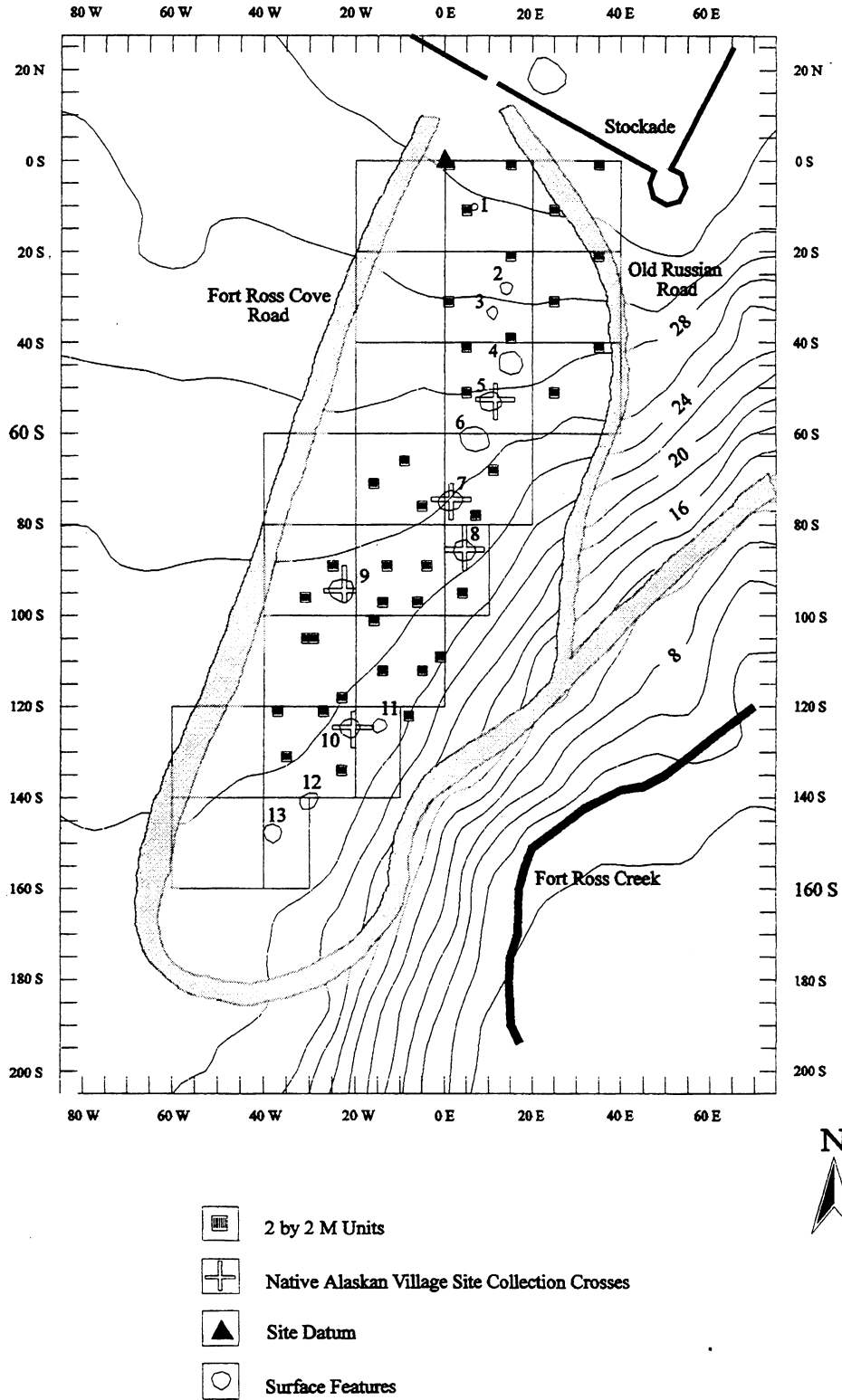


Table 3.1 *Counts and Density Figures for Materials from the Thirty-eight 2-by-2 m Units*

Artifact Category	Mean	SD	Artifact Density (per m ²)		# of Empty Units (n=38)
			Maximum Value	Count (n)	
Flake/Core/Biface	.592	.650	2.5	90	14
Fire-Cracked Rock	.112	.307	1.75	17	30
Bead	.046	.113	.5	7	32
Window/Bottle Glass	.934	1.047	4.0	142	9
Ceramic	.579	.688	2.75	88	15
Metal	.349	.792	4.75	53	20
Fish	.585	.999	3.5	89	22
Bird	.230	.449	2.25	36	26
Marine Mammal	.230	.57	3.25	35	25
Artiodactyl	.105	.219	.75	16	30
Total Mammal	2.85	3.39	13.25	433	13
Shellfish	1.57	2.49	11.75	239	15

collected from the five surface features were analyzed separately.

SURFACE COLLECTION: AREAL SAMPLE

Table 3.1 presents the counts, density statistics (mean, sd, maximum density), and number of empty collection units for flakes/cores/bifaces, fire-cracked rocks, glass beads, window/bottle glass fragments, ceramic sherds, metal artifacts, and various categories of faunal remains for the 38 2-by-2 m units. The small averages and substantial standard deviations, as well as the relatively large number of empty units, indicate great variation in the density of materials across NAVS. Some collection units contain relatively high densities of lithic specimens, ceramic sherds, glass pieces, metal artifacts, and faunal remains while others are relatively empty.

The isopleth maps generated for the lithic, ceramic, glass, and metal artifacts illustrate two spatial patterns: 1) a bimodal distribution of high artifact densities in the north and south areas of the site, separated by low artifact densities in the central area, and 2) a tendency for artifact densities to increase along the eastern edge of the terrace in the north, central, and eastern areas of the site. The faunal remains are concentrated primarily in the southern half of NAVS.

a) *Flakes/Cores/Bifaces* (figure 3.3). Large numbers are found along the northeastern edge of the site, directly south of the Blockhouse and along the cliff face, and in the south zone of the site, beginning about 90 m south. Lithic densities increase substantially along the eastern edge of the terrace across the entire site.

b) *Fire-Cracked Rocks* (figure 3.4). A similar spatial pattern as that described for flakes/cores/bifaces is evident. However, instead of multiple peaks of high lithic densities in the south zone, only one significant concentration and several minor peaks are depicted.

c) *Glass Beads* (figure 3.5). The density is also

highest in the south zone, beginning about 90 m south, and a moderate number were collected from the east central zone along the terrace edge as well.

d) *Window/Bottle Glass* (figure 3.6). Relatively high densities are found across much of the site. Most were collected from the northeastern section of the site, directly south of the southern portal of the Stockade, and in the south zone, beginning about 90 m south, where two significant peaks were observed. Another smaller peak is located in the south central zone (60 m to 80 m south) along the eastern edge of the terrace.

e) *Ceramics* (figure 3.7). Large numbers are concentrated in several loci in the south zone beginning about 90 m south. Another concentration of ceramics is found in the east central zone, along the terrace edge, centered on grid corner 80S, 10E.

f) *Metal Artifacts* (figure 3.8). A bimodal distribution is evident, with the largest accumulation in the north and two smaller peaks in the south (below 90 m south). Another minor concentration of metal remains is found in the east central zone, 60 to 80 m south.

g) *Fish Remains* (figure 3.9). Fish bones are concentrated in two extensive loci along the eastern edge of NAVS in the south zone (below 90 m south).

h) *Bird Remains* (figure 3.10). Three concentrations are evident in the south zone. One concentration extends along the eastern edge of the terrace (100 to 120 m south), another one along the dirt road (80 to 100 m south), and the third in between them and farther to the south (110 to 130 m south).

i) *Marine Mammal Remains* (figure 3.11). The majority of the marine mammal bones were recovered in the south and south central zone (65 to 120 m south), primarily along the eastern edge of the terrace. Another minor concentration of bones is found in the south zone (110 to 130 m south).

j) *Artiodactyl Remains* (figure 3.12). The spatial

distribution of deer, elk, cattle, and sheep bones corresponds closely to the three clusters of bird bones in the south zone. The three clusters of bones are separated by an empty zone that extends into the central area of NAVS.

k) Total Mammal Remains (figure 3.13). The south zone contains the majority of mammal remains, extending from the eastern terrace edge to the dirt road. The density of bones decreases dramatically in the north central and north areas of the site.

l) Shellfish Remains (figure 3.14). The spatial distribution of shellfish remains is similar to the bird and artiodactyl remains. Three major concentrations are found in the south zone, separated by an area of low density remains that extends into the central area of the site.

SURFACE COLLECTION: FEATURES

Artifact densities for five of the thirteen surface features (figure 3.1) are calculated by dividing artifact counts by total surface area collected (table 3.2). The artifact densities compare favorably to those from nearby 2-by-2 m units, supporting the overall spatial patterns described above.

Feature 5. This leveled platform, measuring 4.8 m in diameter, yielded artifact and faunal densities well below the means for the areal sample, except for fire-cracked rocks and metal. These findings correspond well with the density isopleths that show a significant concentration of metal artifacts in the north area of the site and very low densities of all other artifact categories and faunal remains.

Feature 7. This feature is a shallow depression (5 m in diameter) situated in the central area of the site near the eastern edge of the terrace. It exhibits moderate densities for all artifact classes and high densities of animal bones and shellfish. The densities for flakes/cores/bifaces, window/bottle glass, and metal artifacts are slightly below the means for the areal sample, while

those for fire-cracked rocks, beads, and ceramics are somewhat above. The moderate densities of ceramics, beads, and window/bottle glass, and to a lesser extent flakes/cores/bifaces, correspond well with the modest artifact peaks illustrated in the SURFER maps for this location (figures 3.3, 3.5-3.7). The densities for fish, bird, marine mammal, artiodactyl, total mammal, and shellfish remains are significantly higher than the means for the areal sample. The dense concentrations of faunal remains illustrated in figures 3.9-3.14 begin near Feature 7 and continue into the south zone.

Feature 8. This shallow depression, measuring 5.1 m in diameter, contains a smaller assemblage of artifacts and faunal remains than Feature 7, located directly to the north. Feature 8 yields more flakes/cores/bifaces and fewer fire-cracked rocks, window/bottle glass, and metal artifacts. The densities of beads and ceramics are comparable, although slightly lower in Feature 8. While the SURFER maps predict higher window/bottle glass counts and lower flake/core/biface densities for Feature 8, the other artifact categories fall within the density ranges illustrated in the maps. The quantity of faunal remains is considerably less than Feature 7. The densities of bird, artiodactyl, total mammal, and shellfish remains are slightly higher than the areal sample, while the fish and marine mammals are somewhat lower.

Feature 9. Another shallow depression, 5.1 m in diameter, this feature is situated less than 20 m from the dirt road at the boundary of the central and south zone. Since the south zone yields the highest densities of artifacts from the surface of NAVS, the rather meager surface assemblage from Feature 9 is somewhat surprising. The densities for all artifact categories are well below the means for the areal sample, and much lower than the ranges predicted by the SURFER maps. On the other hand, the densities of faunal remains are comparable to the means for the areal sample (with the exception of marine mammal) and the ranges indicated by the SURFER maps.

Table 3.2 *Artifact Densities for Surface Features*

Artifact Category	Artifact Density (per sq. m) for Surface Features				
	#5	#7	#8	#9	#10
Flake/Core/Biface	.13	.31	.94	.14	1.06
Fire-Cracked Rock	.13	.19	0	.07	.18
Bead	0	.13	.05	0	.31
Window/Bottle Glass	.13	.69	.28	.36	1.68
Ceramic	.25	.88	.5	.07	1.19
Metal	.50	.18	0	.07	.37
Fish	0	1.62	.33	.50	2.19
Bird	0	1.00	.44	.21	1.00
Marine Mammal	0	.44	.05	0	.94
Artiodactyl	0	.50	.11	.29	.31
Total Mammal	.06	8.06	3.44	2.50	10.00
Shellfish	0	4.19	2.83	1.00	6.12

Figure 3.3 *Surface Distribution of Flake/Core/Biface*

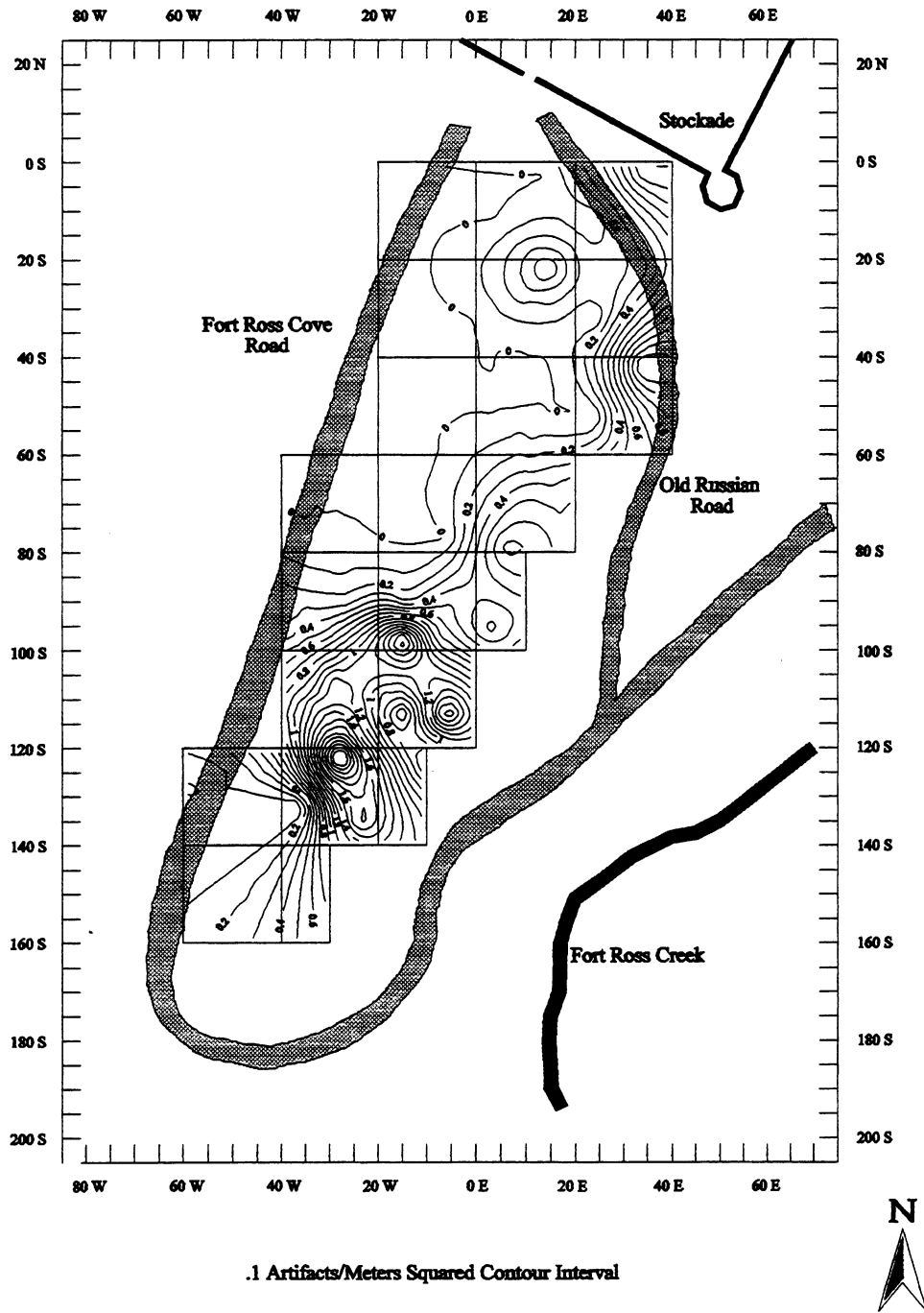


Figure 3.8. Surface Distribution of Metal Artifacts

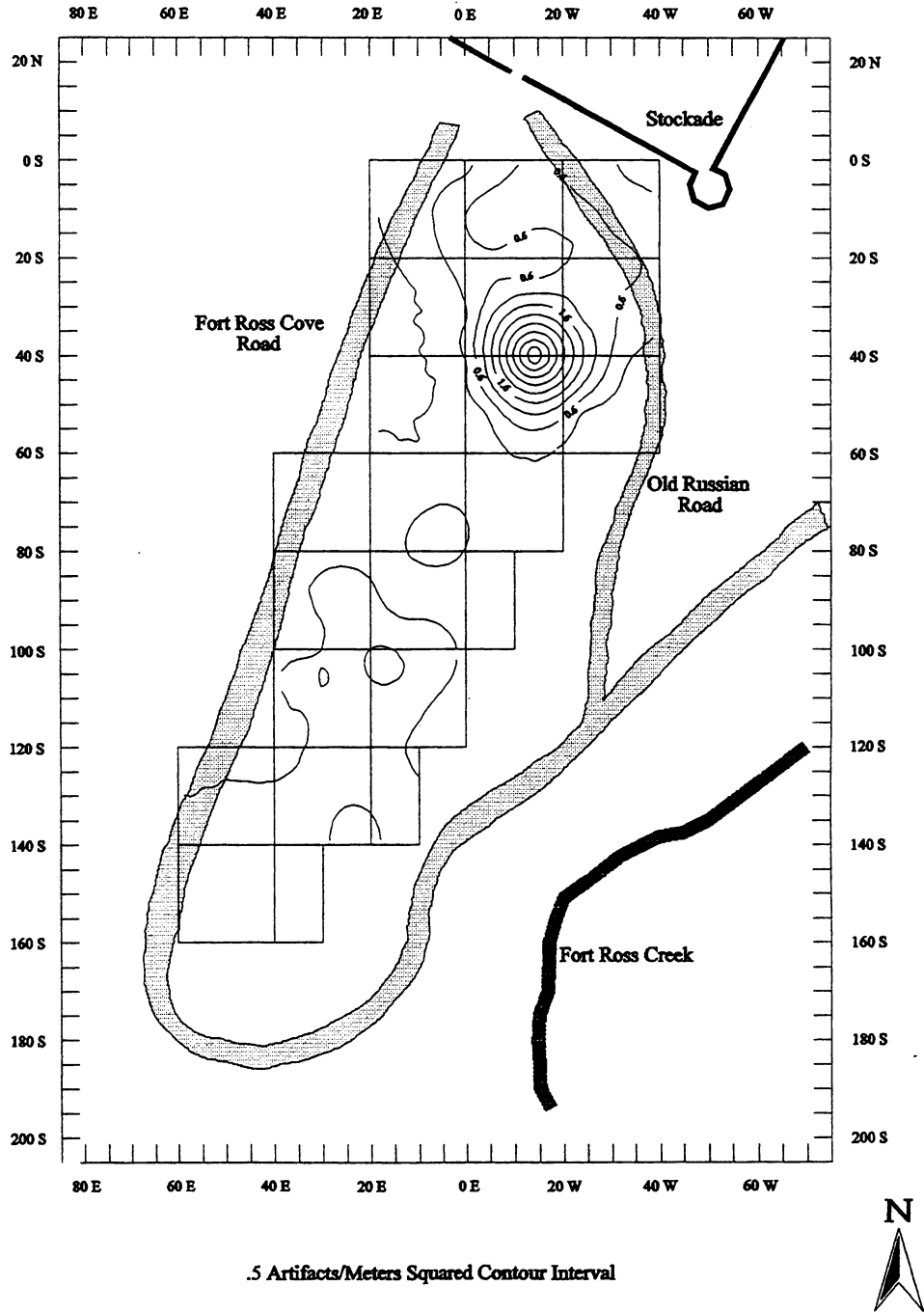
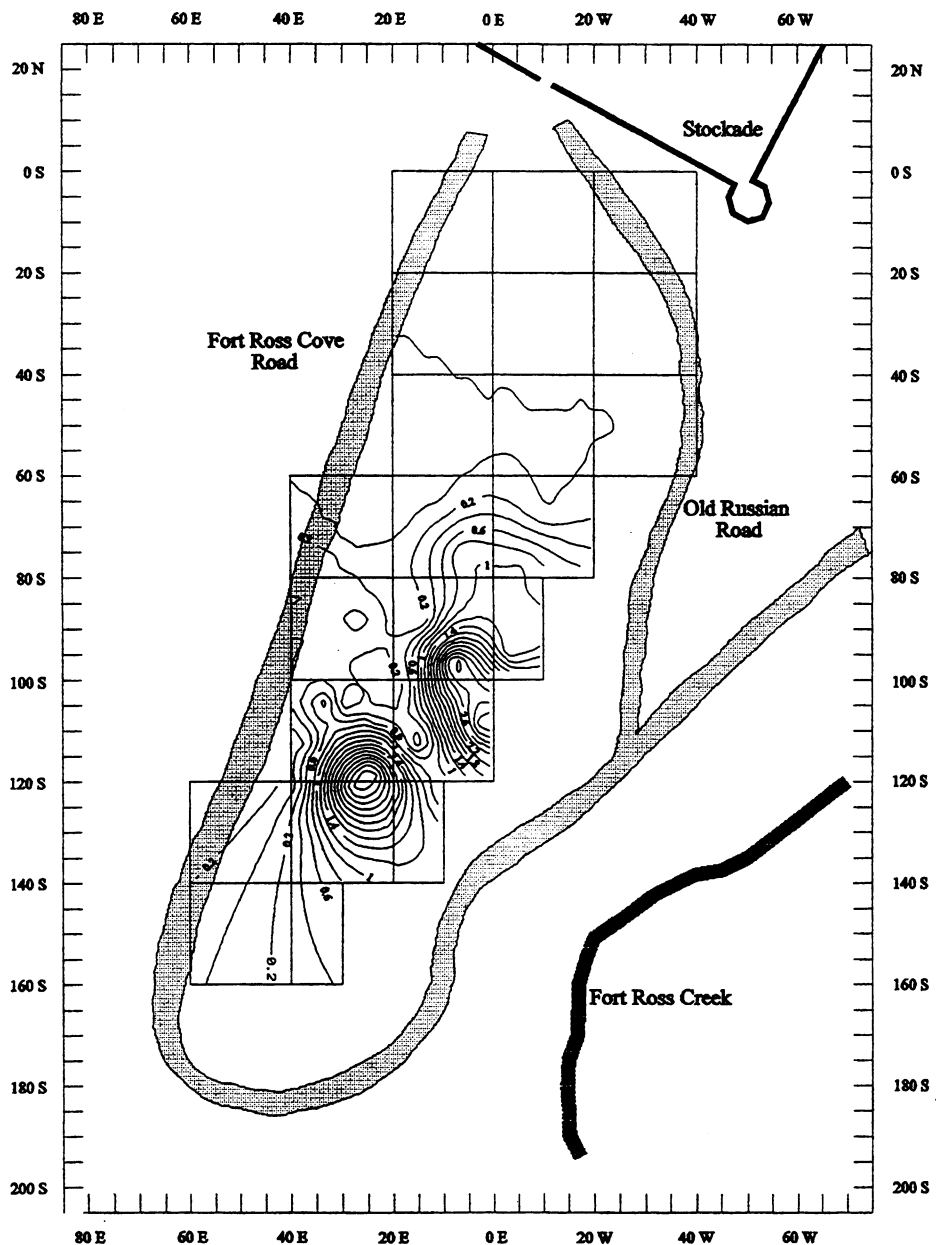


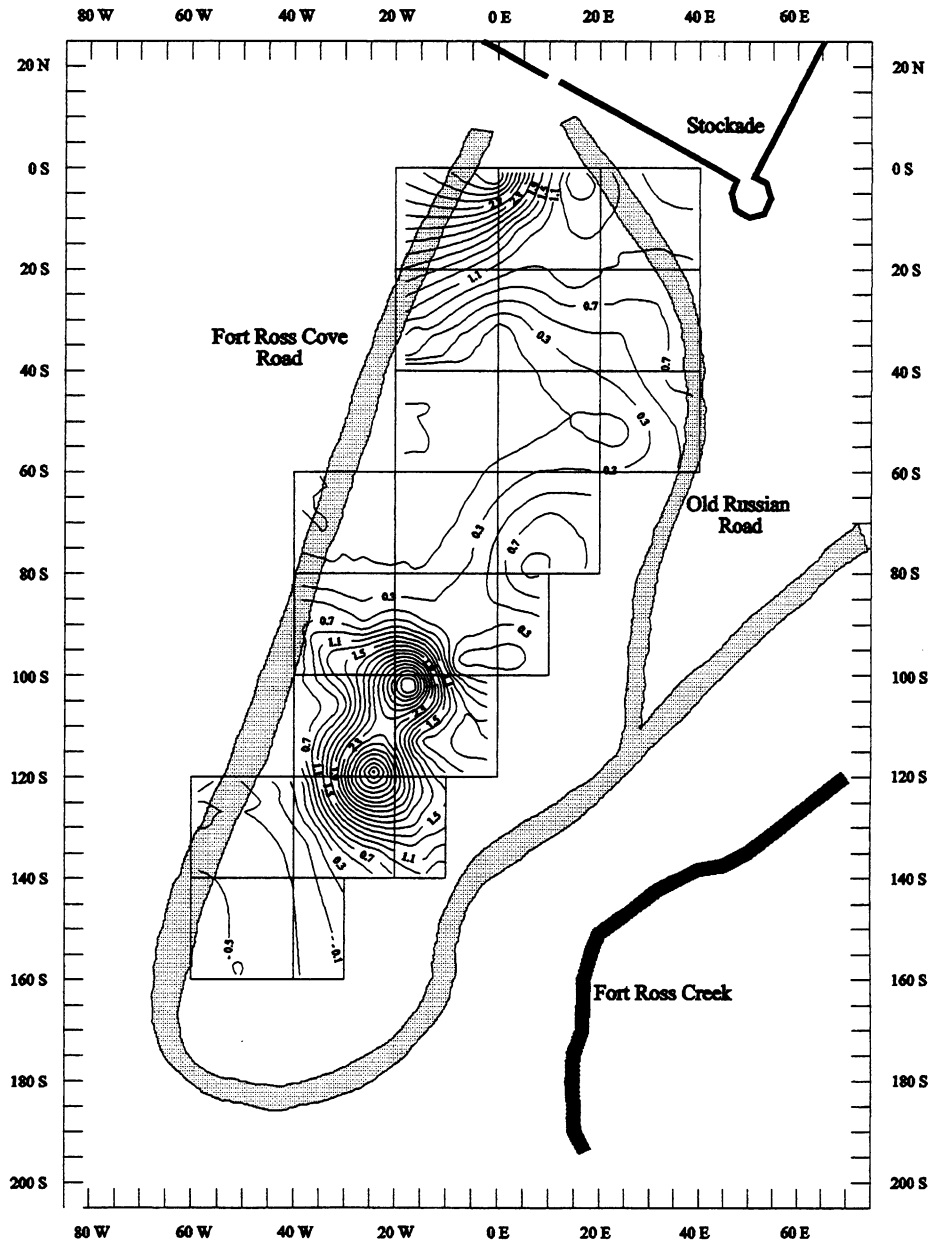
Figure 3.9. Surface Distribution of Fish Remains



0.2 Artifacts/Meters Squared Contour Interval



Figure 3.6 Surface Distribution of Window/Bottle Glass



.2 Artifacts/Meters Squared Contour Interval



Figure 3.7 *Surface Distribution of Ceramics*

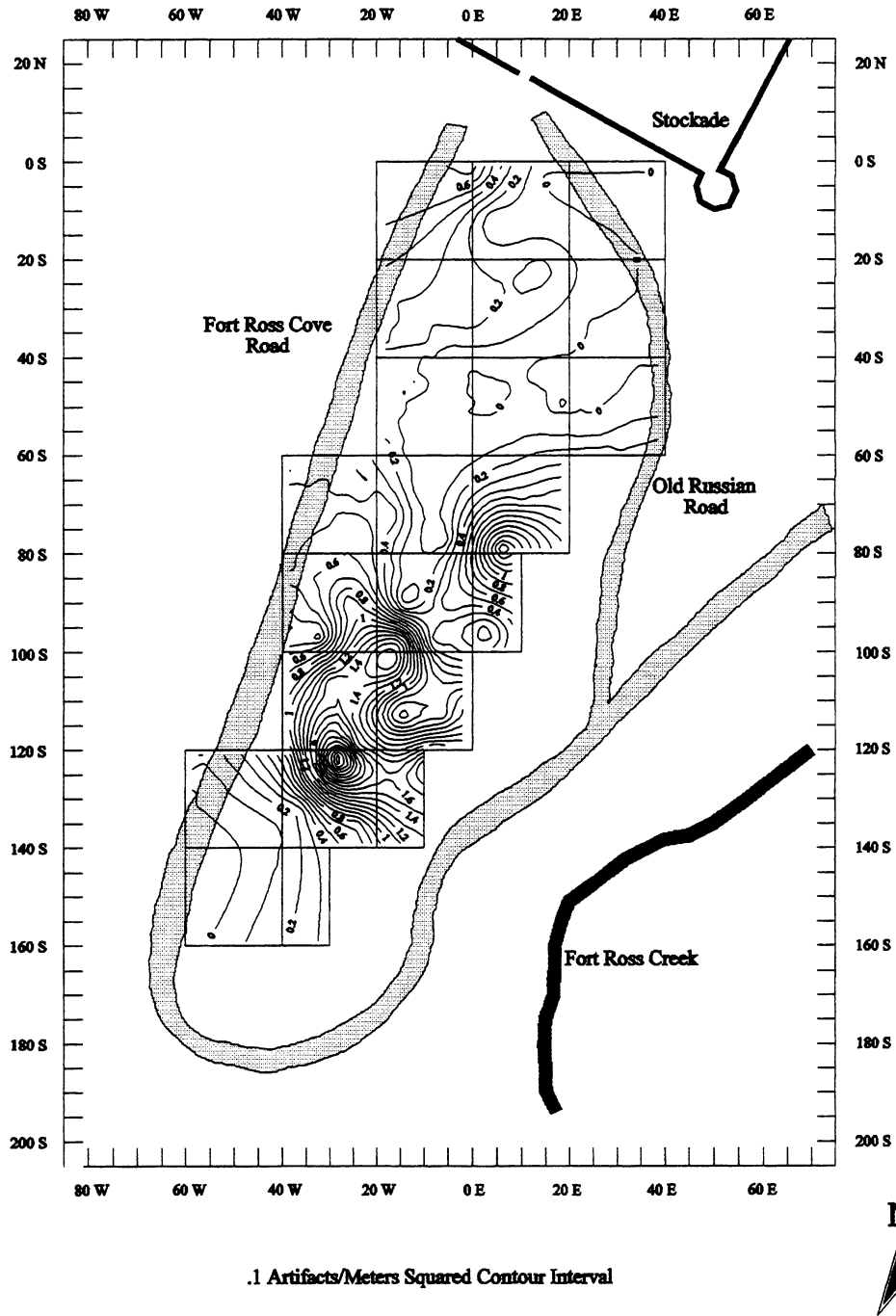
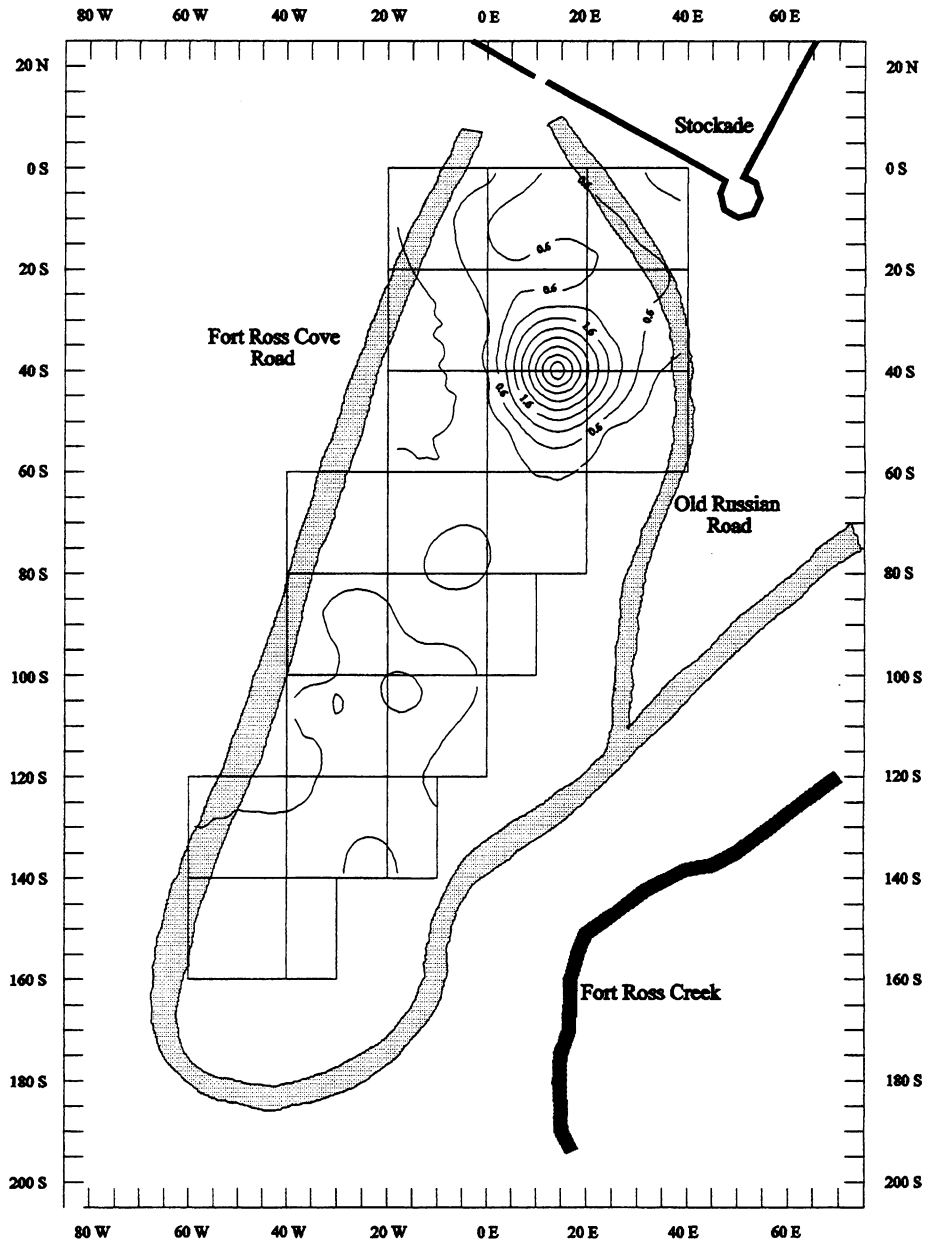


Figure 3.8 Surface Distribution of Metal Artifacts



.5 Artifacts/Meters Squared Contour Interval



Figure 3.9 *Surface Distribution of Fish Remains*

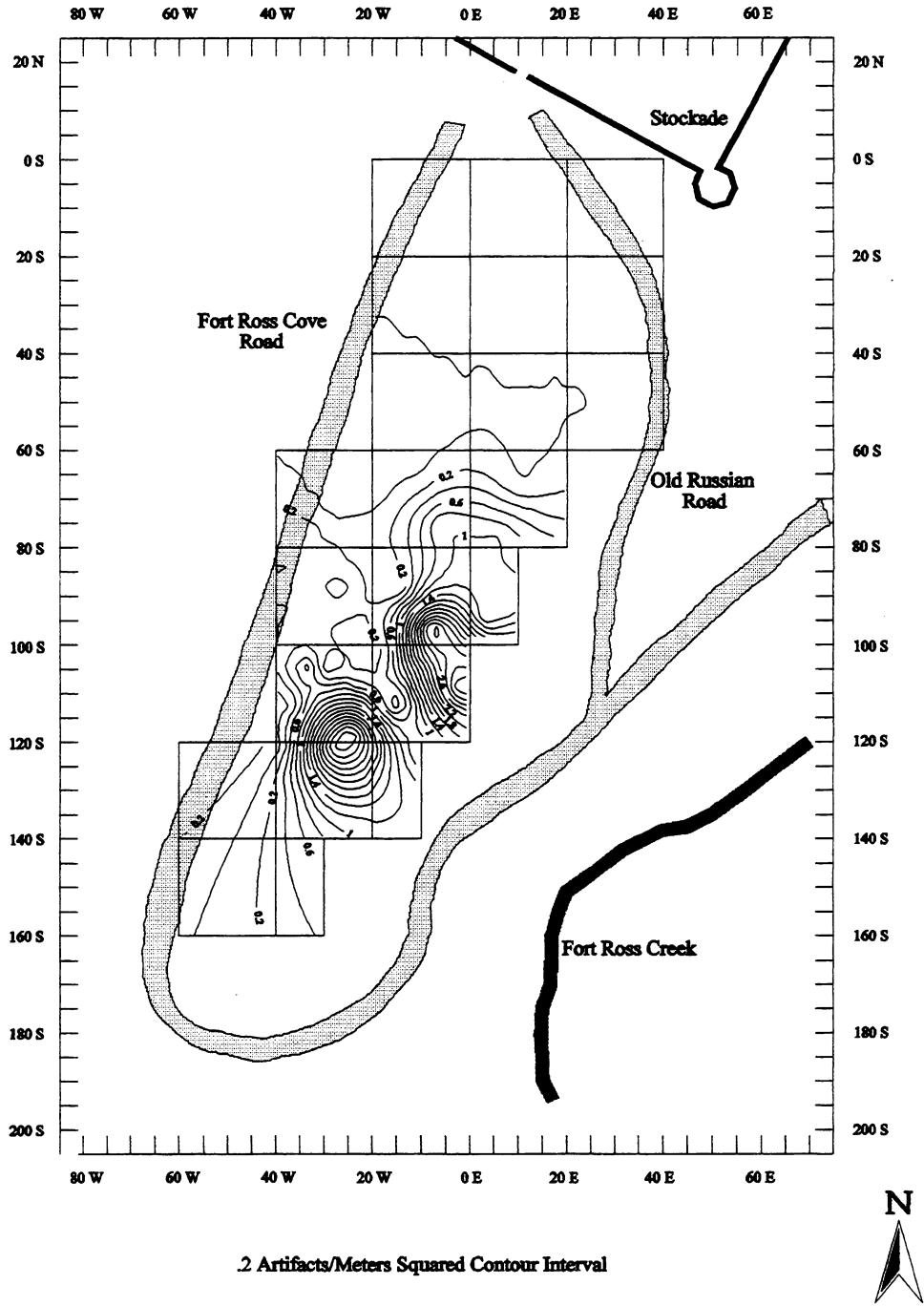
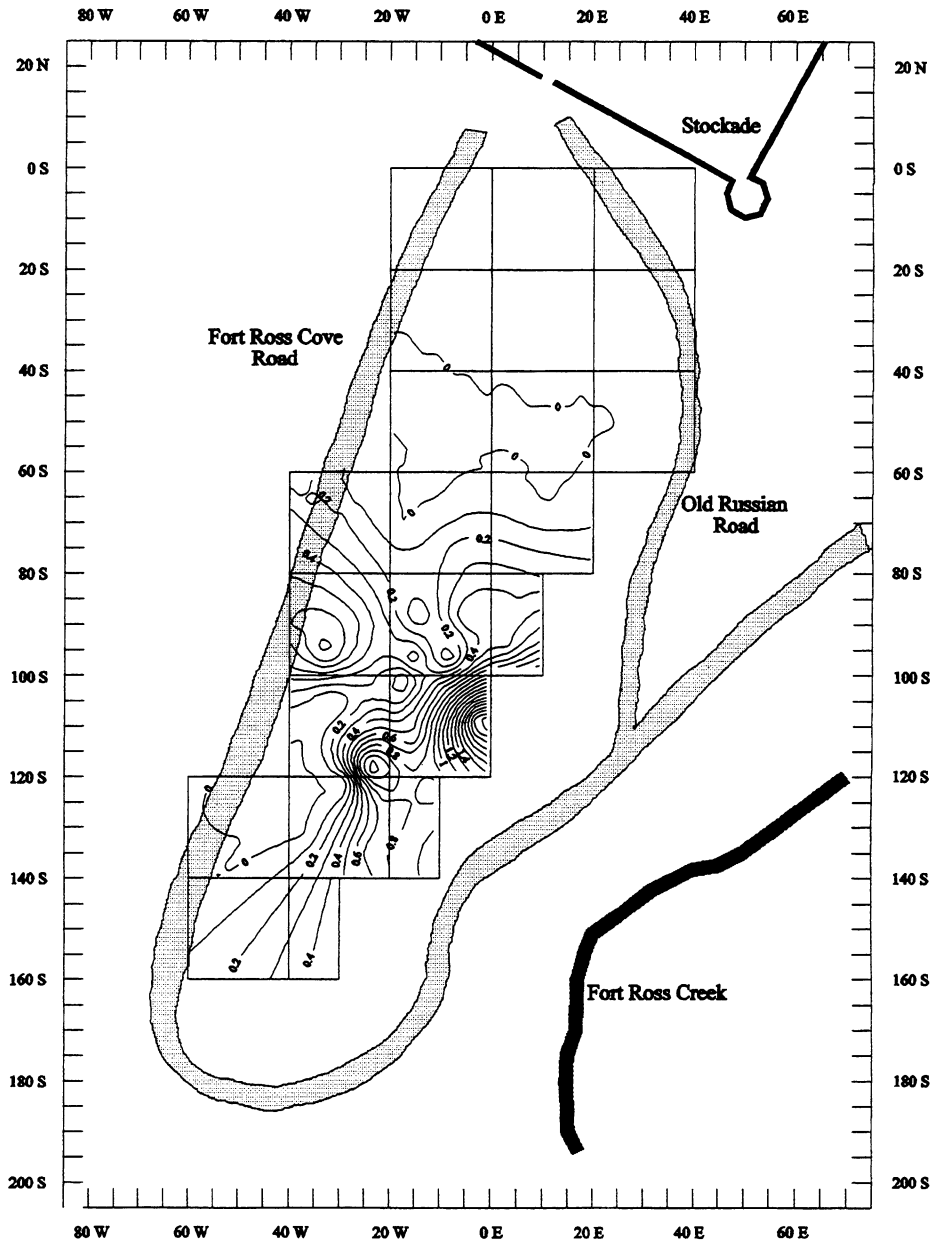


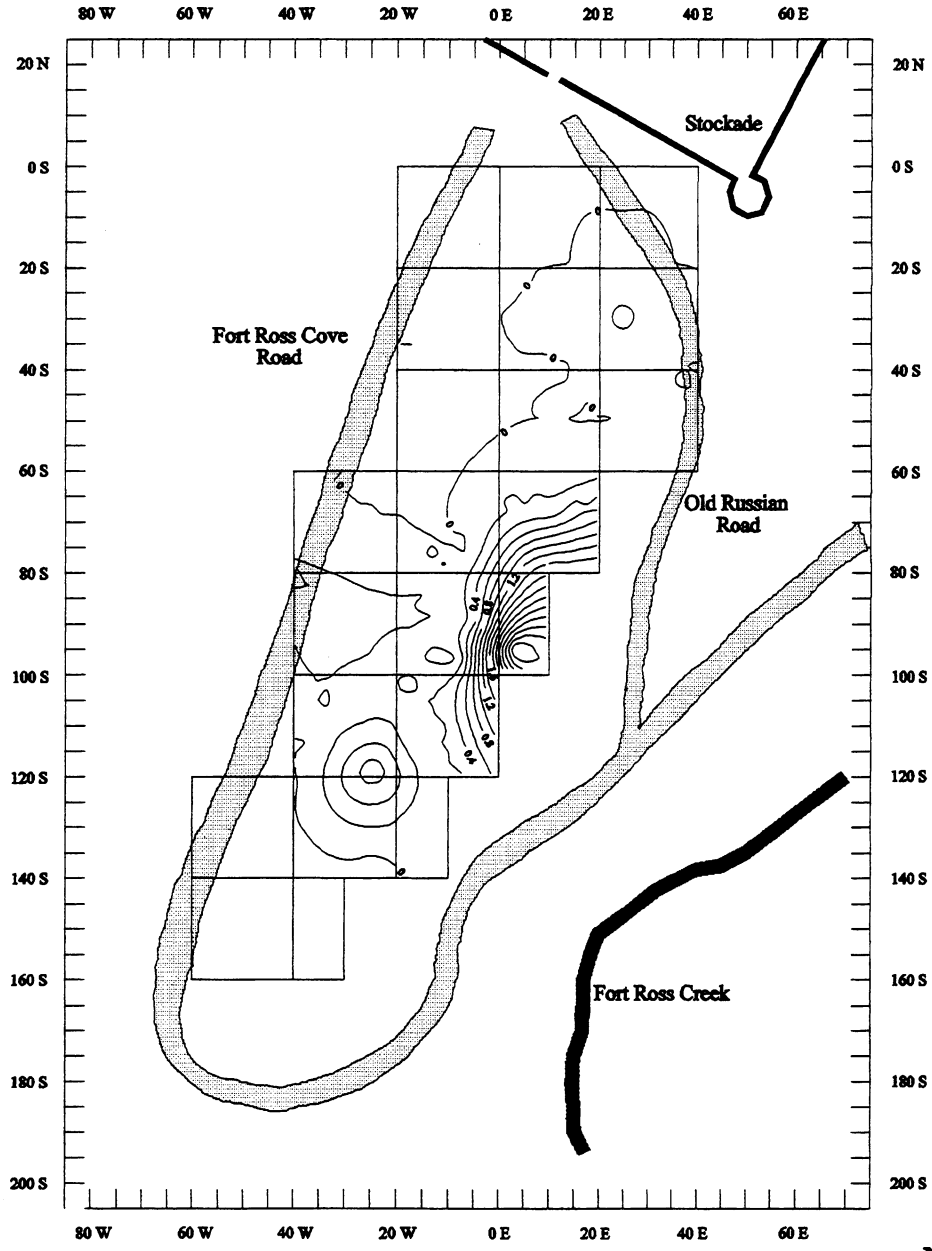
Figure 3.10 Surface Distribution of Bird Remains



.1 Artifacts/Meters Squared Contour Interval



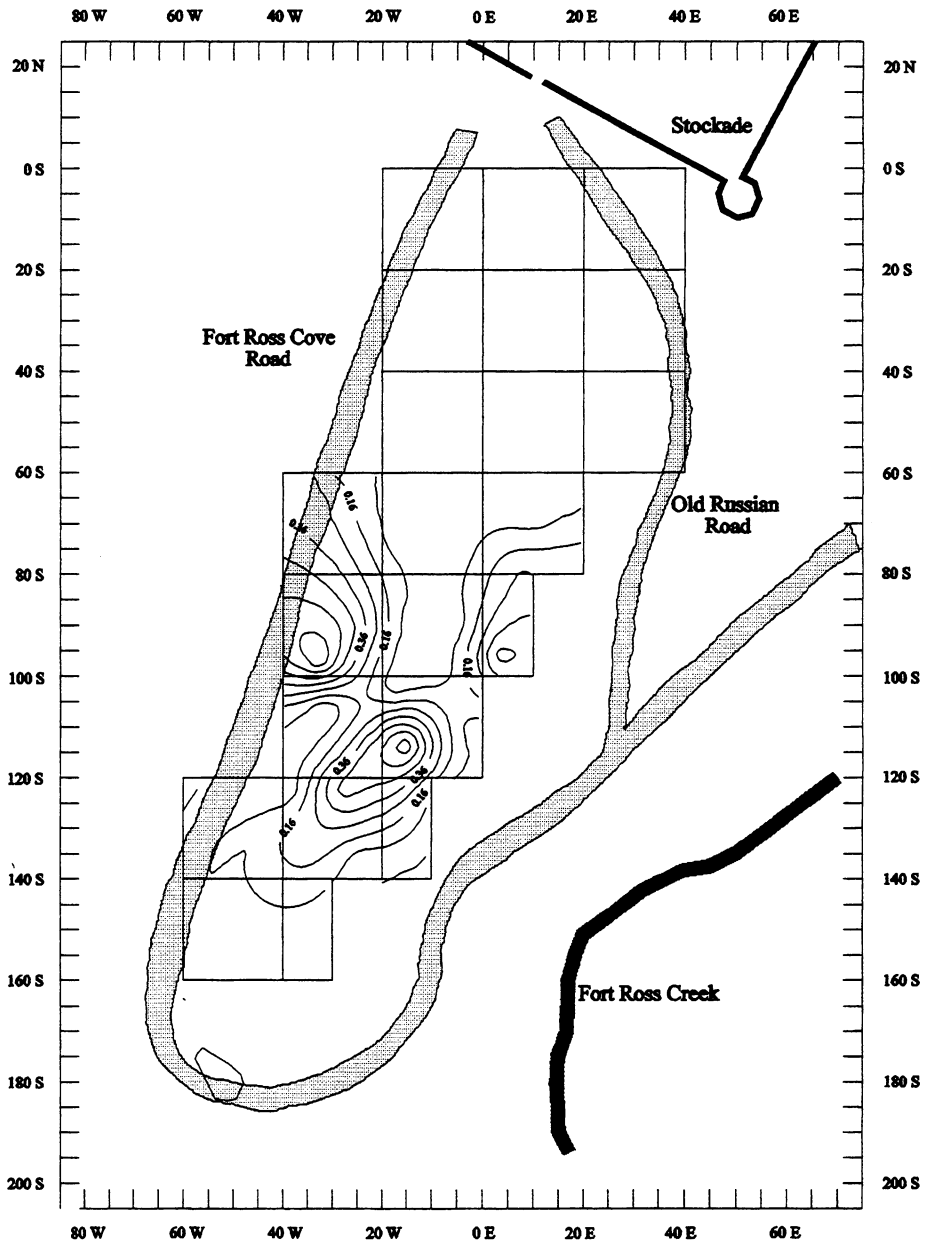
Figure 3.11 *Surface Distribution of Marine Mammal Remains*



2 Artifacts/Meters Squared Contour Interval



Figure 3.12 Surface Distribution of Artiodactyl Remains



.1 Artifacts/Meters Squared Contour Interval



Figure 3.13 *Surface Distribution of All Mammal Remains*

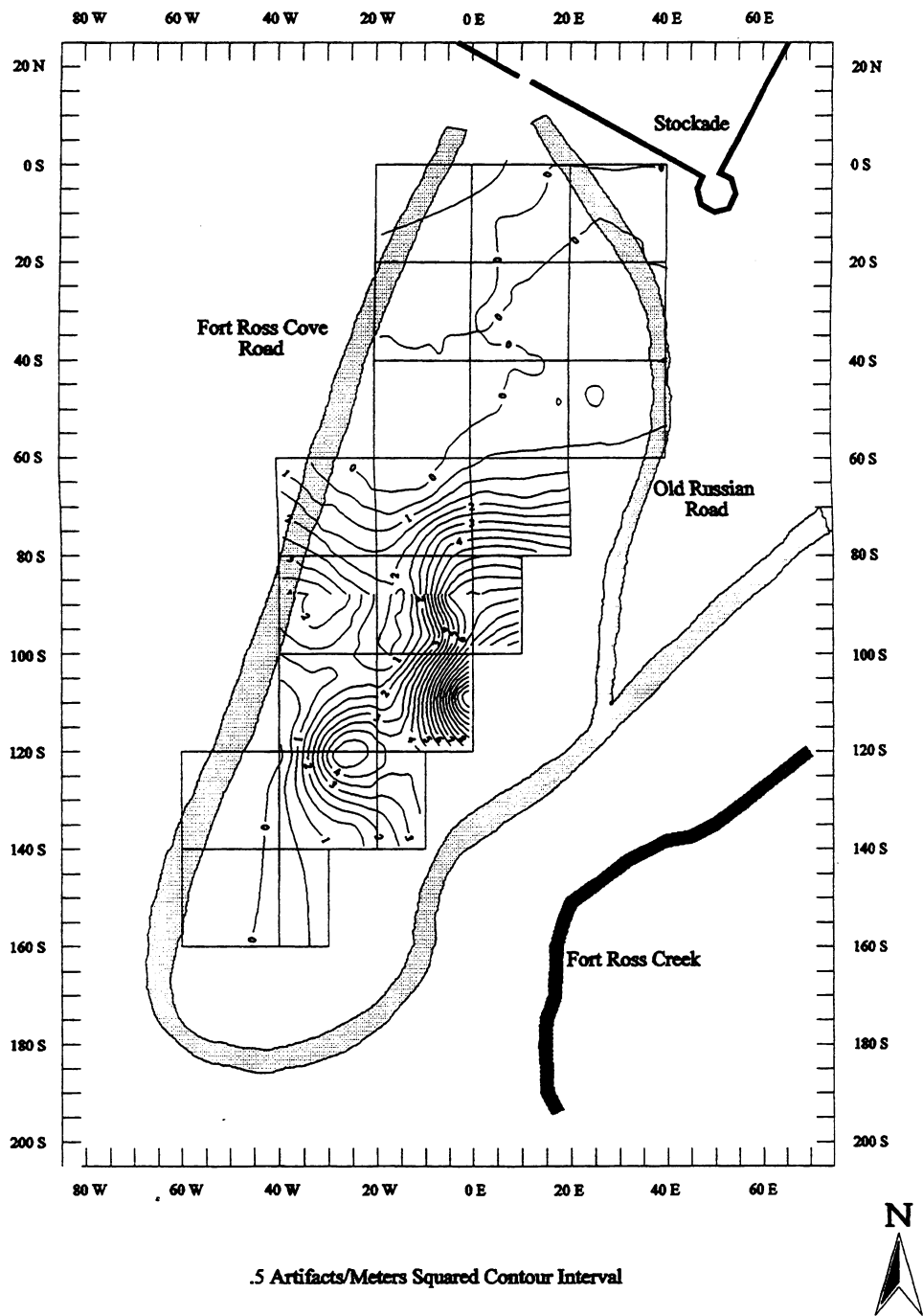
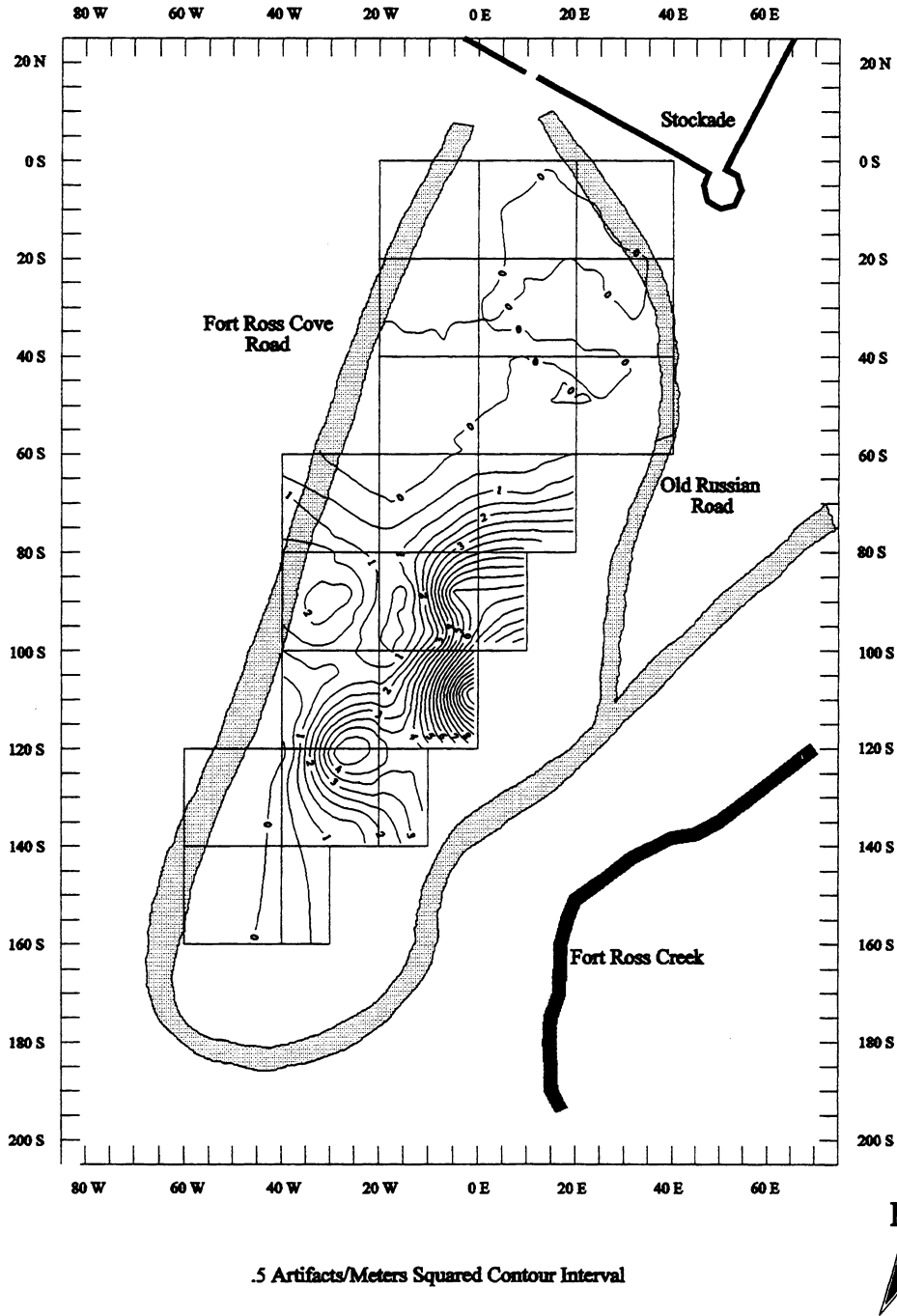


Figure 3.14 Surface Distribution of Shellfish Remains



Feature 10. This leveled, slightly depressed feature, measuring 4.8 m in diameter, is located in the south zone along the eastern edge of the terrace. In contrast to Feature 9, it yields very high densities for all artifact categories, at the upper end of the areal sample standard deviations for all but metal artifacts. The large number of materials collected from the feature correspond well with the density ranges generated in the SURFER maps. The densities of the faunal remains exhibit a similar pattern, whereby all faunal categories are at the very upper end of the areal sample standard deviations as predicted by the SURFER maps.

GEOPHYSICAL SURVEY

A magnetometer survey was undertaken by Dr. Lewis Somers in the summer of 1989 using a Geoscan Fluxgate Gradiometer FM18. The initial survey was conducted in the 20-by-20 m grid system illustrated in figure 3.1. The results exhibited subsurface, magnetic anomalies that paralleled the eastern edge of the terrace. Although the magnetic anomalies may have been produced by the underlying geological structure of parallel beds of sedimentary rocks (see chapter 4), they could also be indications of subsurface features and archaeological deposits. The latter interpretation correlates neatly with the linear distribution of surface features and the artifact density peaks found in the north, central, and south areas along the eastern edge of the terrace.

The geophysical survey was augmented considerably in the summer of 1992, and in a short field season in 1993. A detailed soil resistance survey was completed employing an electrical resistivity meter (Geoscan RM15 Resistance Meter). A full description of this research, including maps of the expanded geophysical grid system of NAVS, is presented in chapter 5 by André Tschan.

SUMMARY: PHASE ONE

The results of the 1989 field season revealed a linear distribution of surface features, relatively high artifact densities, and magnetic anomalies that paralleled the eastern edge of the marine terrace. Faunal remains were concentrated primarily in the south, especially along the eastern edge of the marine terrace. The site was divided into three areas or zones (north, central, and south) based on the spatial patterning of artifact and faunal densities (figure 3.15).

The north area contained five surface depressions (Features 1-5), a very large number of metal artifacts, some lithic and window/bottle glass artifacts, very few glass beads and ceramics, and few faunal remains. The central zone was characterized by four surface pits (Features 6-9), limited concentrations of lithic tools, ceramics, glass beads, window/bottle glass, and metal

objects along the eastern edge of the terrace (ca. 60 to 80 m south, 0 to 20 m east), and few artifacts in the remainder of the area. High densities of fish, bird, mammal, and shellfish remains extended south from Feature 7 along the eastern edge of the terrace. There was a sharp drop-off in the densities of faunal remains to the west of the terrace edge. The south area included four surface depressions (Features 10-13) and very high densities of all artifact and faunal categories throughout the area.

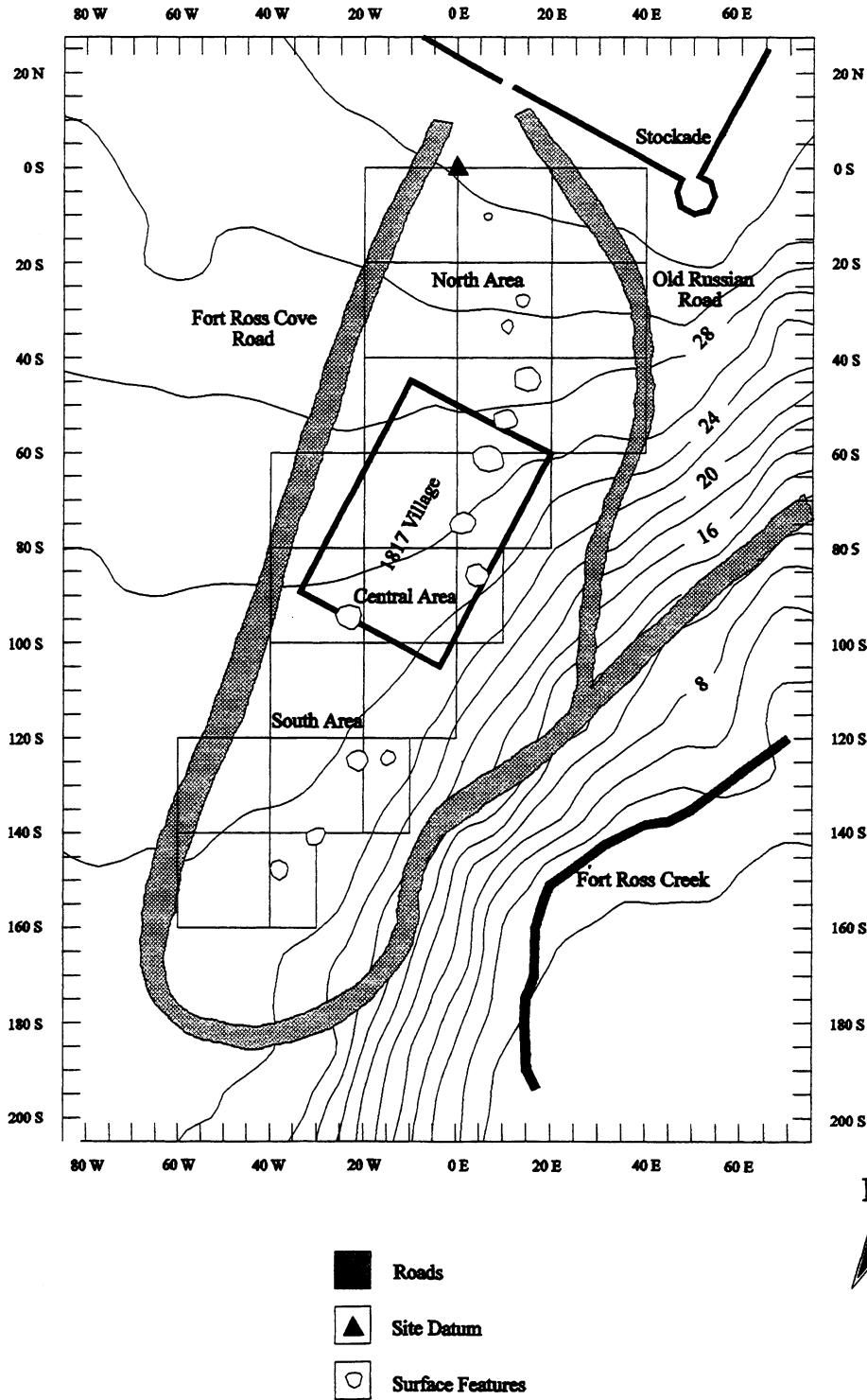
When we compared the surface structure of NAVS to the Village locality portrayed in the 1817 map (Fedorova 1973), an interesting pattern became evident (see figure 3.15). The outline of the 1817 Village corresponded very closely to the boundaries separating areas of high and low densities of both artifacts and faunal remains. That is, the original Village "core," as mapped by Russian-American Company surveyors only four or five years after the founding of Ross, was situated in the central area, fitting perfectly between the artifact concentrations of the north and south areas and the high faunal densities in the south.

It is possible, of course, that the placement of the "Aleut" Village in the 1817 map might be in error. The Village "core" might have been situated farther to the north or south in areas containing higher artifact densities. However, this interpretation is not corroborated by the accurate rendition of other topographic features depicted in the map. When the 1817 map is superimposed on the 1978 USGS quad map of Fort Ross, a close correlation is found in the locations of the marine terrace, Stockade complex, and Fort Ross Cove, suggesting that the area was mapped with considerable precision.

The spatial pattern of surface artifacts may also be explained by post-Russian use and modification of the landscape. A detailed perusal of the photographic archive in the Fort Ross Interpretive Association Library and the State Parks Archaeology Lab in Sacramento, as discussed by Tschan in chapter 5, identified buildings and fences in the north area of NAVS dating to the late 19th and 20th centuries. Several American Period farm buildings were located here. Until Highway 1 was rerouted in the 1970s, the road ran directly through the north and south walls of the Stockade complex, then turned west toward the Call family ranch house. A gas station was once situated off Highway 1 near the south Stockade wall. The large number of metal artifacts in the north area, as well as the electrical resistance anomalies detected here, may be attributed, in part, to ranching and commercial use in post-Ross times.

A review of pertinent historic photographs indicates, however that the central and south areas of NAVS were impacted far less extensively by American Period structures than the north. The major cultural feature observed in photographs dating back to the 1860s was a fence line that paralleled the eastern edge of the marine terrace.

Figure 3.15 Three Areas of the Native Alaskan Village Site Showing Their Relationship to the "Village Core" in the 1817 Map



as
ck
ire
ii-
ty
by
l
or
ey
in
le
ay
e
rth
;
s
ips
of

We must also consider whether the spatial pattern of surface artifacts was largely fortuitous, a product of differential rodent disturbance across the site. Rodent bioturbation may have been concentrated in the north and south areas, and along the eastern edge of the terrace, where cultural materials were pushed and kicked to the surface in large numbers. Nonetheless, upclose encounters with our furry friends over three field seasons demonstrated their ubiquitous presence across the entire site. Rodent burrows were noted in all 20-by-20 m grid squares. While rodent action certainly facilitated the movement of archaeological materials to the surface, the broader spatial distribution of specific classes of surface remains cannot be explained by rodents alone.

We believe the surface patterning of artifacts, faunal remains, geophysical anomalies, and features reflect, in large part, the underlying spatial structure of the Native Alaskan Village. Residents appear to have selected the eastern edge of the marine terrace in the north, central, and south areas for the construction of architectural structures, the performance of domestic activities, and the creation of refuse dumps. Some surface features may represent former house locations with household refuse deposited around their perimeters. The distribution of artifacts along the eastern edge, some found in clearly defined midden deposits, indicates that refuse from NAVS households may have also been deposited over the cliff face. This disposal practice certainly would account for many of the archaeological remains recovered in the colluvial deposits at FRBS.

PHASE TWO (1991 FIELD SEASON)

The results of the topographic mapping, of the surface collection of 38 2-by-2 m units and 5 surface features, and of the geophysical survey guided the next phase of field work—the initial subsurface testing of NAVS. The Phase Two testing had two purposes. First, we evaluated whether the surface features represented former house structures with household refuse deposited around their perimeters. Second, we tested several different locations within the central and south areas to evaluate the relationship between the Village “core” and its southern periphery. We did not test the north area, recognizing that its more complicated landscape had been clearly altered after the abandonment of the Native Alaskan Village.

We excavated a 1-by-1 m test unit (South Central Test Unit), a block of three 1-by-1 m units (West Central Trench), and two hand-dug trenches consisting of five and seven 1-by-1 m units (East Central and South trenches, respectively) (figure 3.16). The units were excavated in natural or cultural strata to sterile sediments or bedrock. Thick deposits were further divided into 10 cm levels within each natural or cultural stratum. The maximum depth of units was 70 cm below surface. The southwest corners were designated the unit datums, from

which elevation readings and artifact point proveniences were taken. A 25% sample of sediments from each level was wet-screened through a 1/16" mesh (three 10 liter buckets per 10 cm level), the remaining 75% was dry screened through a 1/8" mesh. Sediment samples were taken from each stratum. Artifacts were collected in lots for each level, unless intact features were encountered, in which case materials larger than the excavator's thumb-nail were point provenienced.

SOUTH CENTRAL TEST UNIT

The first subsurface unit excavated at NAVS was placed near the eastern edge of the terrace on the boundary between the central and south areas at 110S, 11W (figure 3.16). The objectives of the excavation were to define the stratigraphy and relative depth of NAVS deposits, and to test the eastern area of the site.

WEST CENTRAL TRENCH

The excavation units included 75S, 20W; 75S, 18W; and 75S, 16W in the central area (figure 3.16). This location was chosen to test the site's west central area that exhibited low artifact and faunal densities, limited subsurface anomalies, and no surface features. The units were placed within the Village “core” defined in the 1817 map, several meters inside the western border. The excavation units were spaced one meter apart, leaving open the possibility of opening up contiguous units if we uncovered a feature or intact living surface. Since neither was detected, we excavated only the original three units.

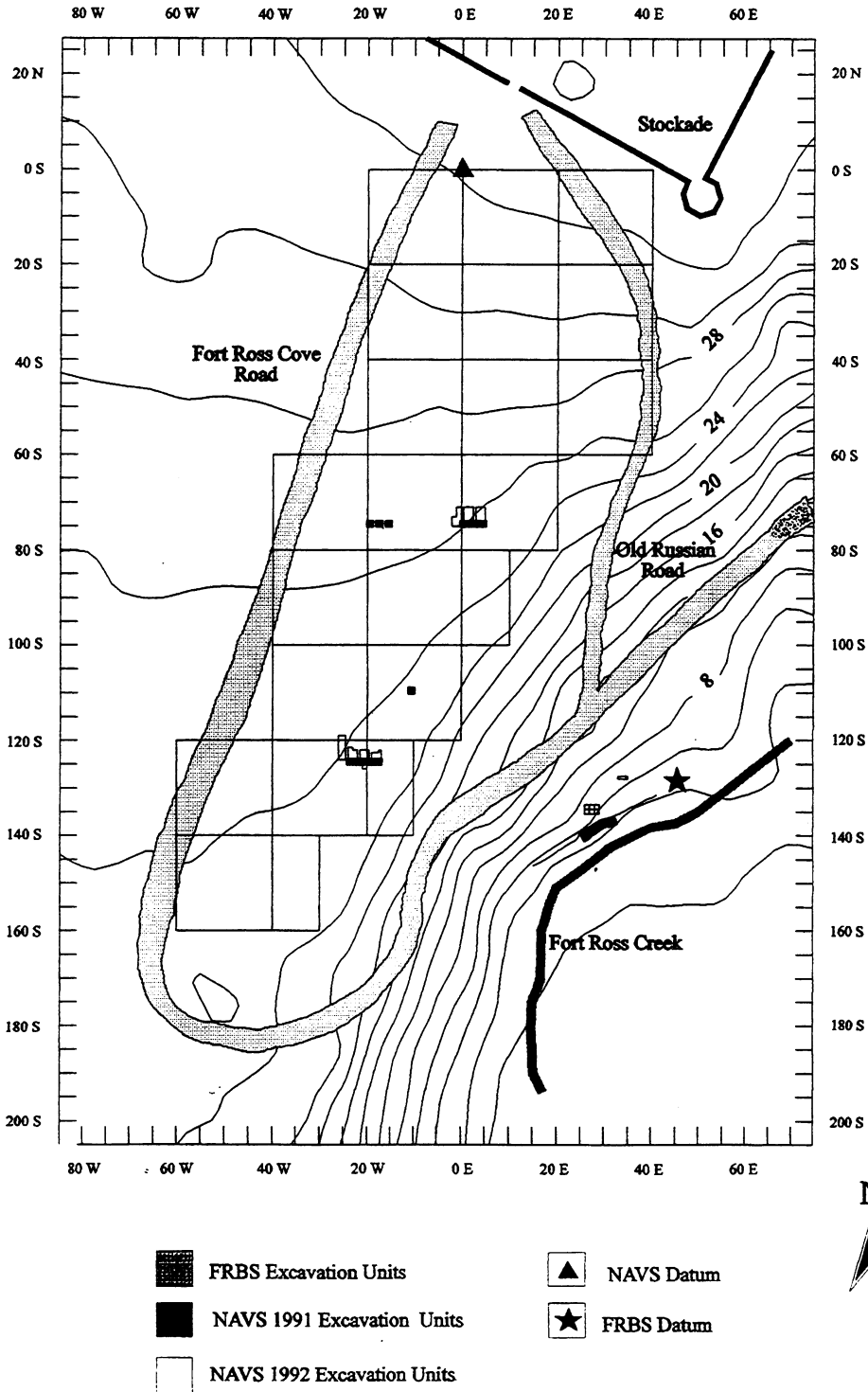
EAST CENTRAL TRENCH

The excavation units included 75S, 0E; 75S, 1E; 75S, 2E; 75S, 3E; and 75S, 4E in the central area (figure 3.16). We decided to test a location in the Village “core” that contained a surface feature on the eastern edge of the terrace. We chose Feature 7 for testing since this location was characterized by moderate densities of ceramic, lithic, and glass artifacts and high concentrations of faunal remains. Starting with the 75S, 0E corner stake, a 5-by-1 m long trench was laid out on a western bearing that cross-sectioned Feature 7. A bone bed was uncovered about 20 to 25 cm below surface, exhibiting a dense concentration of animal bones, marine shells, fire-cracked rocks, and ceramic, metal, and glass artifacts. Two redwood posts and the bottom of a pit feature were also unearthed.

SOUTH TRENCH

The excavation units included 125S, 24W; 125S, 23W; 125S, 22W; 125S, 21W; 125S, 20W; 125S, 19W; and 125S, 18W in the south area (figure 3.16). The trench bisected Feature 10. The purpose was to cross-section a surface depression south of the Village “core” along the eastern edge of the terrace that exhibited high densities of surface artifacts and faunal remains.

Figure 3.16 Native Alaskan Village Site Excavation Units



er
as
y
rock
ture
osi-
l-
rity
d
by
al
l or
hey
s
in
cle
way
e
rth
s
ps
of

The excavation revealed another bone bed deposit, consisting of hundreds of faunal elements, historical artifacts, and fire-cracked rocks 20 to 30 cm below ground surface. Four small posts were also unearthened in the eastern end of the trench.

SUMMARY: PHASE TWO

Subsurface testing at NAVS began in the south central, east central, west central, and south areas of the site. The initial testing revealed archaeological remains that were consistent with the surface patterns detected in Phase One fieldwork. The South Central Test Unit revealed high densities of faunal remains and most artifact categories. The West Central Trench produced a low density of faunal remains, moderate densities of ceramic, metal and lithic artifacts, and large numbers of glass fragments, mostly from window panes. The East Central and South trenches both revealed dense deposits of fire-cracked rocks, artifacts, and faunal remains that were described in the field as bone beds. In addition, a pit feature was detected in the East Central Trench.

PHASE THREE (1992 FIELD SEASON)

The final phase involved broadscale exposure of the East Central Area Excavation and South Area Excavation. The purpose was to define the spatial boundaries of the bone bed deposits in Features 7 and 10 and to evaluate whether they were both associated with house structures. We employed an excavation strategy specifically designed to expose the bone beds without destroying their internal spatial structure. In the previous field season, all materials encountered in the bone beds were point provenienced, mapped, and photographed *in situ* prior to removal, a meticulous procedure that took an exceedingly long time to complete. In fact, the lower-most levels of the bone bed deposit in 125S, 23E and 125S, 22E were not completed until the 1992 field season. Since we already had a good sample of the internal constituents of the bone beds, and recognized that the time involved in completely excavating the dense deposits of bone, shell, and lithics in a rigorous manner would be prohibitive, we employed the following protocol to expose the upper level of the bone beds.

The East Central and South trenches were reopened, additional 1-by-1 m units were gridded on both sides of the trenches, and .5 m balks were set up every two meters on a 360 degree bearing. Area datums were established on the balks and in nearby unexcavated units. The 1-by-1 m units were then quarter-sectioned into .5-by-.5 m quads. Since the topsoil and dark sandy loam soils overlaying the bone beds were disturbed by both bioturbation and recent ranching activities, we removed them as one level in each .5-by-.5 m quad. The reason for excavating in quads was to refine the horizontal

provenience of materials recovered in this upper level. All sediments were dry screened through 1/8" mesh.

Once the level of the bone bed was reached, the surface was carefully cleaned to reveal the spatial organization of materials *in situ*. Faunal remains and artifacts on the exposed surfaces were then identified, mapped, photographed, and a few selected materials were collected for later laboratory analyses. Photographs were taken using the Prince (1991) extension pole for low-level, direct-overhead photography, resulting in pictures of each 1-by-1 m unit at a constant height (2.59 m or 8' 6") and angle (perpendicular to the ground) above the bone bed surface. This systematic procedure produced a mosaic of photos for the entire exposed surface all at the same scale. Trenches were selectively excavated into the bone bed surfaces to define the underlying sediments and to detect other features. Once the bone beds were completely recorded, they were then covered with plastic and carefully backfilled. The future plans for the trailside exhibits at NAVS include uncovering the excavated bone beds and constructing viewing areas with interpretive panels, thus making these features accessible to the public.

EAST CENTRAL AREA EXCAVATION

Twenty-one 1-by-1 m units were exposed, either fully or partially, to the north and west of the original East Central Trench, including 75S, 2W; 74S, 2W; 75S, 1W; 74S, 1W; 73S, 1W; 72S, 1W; 74S, 0E (1/2 unit); 73S, 0E (1/2 unit); 72S, 0E (1/2 unit); 74S, 1E; 73S, 1E; 72S, 1E; 74S, 2E (1/2 unit); 73S, 2E (1/2 unit); 72S, 2E (1/2 unit); 74S, 3E; 73S, 3E; 72S, 3E; 74S, 4E; 73S, 4E; and 72S, 4E. A total block of 23 sq m was unearthened, five sq m in 1991 and 18 sq m in 1992 (figure 3.17). In 1992, we also excavated a 3-by-.5 m wide trench (East Central Extension Trench) below the level of the bone bed along the balk face in the western halves of 74S, 3E; 73S, 3E; and 72S, 3E. These investigations delimited an extensive bone bed deposit in the fill of a subsurface structure.

SOUTH AREA EXCAVATION

Twenty-six 1-by-1 m units were excavated, either fully or partially, to the north, west, and south of the South Trench, including 124S, 26W; 123S, 26W; 122S, 26W; 121S, 26W; 120S, 26W; 124S, 25W (1/2 unit); 123S, 25W (1/2 unit); 122S, 25W (1/2 unit); 121S, 25W (1/2 unit); 120S, 25W (1/2 unit); 124S, 24W; 123S, 24W; 122S, 24W (1/2 unit); 124S, 23W; 123S, 23W; 124S, 22W (1/2 unit); 123S, 22W (1/2 unit); 126S, 21W; 124S, 21W; 123S, 21W; 124S, 20W; 123S, 20W; 124S, 19W; 123S, 19W (1/2 unit); 124S, 18W; and 123S, 18W (3/4 unit). A total block of 27.25 sq m was exposed, 7 sq m in 1991 and 20.25 sq m in 1992 (figure 3.18). In 1992, we also cleaned, deepened, and profiled the south wall of the

Figure 3.17 East Central Area Excavation

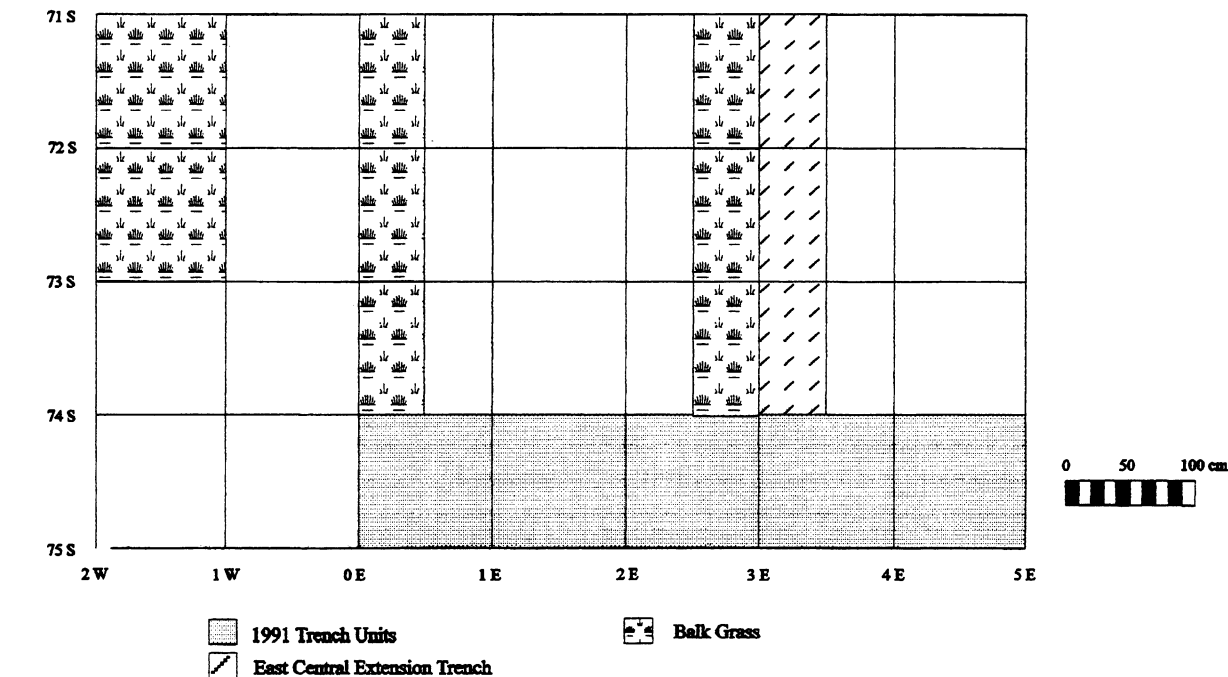
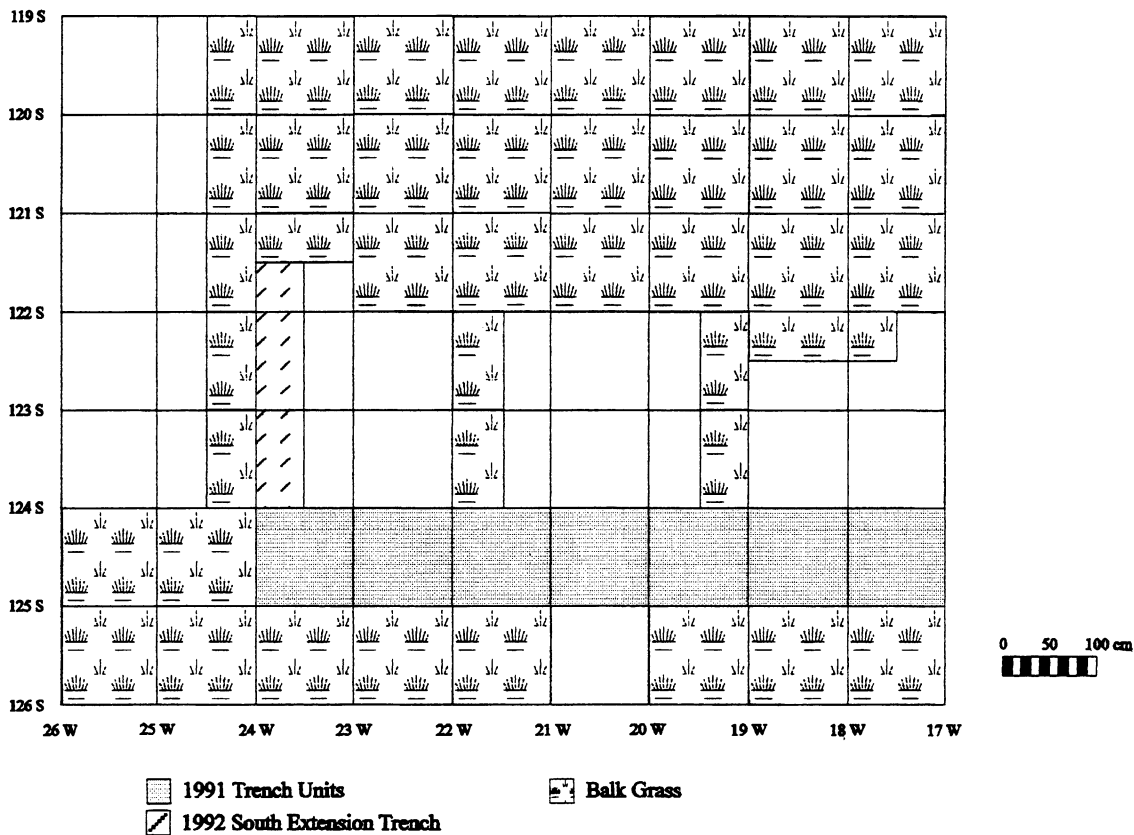


Figure 3.18 South Area Excavation



original South Trench. Finally, we excavated a 3 m by .5 m trench (South Extension Trench) along the balk face in the western halves of 124S, 24W; 123S, 24W; and 122S, 24W. This trench was excavated to evaluate the spatial patterning of rock rubble below the bone bed. These combined investigations unearthed 2 separate bone bed deposits, the cross-section of a subsurface structure, an extensive concentration of rock rubble, a linear clay feature, and 12 redwood posts.

SUMMARY: PHASE THREE

The East Central Area Excavation and South Area Excavation produced similar kinds of deposits. Both blocks contained extensive bone bed deposits located in the upper fill of earlier pit features. Human modifications of the landscape in the South Area Excavation also involved the dumping of tons of rock rubble, as well as the construction of a fence composed of small redwood posts.

**STRATIGRAPHY AND ASSOCIATION
CULTURAL MATERIALS**

In this section, we describe the stratigraphy, features, and overall distribution of artifacts and faunal remains in four excavation loci: 1) South Central Test Unit, 2) West Central Trench, 3) East Central Area, and 4) South Area.

SOUTH CENTRAL TEST UNIT

The unit datum (110S, 11W) of this 1-by-1 m unit is 23.5 m asl. The surface of the unit drops .24 m in elevation from the northwest to southeast corners. The unit extends to a maximum depth of .60 m below surface (22.9 m asl). Four deposits are defined (figure 3.19).

1) Topsoil. The dark brown (10YR 3/3), sandy loam soil is dry and unconsolidated, full of grass roots and recently deposited organic remains. The high percentage of sand in the soil matrix is a result of aeolian deposition along the terrace top. The thickness of the deposit increases from west to east, ranging in depth from .1 to .25 m below ground surface. A diverse assortment of lithic, ceramic, metal, and glass artifacts were recovered, although the frequency of shell and faunal remains was modest. No features are found.

2) Dark Sandy Loam. The dark grayish-brown (10YR 4/2), sandy loam becomes more compact with increasing depth. The deposit differs from the topsoil in color, in the decreasing mass of grass roots, and in the greater frequency of shell and animal bone fragments. The stratum is about .15 to .2 m thick along the south wall, sloping to a maximum depth of 23.1 m asl along the eastern edge of the unit. Many lithic, metal, ceramic, and glass artifacts were recovered. Rodent burrows are common, and charcoal flecks are distributed throughout the stratum. No features are found.

3) Rock Rubble. Underlying the dark sandy loam is a distinctive deposit of yellowish-brown clay (10YR 5/6) containing many subangular and angular sandstone and siltstone rocks. The rocks vary in size, but many are fist-sized and some appear to be fire-cracked. The rock rubble deposit is .1 to .15 m thick along the south wall, extending to a maximum depth of 22.98 m asl. A redwood stake, 9 cm long and 2 cm wide, was detected in the west wall .35 m below surface. The diversity and frequency of artifacts and faunal remains decrease in this deposit.

4) Clay. Compact yellowish-brown clay (10YR 5/6) underlies the rock rubble. The stratum contains some small sandstone and siltstone inclusions, but the size and number decrease markedly from the above stratum. Evidence of gopher activity is noted. The excavators believe this stratum is relatively sterile, with the exception of materials found in discolored gopher runs. Layered beds of siltstone are exposed in the southwest corner about .55 m below surface (22.95 m asl).

WEST CENTRAL TRENCH

The elevations of the unit datums for 75S, 20W; 75S, 18W; and 75S, 16W are 26.75, 26.71, and 26.64 m asl, respectively. The surface of the area is relatively flat, dropping only .20 m from west to east over a 5 m distance (75S, 20W to 75S, 15W). The three 1-by-1 m units are excavated to a depth of about .4 m below ground surface. Three deposits are identified (figure 3.20).

1) Topsoil. The dark gray (5YR 4/1), sandy loam soil is characterized by fine to medium-sized grains, poorly sorted, in a grass root matrix. The stratum is thickest in 75S, 20W (ca. 20 cm deep) and shallowest in 75S, 18W (ca. 10 cm deep). Much evidence of bioturbation is observed. A diverse range of lithic, ceramic, glass, and metal artifacts was recovered, but shell and animal bone fragments were sparse in all units. No features are found.

2) Dark Sandy Loam. The dark gray (5YR 4/1) sandy loam deposit differs little from the topsoil except in the lower density of grass roots and organic matter. Sediment grains are again very fine to medium in size and poorly sorted, with some larger sandstone inclusions. The stratum is about .2 to .3 m thick. Evidence of rodent disturbance is ubiquitous in all three units. A diverse range of artifacts was recovered—charcoal and brick fragments were frequent, but few shell and animal bone specimens were found. There was, however, a thin (2 cm deep) concentration of ash, charcoal, and burned bone uncovered along the western boundary of 75S, 20W, .25 to .27 m below surface.

3) Clay. The highly compact, yellowish-brown (10YR 5/4) sand/clay sediments contain a high density of angular sandstone cobbles and sandstone pebble inclusions. The frequency of artifacts decreases markedly in

Figure 3.19 South Wall Profile of South Central Test Unit

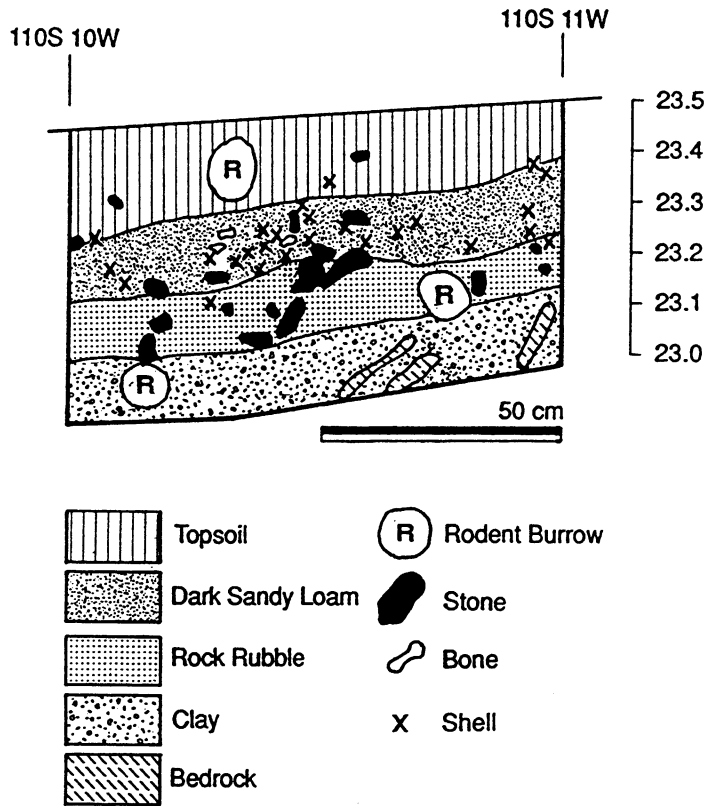
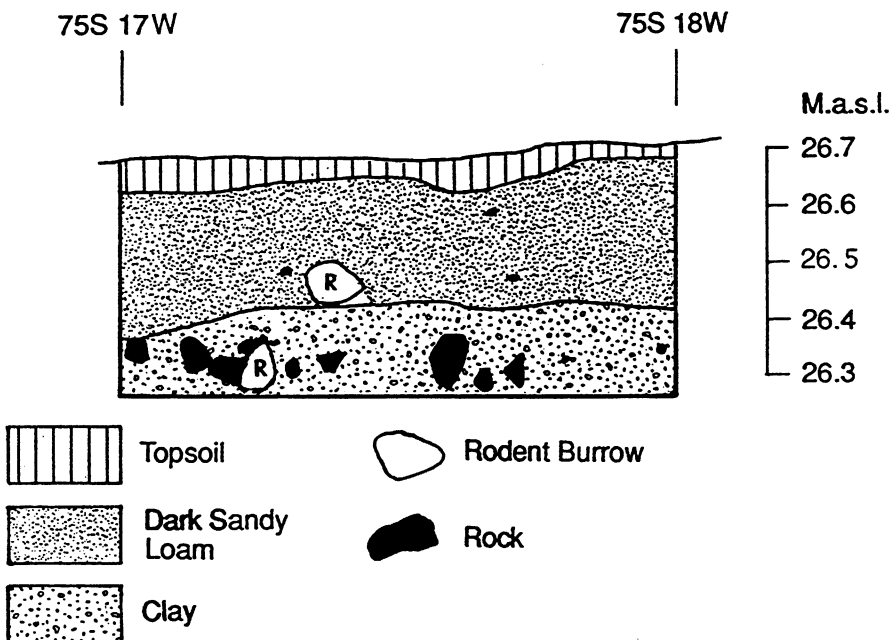


Figure 3.20 South Wall Profile of West Central Trench (75S, 18W)



this stratum, and all three units are sterile beneath .32 to .35 m below the surface.

EAST CENTRAL AREA

The unit datum elevations in the East Central Trench range from 25.99 m asl (75S, 0E) to 25.90 m asl (75S, 4E). The three datums placed in the balks for taking elevations in the 1992 East Central Area Excavation—72S, 2.25W; 72S, .25E; and 72S, 2.75E—are 26.4, 26.17, and 26.06 m asl, respectively. The surface topography of the block slopes downward .48 m from the northwest corner (71S, 1W; 26.4 m asl) to the southeast corner (75S, 5E; 25.92 m asl) over a distance of 7 m. Two balks were laid out on a 360 degree bearing from 74S, 0E (3-by-.5 m) and 74S, 2.5E (3-by-.5 m). We begin by describing the stratigraphy of the East Central Trench excavated in 1991, and then the East Central Extension Trench excavated in 1992. This is followed by a description of the features unearthed in the combined trench and area excavations.

EAST CENTRAL TRENCH

Six deposits are defined (figure 3.21).

1) Topsoil. About 10 cm thick, this brown (10YR 3/2) soil is a very fine sandy to silty loam that contains many grass roots and a high organic content. Rodent action is common throughout the stratum, and sediments are not compacted or well sorted. Artifact density and diversity are relatively low, as are concentrations of shell and animal bone fragments. Charcoal fragments are found throughout.

2) Dark Sandy Loam. This sandy loam deposit, ranging in color from dark brown (10YR 3/3) to dark grayish-brown (10YR 4/2), is characterized by very high densities of ceramic, glass, metal, and lithic artifacts, mollusk shells, and animal bones. The deposit is about 10 to 20 cm thick, varying in depth only slightly across the five units. As described below, a bone bed feature is found in 75S, 0E; 75S, 1E; and the western half of 75S, 2E. Evidence of rodent burrows is common outside the bone bed deposit in 75S, 3E and 75S, 4E. Rodent burrows are evident above and below the bone bed deposit, but few penetrate it.

3) Pit Fill. This brown (10YR 3/2) sandy loam is dry, crumbly and not compact, with much evidence of rodent activity. The deposit is .3 to .35 m thick across the five units. The density of artifacts and faunal remains decreases dramatically from the overlying stratum. Whole mollusk shells and animal bones are rare, with occasional fragments dispersed throughout the stratum.

4) Mottled Fill. Two pockets of yellowish-brown (10YR 5/8) sediments are noted at the interface of the pit fill and underlying silty loam. It is a silty loam containing shell fragments.

5) Silty Loam. This mottled, yellowish-brown (10YR 5/8) soil is characterized by a compact matrix of fine sand, silt and clay particles, with inclusions of subangular and angular sandstone and siltstone pebbles and rocks. The stratum is .1 to .25 m thick, ranging from .42 to over .7 m in depth below ground surface. The deposit slopes downward as part of the floor of a pit feature. Some metal, ceramic, glass, and lithic artifacts were recovered, but faunal remains were very sparse. Some charcoal fragments were observed.

6) Clay. Brownish-yellow (10YR 6/6) silty clay that contains angular sandstone and siltstone pebbles and rocks. This stratum appears to be relatively sterile of cultural materials.

EAST CENTRAL EXTENSION TRENCH

Along the balk face in the western halves of 74S, 3E; 73S, 3E; and 72S, 3E and oriented at a perpendicular angle to the 75S, 0E trench, a second trench was excavated to obtain another profile of the pit feature. Five deposits are defined (figure 3.22).

1) Topsoil. This brown (10YR 3/2) fine sandy, silt soil is not well compacted, containing grass roots in the upper .15 m. The topsoil and dark sandy loam defined in the East Central Trench were excavated together and profiled as one stratum. As a consequence, the deposit is quite thick, about .3 m on the average. A low density of artifacts and faunal remains is observed in the extension trench.

2) Yellow-Brown Sandy Loam. The dark yellowish-brown (10YR 4/4) deposit is composed of fine sand and silt particles with occasional rounded to subangular sandstone and siltstone gravel and rocks. There is a gradual transition from the topsoil to the yellow-brown sandy loam in areas not disturbed by the pit feature (northern half of 73S, 3E and 72S, 3E). The deposit is relatively thin (.1 m thick), with extensive mottling caused by worm casts, and very compact. It differs from the dark sandy loam soil described in the East Central Trench in the degree of compactness, the paucity of organic remains, and the low density of cultural materials. Few shell or bone fragments are observed.

3) Silty Loam. This mottled, yellowish-brown (10YR 5/8) deposit contains a compact matrix of fine sand, silt, and clay, with inclusions of subangular and angular pebbles and rocks. It is about .2 to .25 m thick, paralleling the lower surface of the yellow-brown sandy loam stratum, then dropping sharply downward below the pit feature. Few cultural materials are observed in this stratum.

4) Pit Fill. This brown (10YR 3/2), very fine, sandy loam deposit truncates the yellow-brown sandy loam and silty loam levels at 72.6S, 3E. The upper surface of the deposit, in direct contact with the topsoil, is .3 m below

Figure 3.21 North Wall Profile of East Central Trench

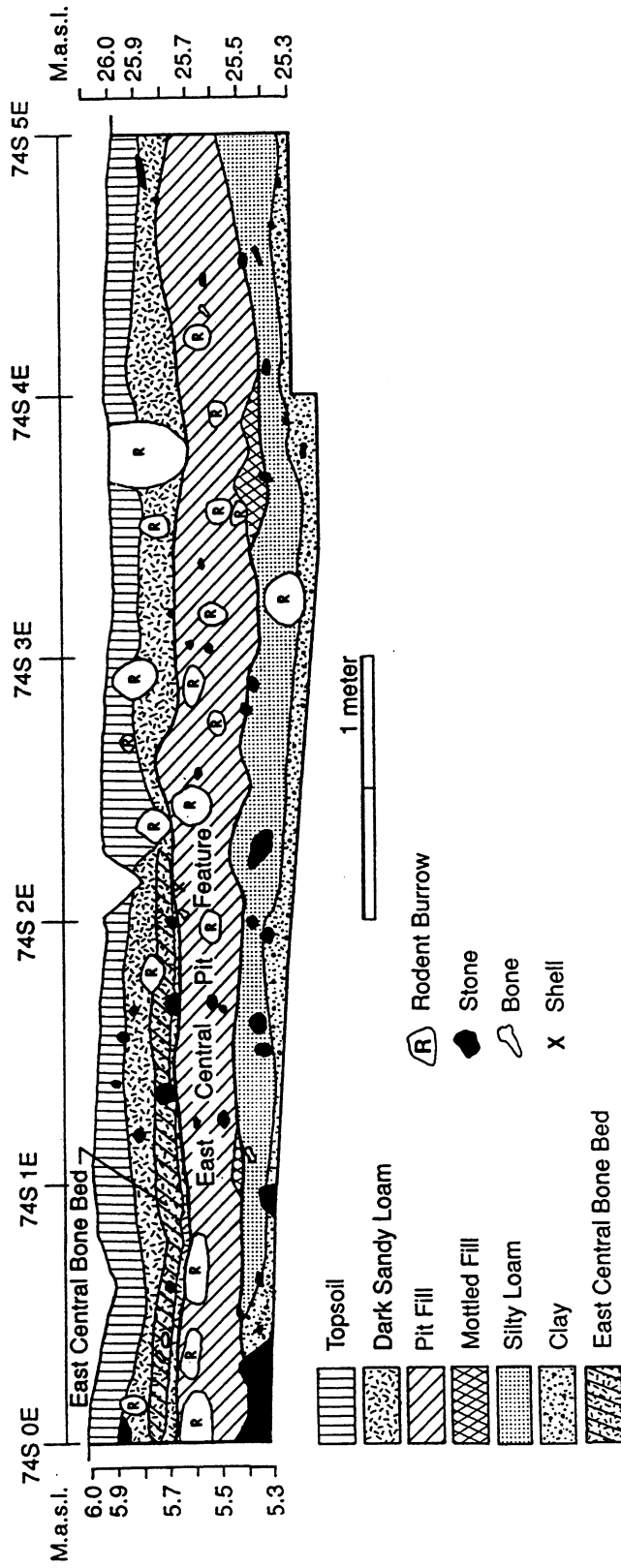
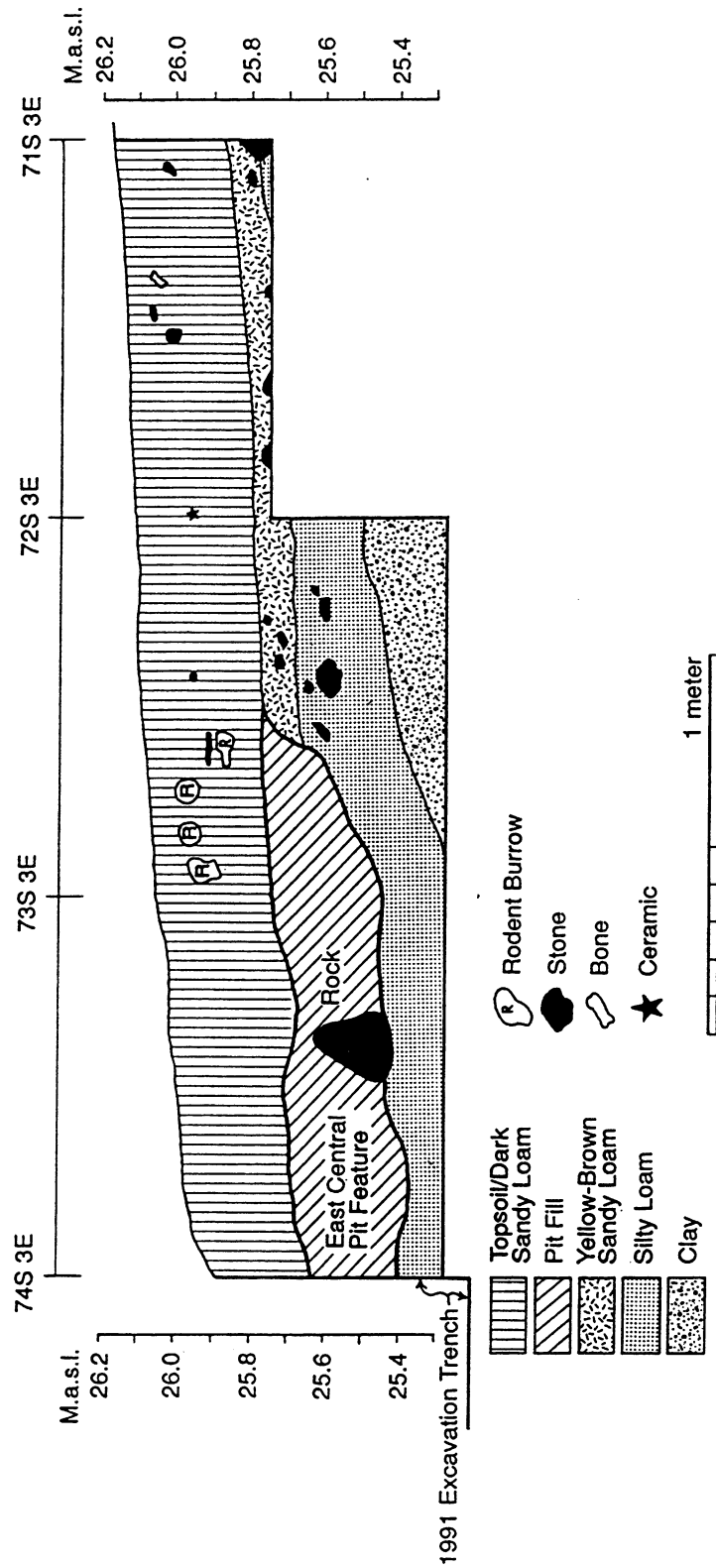


Figure 3.22 West Wall Profile of the East Central Extension Trench



ground level, while the bottom of the deposit slopes downward from .45 to .6 m below ground. The pit fill is characterized by a relatively high density of modest-sized shell fragments, charcoal, and small bone fragments. Some ceramic, metal, and lithic artifacts are also distributed throughout the deposit.

5) Clay. The brownish-yellow (10YR 6/6) silty clay, containing some subangular and angular pebbles and rocks, is observed underlying the silty loam level in unit 73S, 3E. The level appears to be sterile.

EAST CENTRAL BONE BED

The bone bed was first detected about 20 cm below ground surface in the East Central Trench in 75S, 0E; 75S, 1E; and the western half of 75S, 2E. It consists of a dense concentration of fire-cracked rocks, mollusk shell (whole abalone, clam, mussel, etc.), sea urchin spines, and fish, bird, and mammal bones (figures 3.23, 3.24, 3.25). A lower frequency of ceramic, metal, glass, and lithic tools is dispersed throughout the deposit. The dense cultural materials are generally not crushed or fragmented, but embedded *in situ* in the dark sandy loam soil. The presence of whole shell, sea urchin spines, and articulated fish vertebrae indicates the deposit was protected from trampling and bioturbation both during and after deposition.

The deposit was excavated in two levels, each measuring between 4 to 6 cm in thickness. In both levels, all materials greater than the excavator's thumbnail were point provenienced, mapped, and removed for analysis. Photos were taken of the surface of each bone bed level. The first excavation level consists of the upper surface of the bone bed that was carefully cleaned and exposed (figures 3.26 and 3.27). The elevation ranges from 25.78 m asl in the nw corner of 75S, 0E to 25.66 m asl in the sw quad of 75S, 2E. The second excavation level includes the lower tier of materials in the bone bed deposit. The upper surface of this level ranges in elevation 25.74 m asl in the nw corner of 75S, 0E to 25.6 m asl in the sw quad of 75S, 2E.

In 1992, the upper surface of the bone bed and adjacent deposits to the north and west of 75S, 0E; 75S, 1E; and 75S, 2E were exposed in the East Central Area Excavation. Photographs of the area excavation were taken in three sections. The first section (figure 3.28) consists of six full units east of the 72S, 2.75E balk datum (74S, 3E; 73S, 3E; 72S, 3E; 72S, 4E; 73S, 4E; and 72S, 4E). The second section (figure 3.29) includes nine full or half units east of the 72S, .25E balk datum (74S, 0E; 73S, 0E; 72S, 0E; 73S, 1E; 74S, 1E; 72S, 1E; 74S, 2E; 73S, 2E; and 72S, 2E). The third section (figure 3.30) comprises six full units east of the 72S, 2.25W

Figure 3.23 Close-up of Worked Antler in 75S, 0E: East Central Bone Bed, Level 1

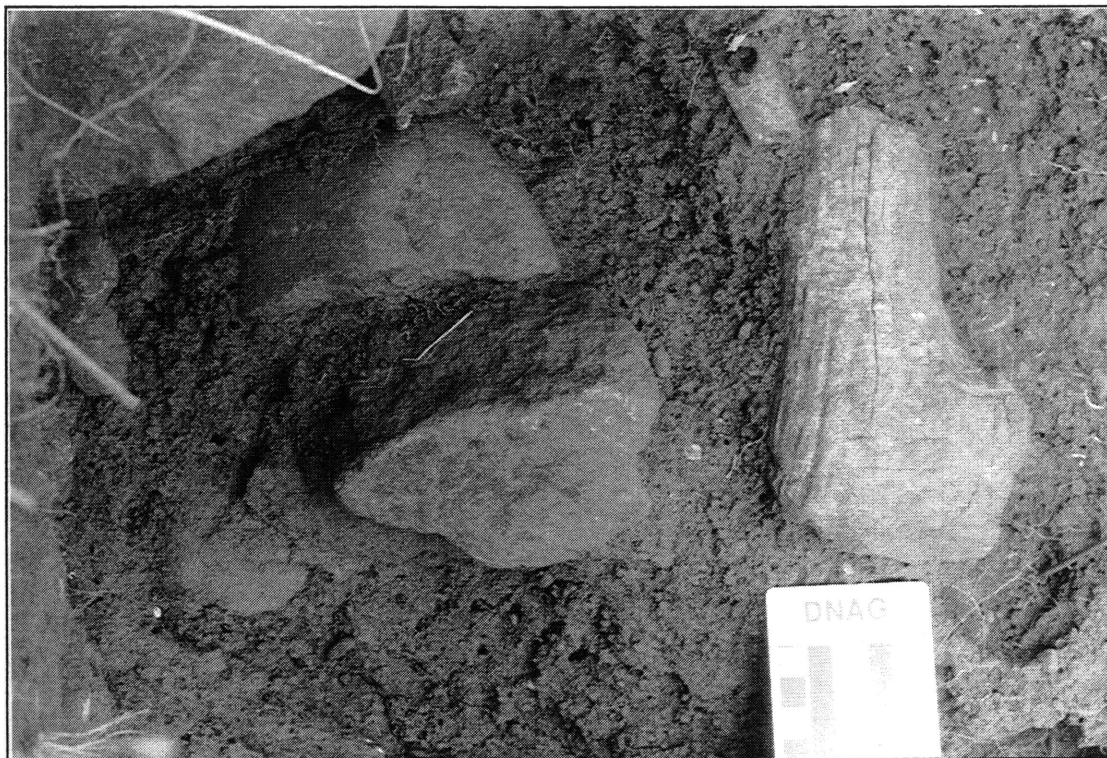


Figure 3.24 *Close-up of Artiodactyl Remains and Abalone Shells in 75S, 1E: East Central Bone Bed, Level 1*



Figure 3.25 *Close-up of Fire-Cracked Rocks, Ground Stone, Turban Snail, and Abalone Shells in 75S, 0E: East Central Bone Bed, Level 1*

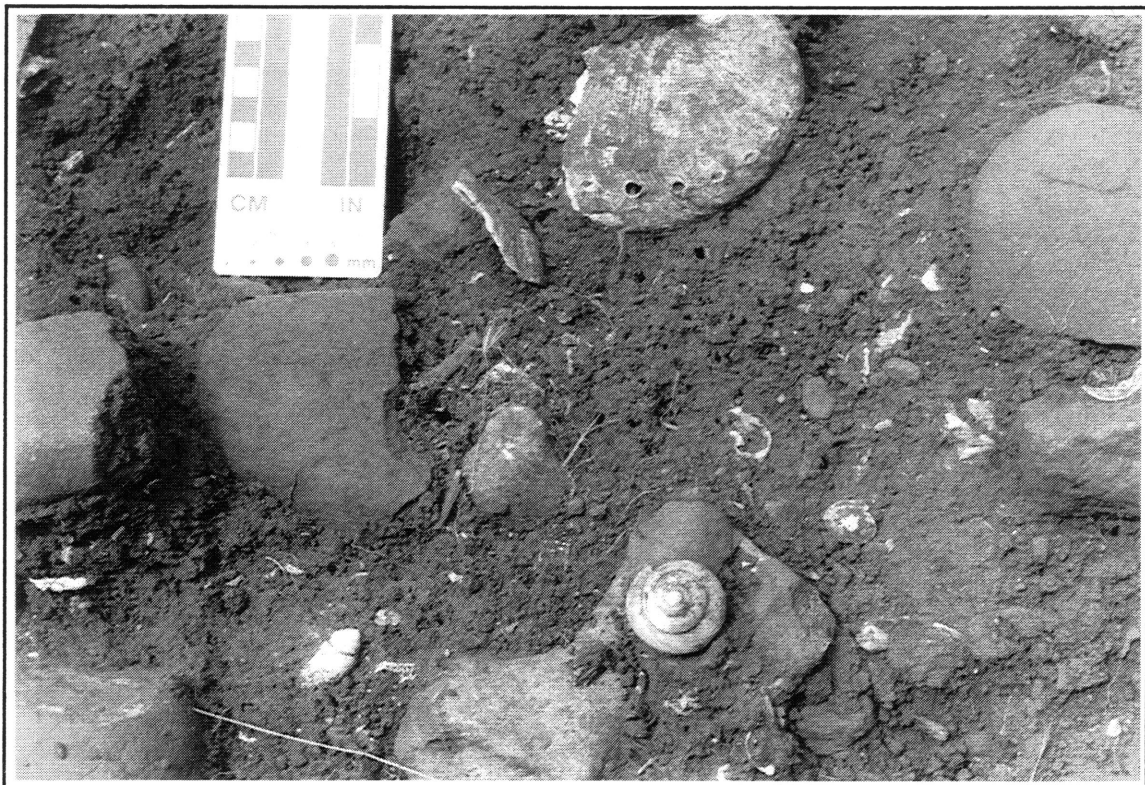


Figure 3.26 Photo of 75S, 0E: East Central Bone Bed, Level 1



Figure 3.27 Photo of SW Quad of 75S, 0E: East Central Bone Bed, Level 1



Figure 3.28 *Photo of the First Section (74S, 3E) of the East Central Area Excavation*

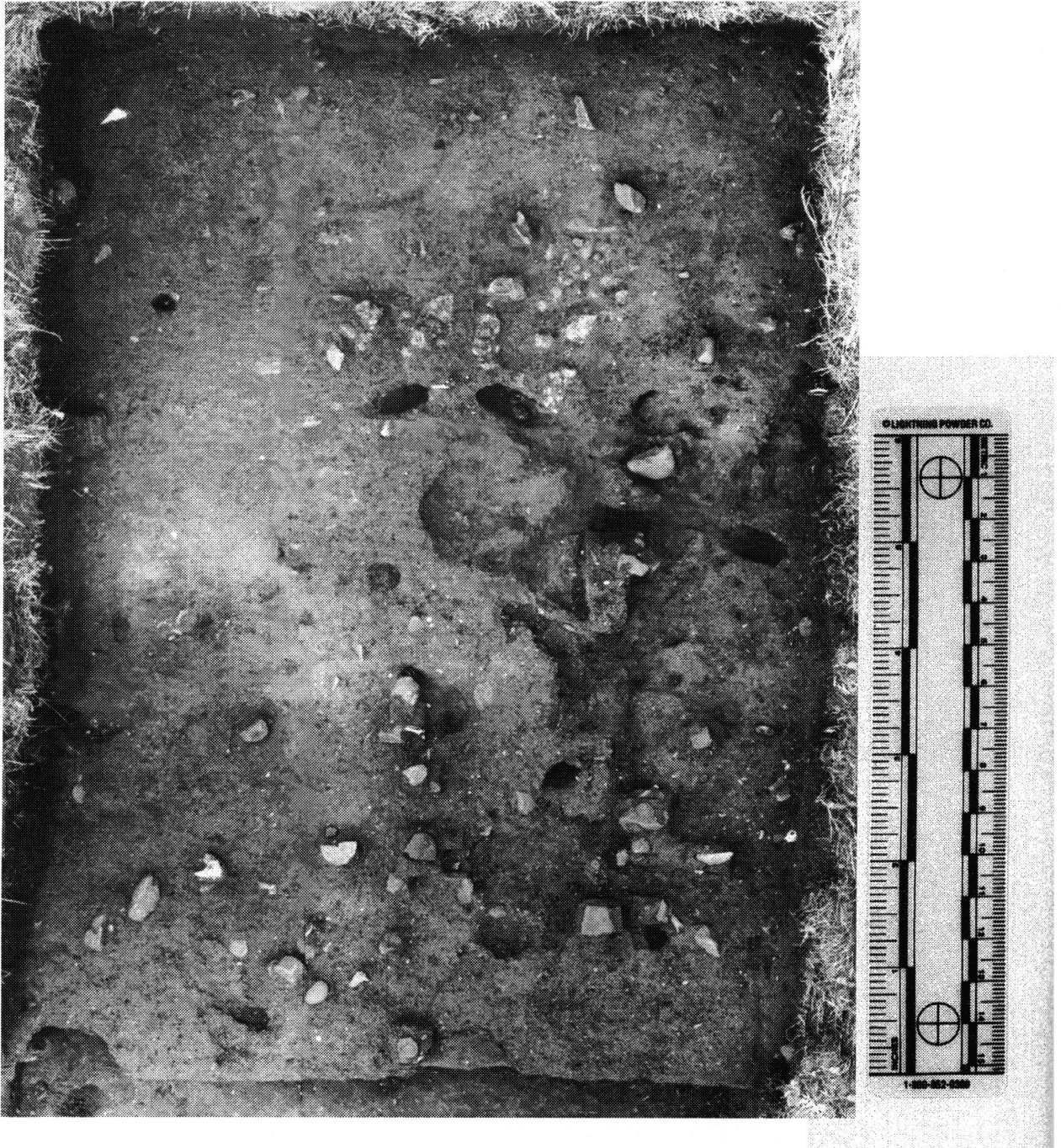


Figure 3.29 Photo of the Second Section (74S, 0E) of the East Central Area Excavation

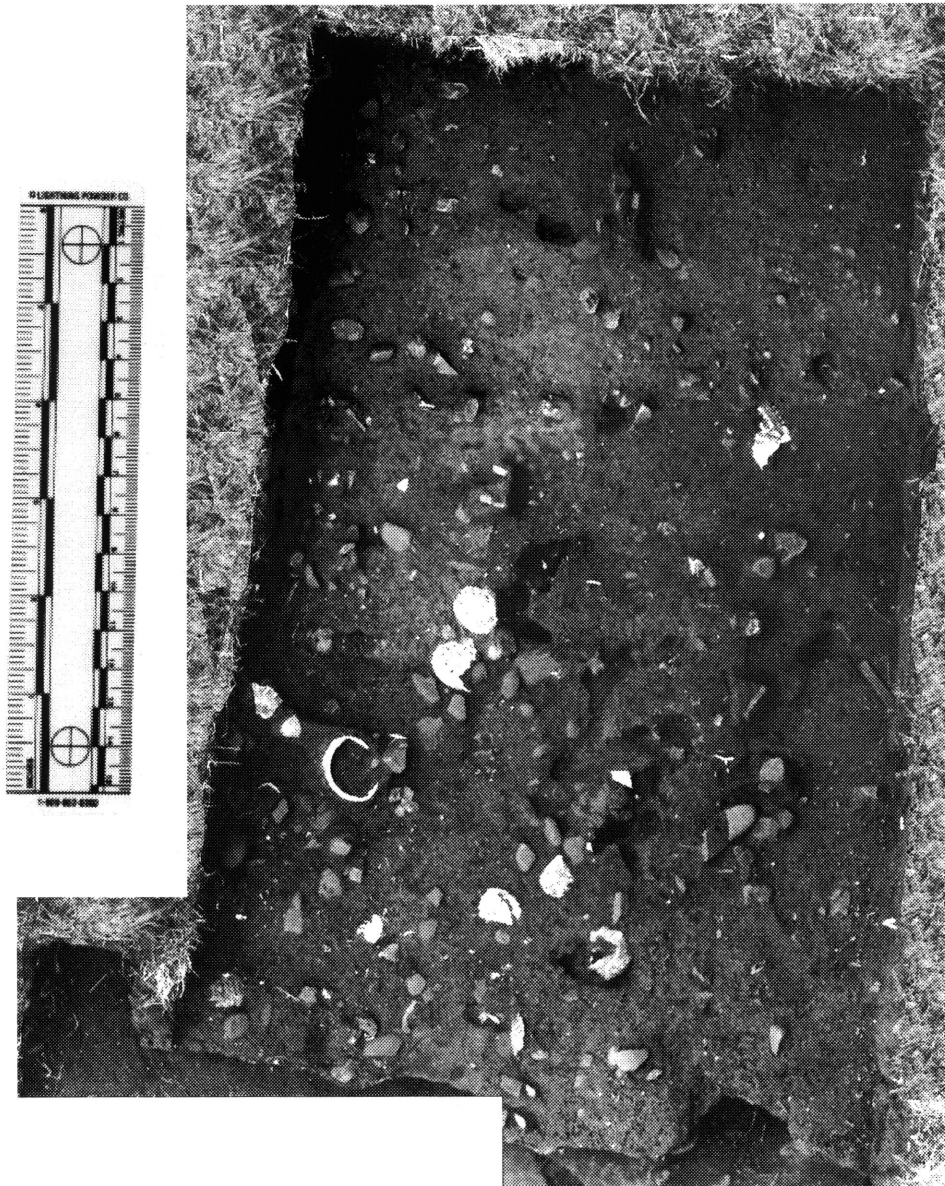


Figure 3.30 *Photo of the Third Section (75S, 2W) of the East Central Area Excavation*



datum (75S, 2W; 74S, 2W; 75S, 1W; 74S, 1W; 73S, 1W; 72S, 1W). Another close-up shot of the bone bed deposit is represented in figure 3.31.

The total area of the bone bed unearthed in 1991 and 1992 is about 10 sq m, found at a relatively uniform depth of .2 to .25 m below ground surface (figure 3.32). The elevation of the upper surface of the deposit varies from about 25.92 to 25.72 m asl, with some areas of higher elevation and depressions evident. Base maps showing the balks, grid units, rodent burrows, soil stains and nonartifactual rocks were produced for each excavation level using CorelDRAW software. Figure 3.33 illustrates level 1 of the bone bed and adjacent deposits in the 23 sq m exposure of the East Central Trench and East Central Area Excavation. Figure 3.34 depicts level 2 of the bone bed and adjacent deposits in the East Central Trench. The spatial distribution of specific artifact categories and faunal remains will be presented in chapter 17.

While a similar range of cultural materials is found outside the bone bed to the west and east in level 1, the overall frequency is less, and bone and shell elements tend to be more fragmented. We suspect that these materials may have once been embedded in the bone bed deposit, but have been broken-up, mixed, and transported short distances by post-depositional bioturbation.

The yellow-brown sandy loam borders the dark sandy loam soil to north and west. While the upper surface of the yellow-brown sandy loam is not sterile, the density of cultural material dropped off significantly from the bone bed deposit. Excavations into the yellow-brown sandy loam (e.g., extension trench) reveal few cultural materials, with the exception of artifacts transported into the stratum by rodent burrows. The upper level of the yellow-brown sandy loam may have been the original surface in the East Central Area when NAVS was first occupied in the early 1800s.

EAST CENTRAL PIT FEATURE

The two East Central trenches unearthed a pit feature whose floor was .6 to .7 m below ground surface. The pit was initially dug into the original surface of the yellow-brown sandy loam (see figure 3.22), and penetrated into the underlying silty loam and clay soils. The pit was relatively shallow when used, dug only about .3 m below the yellow-brown sandy loam.

Figure 3.35 illustrates the base map of the floor of the Pit Feature exposed in the East Central Trench. The contour of the floor slopes down from the nw corner of 75S, 0E (25.48 m asl) to the lowest points in 75S, 1E; 75S, 2E; and 75S, 3E (ca. 25.32-25.36 m asl) and then rises again until it reaches its maximum height in the ne corner of 75S, 4E (25.52 m asl). Rock rubble was placed or dumped in the bottom of some units, especially in 75S, 0E and 75S, 2E. It is not clear whether the rock pave-

ment was placed in the bottom to raise the surface for better drainage and/or to level the floor. No hearths or other internal features are detected. Few cultural remains were recovered on the floor (see chapter 17).

Two intact redwood posts were recovered in 75S, 4E. The posts were spaced .2 m apart, from center to center, and were anchored into the silty loam soil at the bottom of the pit. Post 1 consists of a .17 m section, badly decomposed, which appears to be rectangular in cross section, measuring 5-by-4 cm. Post 2 is rectangular in cross section, measuring 6-by-4 cm, and smoothed (possibly planed) on at least one side. A .30 cm section of the deposit was recovered within a post-hole, a 7 to 8 cm diameter hole filled with a porous, uncompacted dark sandy loam, which had been dug into the silty loam soil. The remnants of a third post were noted by excavators in 75S, 4E about .2 to .3 m below surface. It is located .2 m north of the center of post 2. While the posts may be associated with the pit feature, we suspect they are the remnants of a fence constructed in the later American Period. Tschan's careful analysis of archival photos in the FRIA library (chapter 5) indicates that the American Period fence ran across the East Central Area near 75S, 4E.

After the East Central Pit Feature was abandoned, it was filled with soil to the level of the original ground surface (top of the yellow-brown sandy loam). The relative paucity of materials in the fill suggests it was not used as a trash dump, but that sediments already containing fragmented shell and bone were deposited into the pit, possibly in a single dumping episode. There is little indication in the wall profiles of discontinuities in the fill deposit, or of separate dumping episodes. By filling the pit to the height of the original ground surface, a surface was produced with little topographic relief. This level surface was then used to dump large quantities of whole mollusk shells, fish, bird, and mammal bones, fire-cracked rock, and some lithic, ceramic, glass, and metal artifacts.

The full dimensions of the East Central Pit Feature are not known. The structure was at least 5 m long on a east/west bearing based on the profile of the East Central Trench (figure 3.21) and at least 2.5 meters wide on a north/south orientation based on the profile of the East Central Extension Trench (figure 3.22).

SOUTH AREA

The unit datum elevations in the 7 m long South Trench excavated in 1991 range from 23.73 m asl (125S, 24W) to 23.37 m asl (125S, 18W). Four datum points were established on balks or in unexcavated areas for taking elevations in the 1992 South Area Excavation. The datum coordinates and elevations are 122S, 26.25W (24.14 m asl); 122S, 24.25W (23.99 m asl); 122S, 21.75W (23.76 m asl); and 122S, 19.25W (23.75 m asl).

Figure 3.31 *Close-up of Artiodactyl Remains, Ground Stone, and Fire-Cracked Rocks in 74S, 1W: East Central Bone Bed, Level 1*



Figure 3.32 *Outline of the East Central Bone Bed in the East Central Trench and Area Excavation*

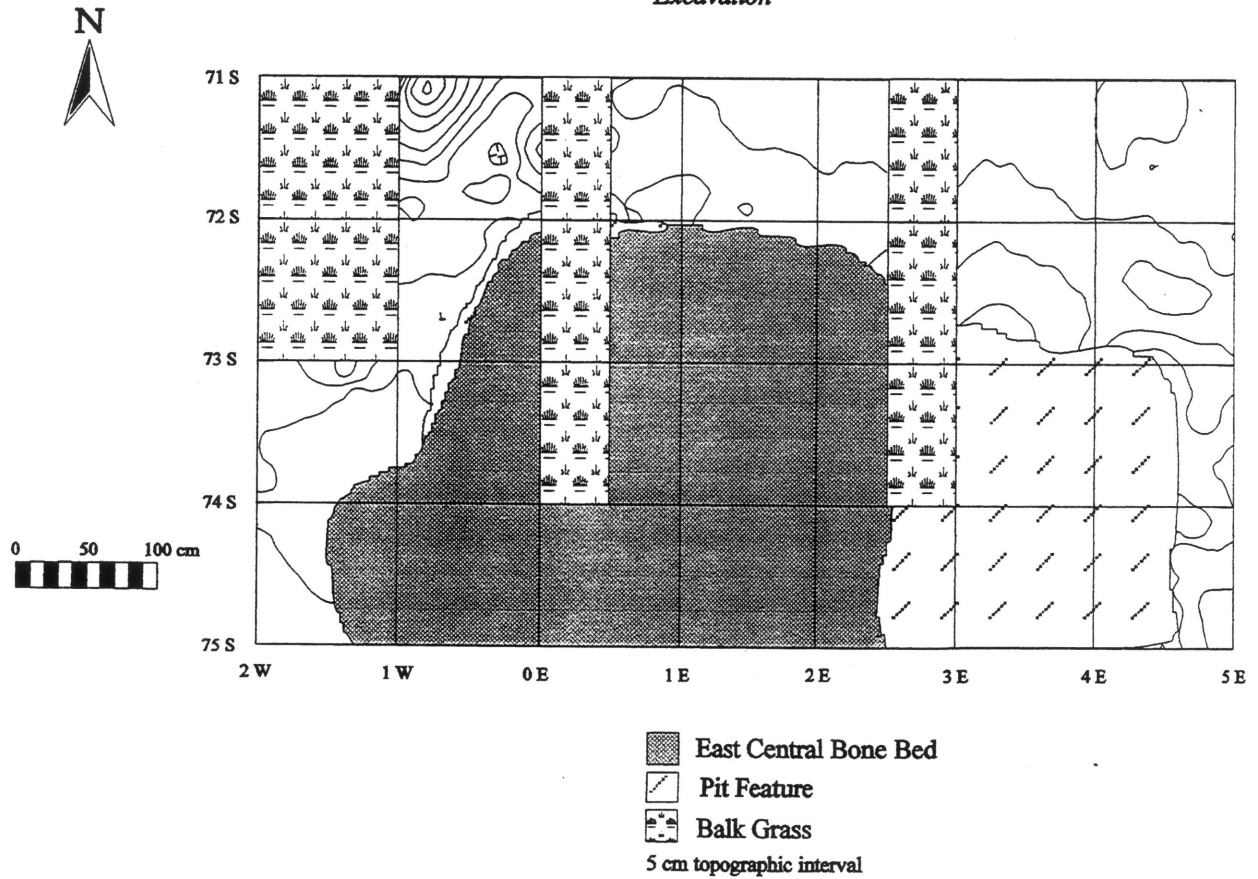


Figure 3.33 Basemap for the East Central Bone Bed and Adjacent Deposits, Level 1 (East Central Trench and Area Excavation)

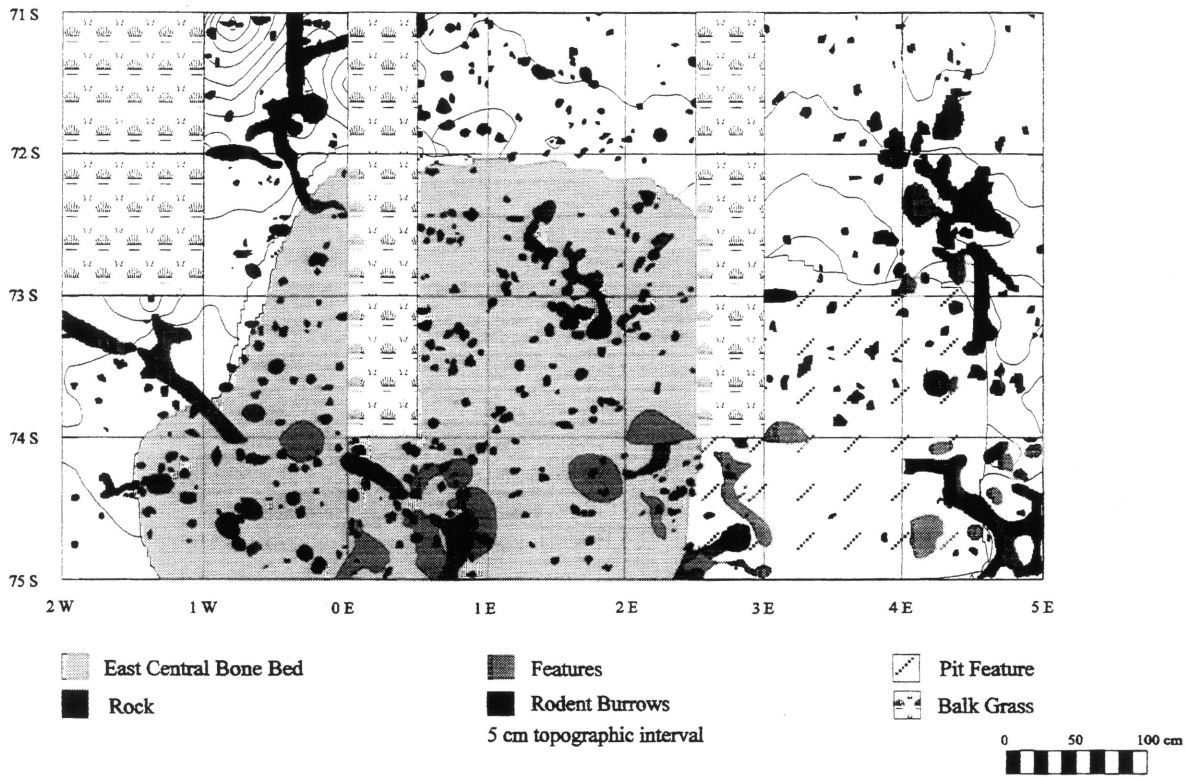


Figure 3.34 Basemap for the East Central Bone Bed and Adjacent Deposits, Level 2 (East Central Trench)

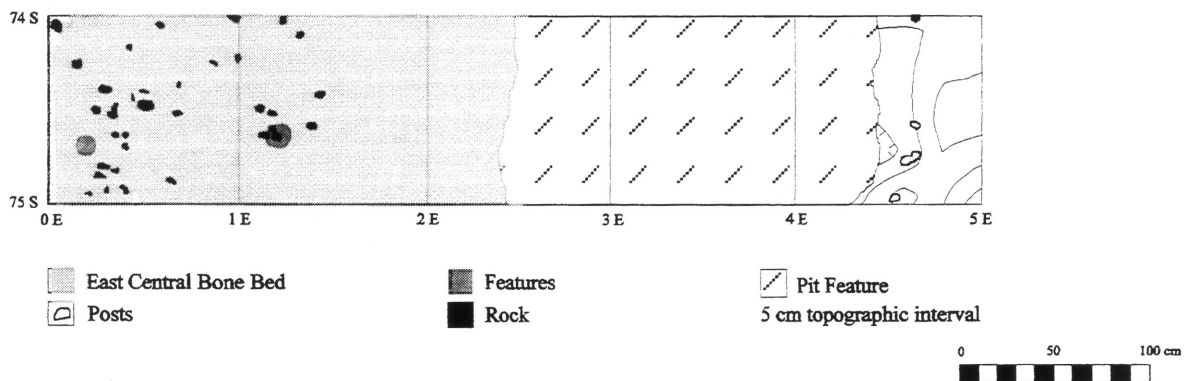
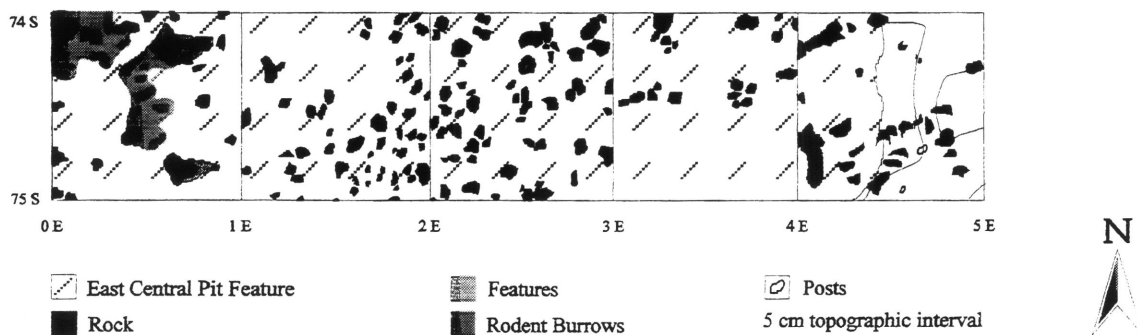


Figure 3.35 Basemap for the Floor of the East Central Pit Feature (East Central Trench)



The surface grade of the block is relatively gentle, sloping downward about 1 m from the northwest (119S, 26W; 24.23 m asl) to the southeast corner (125S, 17W; 23.19 m asl) over a distance of 11 m. Three balks were laid out on a 360 degree bearing from 124S, 24.5W (5-by-.5 m), 124S, 22W (2-by-.5 m), and 124S, 19.5W (2-by-.5 m).

After providing the stratigraphy of the South Trench, which was cleaned and deepened in 1992, we describe natural and cultural features in the South Trench and South Area Excavation. These features include a line of wooden posts, two bone bed deposits, a linear feature of clay, an extensive layer of rock rubble, natural bedrock blocks, and one pit feature.

SOUTH TRENCH

Five deposits are defined for the south wall profiles of 125S, 24W; 125S, 23W; 125S, 22W; 125S, 21W; 125S, 20W; 125S, 19W; and 125S, 18W (figure 3.36).

1) Topsoil. This light to dark grayish-brown (10YR 3/2, 10 YR 3/3) sandy loam is shallow (about 10 cm thick) and loosely packed, almost porous in composition. It varies little in texture from the underlying stratum, differentiated primarily by a slightly lighter color, a greater frequency of roots, and a lower density of artifacts and faunal remains. Rodent burrows are common.

2) Dark Sandy Loam. This dark-grayish brown (10YR 3/2) sandy loam is poorly sorted, crumbly, and contains many angular and subangular pebbles and rocks. Although many faunal remains, artifacts and charcoal were recovered, the depositional context of cultural materials varies greatly from the eastern to western units. In the eastern units (125S, 20W; 125S, 19W; 125S, 18W), cultural materials are highly fragmented and dispersed throughout the stratum. The dark sandy loam is relatively uniform in thickness (.3 to .35 m) across the three units. An intact bone bed deposit (described below) is found along the 125S, 23W; 125S, 22W; the western half of 125S, 21W; and the eastern edge of 125S, 24W.

The bone bed is laid down directly on subangular and angular sandstone and siltstone rocks. Many of the rocks measure between .1 to .15 m in length. The rock rubble is dispersed throughout the western half of the trench at a depth of between .4 to .5 m below the ground surface. In the eastern half of 125S, 24W, where the bone bed terminated, a mass of large angular rocks was unearthed ranging in depth from 20 to 50 cm below surface.

3) Dark Pit Fill. This deposit is identified only in the western section of the trench, beginning along the western edge of 125S, 20W, and continuing in units 125S, 21W to 125S, 24W. The pit fill, consisting of a dark grayish-brown (10YR 3/2) sandy loam is found directly below the rock rubble in units 125S, 24W and 125S, 23W, and within and below the rock rubble in 125S, 22W; 125S, 21W; and the western edge of 125S, 20W. The deposit differs from the upper dark sandy loam

in its darker color, its oily (almost greasy) feel, and its paucity of shell and animal bones. Charcoal flecks and artifacts are found in this stratum.

4) Mottled Dark Sandy Loam/Clay. Several discrete pockets of mixed dark sandy loam and clay soil are observed in the eastern half of 125S, 20W and the west edge of 125S, 19W; in 125S, 21W and 125S, 22W; and in 125S, 24W. The pockets are light yellowish-brown (10YR 5/6) in color and exhibit a mottled texture of unsorted sand, silt, and clay sediments.

5) Clay/Bedrock. The underlying yellowish-brown (10YR 5/8) clay deposit exhibits an uneven topography across the trench, ranging in depth below surface from .4 to .8 m. In the eastern units (125S, 20S; 125S, 19W; 125S, 18W), the compact sand/clay stratum is observed only .4 to .45 m below the surface. With the exception of the above pocket of mottled soil, the interface between the dark sandy loam and clay levels is very sharp and distinct. The clay sediments appears to be sterile. Parallel bands of siltstone bedrock are observed in the clay soil in unit 125S, 20W.

In the western units, beginning with the western edge of 125S, 20W and continuing through eastern half of 125S, 24W, a shallow pit had been dug into the underlying clay soil at a depth of about .2 to .3 m. The pit measures about 3.5 m in length, and is characterized by an uneven floor surface. The pit feature was first defined when the original South Trench was deepened and profiled in the 1992 field season.

WOODEN POSTS

Twelve redwood posts were mapped and recovered *in situ* in units 125S, 19W; 124S, 18W; and 123S, 18W. Beginning with the southernmost post, each is numbered consecutively from 1 to 12 (figure 3.37). The length of the posts exposed in excavation varies from 5 to 30 cm. The posts are rectangular to round in cross-section, ranging in size from very thin slabs, less than 3 cm in diameter, to thicker pieces over 4 to 5 cm in width. Seven posts (4, 5, 6, 7, 9, 10, 11) measure between 1-by-1 cm to 3-by-2 cm in cross-section, while the remainder (1, 2, 3, 6, 12) measure between 4-by-3 cm to 7-by-4 cm. Most posts are not well preserved, but at least one exhibits chopping marks from an axe.

All but one post (#12) are found in a linear configuration that is oriented along a northern bearing, from 0 to 40 degrees. The linear arrangement of posts is roughly S-shaped, curving slightly in a northeastern direction. The spacing between adjacent posts, measured from their centers, ranges between 12 to 62 cm, although the interval separating most is only 28 to 35 cm. No pattern of thick and thin posts is detected. The first three posts (1-3) are thick, followed by 4 thin slabs (4-7), then a thick post (#8), followed by three thin slabs (9-11).

A shallow trench had been cut into the yellow clay/bedrock in which the first four posts had been placed. The trench is 2 to 5 cm deep, and measures between 20

Figure 3.36 South Wall Profile of South Trench

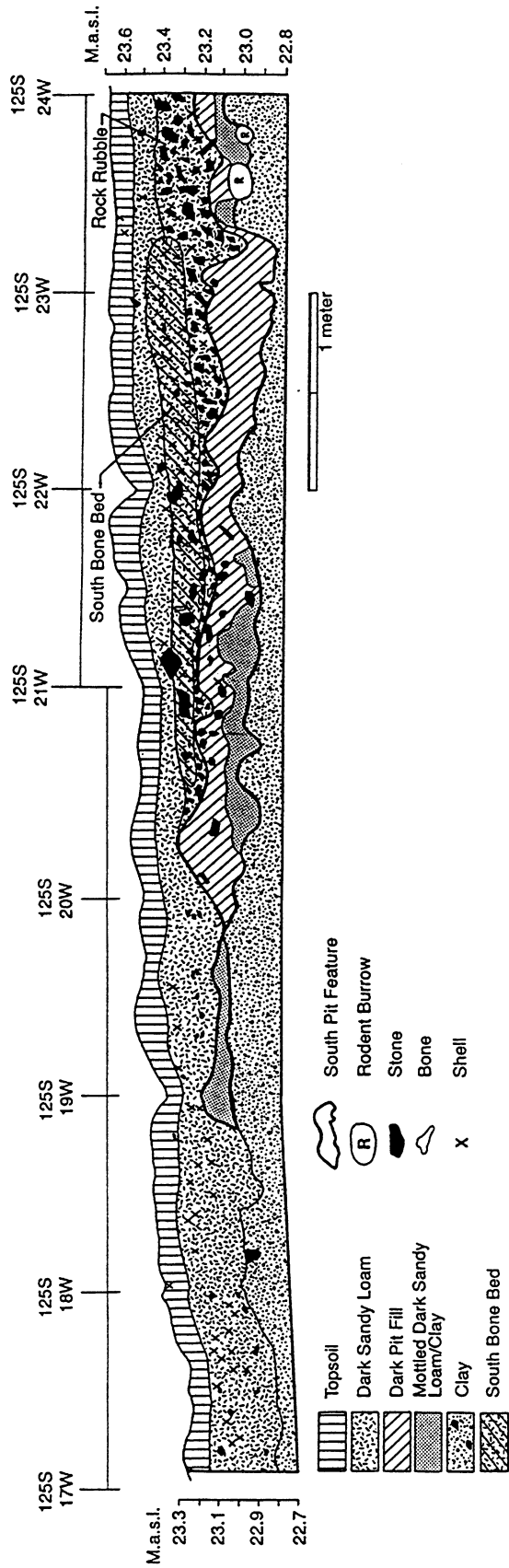
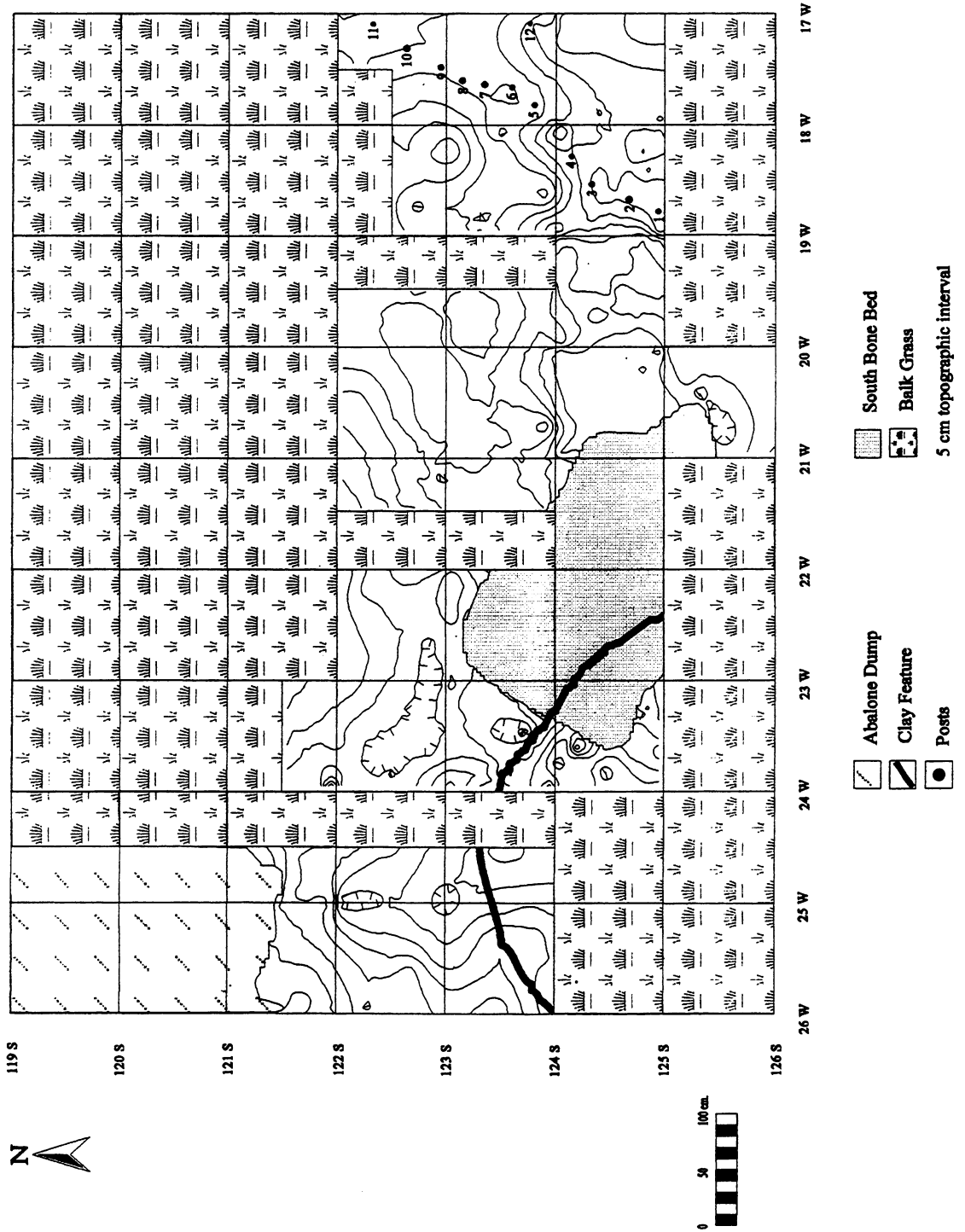


Figure 3.37 Outline of the South Bone Bed, Abalone Dump, Wooden Posts, and Linear Clay Feature in the South Trench and Area Excavation



and 30 cm in width. Post #8 is braced between two large rocks. A small (16-by-8 cm), shallow ash and charcoal deposit, on the interface between the dark sandy loam and clay soils, is found .8 m east of post #2 in 125S, 18W.

While the posts may outline the remains of a roofed structure, their small size and S-shaped distribution, taken together with the lack of any corroborating features (floor foundations, pits, rock pavement), argue against this interpretation. The posts appear to be part of an historic fence-line constructed along the eastern edge of the terrace. However, it is not clear when the fence-line was constructed. It could be related to the American Period fence-line observed in historical photographs in the south area of NAVS. On the other hand, the very small diameter of some of the posts and S-shaped configuration make it anomalous to most extant ranch fences. Interestingly, the excavation of the shallow trench, in which posts were positioned and anchored, is somewhat analogous to the method employed in the construction of the Ross Stockade. A trench was first excavated where the Stockade wall was to be constructed, within which wall posts, the lower sill, and puncheons were then positioned, secured, and buried (see Treganza 1954:19-24).

SOUTH BONE BED

The bone bed was initially observed about 25 to 30 cm below ground surface in the South Trench. The

deposit is very similar to the East Central Bone Bed, containing hundreds of fire-cracked rocks and other lithic artifacts, whole shellfish, bird, mammal, and fish remains, and some ceramic, glass, and metal specimens. Again, the dense concentration of materials appears to be deposited *in situ*, with little evidence of trampling or of other post-depositional processes (e.g., figure 3.38).

The 10 to 15 cm thick deposit in the South Trench was excavated in four levels, with materials removed one tier at a time so that underlying remains could be exposed and recorded *in situ*. As each level was exposed, all materials greater than the excavator's thumbnail were point provenienced, mapped, photographed, and removed for later analysis. The first excavation level is the upper surface of the bone bed. It is distinguished by the large whale bone core and concentration of marine mammal bones in the center of 125S, 23W (figure 3.39). The elevation ranges from 23.54 m asl in the nw corner of 125S, 23W to 23.26 m asl in the center of 125S, 21W. The second level consists of the next tier of materials unearthed that varies in elevation from 23.48 m asl in the nw corner of 125S, 23W to 23.22 m asl in the se corner of 125S, 21W. This surface is marked by the high frequency of fire-cracked rock in 125S, 23W and the whole abalones and mammal bones in 125S, 22W (figure 3.40). The third and fourth levels of the South Trench Bone Bed were removed in 1992. In level 3, the deposit is defined only in 125S, 23W and 125S, 22W at elevations of 25.44 m asl to 25.20 m asl. The fourth level

Figure 3.38 Close-up of Whale Bone Core and Mollusk Remains in 125S, 22W: South Bone Bed, Level 1



Figure 3.39 *Photo of 125S, 22W and 125S, 23W: South Bone Bed Level 1*



Figure 3.40 *Photo of 125S, 21W and 125S, 22W: South Bone Bed Level 2*



includes 125S, 23W; 125S, 22W; and 125S, 21W at elevations ranging from 23.40 m asl to 22.98 m asl.

In 1992, the upper surface of the bone bed and adjacent deposits to the north and south of the South Trench were exposed in the South Area Excavation. Photographs of the South Area Excavation were taken in four sections. The first section (figure 3.41) consists of four full or partial units east of the 122S, 19.25W balk datum (124S, 19W; 123S, 19W; 124S, 18W; 123S, 18W). The second section (figure 3.42) includes six full or partial units east of the 122S, 21.75 balk datum (124S, 22W; 123S, 22W; 124S, 21W; 123S, 21W; 124S, 20W; 123S, 20W). The third section (figure 3.43) contains five full or partial units east of the 122S, 124.25W balk datum (124S, 24W; 123S, 24W; 122S, 24W; 124S, 23W, 123S 23W). The fourth section (figure 3.44) covers ten full or partial units east of the 122S, 26.25W datum (124S, 26W; 123S, 26W; 122S, 26W; 121S, 26W; 120S, 26W; 124S, 25W; 123S, 25W; 122S, 25W; 121S, 25W; 120S, 25W).

The total area of the South Bone Bed exposed in 1991 and 1992 is about 4 sq m, extending across 125S, 23W and 125S, 22W and into the eastern edge of 125S, 24W; the west half of 125S, 21W; the nw quad of 126S, 21W; the sw quad of 124S, 22W; most of 124S, 23W; and the eastern half of 124S, 24E (figure 3.37). The upper surface of the bone bed is relatively flat, maintaining a depth of 25 to 30 cm below ground surface at elevations ranging from 23.60 m asl in 124S, 23W to 23.40 m asl in 125S, 21W and 125S, 22W.

Base maps were produced for each excavation level of the bone bed showing the balks, grid units, rodent burrows, soil stains, and nonartifactual rocks using CoreIDRAW software. Figure 3.45 illustrates level 1 of the South Bone Bed and adjacent deposits and features in the 27.25 sq m block exposed in the South Trench and South Area Excavation. Figures 3.46, 3.47, and 3.48 show levels 2, 3, and 4 of the South Bone Bed exposed in the South Trench, respectively. Subsequent analyses of cultural materials from the South Trench Bone Bed will focus on 125S, 23W; 125S, 22W; and the west half of 125S, 21W. Unless otherwise noted, the eastern edge of 125S, 24W will not be included because of problems in recording some bone bed proveniences in the field. The spatial distribution of specific artifact categories and faunal remains will be illustrated in chapter 17.

ABALONE DUMP

Another intact bone bed deposit is found in the northwest units of the South Area Excavation (120S, 26W; 120S, 25W; 121S, 26W; 121S, 25W; 122S, 26W; 122S, 25W) (figure 3.37). Hundreds of specimens of whole abalone shells, animal bones, fire-cracked rocks, and artifacts are embedded in the dark sandy loam (figure 3.44, close-ups in figures 3.49, 3.50, 3.51). The deposit is detected about .3 to .4 m below surface at an elevation ranging from 23.88 m als to 23.78 m asl. The Abalone

Dump is deposited directly on rock rubble. Since a limited area is exposed, the dimensions of the deposit are not determined, although it measures at least 2-by-1.5 m in area.

LINEAR CLAY FEATURE

A linear clay feature is found at the interface of the rock rubble in 124S, 26W; 124S, 25W; 124S, 24W; 125S, 24W; and 125S, 23W. The feature is a yellow (10YR 7/4) clay band, ca. 10 to 18 cm in width and 10 cm high, that forms a quadrangular outline with rounded corners measuring at least 3.0 m in length and 1.8 m in width (figure 3.37). The quadrangular outline is oriented at a 305 to 310 degree angle along its longest axis and about a 45 degree bearing on the other. The clay feature is sandwiched between the South Bone Bed and rock rubble in 125S, 23W (figure 3.52). One interpretation of the clay feature entertained in the field is that of an extensive burrow produced by a very unusual rodent. However, the size, clay composition and compaction, and overall quadrangular shape strongly suggest it is a cultural feature.

ROCK RUBBLE

An extensive deposit of rock rubble is uncovered in the western half of the South Area Excavation, especially in 124S, 26W; 123S, 26W; 122S, 26W; 124S, 25W; 123S, 25W; 122S, 25W (figures 3.44 and 3.45). Hundreds of large angular rocks, many measuring between .1 to .3 m in length, some rounded cobbles, and a few fire-cracked rocks are concentrated in two or more courses over an area measuring at least 4-by-3 m. The rocks are found .2 to .5 m below ground surface. The rock layer represents a cultural stratum produced by the intentional placement or dumping of rocks into the western half of the South Area. The rock rubble may have been used to raise and level the ground surface, as a place for dumping rocks excavated from other nearby locations, or they may represent the remains of walls or building foundations. Farris (1990:485) notes that rock rubble was used in the construction of the Old Warehouse at Fort Ross to raise the foundation of the building and to provide better drainage.

BEDROCK

Tilted beds of siltstone and sandstone rocks were exposed in 122S, 24W; 123S, 23W; 123S, 22W; 123S, 21W; 123S, 20W; and 123S, 19W. The parallel beds mapped *in situ* are oriented along a 310 to 320 degree bearing (figure 3.42). The bedrock is very shallow in this area, only .1 to .2 m below surface, covered by thin strata of dark sandy loam and topsoil. Large, broken angular rocks are found along the southern margins of the exposed bedrock (125S, 18W; 124S, 18W; 125S, 19W; 124S, 19W; 125S, 20W; 124S, 20W; 124S, 21W; 124S, 22W). It appears that human occupation and use of this

Figure 3.41 Photo of First Section (124S, 19W) of the South Area Excavation



Figure 3.42 *Photo of Second Section (124S, 22W) of the South Area Excavation*

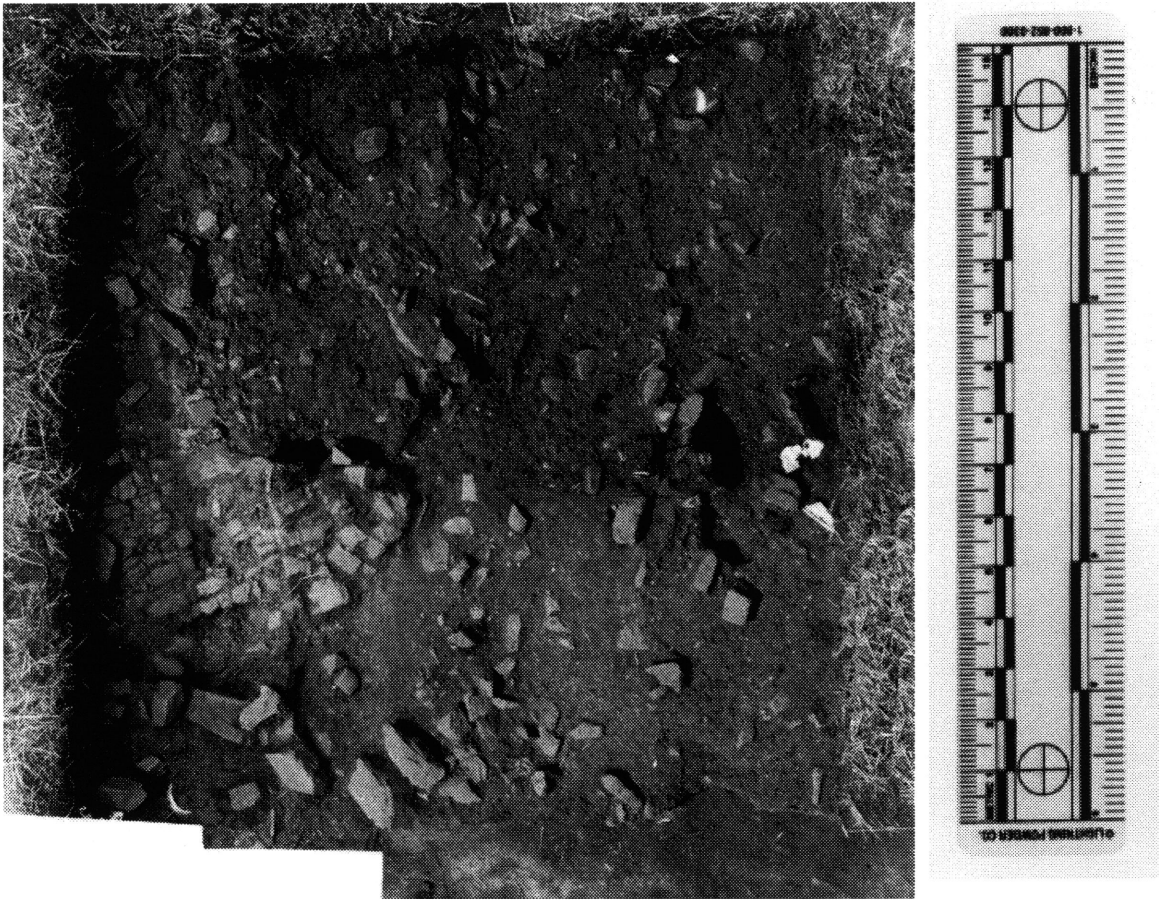


Figure 3.43 *Photo of Third Section (124S, 24W) of the South Area Excavation*

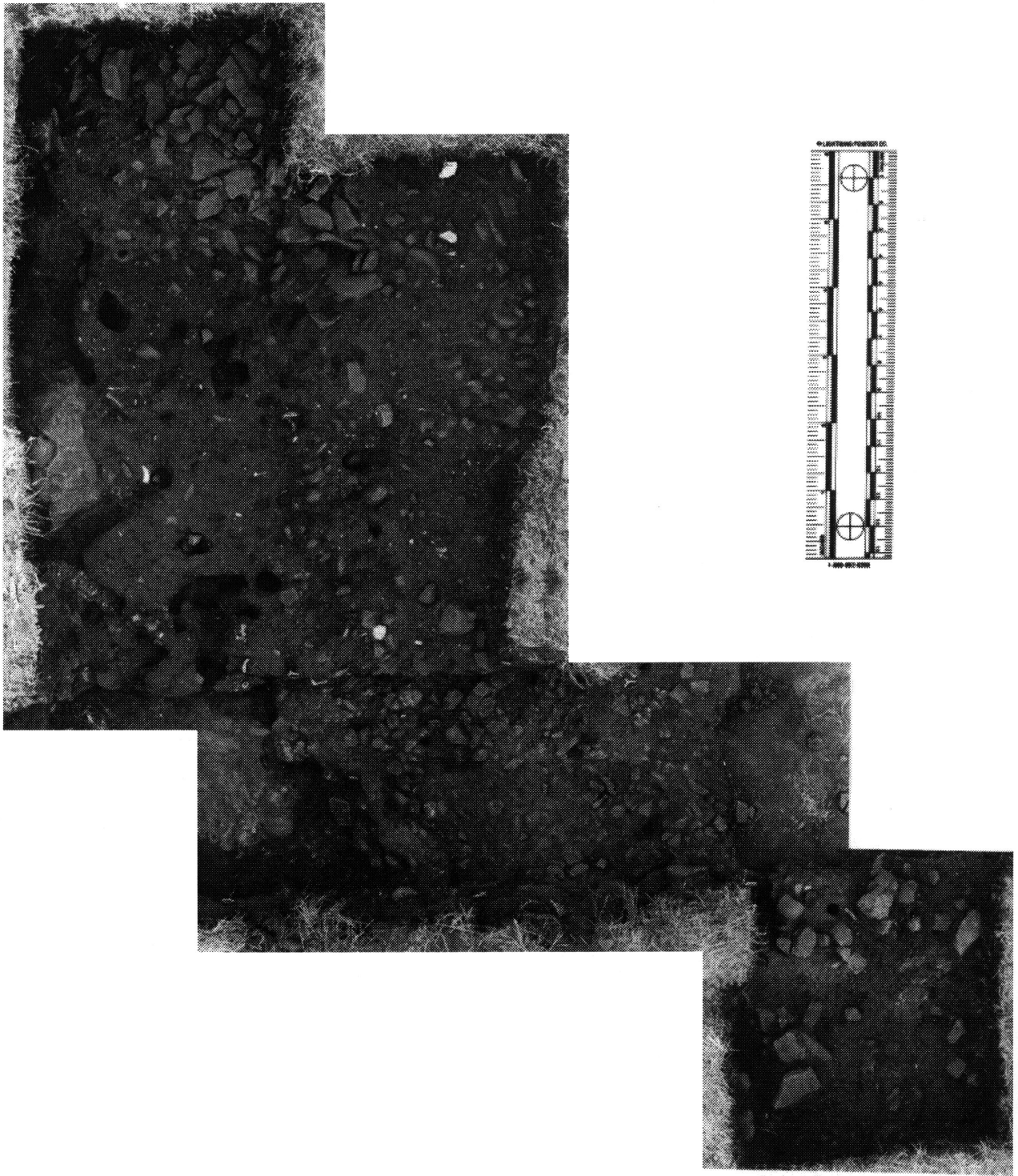


Figure 3.44 *Photo of Fourth Section (124S, 26W) of the South Area Excavation*

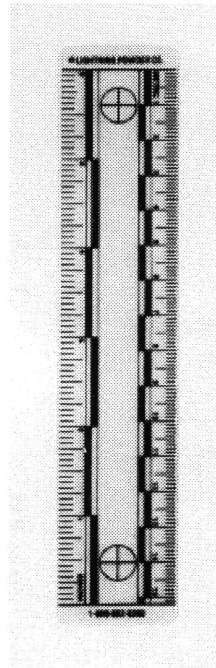
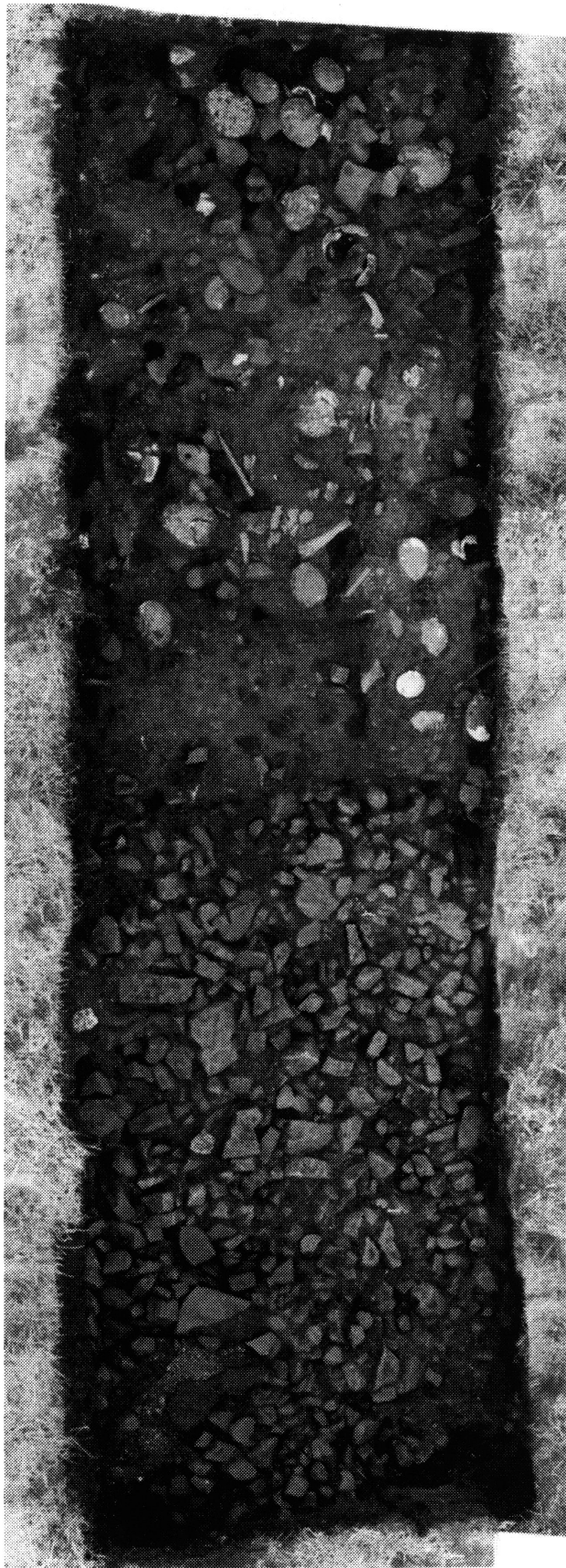


Figure 3.45 Basemap for the South Bone Bed and Adjacent Deposits, Level 1
(South Trench and Excavation Area)

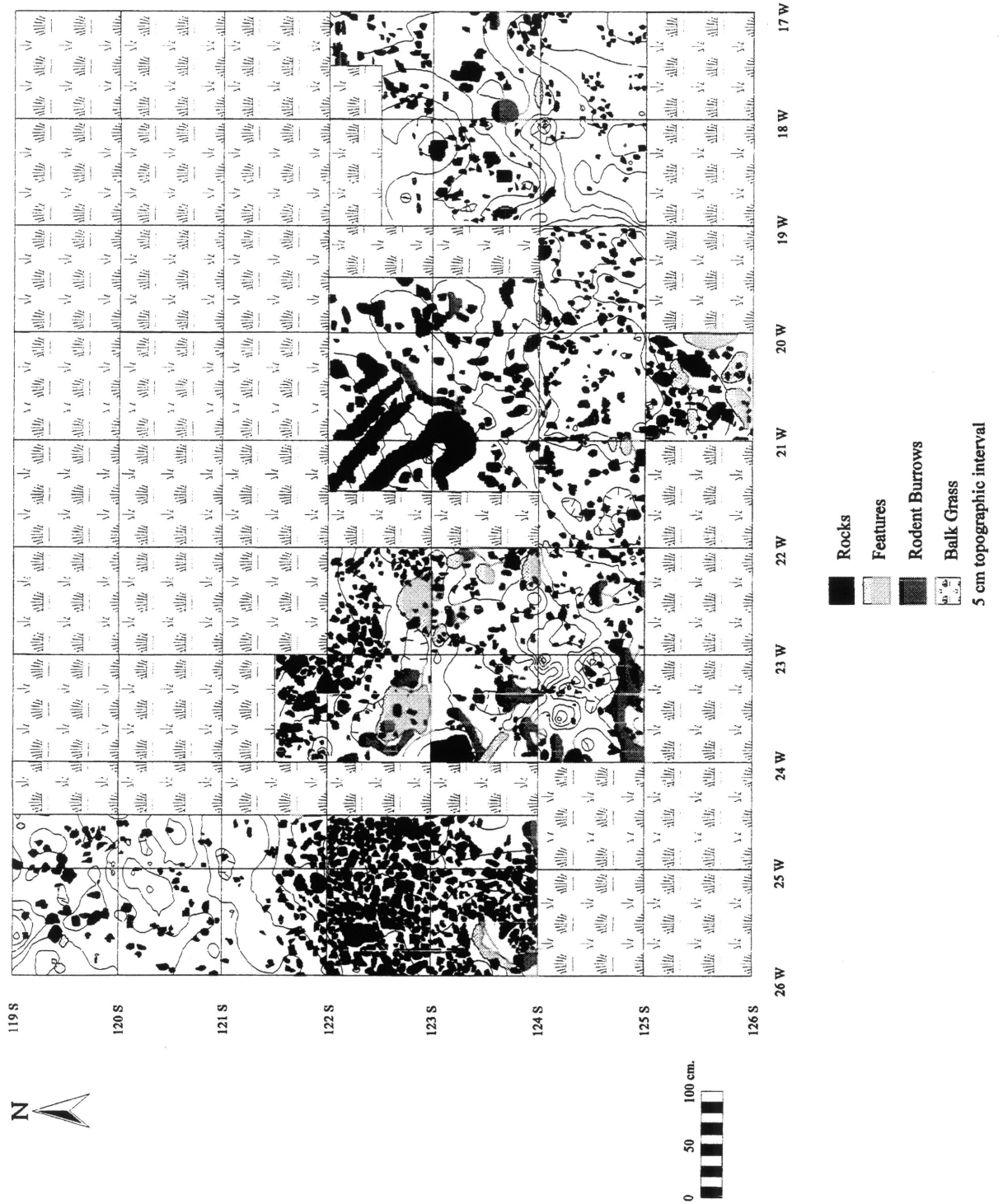


Figure 3.46 Basemap for the South Bone Bed, Level 2 (South Trench)

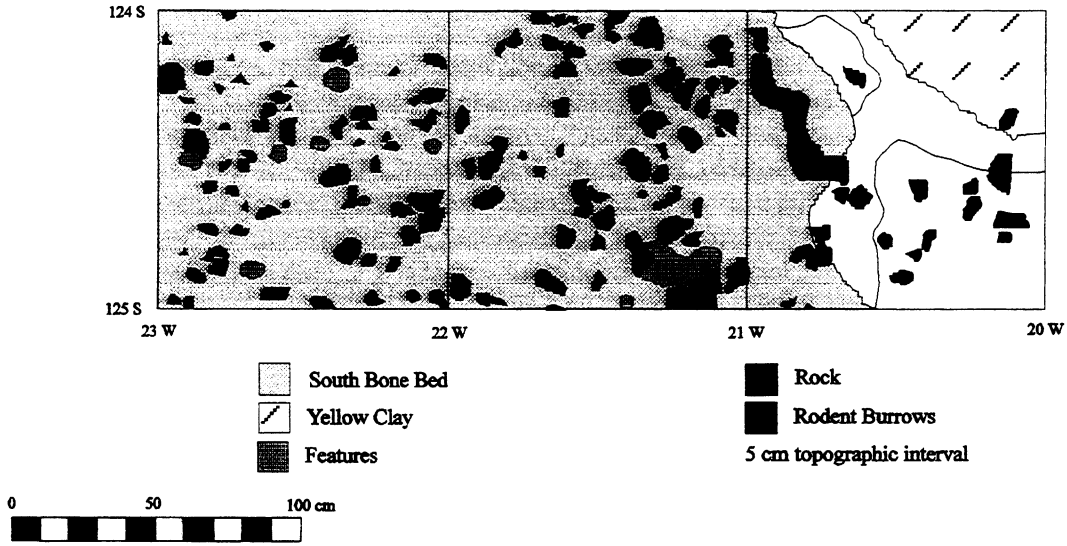


Figure 3.47 Basemap for the South Bone Bed, Level 3 (South Trench)

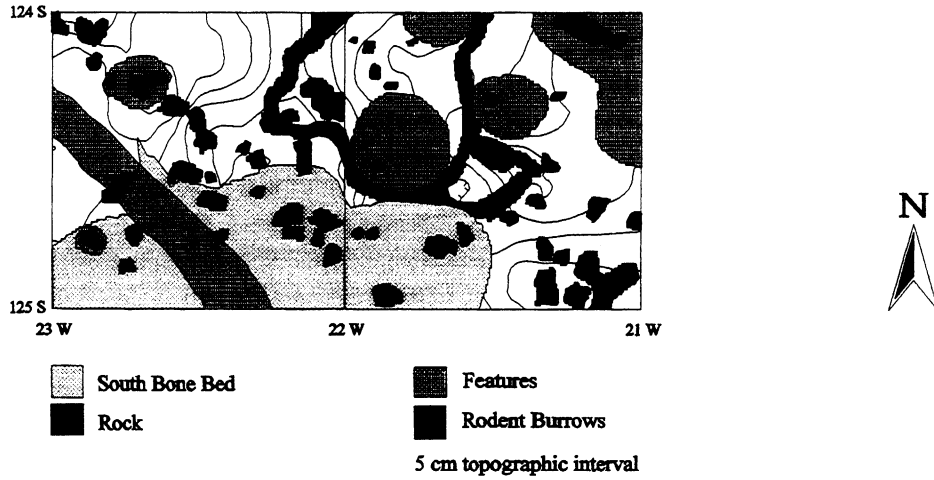


Figure 3.48 Basemap for the South Bone Bed, Level 4 (South Trench)

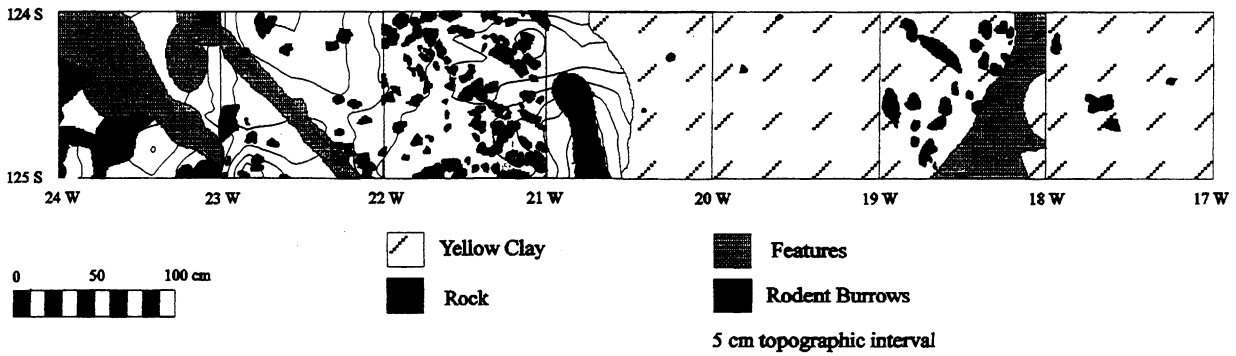


Figure 3.49 *Close-up of Abalone Shell, Ground Stone, and Iron Axe Head in 121S, 26W: Abalone Dump, Level 1*



Figure 3.50 *Close-up of Iron Spike, Mollusk Shells, and Artiodactyl Remains in 122S, 25W: Abalone Dump, Level 1*



Figure 3.51 *Close-up of Worked Bone Tools, Abalone Shells, Ground Stone, and Fire-Cracked Rocks in 121S, 26W: Abalone Dump, Level 1*



Figure 3.52 *Close-up of Linear Clay Feature on Rock Rubble in 125S, 23W: (NW to SE - Photo Center)*



latter location has shattered the upper surface of the bedrock into many pieces.

SOUTH PIT FEATURE

The expanded profile of the South Trench in 1992 revealed a pit dug into the clay level about .2 to .3 m deep (figure 3.36). The pit feature measures about 3.5 m in length, and varies in depth between .5 and .8 m below surface. The mottled dark sandy loam/clay pockets at either end of the pit mark the outer rim of the feature. This observation suggests that the original ground surface during the construction of the pit was the upper surface of the clay/bedrock. If this were the case, then the original depth of the pit was quite shallow, only .2 to .3 m below the historic ground surface. Sediments removed from the pit were dumped directly on the clay surface to form the rim of the feature. The shallow depth of the clay/bedrock horizon directly north of the pit adds support to the idea that exposed clay/bedrock was the original surface of this area in the early 1800s.

Once the pit feature was abandoned, it was filled with sediments (pit fill, mottled soil) to the level of the upper clay surface. Tons of rock rubble were then dumped on top of the pit fill. The rock dumping episode(s) raised the elevation of the surface between .2 to .5 m. The linear clay feature was then constructed directly on top of the rock rubble, and the bone bed laid down over the former pit feature.

CONCLUSION

The surface topography of NAVS includes a line of platforms or shallow depressions paralleling the eastern edge of the terrace that are associated with high densities of cultural remains. The remainder of the central area is largely sterile, bounded by clusters of artifacts, especially metal objects, to the north and dense concentrations of artifacts and faunal remains to the south. The surface structure of NAVS suggests that one or more rows of houses were constructed along the terrace edge where domestic practices and refuse disposal took place. The Village "core" as illustrated in the 1817 map correlates with the relatively "empty" central area, except along the eastern edge of the terrace where surface features and artifact clusters are noted.

Subsequent subsurface investigation in the east central and south areas largely support the above observations. Limited testing in the central area (West Central Trench) on the western border of the Village "core," suggests minimal archaeological evidence of human modification to the landscape. While a diverse, albeit limited, assemblage of historical materials is found, the frequency of shell and animal bone remains is low, no discrete trash deposits are detected, and no architectural features are observed. If houses were constructed in this area, as indicated in the 1817 map, then they were

probably above ground, wooden structures with foundations that left few remains in the archaeological record.

In contrast, the topography of the central and south areas along the eastern edge of the terrace (East Central and South area excavations) was created artificially, a product of distinct dumping episodes that raised and probably leveled the ground surface during the occupation of NAVS. In both areas, space was reused and redefined over time. In the East Central Area, a pit feature was dug, abandoned, then filled with sediments and leveled to the old ground surface. The new artificial surface was then used as a small refuse dump (East Central Bone Bed). In the South Area, another pit feature was dug, used, abandoned, then filled with sediments making it level to the original clay/bedrock surface. On top of this fresh surface, tons of rock rubble were then dumped into the vicinity, raising the elevation of the ground surface .2 to .5 m. A linear clay feature was then constructed on this new surface, followed by the dumping of hundreds of faunal elements and artifacts in two discrete trash dumps (South Bone Bed and Abalone Dump). We observed a similar pattern in the South Central Test Unit where rock rubble overlaid the clay/bedrock, indicating that the ground surface was artificially raised here as well.

The above findings suggest that the western side of the Village "core" was treated differently from much of the rest of the site. The West Central Trench does not exhibit evidence of massive dumping, multiple reoccupation episodes, and intentional surface raising and leveling. This area also does not appear to have been used as a refuse disposal area. The low density of surface artifacts, the moderate density of materials recovered from surface Feature 9, and the low frequency of faunal remains in the West Central Trench suggest that either the area was intentionally cleaned of household refuse or that domestic chores involving cooking and tool maintenance were not commonly conducted here or that the archaeological context was not suitable for the preservation of some kinds of archaeological remains.

It is unclear how the west central zone was used by NAVS households. The relative scarcity of archaeological remains suggests it may have been designated as a special place that was intentionally kept clean of trash. The area may have served as a communal place where public ceremonies, dances, and other events could have taken place.

We argue that NAVS households intensively used the south area and eastern edge of the terrace for establishing residences, for conducting a variety of domestic chores, and for discarding domestic refuse. The East Central and South pit features probably represent architectural structures constructed in the formative years of the Native Alaskan Village. The floor of the East Central Pit Feature contains a small assemblage of historical

materials, including nails and window glass, that will be examined in chapter 17. Since the South Pit Feature was only revealed in cleaning the wall profile for the South Trench, little archaeological remains have yet been recovered from it. Both features are shallow, dug into the original ground surface to only a depth of .2 to .3 m. No internal features are observed in either structure, although the bottom of the East Central Pit Feature contains rock rubble that indicates the surface was raised for drainage purposes and/or to level the floor.

The wooden posts found in the East Central Pit Feature may be associated with a later American Period fence. The age of the small wooden posts uncovered to the east of the South Pit Feature is not known. They may represent a small garden plot associated with one of the NAVS houses, or alternatively they may date to the later American Period. The linear clay feature in the South Area was built on the rock rubble that covered the South Pit Feature. While the specific purpose of the feature remains unknown, we suspect it may have been associated with an above ground structure built on the raised platform of rock rubble.

The discrete trash deposits unearthed in the East Central and South area excavations do not appear to be associated with the original use or occupation of the underlying pit features. The East Central and South bone beds probably date to the 1820s or 1830s (see chapters 7 and 16). The bone bed deposits were laid down on artificially raised surfaces protected from trampling and bioturbation. The spatial integrity of the deposits may have been maintained by the high density of fire-cracked rocks in a compact surface that would have discouraged rodent penetration. In addition, the rock rubble underlying the South Bone Bed and Abalone Dump would have created an impervious barrier to rodents. A careful examination of rodent burrows in the East Central Area indicates considerable activity above and below the bone bed deposit but relatively little within the deposit itself. In fact, it appears that the "little guys" were using the lower surface of the bone bed deposit as the roofs to their nests in some cases. The fragmented nature of the materials in the dark sandy loam directly west and east of the East Central Bone Bed may be due to the lower density of fire-cracked rocks that did not discourage rodent action.

The intact nature of the bone bed deposits was perpetuated by more than a high density of fire-cracked rocks or the underlying stratum of rock rubble. The presence of whole abalones, mussels, clams, sea urchin spines, and articulated fish vertebrae indicates that the surfaces were not trampled by the occupants of NAVS or impacted by later ranching activities in post-Ross times. This observation suggests that the raised surfaces on which the materials were deposited were not used as extramural activity areas, but almost exclusively as refuse

dumps. Either the surfaces were protected by a physical barrier, such as the remains of an old structure that kept people from walking across the surface, and/or the deposits were rapidly covered or intentionally buried with sediments. The bone bed deposits could even represent the final sequence of abandonment in the East Central and South areas.

We believe the bone bed deposits were trash dumps for nearby NAVS residents. The discrete size and pristine nature of the bone bed deposits suggest that they were probably created over a short time by the discard practices of one or two related households. The bone beds appear to be sealed deposits of household trash dating to the later occupation of the Native Alaskan Village.

REFERENCES CITED

- Carlson, E. V. (Ed.)
1976 *Fort Ross State Historic Park: Resource Management Plan and General Development Plan*. State of California, The Resources Agency, Department of Parks and Recreation, Sacramento.
- Farris, Glenn J.
1990 Fort Ross, California: Archaeology of the Old *Magazin*. In *Russia in North America: Proceedings of the 2nd International Conference on Russian America*, edited by Richard A. Pierce, pp. 475-505. Limestone Press, Kingston, Ontario.
- Fedorova, Svetlana G.
1973 *The Russian Population in Alaska and California Late 18th Century - 1867*. Translated and Edited by Richard A. Pierce and Alton S. Donnelly. Limestone Press, Kingston, Ontario.
- Lightfoot, Kent G., Thomas A. Wake, and Ann M. Schiff
1991 *The Archaeology and Ethnohistory of Fort Ross, California: Vol. 1, Introduction*. Contributions of the University of California Archaeological Research Facility No. 49. University of California, Berkeley.
- McKenzie, John
1963 Historic Resources and Indian Sites at Fort Ross State Historic Park as Identified by John McKenzie, August 20, 1963. Manuscript on file, Cultural Heritage Section, Archaeology Laboratory, California Department of Parks and Recreation, Sacramento.
- Prince, Gene
1991 Extension Poles for Low-Level Elevated Photography. Copy on file, Phoebe Hearst Museum of Anthropology, University of California, Berkeley.
- Treganza, Adan E.
1954 *Fort Ross A Study of Historical Archaeology*. Reports of the University of California Archaeological Survey No. 23:1-26.

4

Site Formation Processes at the Native Alaskan Neighborhood

HEATHER A. PRICE

IN CONJUNCTION WITH the archaeological investigations at the Native Alaskan Village Site (NAVS) and the Fort Ross Beach Site (FRBS) introduced in chapters 2 and 3, a multi-scalar analysis is undertaken to elucidate the history and processes of site formation on and along the base of this California coastal terrace. The analysis includes a field-based geomorphological study and a series of sedimentological studies carried out in the laboratory facilities of the Archaeological Research Facility at U. C. Berkeley.

Qualitative observations taken in the field are designed to address three related issues. These are: the origin of the site sedimentary matrix (location and lithology of the parent rock); the way in which sediment travels from sources to deposits (including weathering and transport processes); and the degree of and kinds of alterations undergone by the sediments once deposited. This information enables the archaeologist to determine both how the cultural materials were deposited at the sites and the relative integrity of the archaeological deposits; that is, whether the cultural materials were relatively undisturbed once deposited, or whether and to what extent they have been disturbed post-depositionally.

Qualitative and quantitative analyses carried out in the lab complement the geomorphological study by providing further information regarding post-depositional processes and the history of soil formation at both sites. Lab analyses include determination of color, pH, organic carbon content, calcium carbonate content, and structure. These analyses help us understand the nature and degree of human impact on these sites from the time of deposition through the present.

Before proceeding with the geomorphological report, I will briefly summarize observations of the

stratigraphic successions exposed at both sites during the field seasons of 1988-89 and 1991-92. The stratigraphic successions are treated in greater detail in chapters 2 and 3 and in the sedimentary section of the current chapter.

FORT ROSS BEACH SITE

The Fort Ross Beach Site extends for roughly 30 m across the colluvial toe at the southeastern base of the coastal terrace. The profile is divided into three segments—West, Middle, and East based on topographical and archaeological characteristics. The West Profile is nearly 2 m deep and has 4 strata: a fill consisting of yellow compacted clay and large angular siltstone fragments, compacted brown mottled clay, a localized yellow clay lens, and a beach gravel base. The Middle Profile centers around a feature composed of a red clay-lined basin roughly 2 m across that was partially filled with large rocks. This profile consists of topsoil, fill of yellow compacted clay and large angular siltstone fragments, a midden (garbage area), compacted brown mottled clay, and an underlying clay stratum. The midden is sometimes divided into midden 1 (upper) exhibiting numerous bone and shell fragments, and midden 2 (lower) exhibiting the same dark-brown-to-black loosely packed sediments with a significantly lower concentration of bone and shell. The East Profile is less than 1 m deep and consists of the topsoil, a midden, and a clay stratum.

The beach gravel base and the lowest clay strata of FRBS yield charcoal and obsidian tools and debitage from lithic production. Historic Period artifacts such as glass, glass beads, and ceramics are limited to the upper portion of the profile, including the compacted brown clay stratum, the midden (where they are quite common),

and the topsoil. Bone and shell fragments of all sizes have been recovered from the top meter or so of the profile. In general, the West Profile has only a sparse concentration of cultural materials while the Middle and the East profiles yield more artifacts. These are primarily associated with the midden and the pit feature.

The West Profile of the site is steeply sloping. The Middle Profile is moderately sloping, and the East Profile forms almost a bench, although it too has a gentle slope.

NATIVE ALASKAN VILLAGE SITE

The Native Alaskan Village Site extends across the top of the terrace between the Fort Ross Stockade and the ocean. The excavation trenches and test units placed across the site expose a basic stratigraphic succession including the topsoil, a midden (identified as dark sandy loam), and a clay substratum. In some places there are additional strata that appear to be related to cultural features. For example, in unit 110S, 11W there is a layer of rock rubble between the dark sandy loam and the clay substratum. In other units, such as 125S, 22W, a lens primarily composed of bones, fire-cracked rock, and artifacts (the bone bed) is seated within the dark sandy loam. Beneath this stratum is a concentration of rock rubble, then a dark pit fill associated with a pit feature, and beneath the pit feature a discontinuous layer of mottled dark sandy loam. This stratum is succeeded by the final clay substratum that rests on the marine sedimentary bedrock of the terrace. This terrace top deposit is less than one meter deep.

GEOMORPHOLOGICAL METHODS

Geomorphological methods include reference to geological maps in association with field inspection of bedrock exposures, stream and road cuts, erosional features such as gullies, and evidence of modern day rodent activity. Geological literature describing local processes (such as wave erosion) is consulted. Historical documents, including maps and photographs housed in the Fort Ross Interpretive Association Library at the Fort Ross State Historic Park, help to locate old roadbeds, determine the date of road building and other ground disturbing activities, trace the rate and path of migration of the Fort Ross Creek, and locate Historic Period structures on or near the sites. The excavation profiles at FRBS and the excavation units and trenches of NAVS present vertical and horizontal windows into the succession of sediment deposition at the two sites.

The source of sediments is determined by comparing characteristics of the deposit to local bedrock. The lithology of the sedimentary particles indicates the possible source materials. Relative particle angularity and size indicate the relative distance the particles have been transported, as well as the most likely agent of transport. For example, the more angular the sediments,

the less distance traveled from their parent rock. Smoothed particles are more likely to have been water transported. Rock composition is taken into account, as it affects the amount of weathering and alteration any given particle may be susceptible to (Selby 1982).

Once the source is determined, the exposed bedrock is examined for evidence of predominant weathering processes. Local weather patterns and the rock structure are considered in creating a scenario for the decomposition of the bedrock into sediment. The transport processes are ascertained by looking for a checklist of possible agents such as earthworms and rodents, landslides, rock falls, sheetwash, and so on. Rodent activity is revealed by heaps of churned up sediment on the ground surface, and by the presence of abandoned and filled in rodent burrows in the profile. Landslides are identified by scarp scars, and rock falls are identified by the concentration of large particle sizes in the colluvial profile.

Post-depositional alteration includes any physical or chemical processes that changed the sediments once they were deposited. Evidence for such alteration includes vertical horizonation and soil development, animal burrowing, leaching, color change, or erosion. The profile is examined for any evidence of structure within the colluvial deposit, such as size graded lenses, particle orientation, and for any signs of disturbance such as mixing.

GEOMORPHOLOGICAL RESULTS

BACKGROUND

The Native Alaskan Village Site is situated on the relatively flat terrace top that gently slopes upward away from the ocean. The Fort Ross Beach Site is situated along the beach front of this southeast facing coastal terrace. The terrace beach front ranges from a nearly vertical escarpment at the ocean to a moderate hillslope inland. At the base of the hillslope is the Fort Ross Creek. The creek bed has migrated across the cove through time, and its current position up against the north edge of the cove (where FRBS is located) was reached after the mid-1800s. Both the terrace top and hillslope are crisscrossed by the remains of a road built by the Russians as well as by the currently used dirt road that was constructed in the early 1920s. The hillslope bears these scars as well as small scale, localized erosional features such as gullies and slumps. Large sandstone boulders (riprap) litter the base of the terrace and the beach. These originated from the terrace above. The parent material can be seen protruding in isolated clumps towards the edge of the terrace closest to the ocean.

The Soil Survey of Sonoma County, California (USDA 1972) assigns the local soils to the Rohnerville series. These soils are moderately well-drained loams of varying slopes. The subsoil consists mainly of sandy

clay material weathered from the soft sandstones on the marine and beach terraces. The Mean Annual Precipitation is from 30 to 45 inches, while the Mean Annual Temperature ranges from 52 to 54° F. The vegetation consists primarily of annual and perennial grasses and legumes.

ORIGINS OF THE SEDIMENT

The Fort Ross coastal terrace is composed of Monterey Formation marine sandstones, siltstones, shale, and thin-bedded chert laid down during the Tertiary (Wagner and Bortugno 1982). These are most likely turbidites formed by turbidity or density currents in the ocean, in this case, on the continental shelf. Variation in the currents and therefore in the suspended sediment load resulted in distinct beds of different grain size and thickness (Walker 1979). These beds are parallel sided and laterally extensive.

Exposed bedrock near the top of the terrace shows parallel beds of siltstone of varying thickness. The color varies from light brown to light grey. This may be an effect of weathering since only exposed beds were observed, and marine sedimentary beds are known to change color with weathering (Bedrossian 1974). These beds have been tilted to an almost vertical attitude (dipping west), probably during subduction activity on the ocean floor (cf. *ibid.*). The thicker, more consolidated beds range from 4 to 10 cm wide. Laminae of roughly 1 cm are clustered together in bedsets up to 15 cm thick. Both types of beds have sharp contacts and uniform composition (cf. Collinson and Thompson 1989).

The siltstones in these almost vertical beds exhibit joints or cracks horizontal to the present surface. These joints serve as foci for weathering processes, both chemical and physical. Water enters the rock through these joints, and solution and cracking due to wetting and drying lead to loss of material and rock fall (Selby 1982; Small and Clark 1982). The thinner laminae appear to break up more frequently and in smaller fragments. At the exposed surface, the thinner bedsets are more recessed, suggesting that they erode at a faster rate than do the thicker, more consolidated beds.

The terrace top sediments and the colluvial deposits at the base of the terrace exhibit many features of this bedrock. The color is light brown to light yellow, larger particles are angular, predominantly sandstone and siltstone, and the matrix is composed primarily of clay and silt. Occasional inclusions of sand, pebbles, and large rounded cobbles match those of the beach below.

TRANSPORT OF SEDIMENTS

The sediments forming the terrace top and the colluvial terrace base originate primarily from the local mudstone, siltstone, and sandstone, yet the two settings have a significant difference in slope. Although both loci

are currently vegetated in coastal grasses, the hillside appears less stable. The southeastern side of FRBS is a colluvium-covered hillside cut at the base by the Fort Ross Creek. Modern roads and footpaths crisscross the hill's slope. Numerous small slip and slump scars are evident. A recently formed gully extends down to the beach from the dirt road. Just above the FRBS archaeological excavation, roughly 2 m above the beach base, a recent scar extends across the colluvium. It is unclear whether this scar is due to slumping or storm wave erosion.

Sediment transport both on top of the terrace and downhill is often initiated and speeded up by rodent burrowing. The rodents break up subsurface sediments and bring them to the surface where they are susceptible to downhill movement by gravity as well as by rainfall impact. There is ample evidence in the excavation profiles of both FRBS and NAVS of old, filled-in rodent burrows. Many piles of churned-up sediment deposited by an active rodent community of the present day cover the land surface. In fact, rodents are a major agent in the slow process of sedimentation and downslope soil erosion along the entire northern California coastline (Black and Montgomery 1990; Bocek 1992; Erlandson 1984; Thorn 1978). Even without help from rodents, the fragments produced by differential weathering of the marine sedimentary rocks are gradually transported downhill by rainfall impact and gravity, and more quickly during events such as earthquakes or major storms (Griggs and Johnson 1979).

Slumping and gullying also cause downhill movement of sediments. At least one slump episode is evident in the westernmost section of the FRBS profile. Gullies of different widths and depths are obvious on the present-day slope surface of FRBS. The effects of slumps and gullies on NAVS have been negligible.

Finally, humans have caused (and continue to cause) the transport of sediment during road building, road use, and foot traffic on both sites. The uppermost stratum of some of the excavation units of FRBS exhibits a very large grained, angular, and loosely packed structure. This sediment dates to a major rerouting of the road in the 1920s. A new cut was made into the siltstone bedrock above the site, and the material was pushed over the edge of the terrace.

EROSION OF SEDIMENTS ONCE DEPOSITED

Predominant local erosive agents include wind and episodic water action by the creek and ocean at the base of the colluvial deposit and wind. Our attention was initially drawn to the site because cultural materials were eroding out of the base of the terrace after major storms.

The terraces along the California coast erode at differing rates due to four major factors. The four are: the available wave energy (affected by the absence or

presence of a protective beach); the lithology of the sea cliffs (their resistance to erosion); the geologic structure including joints and folding; and the height of the sea cliff or terrace edge (Griggs and Johnson 1979). The southeastern portion of the Fort Ross terrace is relatively protected from major storm wave impact by a wide beach. Nonetheless, the presence of the large sandstone boulders along the south base of the terrace suggests that the area is a high-energy littoral environment. These boulders were transported by wave action after having eroded out of the cliffside above. The erosive action of the creek is limited to episodic and probably only severe flood events.

It is difficult to determine the extent to which the terrace colluvium and archaeological deposits have been disturbed through wave and creek impact, and how much material has been lost through erosion. The FRBS excavations were conducted at the foot of the existing colluvium. The natural contour of the more gradual, eastern slope suggests that less than a meter of the colluvial toe has been eroded away. By contrast the western slope is cliff-like. Nonetheless, it would appear to have been more impacted by erosive agents since it seems to have lost at least 2 m of the colluvial toe.

As mentioned above, terraces and hillsides along the northern California coastline are unstable and frequently exhibit small gully and slump scars. The Fort Ross Beach slope is no exception. At least two gully scars are evident on the present-day surface, and the FRBS excavation profiles show a distinct slump (filled with culturally sterile yellow clay with angular structure) on the western end, prior to Historic Period occupation. This feature occurs roughly a meter and a half below the present surface. This natural process is most likely responsible for transport of sediments from above to FRBS below. The terrace top shows no evidence of this form of erosional disturbance.

In sum, wave and creek action have removed cultural deposits from across the length of FRBS. In addition, rodents and localized slumping and gulying have removed and/or redeposited small portions of deposits within this site. On the terrace top, NAVS is continuously subject to human traffic on foot and by car, strong coastal winds, and to a lesser extent, the gopher and rainfall activity observed on the hillside.

WEATHERING OF THE SEDIMENTS IN SITU

The archaeological profile across the length of FRBS offers additional information. The sediments in the upper strata are primarily siltstones and sandstones, clays and silts. These materials are particularly vulnerable to chemical and physical break down. The lowest stratum shows some additions of the beach gravels upon which the archaeological deposits rest. With the exception of these beach gravels, the majority of the particles through-

out the profile are angular, showing little evidence of chemical weathering or long distance transport. These observations support the conclusion that sediments that form the colluvial deposit have not traveled very far from their origin, and in fact, derive from the terrace above. They have been deposited gradually, with the exceptions of one localized event of rapid deposition (road building) and another localized slump. Excluding the road building event in the 1920s and localized slumping and gulying, both NAVS and FRBS appear to have been formed by gradual accumulation of local sediments from the marine sedimentary bedrock and the beach gravels.

PEDOGENIC ANALYSES

GOALS

The geomorphological study provides an understanding of the processes that have acted on the beach terrace and how the sedimentary matrix has accumulated. The pedogenic study is designed to explore questions of differential site use and development through time. I have chosen a series of qualitative and quantitative characteristics of the sediments that together form a comparative basis for identifying the relative affects of anthropogenic and non-anthropogenic pedogenic processes acting on the sites. No single measurement leads to clear-cut interpretive results. Rather, it is the combination of measures taken together with the geomorphological and archaeological observations that add to an overall understanding of the site development. The chosen measures include color, alkalinity (pH), percent of organic carbon, percent of calcium carbonate, and structure.

BACKGROUND AND EXPECTATIONS

The following expectations derive from discussions in Birkeland (1984) and Courty et al. (1989). The Fort Ross soil is a relatively young, cumulative soil in a coastal setting. The soil of FRBS is somewhat thicker than that on the terrace top due to its position at the base of a steep slope and the consequently more rapid buildup of colluvium from above. In both site locations, color should be darkest in the top stratum as this is where organic matter is the most concentrated. Typically organic matter is limited to the upper stratum and causes dark-brown-to-black colors. However, middens or the organically rich deposits created by humans are also dark-brown-to-black and may occur in strata located beneath the top stratum. The presence of a substratum as dark or darker than the topsoil strongly suggests the presence of a midden.

Relative soil acidity or alkalinity may not vary much between strata. This characteristic tends to develop over a longer period of time than we know the Fort Ross soil to have existed. However the pH is crucial for determining the existence of preservation bias for faunal remains.

A neutral sedimentary matrix (pH in a range of 6.6 - 7.3) offers the best conditions for the preservation of organic matter such as bones and shell. Because we have already identified the presence of both middens and distinct bone beds, it is important to assess the pH across the site and at all depths to determine the extent to which these features reflect a past depositional event, or are simply a result of differential preservation.

As with color, the organic carbon content should be highest in the top stratum. This is where micro-organisms live and process plant and animal remains as they are added to the soil. Relatively high organic carbon content elsewhere in the strata would suggest past human activity. Of course there are other potential causes, such as rodents burrowing down through lower strata and allowing organic carbon rich topsoil to be transported to a lower level. Thus organic carbon values must be interpreted in the context of profile drawings to help distinguish between filled-in rodent burrows and true middens.

No significant leaching and reprecipitation of carbonates is expected in this area of low annual rainfall. Consequently in such a young soil, the calcium carbonate concentration should show little variation throughout the profile, though the fragmented shell present in the midden zones possibly causes calcium carbonate values to be enriched locally compared to those around the rest of the site.

Pedogenic structure should grade from non-structured or granular near the top to progressively more structured towards the base of the profile. This means that the top stratum should be composed of loose sediments with very few or no aggregates of sediments. Lower strata should exhibit aggregates of sediments. Anthropogenic strata, such as middens, generally show less structure than strata that have not been affected by human actions.

Because FRBS is located at the base of a hillside and is part of a dynamic geologic and pedogenic system, new sediments are constantly being added from upslope. Compared to NAVS soil of similar age located on top of the terrace, the entire profile should be thicker (including the topsoil), percent of clays will be greater (as clays are not only forming from pedogenesis but are added by erosion from the sediments above), and the distribution of organic matter should be more constant throughout the profile. Of course, erosion and removal of some of the top stratum is also evident, and this should be kept in mind when interpreting the results of analysis.

PEDOGENIC SAMPLING

In order to get a representative picture of variation across both sites, samples are analyzed from several locations. Within each sample location, discontinuous systematic samples are taken. That is, at each location

selected, a representative sample is taken from each identifiable stratum in the profile. Eight locations were sampled from FRBS. These include, from west to east, profile units P29, P23, P16, P15, P14, P6, and P2. The eighth unit (7S, 19W) comes from a 3 by 2 m² block located in the Southwest Bench upslope from the Middle Profile.

Seven units are sampled from NAVS. These include the South Central Test Unit (110S, 11W); two units from the West Central Trench (75S, 16W and 75S, 20W); two units from the East Central Trench (75S, 0E and 75S, 1E); and two units (125S, 21W and 125S, 24W) from the South Trench. These samples are chosen to represent a variety of depositional contexts across the terrace top site. The units from the West Central Trench represent the simplest depositional succession (topsoil, dark sandy loam, clay). The South Central Test Unit (110S, 11W) exhibits a relatively simple stratigraphic succession, including a layer of rock rubble between the dark sandy loam and the basal clay stratum. The East Central Trench and South Trench units represent perhaps the most complex deposits, including pit features, at least two midden strata, and lenses of concentrated faunal debris and artifacts (the bone beds).

A Jones sample splitter is used in the lab to obtain smaller, representative samples of those collected in the field. Roughly a kilogram of sediment was collected for each sample in the field. All stages of the lab analyses together used a maximum of 10 grams from each sample. The remaining sediment is stored at the Archaeological Research Facility, U.C. Berkeley for future analyses.

PEDOGENIC METHODS

COLOR

Sediment color, when compared throughout a profile, indicates the degree and type of pedogenic as well as anthropogenic processes that have acted on the deposits. The longer a soil has developed, the more distinctive the differences between horizon color. In a relatively undeveloped soil, color mainly serves to identify the parent material and relative amounts of organic matter. Given the marine sedimentary parent material and the lack of strong leaching, the expected range of colors is in the yellow-to-brown shades, with darker browns near the surface.

In an anthropogenic soil, darker browns and blacks indicate the locations of middens, or concentrations of organic refuse that was deposited as either a direct or indirect effect of human behavior. The FRBS archaeological profile shows an extensive midden that corresponds to the Russian occupation. The same is true for NAVS on the terrace top. Comparing color across the site should help to delineate the extent of this midden as well as to identify areas of greater or lesser concentration.

All colors are determined in the lab with moistened

samples using the standard Munsell color chart.

SOIL ACIDITY AND ALKALINITY

The degree of acidity or alkalinity of a sediment (the pH) provides another basis for comparison. There is no one value that can be linked to a single cause or condition, yet the relative acidity or alkalinity can serve as a guideline for judging preservation bias of bones or other organic materials. That is, when delimiting the extent of a midden, the possibility of differential preservation can be assessed by comparing the pH of the sediments. Sediment pH is measured in the lab using an automatic Beckman 32 pH meter. Samples are brought to stability in a 1:1 ratio with distilled water (20 g sample in a 20 ml distilled water solution). The pH value is determined when three successive readings are within .1 unit of each other.

ORGANIC CARBON CONTENT

A higher concentration of organic carbon is expected in the top stratum, as it is continuously added through roots, organisms living in the soil, tree leaf litter, etc. As organic carbon travels downwards through the profile it is broken down into a nonorganic form of carbon. The combination of constant addition at the surface and constant migration and breakdown beneath the surface maintains a gradient in a nonanthropogenic soil. Anthropogenic soils and especially middens tend to be enriched in organic carbon. The concentration of organic carbon within the same horizon across the site should help to delimit the extent of midden deposits.

Organic carbon content is measured by the loss-on-ignition method as described in Dean (1974). The weight of a sample is recorded before and after exposure to 550° C for one hour. This temperature is high enough to burn off organic carbon without burning carbon attached to inorganic compounds (calcium carbonate, for example). The difference between the before and after weights is expressed as a percentage of the total weight of the sample to give the percent of organic carbon present in the sediment.

CALCIUM CARBONATE

Concentration of calcium carbonate can be an indicator of the relative intensity of pedogenic processes. For example, if a soil has experienced intensive leaching, there should be a concentrated stratum of calcium carbonate just below the greatest depth to which water regularly saturates the profile. Because the Fort Ross soil is both relatively young and has experienced relatively little leaching, pedogenic differences in calcium carbonate are not expected. Variance in the calcium carbonate percentage across the site is more likely to reflect varying concentrations of shell associated with debris generated by human inhabitants of the sites. Therefore, this value is

expected to be most useful in delimiting areas of concentrated refuse disposal or some form of shell processing, especially when the shell has not been preserved as concentrations of large particles obvious to, and noted by, the observer in the field.

Calcium carbonate content is measured by the loss-on-ignition method (Dean 1974). The same principle applies as for organic carbon, but the temperature necessary to burn off the calcium carbonate is 800° C. The samples are exposed to a temperature of 1000° C for one hour to ensure that the calcium carbonate is completely burned off. The difference between the post-550° C burn weight and the post-1000° C burn weight is expressed as a percentage of the original total weight of the sample. This value is then divided by 0.44 to obtain the percentage of calcium carbonate present in the sample.

PEDOGENIC STRUCTURE AND PARTICLE ANGULARITY

Structure is a qualitative variable. Structure is described in the field and lab as the percentage of sediments that are aggregated, and the relative sizes and compaction of those aggregates. Particle angularity is described in the lab with the aid of microscopic inspection.

Structure is one way of assessing the degree to which pedogenesis has taken place. As a general rule, the uppermost stratum of a developed soil shows little structure and the sediment is rather loose and granular. Lower strata show aggregates of sediment. Anthropogenic soils, even when they are in lower strata, tend to develop fewer aggregates.

Particle angularity is a qualitative indication of the degree to which individual particles have been exposed to weathering processes such as chemical solution or physical abrasion. Both the colluvial deposit and the terrace top have two major sources of sediments, the siltstone bedrock and the beach gravels. In this study a qualitative assessment of the angularity of particles serves to corroborate conclusions made as to the source of sediments, and also as a baseline for comparison of post-depositional alteration across the site.

PEDOGENIC RESULTS

The results from each analysis are presented in table format for comparison between units and strata. The sample units are grouped on the basis of similar stratigraphic successions, but these successions are not always identical. The basic stratigraphic succession in both FRBS and NAVS includes topsoil, midden, clay, and bedrock. Topsoil refers to the uppermost stratum of sediment including the root zone. Midden is defined as "a deposit of artifactual debris and garbage in a primary archaeological context and/or sediment that is predominantly made up of anthropogenic materials in a secondary

archaeological context” (Kolb et al. 1990:216). Clay has been used to describe the stratum between midden and bedrock composed primarily of clay particles and exhibiting little or no cultural and organic inclusions. The individual strata are described more thoroughly in the preceding chapters.

For comparison between sample units the following explanation of discrepancies is provided. The 7S, 19W mottled brown clay was divided into midden 1 and midden 2 in the field on the basis of cultural inclusions. Midden 1 exhibited a much higher concentration of visible shell, bone, charcoal, and artifactual fragments. The highly mottled clay stratum of unit 7S, 19W was subdivided in analysis to look for any differences that might have developed vertically in this relatively thick stratum. The first value in the clay segment corresponds to 120 cm below surface and the second corresponds to 160 cm below surface, just above the bedrock. Unit P15 was not excavated below the midden. Units P6 and P2 did not exhibit a fill stratum. Due to the erosional action of storm waves, the western units of FRBS had no topsoil remaining. The mottled clay stratum began just beneath the topsoil, and there was no evidence of a midden. The yellow clay of unit P23 corresponds to a lens of yellow clay with large angular fragments that appears to correspond to a localized slump event. No topsoil samples were taken for the NAVS units 75S, 16W and 75S, 20W. Only two units, 75S, 0E and 75S, 1E, had bone bed strata between the midden and the clay. Hence, examination of the bone bed deposit characteristics occurs only in these two units of the East Central Trench.

COLOR

The hues are uniform across both sites (10YR) due

to the similarity of the parent material (table 4.1). The darker colors of NAVS and to the east at FRBS suggest a more intensive human use of those portions of the sites. They correspond to the midden zones that were identified in the field on the basis of darker color, more loosely packed sediments, as well as obvious bone, shell, and charcoal inclusions.

SEDIMENT ACIDITY AND ALKALINITY: PH

In FRBS samples there appears to be a trend from west to east of slightly acidic sediments to neutral or slightly alkaline sediments (table 4.2). Bone is best preserved in alkaline conditions, yet the difference in pH value from west to east is not great enough to suggest differential preservation of bone across the site. Variance in bone and shell concentrations observed in the field can then be interpreted as representing spatially distinct differences in the use or deposition of material at the site.

In the NAVS samples there is a distinct correlation between concentrations of faunal remains and soil pH. The zones that exhibited a high concentration of faunal remains, such as the bone bed, show a neutral pH. The 75S, 16W and 75S, 20W units exhibit somewhat surprisingly acidic pH values, even those in association with the midden. In terms of differential use of the site, this suggests that in the West Central Trench area of NAVS a lesser concentration of organic debris was deposited.

ORGANIC CARBON CONTENT

Each unit sampled shows similar patterns of decreasing organic carbon content from the top of the profile to the bottom (table 4.3). This is to be expected in pedogenic development. Perhaps the more informative pattern is the variance in values from one unit to another

Table 4.1 *Color Values of Neighborhood Sediment Samples*

FRBS Units	P29	P23	P16	P15	P14	P6	P2	7S, 19W
Topsoil	*	*	10YR3/2	10YR3/2	10YR3/2	10YR2/2	10YR2/2	10YR3/3
Fill	*	*	10YR3/2	10YR3/3	10YR3/3	*	*	10YR3/3
Midden	*	*	10YR2/2	10YR2/2	10YR2/2	10YR2/1	10YR2/1	10YR2/1
Clay	*	*	10YR2/2	*	10YR3/2	10YR2/2	10YR2/1	10YR3/2
Mottled Brown Clay II	10YR3/2	10YR3/2	*	*	*	*	*	*
Yellow Clay	10YR3/2	10YR4/3	*	*	*	*	*	*
Beach Gravel	10YR2/2	10YR2/2	*	*	*	*	*	*
NAVS Units	75S, 0E	75S, 1E	110S, 11W	125S, 21W	125S, 24W	75S, 16W	75S, 20W	
Topsoil	10YR2/2	10YR3/1	10YR2/1	10YR2/1	10YR2/1	*	*	
Midden	10YR2/1	10YR2/1	10YR2/2	10YR2/1	10YR2/1	10YR2/2	10YR2/1	
Bone Bed	10YR2/1	10YR3/1	*	*	*	*	*	
Clay	10YR3/3	10YR2/2	10YR3/3	10YR2/2	10YR3/3	10YR2/2	10YR2/2	

* This strata either did not exist or was not sampled.

Munsell color key is as follows: 10YR4/3 = brown; 10YR3/1 = very dark grey; 10YR3/3 = dark brown;

10YR2/2 = very dark brown; 10YR3/2 = very dark grayish brown; 10YR2/1 = black.

Table 4.2 pH Values for Neighborhood Sediment Samples

FRBS Units	P29	P23	P16	P15	P14	P6	P2	7S, 19W
Topsoil	*	*	5.9	5.5	5.8	7.0	6.2	5.6
Fill	*	*	6.6	5.9	6.6	*	*	5.9
Midden	*	*	7.0	7.5	7.7	7.7	7.1	7.1
Clay	*	*	7.3	*	7.4	7.8	7.1	7.2
Mottled Brown Clay II	6.5	6.8	*	*	*	*	*	*
Yellow Clay	6.9	6.5	*	*	*	*	*	*
Beach Gravel	6.8	6.5	*	*	*	*	*	*
NAVS Units	75S, 0E	75S, 1E	110S, 11W	125S, 21W	125S, 24W	75S, 16W	75S, 20W	
Topsoil	5.9	6.1	6.4	6.6	6.8	*	*	
Midden	6.0	6.5	6.8	7.3	6.7	4.9	4.9	
Bone Bed	7.0	7.0	*	*	*	*	*	
Clay	6.1	6.4	6.8	7.1	7.0	5.3	5.4	

* This strata either did not exist or was not sampled.

The pH values are as follows: 4.5 - 5.0 = very strongly acid; 6.1 - 6.5 = slightly acid; 5.1 - 5.5 = strongly acid; 6.6 - 7.3 = neutral; 5.6 - 6.0 = medium acid; 7.4 - 7.8 = mildly alkaline.

across the two sites. For example, P29, the westernmost unit in FRBS, shows relatively high organic carbon content for the clay strata. These values are not only high compared to other clay strata across the site, they are comparable to the organic carbon content of some midden samples. This suggests that although bone and shell and other human-introduced organic constituents are not immediately visible in the field, this steep section of FRBS is relatively rich in organics. This may be due to the hypothesized steady disposal of debris over the edge of the terrace from the inhabitants of NAVS above.

CALCIUM CARBONATE CONTENT

Calcium carbonate content varies little across FRBS (table 4.4). Nearly all of the samples range between 2.2 and 3.5%. Two samples, midden 1 of unit 7S, 19W and

the midden of unit P14, yielded values nearly twice as high as the others, at 5.2% and 5.0% respectively. The higher concentration in the midden strata of these units is most likely attributable to the visibly higher concentration of shell fragments.

NAVS shows a base level of percent calcium carbonate at from 2.1 to 3.0%. The elevated values associated with the midden and bone bed zones in the neighboring 75S, 0E and 75S, 1E units are attributable to noticeably higher concentrations of marine shell debris.

PEDOGENIC STRUCTURE

Initial inspection of the samples showed that they contained various proportions of three major categories of particles. These include rounded grains of sizes matching those found in the beach sands and gravels,

Table 4.3 Organic Carbon Content of Neighborhood Sediment Samples

FRBS Units	P29	P23	P16	P15	P14	P6	P2	7S, 19W
Topsoil	*	*	11.2	13.0	12.4	6.7	6.2	9.4
Fill	*	*	7.1	6.9	7.0	*	*	6.8
Midden	*	*	6.4	6.5	6.4	4.8	6.5	6.8
Clay	*	*	4.8	*	4.2	5.0	5.8	5.9
Mottled Brown Clay II	7.6	6.6	*	*	*	*	*	*
Yellow Clay	7.3	5.5	*	*	*	*	*	*
Beach Gravel	6.9	4.8	*	*	*	*	*	*
NAVS Units	75S, 0E	75S, 1E	110S, 11W	125S, 21W	125S, 24W	75S, 16W	75S, 20W	
Topsoil	9.7	10.4	9.5	12.7	11.8	*	*	
Midden	9.3	8.7	7.8	10.3	11.8	8.3	9.0	
Bone Bed	7.8	8.1	*	*	*	*	*	
Clay	5.5	6.2	5.9	8.8	5.4	5.8	5.2	

* These strata either did not exist or were not sampled. Values are percentages of total sample.

predominantly composed of quartz. The remaining particles are composed of siltstone and sandstone particles of varying sizes. Some show evidence of rounding through weathering.

All topsoil samples show a few small aggregates but are primarily composed of loose sediments. The FRBS clays, from the mottled clay of the west to the below midden clay of the east, show predominance of aggregates that are composed primarily of angular colluvial fragments and are quite compact or hardened. The beach gravels show few aggregates and are composed predominantly of rounded particles. The fill of the FRBS profile to the East Profile shows few aggregates and a predominance of large angular siltstone and shale fragments, reflecting the rapid deposition of debris during the road building event in the 1920s. The middens of the East Profile show some aggregates, inclusions of bone and shell, and a mixture of angular and rounded particles. This suggests human-related transport of gravels and sands from the beach.

Unit P2 diverges from the general trends described above. Large aggregates and particle rounding are found in the top stratum. This could be due to erosion and removal of the uppermost layer. The midden has yielded no visible bone or shell. The aggregates in the clay stratum are the most hardened of all clays across the site. The position of this unit, at the most level and most accessible portion of the site, probably has allowed heavier use and even vehicular traffic by humans during and since the time of the Russian occupation.

With the exception of the topsoil, the strata of NAVS are also quite compacted. This is most likely due to the heavy and continuous traffic across this relatively level terrace top, both before and during the Russian occupation and up to the present day. The only exception are the loosely packed and granular zones of rodent activity.

SUMMARY AND DISCUSSION

FRBS is located within a colluvial deposit that has gradually accumulated at the foot of the primary beach terrace immediately south of the Stockade. The parent materials are of predominantly local origin, including siltstone, sandstone, and beach sands and gravels. Other materials include bone, shell, and artifacts of stone, ceramic, glass, and metal from prehistoric through present day occupations of the terrace above and FRBS below.

The predominant erosional forces acting on FRBS include gopher activity, winds, storm-driven ocean waves, and flood-level creek waters. The winds and water have also contributed to weathering of the sediments.

Both the terrace top and the colluvial soils are relatively young and have not undergone significant pedogenesis. Sedimentary analysis supports the observation and delineation of a midden stratum running across FRBS and a midden in some portions of NAVS. This midden varies in color, pH, organic carbon content, and calcium carbonate content across the sites.

In chapter 2, Lightfoot and Schiff suggest that the western, near-ocean segment of FRBS (represented here by P29 and P23) represents the gradual disposal of culturally generated debris over the edge of the cliff-like terrace. The artifactual and faunal materials are sparse and randomly dispersed throughout the steeply sloped colluvium. The results of the present analyses suggest that the pit feature (in units P16, P15, and P14) is in primary context, while the remainder of the eastern portion of FRBS (units P6 and P2) consists of a concentrated and thick midden deposit that could have been formed by more intensive dumping of debris from the NAVS occupation above. This midden also may have been formed through direct occupation of this more

Table 4.4 *Calcium Carbonate Content of Neighborhood Sediment Samples*

FRBS Units	P29	P23	P16	P15	P14	P6	P2	7S, 19W
Topsoil	*	*	2.6	2.3	2.4	3.2	2.2	2.7
Fill	*	*	2.8	2.8	2.7	*	*	3.0
Midden	*	*	2.8	2.8	5.0	3.0	3.6	5.2
Clay	*	*	2.6	*	2.4	2.9	2.6	2.7
Mottled Brown Clay II	2.8	2.8	*	*	*	*	*	*
Yellow Clay	3.0	3.6	*	*	*	*	*	*
Beach Gravel	2.8	2.7	*	*	*	*	*	*
NAVS Units	75S, 0E	75S, 1E	110S, 11W	125S, 21W	125S, 24W	75S, 16W	75S, 20W	
Topsoil	2.3	2.3	3.0	2.9	2.8	*	*	
Midden	3.4	5.7	2.6	4.6	3.8	2.1	2.1	
Bone Bed	4.4	3.2	*	*	*	*	*	
Clay	2.1	2.2	2.7	3.3	2.4	2.1	2.0	

* These strata either did not exist or were not sampled. Values are percentages.

gently sloping portion of the terrace base colluvium.

The geomorphological and sedimentological analyses support these interpretations of FRBS. The extent of the midden was better defined through color and organic carbon content analyses. The relatively uniform pH values establish that bone and shell preservation was more or less uniform throughout the site, and that the differential concentrations can be interpreted as anthropogenic in origin. Both the fill and midden of the eastern portion of FRBS show relatively little structure and the sediments include a higher percentage of artificial materials, shell, and bone. They are also less compacted than the mottled clays of the western end of the site. The eastern clay, or lower stratum, is relatively enriched in organic materials, most likely transferred from the midden above by natural pedogenic processes through time, such as leaching. The differences across the site are not just due to differences in natural pedogenic development caused by the topographic variation. Rather these differences are due to differential human use of the FRBS, and in the differential distribution of materials from NAVS above.

The NAVS values support the archaeological interpretation of intra-site differences. The horizontal concentration of fire-cracked rock, bone, and shell debris in the bone bed stratum (20 cm to 30 cm below the surface) of 75S, 0E and 75S, 1E is correlated with darker color, neutral pH, and relatively enriched levels of calcium carbonate. Although evidence of gopher activity and even partial gopher skeletons exist, the bone bed feature does show integrity. That is, this deposit shows little pedogenic evidence of significant post-depositional disturbance. For similar reasons, the same can be said for the pit feature at FRBS observed in units P16, P15, and P14.

CONCLUSION

Since the Fort Ross Archaeological Project is ongoing, it has been the purpose of this study to establish a baseline description and understanding of local processes as well as to reconstruct the depositional history of FRBS and NAVS. A second goal has been to establish baseline measurements of depositional and pedogenic variables across both sites so that the degree and type of deposition could be better understood. Most importantly, the study has determined that the sediments and archaeological materials have not experienced differential preservation due to differential soil acidity.

The diverse yet complementary analytic approaches employed in the present study answer specific questions about site formation, especially with regard to the Russian occupation. The relative contributions of natural processes—pedogenic, geomorphological, and biological—to the formation of the site were not immediately

obvious. During the Russian occupation, the entire FRBS profile exposed in the archaeological excavations shows evidence of past human activities. Although the western portion of FRBS shows little more than intermittent dumping from the terrace above, the pit feature and the eastern portion were more intensively and more directly used. The bone beds of NAVS attest to an equally or perhaps more intensively used area of the Native Alaskan Neighborhood. Although there is ample evidence of rodent disturbance, the concentrations of bone and other debris can be attributed more securely to past human actions rather than to differential preservation.

Future archaeological investigation in the immediate area of the Stockade will benefit from this initial study. For example, the results of the present study suggest that bone preservation in the immediate area is quite good, that the soils are relatively undeveloped and have experienced very little alteration due to pedogenic processes, but that rodent activity along with gullying and slumping have been and will continue to be disruptive to the archaeological deposits.

ACKNOWLEDGEMENTS

I would like to acknowledge the technical guidance of Dr. Kent Lightfoot, Dr. William Dietrich, and Dr. Ronald Amundson. Materials studied were collected during the course of the 1988, 1989, 1991, and 1992 U. C. Berkeley Field School seasons. Denise Boyce, Elizabeth Carson, Darren Moore, and Stacy Richardson carried out some of the sediment analyses as students in Lightfoot's Archaeological Laboratory Analysis course (Anthropology 134). Sheelagh Frame assisted in the geomorphological field analysis and served as field photographer. Aron Crowell gave invaluable advice in the collection of samples. Ann Schiff provided helpful editorial suggestions.

REFERENCES

- Bedrossian, T. L.
1974 Geology of the Marin Headlands. *California Geology* April 1974:75-88.
- Birkeland, P. W.
1984 *Soils and Geomorphology*. Oxford University Press, Oxford.
- Black, T. A., and D. R. Montgomery
1990 ms. *Sediment Transport by Pocket Gophers, Marin County, California*.
- Bocek, B.
1992 The Jasper Ridge Reexcavation Experiment: Rates of Artifact Mixing by Rodents. *American Antiquity* 57(2):261-70.

- Collinson, J. D., and D. B. Thompson
1989 *Sedimentary Structures*, 2nd Ed. Uniwin and Hyman, London.
- Courty, M. A., P. Goldberg, and R. MacPhail
1989 *Soils and Micromorphology in Archaeology*. Cambridge University Press, Cambridge.
- Dean, W. E. Jr.
1974 Determination of Carbonate and Organic Matter in Calcareous Sediments and Sedimentary Rocks by Loss on Ignition: Comparison with Other Methods. *Journal of Sedimentary Petrology* 44(1):242-48.
- Erlandson, J. M.
1984 A Case Study in Faunalurbation: Delineating the Effects of the Burrowing Pocket Gopher. *American Antiquity* 49:785-90.
- Griggs, G. B., and R. E. Johnson
1979 Coastline Erosion: Santa Cruz County. *California Geology* April 1979:67-75.
- Kolb, M. F., N. P. Lasca, and L. G. Goldstein
1990 A Soil-Geomorphic Analysis of the Midden Deposit at the Aztalan Site, Wisconsin. In Lasca, N. P., and J. Donahue, editors, *Archaeological Geology of North America*. Special edition of the Geological Society of America, vol. 4, pp. 199-230.
- Selby, M. J.
1982 *Hillslope Materials and Processes*. Oxford University Press, Oxford.
- Small, R. J., and M. J. Clark
1982 *Slopes and Weathering*. Cambridge University Press, Cambridge.
- Thorn, C. E.
1978 A Preliminary Assessment of the Geomorphic Role of Pocket Gophers in the Alpine Zone of the Colorado Front Range. *Geografiska Annaler* 60 A (3-4):181-87.
- United States Department of Agriculture
1972 *Soil Survey of Sonoma County, California*. Sheet #60.
- Wagner, D. L., and E. J. Bortugno
1982 *Geologic Map of the Santa Rosa Quadrangle, California, 1:250,000*. Williams and Heinz Map Corporation, Maryland.
- Walker, R. G., ed.
1979 *Facies Models*. Ainsworth Press Limited, Ontario.

Sensing the Past and the Remoteness of the Future: A Soil Resistivity Survey at the Native Alaskan Village Site

ANDRÉ P. TSCHAN

THE FOLLOWING CHAPTER consists of a short description of subsurface investigations, a condensed summary of one geophysical technique used in archaeology, and an analysis of the soil resistivity survey conducted at the Native Alaskan Village Site.

SUBSURFACE GEOPHYSICAL SURVEYS

The continuing encroachment of outlying properties by urban development initiates many rescue or "salvage" excavations. This unfortunate, but modern reality often involves large areas that need to be surveyed within a short timespan in order to successfully retrieve and conserve the most important traces of ancient life (Clark 1990:12). There is a demand for a technology, such as remote sensing, that can quickly produce detailed information on buried material contexts. In response to this demand, efficient, cost-effective, and feature-specific sampling strategies for excavations under time constraints have been developed. Archaeological investigations can incorporate various geophysical tools (e.g., soil resistivity, magnetic and ground probing radar testing) to facilitate the delineation of the spatial organization of site areas. Intrasite maps can be created from the data collected by applied remote sensing techniques to further determine detailed layouts of particular features and their boundaries. As a final point, it is important to understand that there are two main categories of subsurface detection methods according to Weymouth (1986:313):

- Passive = measuring gravitational/magnetic fields produced by buried features
- Active = measuring the return signal from a device's originally emitted electric/electromagnetic signal.

The following summary highlights one of the most effective tools available. The focus of this report,

however, lies in the soil resistivity case study of the Russian-American venture at Fort Ross and not in a specific analysis of the history and background of geophysical remote sensing equipment. Hence, a great many aspects relating to the usage and development of this methodology, as well as any description of other potentially rewarding techniques, have been deliberately omitted.

SOIL RESISTIVITY SURVEYS

The important difference between the terms resistance and resistivity is that the former relates to a measurement of current flow while the latter indicates material properties (Sears, Zemansky, Young 1983:539). The underlying physical principle that forms the basis for this active geophysical remote sensing method relies on an electric current caused by the movement of charged particles. This net flow of charge determines the resistance of a conductor between any two points when applying a potential difference (V) between these points and measuring the current (I) that results (Halliday, Resnick, Walker 1993:771). The formula for electrical resistance is expressed by $R = V/I$ in which:

V = symbol for potential difference, or Volts

I = symbol for current, in Amperes

R = symbol for resistance, in Ohms (Ω)

Soil resistivity surveys have established that very little current is carried by earth, rocks, and pure water sources, since they actually exhibit insulating properties. However, rainfall that contains dissolved carbon dioxide and carbonic acid from the atmosphere forms conducting electrolytes that react with the minerals in the soil. Together with weakly conductive organic acids, these break down into negative and positive ions which are the actual carriers or conductors of electricity (Clark

1990:27). In addition, modern agricultural fertilizers and humic compounds, some of which have anthropogenic origins (pits, etc.), will increase the chances for a successful survey measuring the electrical resistivity (or conductivity) of the soil in a restricted volume near the surface.

Potentially, any human alterations of the natural stratigraphy can be detected using this technique. Major intrusions from building activities for shelter and storage, as well as utilitarian activities, cause a distinguishable disruption of the geomorphological distribution in a site by exchanging materials from normally discrete soil layers and importing or exporting them into upper or lower levels. Thus, man-made scars in the landscape useful to resistivity research include areas of humus buildup (e.g., refuse pits), soil compaction (e.g., pathways, house floors), and aggregation or loosening of soils (e.g., ditches, midden) (Weymouth 1986:320).

Soil resistance data can be quickly recorded at a site by inserting two electrodes or probes deeply enough into the ground to make adequate contact. The electronic collection device will, upon achieving a closed circuit, store the resistance reading. The probes, nowadays mounted on a portable frame together with the recorder itself, can then be moved along a traverse to the next location. Assuming that the earth is a "semi-infinite medium," the hemispherically shaped research area is sliced in half by its upper and only boundary, the ground surface.

Because the electrodes have a very small contact area compared to the volume of earth that is crossed by the current, there is a much higher resistance immediately around the probes than deeper in the ground (figure 5.1); the soil at the top also tends to be dry and to have a high resistivity. This problem is resolved by applying a four-terminal measurement known as the "Wenner configuration" (figures 5.2a and 5.2b).

All in all, the function of the current electrodes is to set up a field of potential gradient in the ground that is sampled by the potential probes. In a homogeneous soil, half the current spreads to a depth of half the spacing between the current probes (figures 5.3a, 5.3b). As a result, buried archaeological features are likely to cause anomalous readings because they force currents to flow around them in an effort to find longer and easier paths (figures 5.4a, 5.4b, 5.4c). Thus, any past human intrusion clearly shows up against the general and most likely equipotential background of the untouched surrounding soil.

THE SOIL RESISTIVITY SURVEY AT FORT ROSS—A CASE STUDY IN COMPUTER-AIDED ARCHAEOLOGY

The current analysis of the two main resistance data collections—the first collected in the summer of 1992, the second in December 1993—serves as a prime example of the successful results that can be gathered

from a geophysical survey for archaeological research. Specifically, the unknown locations of house structures, middens, and activity areas in the Native Alaskan Village Site (NAVS) have become a great deal more decipherable due to the electronic resistivity maps generated. Hopefully, the insights gained through this work will guide future research designs and will help to facilitate continued excavational projects at Fort Ross.

SENSING THE PAST AT FORT ROSS

The fundamental objective of the survey was to establish a detailed, electronically processed map depicting the resistivity of the soil within a depth of half a meter (0.5 m) (figure 5.5). The desired goal, in conjunction with excavation, was to arrive at a data collection set that would pinpoint the specific location, the spatial boundaries, and the intrasite organization of the Native Alaskan Village.

Obviously, the area encompassed in the site grid is indicative of the potential time and resources required for a broad-scale investigation of this site. The initial research objective for the 1992 survey alone encompassed some 7,600 square meters (figure 3.1). One of the main reasons, therefore, to conduct a resistivity survey on the site was to provide large-scale spatial information. Preliminary work undertaken by Dr. Lewis Somers (Geoscan Research USA), using a gradiometer, provided evidence of clear delineation and concentrations of features buried in the soil south of the Russian Stockade.

Given the site's size and the exploratory nature of the initial magnetometer survey, further geophysical surveys were deemed necessary. With the assistance of Geoscan Research USA—providers of the equipment for the investigations in 1992 and 1993—the goal set by the researchers was to obtain, by testing the soil resistivity, a second and independent subsurface data set that would provide more information to authenticate the original magnetic results while providing complete site coverage.

METHODS

Geophysical surveys are a collaborative effort involving remote sensing specialists, usually geophysicists, and archaeologists. In order to bridge the gap between the two disciplines, frequent and repeated interaction must occur to ensure a rewarding end-result. Any conclusions are the product of combining the available information of the two disciplines in an attempt to arrive at a single interpretive picture. This is, in my opinion, the only justifiable approach to archaeological remote sensing, for neither of the two scientific fields can be treated as mutually exclusive when it comes to analyzing subsurface data.

STAFF

The staff for the 1992 resistivity survey included John Anderson and myself as the principal investigators,

Figure 5.1 *Contact Resistance and Polarization Problems When Taking Ground Resistance Measurements*
 (Text/Graph: Clark 1990:28)

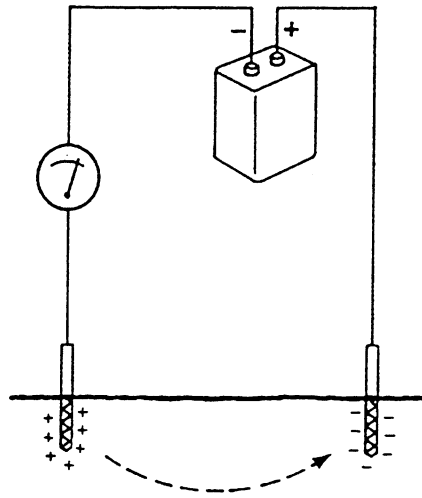
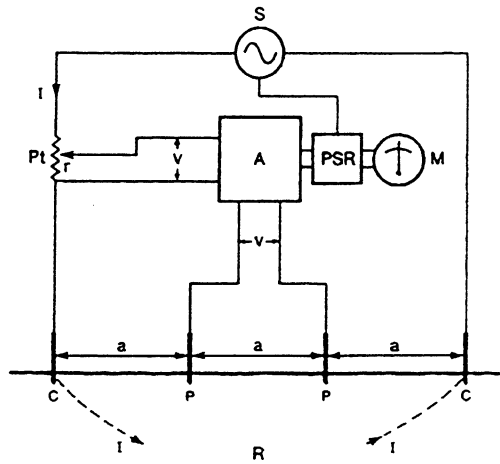


Figure 5.2a *A Resistivity Measuring Circuit (used in the Martin-Clark meters)*



Depicted is a Wenner electrode setup indicating equal spacing (a) between the probes. At this point, contact resistance is overcome by applying separate potential/current electrodes while polarization is avoided using an AC supply. (Text/Graph: Clark 1990:28)

Figure 5.2b *The Detection Hemisphere Resulting from a Wenner Configuration* (Text/Graph: Clark 1990:28)

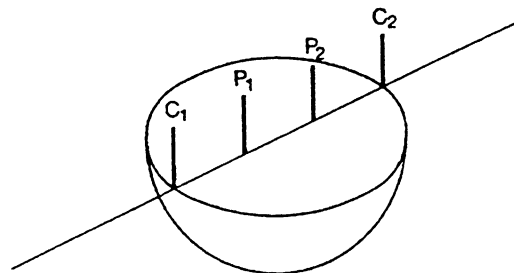
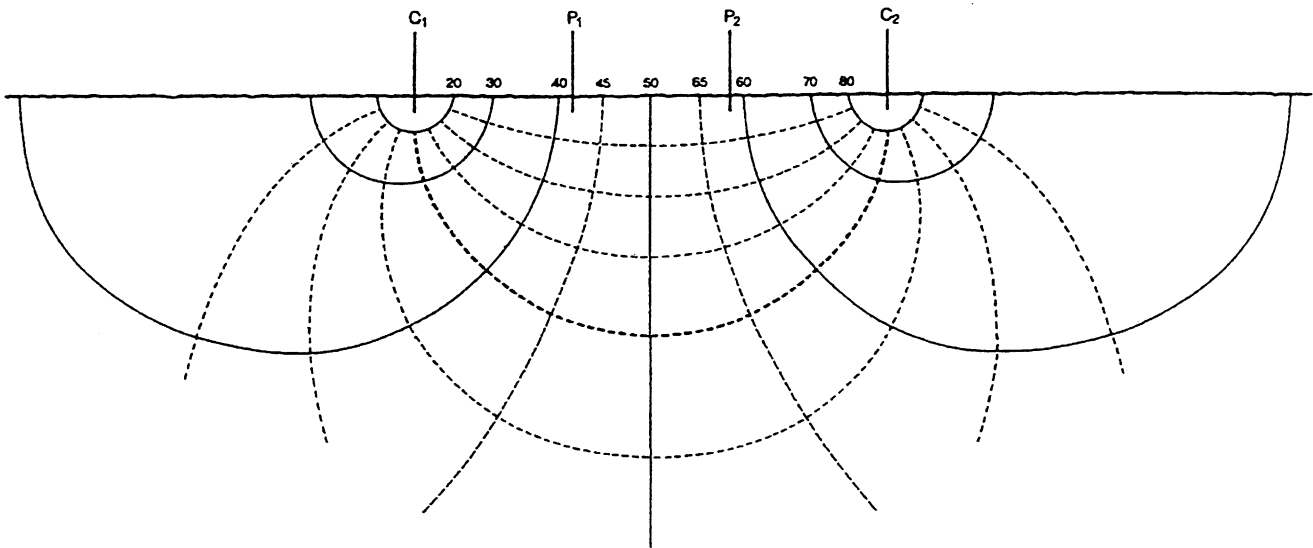
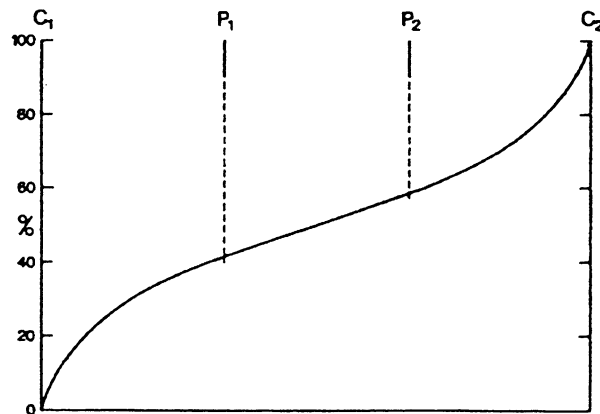


Figure 5.3a *Simulating a Wenner Configuration Cross Section of the Current and Potential Distribution*

The percentage of the total potential difference is indicated for each equipotential line while the current flow is represented by the crossing dotted lines. Half the current from electrodes C1 and C2 flows above the maximum depth of half their separation (indicated by the dark dotted semi-circle. This is the most sensitive area for the geophysical investigation). (Text/Graph: Clark 1990:29)

Figure 5.3b *The Potential Gradient between C1 and C2 Represented as a Plot (Text/Graph: Clark 1990:29)*

as well as Tina Choy, Robert LaDue, Lisa Holm, and Laura Willman as assistants on separate days. The data was collected during a period of eight working days in June, 1992. Due to time limitations combined with some inefficiencies in sampling strategy and instrument settings, this initial resistance data set was as incomplete as the previous investigative magnetic survey by Dr. Somers. Thus, in December of 1992, John Anderson and I returned to Fort Ross to collect more readings.

The final and complete collection was not obtained, however, until December of 1993, with Lisa Holm and myself as the investigators. The decision for redoing the entire site arose after a series of discussions throughout the year with Professor Lightfoot and Dr. Somers. These

talks prompted a new research strategy which was developed based on earlier survey results. Also influential was another resistivity study on a nearby site (CASON-177), conducted by John Anderson and myself in February and May of 1993. Because the most comprehensive principal survey was produced in December of 1993, any reference to resistivity data contained herein relates to that particular set, unless there is a specific statement to the contrary.

EQUIPMENT AND INSTRUMENT SETTINGS

The machinery used for this research included a RM15 Resistance Meter bolted to a half meter (0.5 m) array and Geoplot version 2.0 as the computer imaging

Figure 5.4a A Centrally Located High Resistivity Feature Causes Marginal Interference of the Current Flow
(Text/Graph: Clark 1990:28)

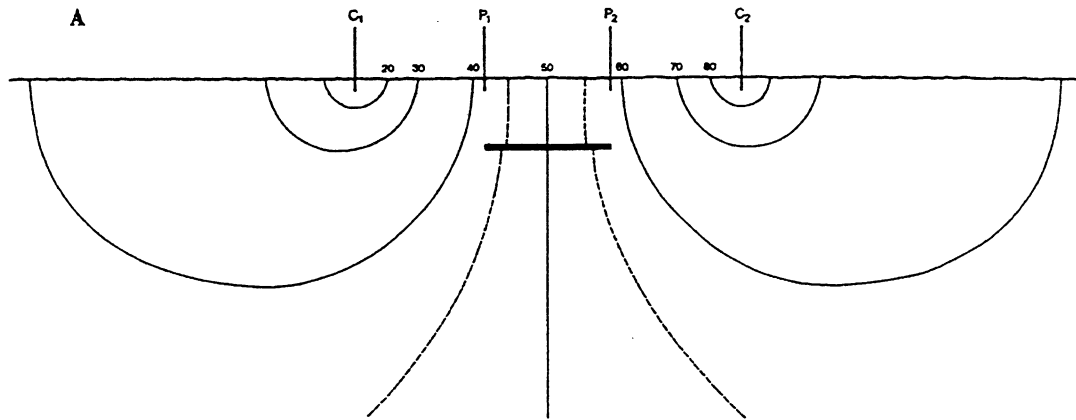


Figure 5.4b The Percentage Difference in Potential between P₁ and P₂ Increases Due to the Feature Being Located Directly beneath P₂ and C₂ (Text/Graph: Clark 1990:28)

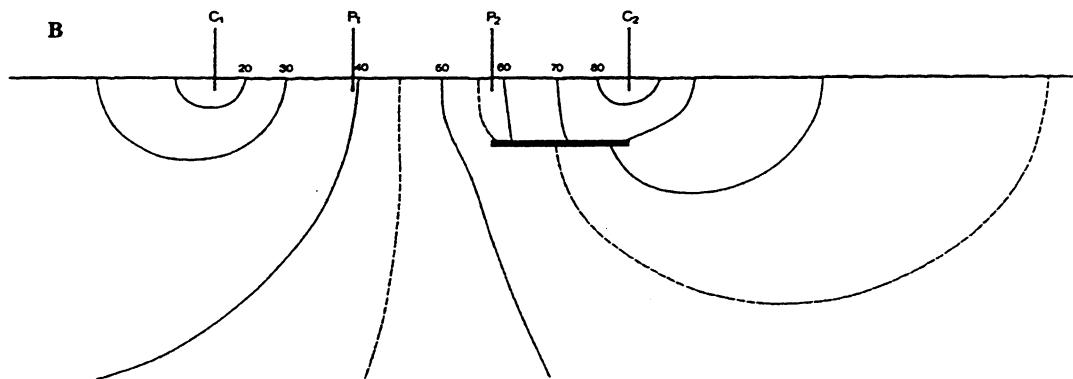


Figure 5.4c A Centrally Located Conducting Feature Interferes to a Greater Extent Than its Counterpart Depicted in Figure 5.4a (Text/Graph: Clark 1990:28)

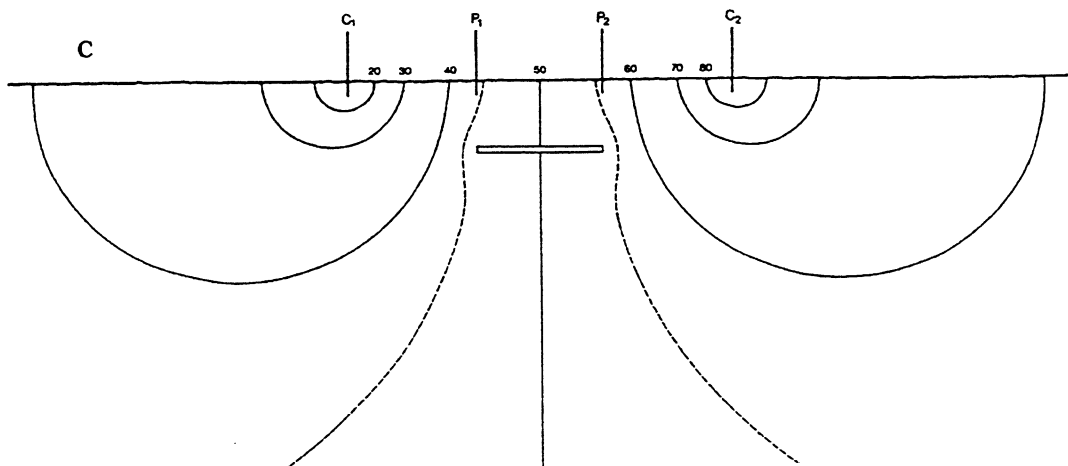


Figure 5.5 *Geoplot Resistivity Map of the Native Alaskan Village Site*



The Fort Ross Cove Road is visible on the left side of the image (linear scar in the landscape).

program. Both the hardware and software were loaned by Geoscan Research USA which, in collaboration with its British partners, is responsible for building a variety of geophysical tools as well as writing the necessary software to translate the data into visual images for the computer screen or printer.

The two fixed and frame-mounted spikes of the array, defined as the "mobile probes" (MP) and spaced at a half meter (0.5 m) distance, were connected to the RM15 Data Logger by an electrical cable; the digital collection unit was mounted on top between the handle-bars. In order for the injected current to behave in the desired fashion—namely to be completely hemispherical in its distribution through the ground—it was also necessary to have a set of permanent or "remote probes" located no closer than 30 times the sample interval spacing from the point where a reading was being taken (i.e., $0.5 \text{ m} \times 30 = 15 \text{ m}$ minimum distance). Because the area of NAVS investigated was quite extensive (160 m x 100 m, maximum dimensions) and the electric cable hooking the remote probes to the RM15 was only 150 m, three stations were established so as to ensure that none of the data would be jeopardized by too close a proximity between the remote and the mobile probes.

Finally, the computers used for the processing work included an IBM clone with a 486/50 MHz processor, 16 MB RAM, and SVGA display as well as a Compaq Contura 4/25CX laptop with a 486/25 MHz chip, 4 MB RAM, and SVGA display. The main data presentation and manipulation software, as mentioned above, came in the form of Geoplot version 2.0, kindly loaned by Geoscan Research USA. This program is a DOS application and therefore manipulations of base memory were required for some data processing and in particular, the Interpolation utility. Any open terminate, stay resident (TSRs) programs reduce the capacity to perform this operation successfully. Overall, Geoplot Version 2.0 is a highly sophisticated tool for processing and visualizing the collected readings using high resolution graphical formats. Thus, coupled with any of the Geoscan tools for subsurface investigation, one has a powerful, reliable, and cost-effective package to retrieve buried traces from the past. Additionally, an Autodesk software program, AutoSketch for Windows Release 2.0, served as a precision drawing tool for numerous maps presented throughout this paper.

Lastly, a series of Fort Ross archival photographs and map images were captured on 35mm film by Nick Jones upon our visit to the storage facility of the Department of Parks and Recreation in Sacramento, California. Each historical reference was recorded experimentally at four different light settings as well as in monochrome and color. Eventually all 104 images were developed on CD-ROM as Kodak Photo image files (PCD). Further computer processing took place using the Media Cybernetics HALO Desktop Imager, version 2.00 and Aldus

PhotoStyler, version 2.0. These software programs were able to correct the deficiencies that were inherent in the old maps, which were mostly enlarged, fairly poor copies of obscure originals.

DATA COLLECTION AND SAMPLING STRATEGIES

In order to guarantee data congruency, fixed control locations were established and were monitored three times a day. At these "reference stations" we checked our readings each day to make certain that no overall changes occurred in the surveyed area during this investigation, either as the result of climatic influences or equipment problems (figure 5.6). For example, if the data had shown a significantly different value from the previous day's last reading, then the remote probe spacing of the spikes could have been adjusted to be greater or smaller than the original half meter (0.5 m). As a corrective measure, this procedure would have lasted until the resistance number was close enough to, or ideally matched, the desired output. This monitoring system was very important, since the absence of a comparable reference station setup dramatically impaired both of the 1992 sample sets.






Weather conditions remained constant throughout the collection period, and no precipitation beyond morning dew was registered. Interestingly, but without consequence, the last day proved to be rather warm for that time of year, and we encountered increasingly high resistance readings. In retrospect, this "warming up" of the site was only a circumstantial phenomenon, greatly outweighed by factors such as the ground's general aridness as well as the complex archaeological composition that prevailed among the grids done last according to our sampling strategy.

The recurring dilemma of having to redo the site's grid layout because of park visitors repeatedly removing the wooden stakes necessitated that we locate a geographic reference point that would be seen clearly on the electronic maps. The obvious choice, based on the previous surveys in 1992, was the Fort Ross Cove Road that leads down the cliff terrace to the coastal cove. This feature, however, was extremely impenetrable due to a cementing compound that makes up the basic compressed gravel track. Fortunately, the morning dew added natural moisture to the roadbed, allowing us to take readings with greater ease. This otherwise impassable stone obstacle is apparently rich in minerals that readily dissolve in water; possibly salt crystals or other super conductors are broken up by passing motor traffic and disintegrate when exposed to rain or mist. Hence, we made effective use of the night's residual moisture on the ground, and the road became the focus of most of our pre-noon data collection.

The attempt to achieve our goal of surveying the entire expanded 1993 site (figure 5.7) within three working days was somewhat ambitious. Because the cliff




Figure 5.6 Survey Reference Stations

MAP LEGEND




-  Datum Point (0S, 0E)
-  Grass Field
-  Fort Ross Cove Road
-  Cliff with Rock Outcroppings
-  Beach Sand and Rocks

Survey Reference Stations

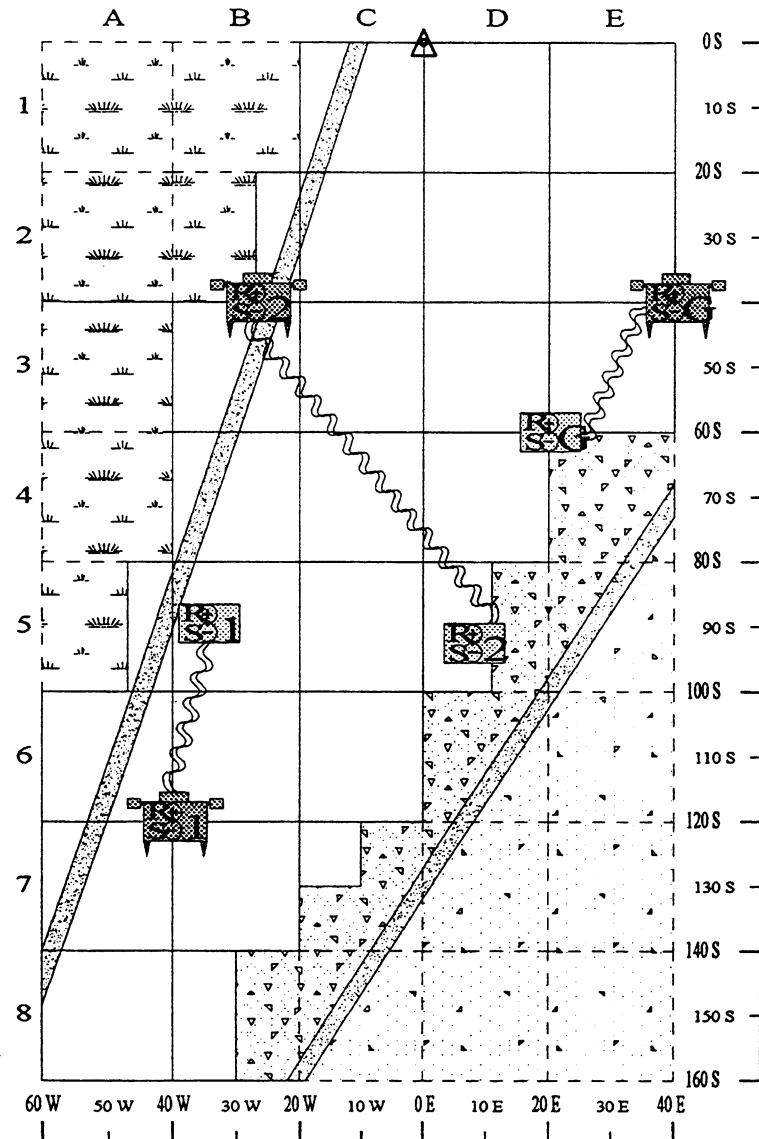
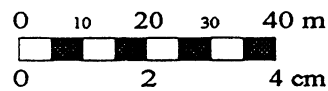
RM15 Remote Probe Locations

-  = 89.5S, 34.5W
-  = 92.5S, 8E
-  = 60S, 20E

RM15 Mobile Probe Locations

-  = 120S, 40W
-  = 40S, 27W
-  = 40S, 40E





G = General/Main Ref. Station

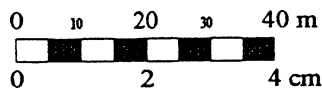
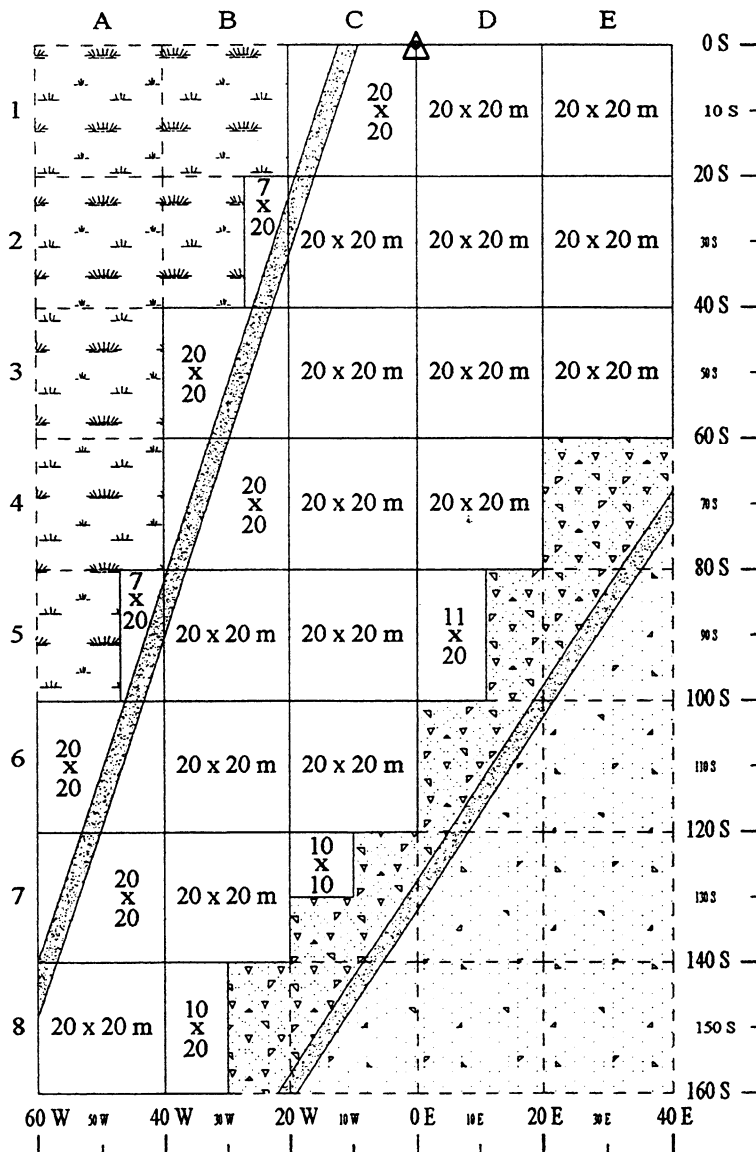


Modified from Original
Compass Design by
Edward C. Mack

Figure 5.7 Survey Grid Sizes

MAP LEGEND

-  Datum Point (0S, 0E)
-  Grass Field
-  Fort Ross Cove Road
-  Cliff with Rock Outcroppings
-  Beach Sand and Rocks



Modified from Original
Compass Design by
Edward C. Mach

to the east is subject to strong erosional forces, many of the outer traverses had to be done from rather uncomfortable positions—sometimes actually hanging off the steep cliff wall. This particular area represented the most arduous and laborious part of the data collection process, and our sampling strategy was swiftly determined by focusing on the hardest work first. The developed approach allowed grids on flatter terrain to be surveyed towards the end of the day. The cliff section was an obvious first choice, since we had two comparative resistance data sets from the earlier work at NAVS. This collection plan allowed us to collect the first day's worth of readings and, based upon that night's analysis, we could have adjusted and refined our research strategy if necessary after comparing the data to our earlier findings.

The sampling interval was changed from the 1992 surveys, where 1600 recordings were taken in each 20 x 20 m grid, to the new approach which called for a more efficient 800 values to be collected for each of these 400-square-meter areas. The main problem was an obvious loss of resolution due to the smaller data set density, but the dramatic results obtained from the first day negated any such worry. Some areas did not yield complete 20 x 20 m grids containing the total number of actual collected readings as depicted in figure 5.7. The so-called "Dummy Log" entry composed of an extremely high value (2758) was needed to complement some of the easternmost cliff grids in places where no further survey results could be obtained. The widths (E-W) were supplemented on three of these units (B8, C7, D5) and, in one instance, even the partial length (N-S) of a grid (C7) was substituted using these off-scale entries. In the western grid units, time constraints resulted in two grids where the first 13 m (E-W) were operator-entered values (A5, B2) as part of an effort to collect only the essential minimum extension of the road. All other parts of the expanded 16,000-square-meter site area were also treated

as dummy entries in the final production of the electronic maps. In all, Lisa Holm and I collected 20,800 readings in three days which amounted to nearly nine grids a day.

RESULTS

Undoubtedly, any analytical results from this survey can only be evaluated through archaeological excavation. The resistivity study serves its main purpose by directing attention to specific anomalies present in the ground. Therefore, the geophysical data collected becomes an additional means to develop, support, or adjust a research design and field strategy. At the same time, it allows one to make inferences regarding the overall spatial organization of the Fort Ross coastal terrace, including the Village to the extent that it was sampled.

The following analysis is based on the electronic resistivity maps of NAVS generated using Geoplot version 2.0. Aside from the main composite image combining all forty 20 x 20 m units into a single site display, the NAVS data was also divided into five segments encompassing 20 grids each, 100 m in an east-west direction (width) and 80 m in a north-south alignment (length). These mini-site composites or restricted-view maps are each advanced from their previous section by 20 m along the longitudinal axis. The reduced sectional displays better exhibited high and low end values, fluctuating less and resulting in often improved overall feature definition and resolution. All the described data sets were then processed using the same criteria for each. Table 5.1 explains the post-collection digital enhancements and correctional utilities that were applied using Geoplot 2.0.

In conclusion, all the electronically available information was evaluated in tandem with earlier archaeological investigations (i.e., subsurface and surface collection data, excavation reports, etc.) to the fullest extent available. Most post-excavational analysis of the

Table 5.1 *Geoplot Processing of the Native Alaskan Village Site Dataset*

Geoplot File Extensions	File Description	Processing
-(None)	Raw Data: Original collection readings	No processing
-K	Despiked: Processing method to repair erroneous and extreme data samples (high/low)	X-Radius = 2, Y-Radius = 1, Threshold = 2, Spike Replacement = SD (Standard Deviation)
-L	Low Pass Filter: Processing method to visually enhance and emphasize the gradual changes represented in the data collection	X-Radius = 2, Y = Radius = 1, Weighting = Gaussian
-H	High Pass Filter: Processing method to visually enhance and emphasize the rapid changes represented in the data collection	X-Radius = 10, Y-Radius = 5, Weighting = Gaussian
-I	Interpolated: Introduction of additional data points between readings in order to artificially increase the overall number of samples thus improving the resolution of the image	Direction = Y, Scaling Factor = 2, Expand

NAVS material, however, is concurrent with the writing of this report and, due to the massive resource base generated by four field seasons, some restrictions applied when trying to adhere to the scope desired. Future projects include computer-aided graphical overlays of the NAVS geophysical survey and historical maps using GIS technology, including visually represented excavation data generated in CorelDraw 3.0. Similarly, any further accessible ethnographic and historical evidence (e.g., texts, photographs) will be used to determine the nature and origin of the recorded resistivity anomalies.

A NORTH, A MIDDLE, AND A SOUTH SECTION: A JUSTIFIABLE DELINEATION?

When examining the general overall patterns evident in the soil resistivity maps of NAVS, it soon becomes clear that there is a striking separation between the northern grid areas and their southern counterparts. This delineation is largely the result of the data in the southern and northern grids exhibiting rapid changes or strong anomalies, whereas a substantial middle section of the survey site displays a mostly uniform and tight value range of collected readings. The reason for such clear boundaries is not determined.

Without the archaeologist to refute or support this boundary separation into three distinct "zones", the data will remain at best a series of strong interpretational arguments for the presence or absence of occupational traces. In particular, the detailed information retrievable from artifactual evidence is crucial in further substantiating any broad site delineation into a north, a middle, and a south area. (See chapter 3.)

GENERAL OBJECT-SPECIFIC DATA INTERPRETATION

The road is probably the most dominant anomaly of the entire survey and serves its desired purpose in orienting the map reader. At the same time, it is a vivid testimony to the extent of human landscape modification. This subsurface record of a presently existing utilitarian feature proves the effectiveness of geophysical surveys as a valuable tool to be applied in archaeology. Not only did the road itself register well, but the extensive historical disturbance to each side of it clearly delineates this feature. The quality of this distinction was an added indicator that we would be able to obtain good resistivity results.

Another general anomaly visible throughout large stretches of the site included a fence scar running along the eastern cliff terrace, pictured clearly in an aerial photograph taken in 1964 just before the site was cleaned up for reconstruction (Tschan 1994: 44, figure 24). This feature was among the strongest detected by the magnetometer, and it also appears dominantly in the resistivity maps. The discovery of numerous wood posts and their fragments in the East Central Trench, as well as some

barbed wire pieces in the same location, correspond very well with the resistance readings depicting a linear arrangement through the easternmost extension of this excavation area.

THE 1817 MAP VERSUS THE PRESENT CENTER OF THE SITE

By correlating the survey data with historical references, some interesting anomalies became apparent. For example, the earliest documented NAVS location based on a Russian map produced in 1817 for the Spanish colonial government (figure 5.8) overlaps to a large degree with an area of very low resistance readings. In the electronic map, this part of the site is of uniform context, and faunal remains in richer (darker) midden soils were evident along the terrace edge. The "empty" area where the earliest map of Fort Ross puts NAVS may be explained in several ways:

1. The relative precision of the 1817 map in regard to the Russian structures can not by default be applied to the native residences surrounding the palisade. The artist may not have deemed them critically important for the Spanish request.
2. There was a deliberate attempt to deceive the Spanish authorities by limiting the exact spatial extent of the Russian colony.
3. The instrumentation used for mapmaking did not allow the degree of accuracy that can be obtained in surveys today.
4. There were shifts in the actual location over time; thus, the original site was later abandoned, and the new buildings were located elsewhere on the cliff.
5. A lack of consideration of erosional forces may distort the view presented. In other words, the location of the Village midway between the Fort and the cliff as depicted in the 1817 map would place the Village further west and north of the midway point in the 1990s, after 150 years of cliff erosion.

It also appears that the Russians generally had little regard for the cultural traditions of their fur-hunting laborers, as is evident in their severely limited accounts of the Unangas and Alutiiq peoples at Fort Ross. This might be an important factor. If their survey instruments really lacked the capacity to accurately and effectively register vertical, horizontal, and especially distance dimensions, it would seem equally impossible for the Russian authority to have engaged in construction work, successful navigation of the world's oceans, or any meaningful cartographic production. On the other hand, the argument that coastal erosion contributed to the disappearance of large tracts of the earliest Village may be partially valid, but basically the area designated in the 1817 map as belonging to NAVS is still readily accessible (figure 5.9).

Regardless of the above and other possible scenarios,

irrefutable evidence (ethnographic and historical references [chapter 1]) indicates the presence of a Village site within this area. The residents must, therefore, have left visible scars in the landscape by erecting structures which would have left the area in a greatly disturbed condition.

Consequently, it is likely that an early NAVS may have been located somewhere in the general area of the cliff, but without direct correspondence to the first available map evidence. Using this probable conclusion allows one to engage in a less restricted search for NAVS by solely interpreting the resistivity results. Unfortunately, the few traces discernible in this middle area of the site are very linear and seem to resemble more the layout of corrals used during the later American Period when intensified animal husbandry became popular (figure 5.10). It therefore seems unlikely that a large-scale settlement could still underlie the extensive “empty” area of the middle section.

*OBJECT-SPECIFIC DATA INTERPRETATION
(MIDDLE SECTION)*

The middle section, as discussed above, is rather limited in historical resources that portray past occupational site layouts. The resistivity survey did however

retrieve some long, linear features as well as one or two small squares containing further internal division (B, figure 5.10). The most dominant “line” in this estimated NAVS section is a long transect (A, figure 5.10) coming across from the western section of the road into the eastern part where it connects to a possible pathway or fence scar that runs mostly parallel to the previously mentioned site-transcending fence. One interpretation may also conclude that there is a rectangular spatial definition within this middle section suggesting that the pathway actually originates here.

A number of small, dispersed anomalies which seemed to have some interior definition were detected. One is found at the intersection of the suggested pathway and an odd-shaped traverse. This particular feature exhibits circular characteristics (C, figure 5.10) while another internally defined object (D, figure 5.10) shows up well within the enclosed space formed by the remaining dominant spatial delineation (interpreted as fences). Interestingly, the former seems to be connected to the traverse anomaly (E, figure 5.10) that mostly runs in a northeastern direction and eventually seems to lead to the “entrance” of a huge northern barn-like structure.

Similarly, at least one of these square objects—a

Figure 5.8 1817 Russian Map of Fort Ross

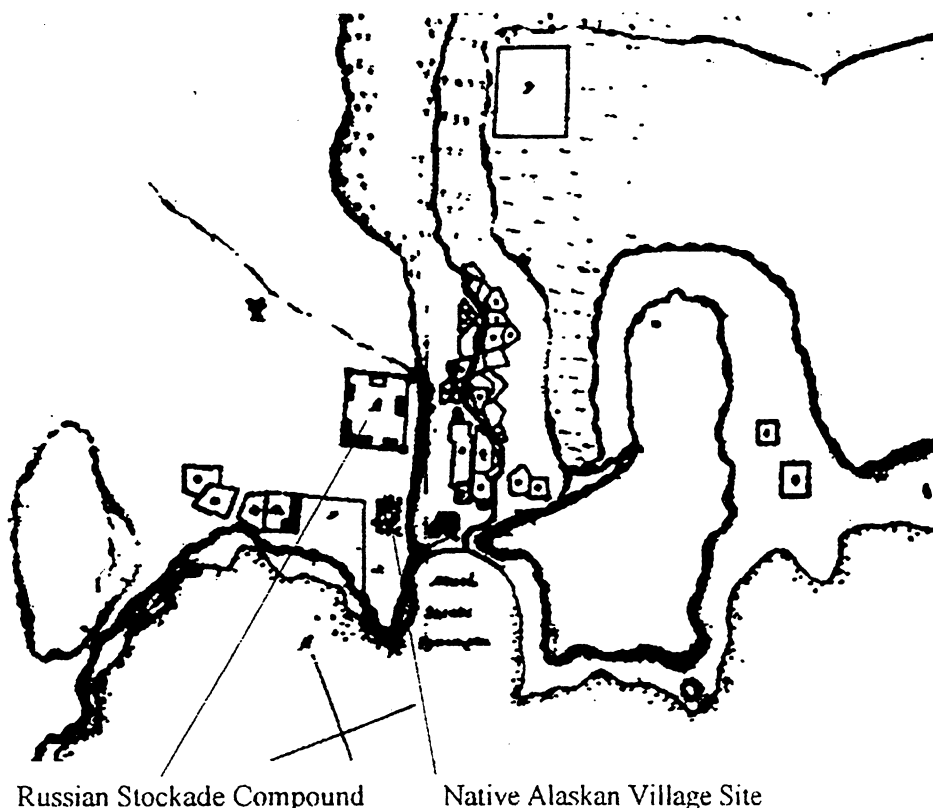








Figure 5.9 Site Reconstruction of Native Alaskan Village Site Based on the 1817 Map

MAP LEGEND

-  Datum Point (0S, 0E)
-  Grass Field
-  Fort Ross Cove Road
-  Cliff with Rock Outcroppings
-  Beach Sand and Rocks
-  NAVS According to 1817 Map

Excavation Units

Trench Reference Points
Represent Extension Corners

East Central Trench Area

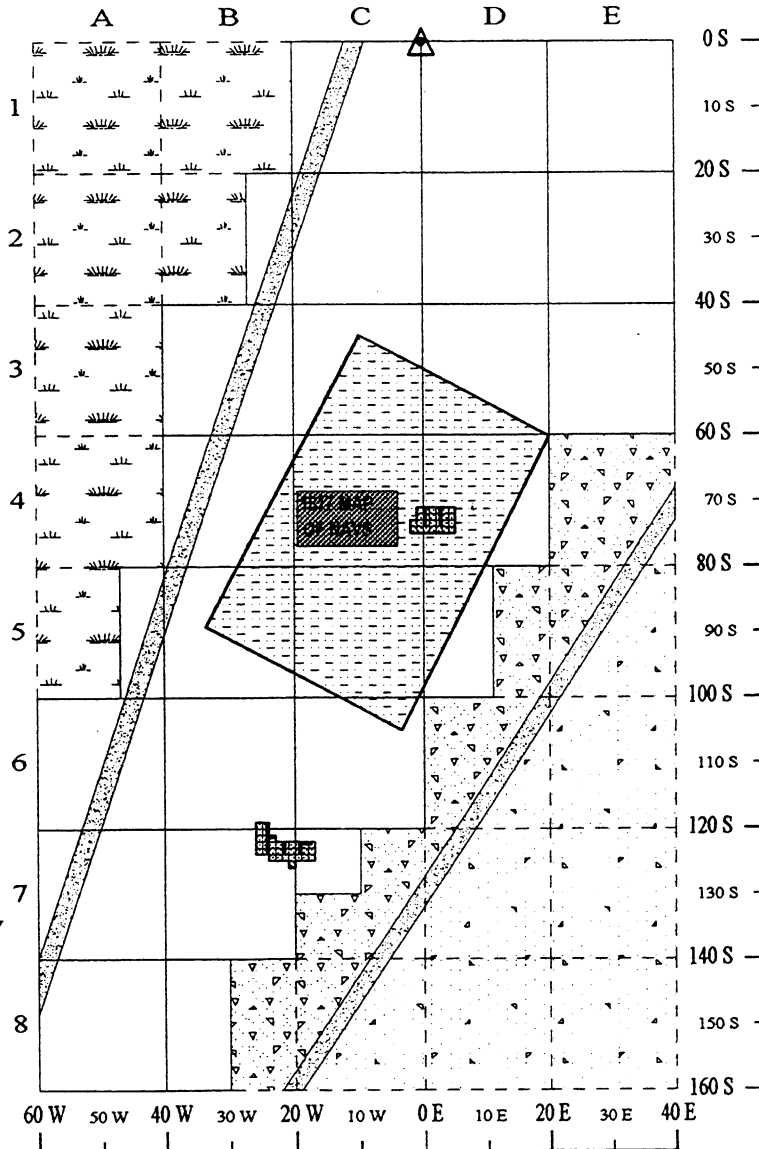
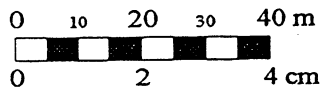


NW = 71S, 2W NE = 71S, 5E
SW = 75S, 2W SE = 75S, 5E

South Trench Area








NW = 119S, 26W NE = 119S, 17W
SW = 126S, 26W SE = 126S, 17W



Modified from Original
Compass Design by
Edward C. Mack

Figure 5.10 Middle Section Map Indicating the Dominant Resistivity Survey Features

MAP LEGEND

-  Datum Point (0S, 0E)
-  Grass Field
-  Fort Ross Cove Road
-  Cliff with Rock Outcroppings
-  Beach Sand and Rocks

Excavation Units

Trench Reference Points
Represent Extension Corners

East Central Trench Area

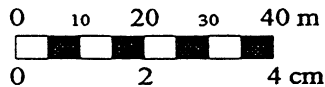


NW = 71S, 2W NE = 71S, 5E
SW = 75S, 2W SE = 75S, 5E

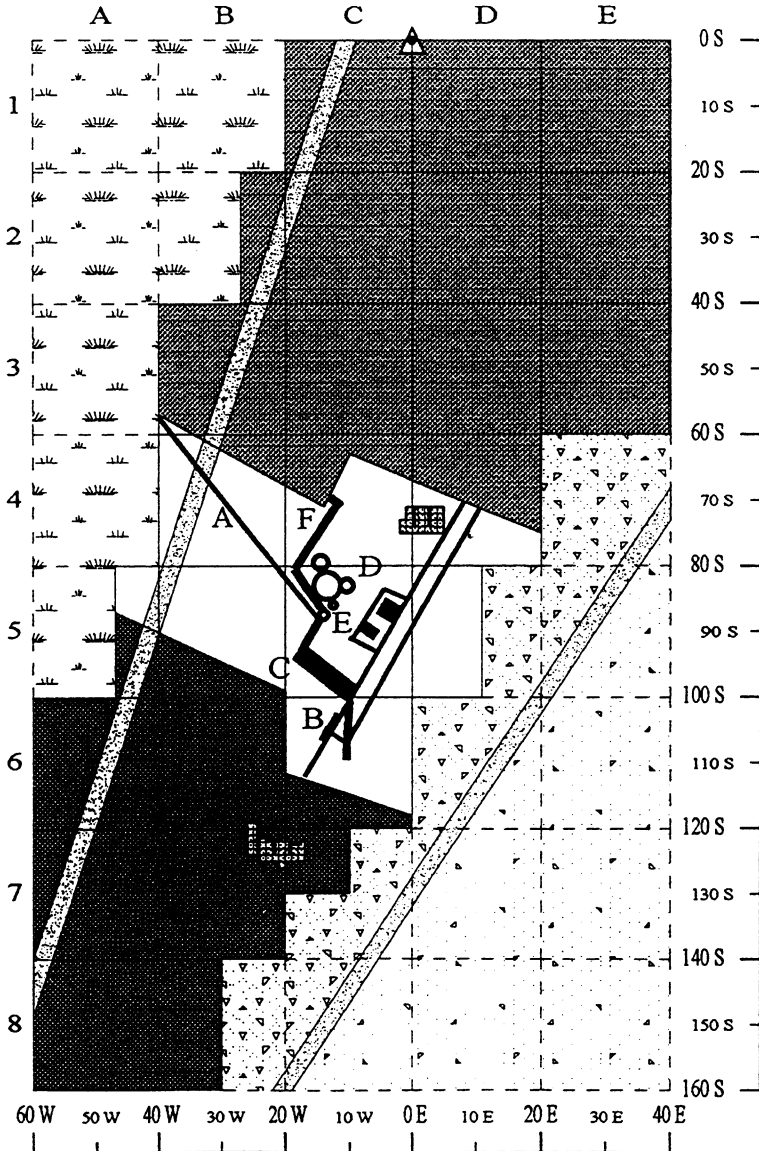
South Trench Area






NW = 119S, 26W NE = 119S, 17W
SW = 126S, 26W SE = 126S, 17W



Modified from Original
Compass Design by
Edward C. Mack



-  North Section
-  Middle Section
-  South Section

plausible interpretation identifies these as troughs—appears on the electronic maps in what I consider to be the south section, possibly indicating shared feature occurrences while generally maintaining the site's three-part separation scheme. Alternatively, the actual occupational chronology for Fort Ross supports different scenarios for the use life of the three main areas. Future archaeological investigation may provide clues to distinguish more clearly any such multi-cultural and long-term activity boundaries.

MULTI-USE DISORDER IN THE NORTH

The anticipated delineation of the site into three main sectors is further reinforced by the distinct differences between the northern and southern grids. The former are riddled by extremely rapid changes, while the latter exhibit much more gradual, though equally numerous, resistance anomalies. This striking and heavy disturbance in the area immediately in front of the Stockade also shows up in the later historical maps that have been assembled as part of the continuing Fort Ross Archaeological Project. None show any buildings further from the southeastern tower than 50 to 60 m (figure 5.11). Photographs of the same area also depict a series of classic American barns (Tschan 1994:40; figure 21). A slaughterhouse, a butcher shop, a post office, a gas station, and a convenience store (Murley, personal communication 1993) all were once present within the same area and, in most instances, they used the same two foundational layouts and superstructural designs, though chronologically most are distinct. The only marked exception is the transition of an eastern wooden barn from a definite square base, which persisted at least until the 1906 earthquake (Tschan 1994:40; figure 22), to a later north-south aligned rectangular structure. This northern section, with its close proximity to the Fort, is also the most puzzling due to its lengthy use-life. Until 1964, when the entire cliff terrace south of the compound's walls was cleared, there were remnants (heavily decayed) of buildings and fences (Tschan 1994:40; figure 23).

When looking at the overall NAVS resistance readings, one is immediately drawn to a roughly square 30 x 30 m feature (B, figure 5.12) that is in stark contrast to the shell midden bordering it immediately to the south. It becomes particularly visible using Geoplot color graphs. Since the midden and feature are adjacent areas, the data from either one would suffer from resolution and detail loss when overemphasizing the opposite value range. Further investigation, especially chemical soil analysis, will have to suggest a cause for the distinctive boundary between the two.

Although the Geoplot Relief utility treats the data with much greater detail by representing the survey results as surface features, these high reading patches could not be further interpreted using current information

gathering methods. Nonetheless, depending on the Scaling Factor, the Sun Direction Degree, or the Sun Elevation Degree in Geoplot, it is possible to distinguish other structural features. For example, there are two long, large linear "pipelines" or "electric cables" which may represent Pacific Gas and Electric power lines. These seem to be connected to what may be the residual shadow of the former gas station's fuel tanks (presumably removed) (A, figure 5.12). Other features with high resistance values include the square feature mentioned above. Within it, one may discern a "four-room structure with a center hearth." Coinciding with these dramatic top end values is a surface area that is almost barren. This is in marked contrast to the surrounding area which needs repeated mowing throughout the year.

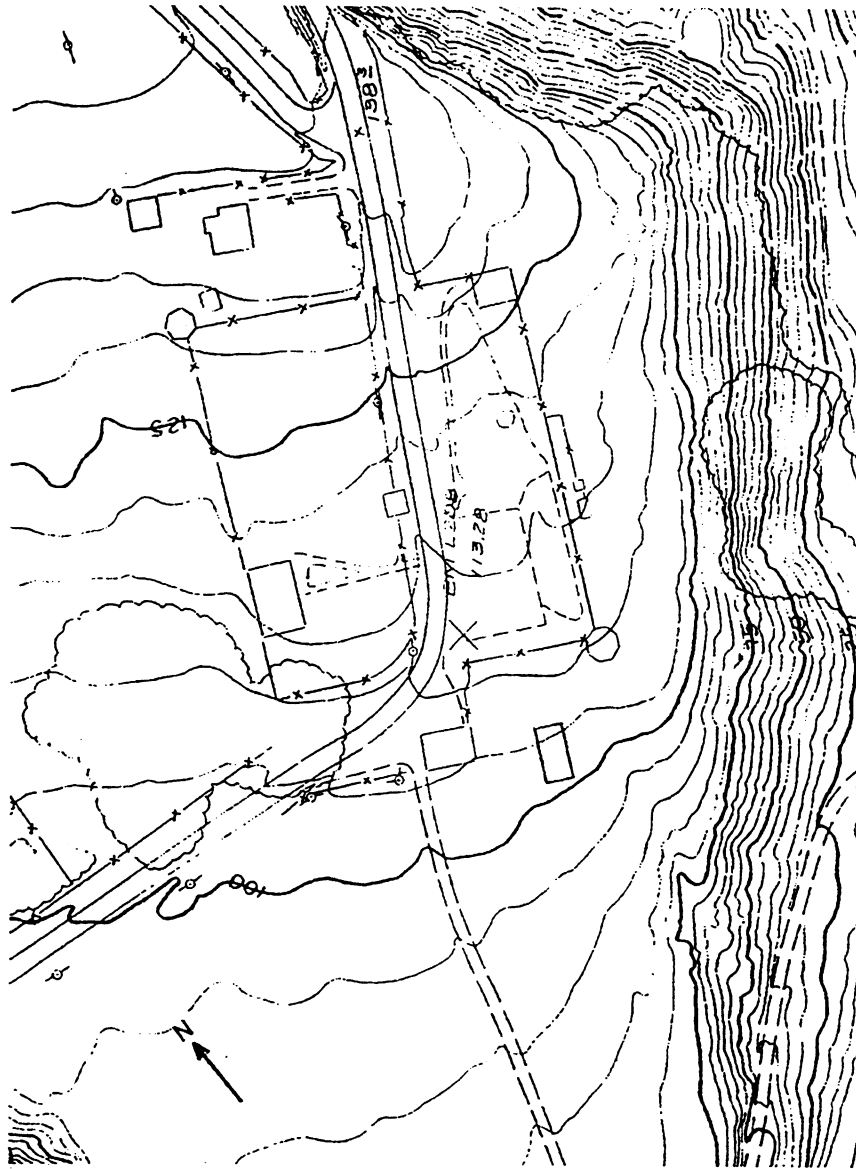
Perhaps the safest interpretation of the circular features calls for either a natural outcropping of the local rock or the filling in of an area with high resistance materials after more fertile matter had been removed, as in the case of a dump. This should not completely discredit the possibility of archaeologically significant architectural structures being present, but when extremes in resistance values are combined with a lengthy use period for the site and heavy disturbance, it is better to engage in test excavation before claiming fanciful discoveries.

These strong and extensive anomalies are among the most intriguing. Particularly rewarding might be the geophysical investigation into the potential effects of penned-up herd animals (i.e., uric acid generation) or other waste products of a dairy and meat operation, in conjunction with an open dump site. The question to be answered for geophysical testing relates to why former animal compounds or butcher areas would show up as high resistivity features, for most of the organic waste products should assist, rather than hinder, in the ground's conductivity, as in the site's middle section. Regardless of the factors contributing to the lack of vegetation in the proximity of the eastern barn (slaughterhouse), two corrals were located there, and these structures overlap or make up to a large extent the areas with the top range resistance values (B, figure 5.12).

This north sector also has geometric structural features that are remarkable, since some do not correspond very well with the historical evidence of buildings situated close to the Fort within the last 100 years. As a final point, the dirt track road is surely nothing more than a modern construct. It therefore must be considered an arbitrary divider in relation to the archaeology of the Russian Period, with their own coastal pathway lying further east. Rapid resistivity changes clearly continue, particularly to the southwest of the Fort Ross Cove Road.

OBJECT-SPECIFIC DATA INTERPRETATION (NORTH SECTION)

Although the most obvious and dominant anomalies have been highlighted above, the massive rectangular and

Figure 5.11 6/1/64 Department of Water Resources Map of Fort Ross

Copied at the Department of Parks and Recreations, Sacramento, CA. Scale unknown.

square outlines of what must be interpreted as barn-like structures caused some considerable debate (C, D, figure 5.12). None of the historical maps show a north-south oriented elongated building in the immediate vicinity of the road. This peculiar feature seems to be further divided into three segments, with the middle being the largest and showing an extensive opening in the center of its eastern boundary. Also, a major linear object originating all the way from the middle section of the site and best described as a pathway leads up to this possible gate or doorway. The smaller, yet still impressively sized, “rooms” to each side (north and south) of the middle interior space each contain a large circular feature in their centers. All in all, this structural complex may encom-






pass an area of up to 250 square meters measuring 25 m in length and 10 m in width.

Partially overlaying this huge spatial anomaly, which seems to end in a semicircle at its north end, is another possible foundation layout. This one is fairly square and includes less distinguishable interior detail because of its positional placement over most of the top resistance “mystery square.” This second likely architectural remnant also refuses to line up directly with historical maps, yet there is close resemblance to a square building described in the Veasey map (figure 5.13). Its proximity would make it the “butcher shop” rather than the “store.”

There is a lack of documented evidence for either of these two well-defined and enclosed spaces. Although

Figure 5.12 North Section Map Indicating the Dominant Resistivity Survey Features

MAP LEGEND

-  Datum Point (0S, 0E)
-  Grass Field
-  Fort Ross Cove Road
-  Cliff with Rock Outcroppings
-  Beach Sand and Rocks

Excavation Units

Trench Reference Points
Represent Extension Corners

East Central Trench Area

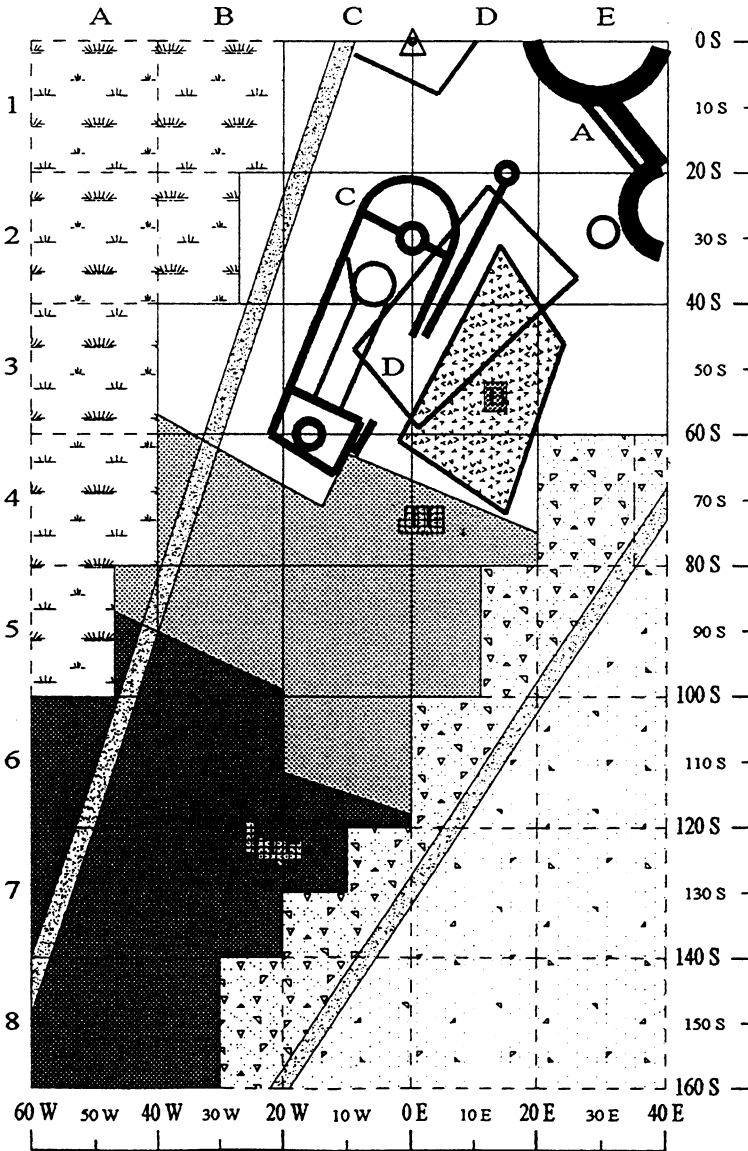
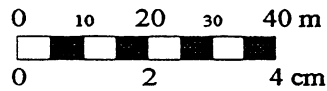





NW = 71S, 2W NE = 71S, 5E
SW = 75S, 2W SE = 75S, 5E

South Trench Area



NW = 119S, 26W NE = 119S, 17W
SW = 126S, 26W SE = 126S, 17W

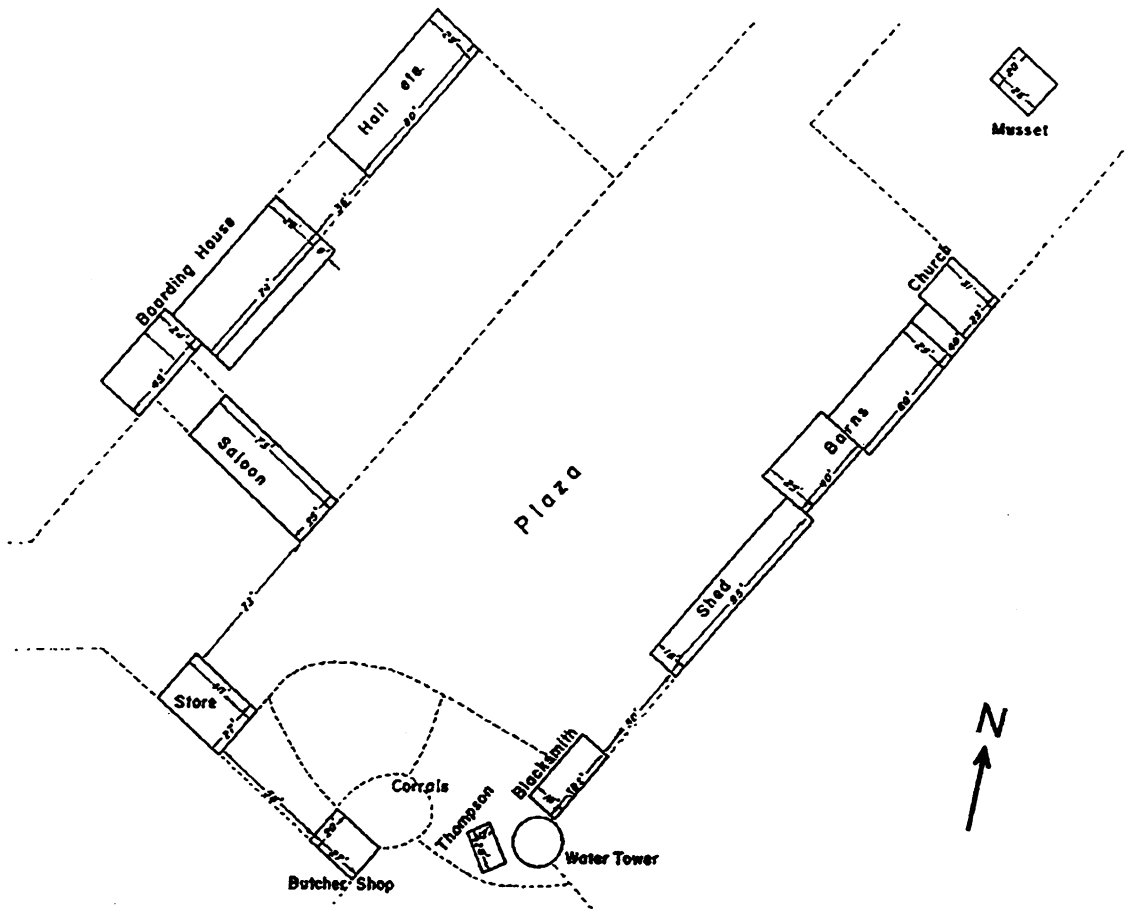


-  North Section
-  Middle Section
-  South Section



Modified from Original
Compass Design by
Edward C. Mack

Figure 5.13 1892 Veasey Map of Fort Ross



Copied at the Department of Parks and Recreation, Sacramento, CA. Scale unknown.

they probably reflect European and American building traditions, one must place these structural remnants as early as the Russian occupation, yet no later than the 1906 cartographic evidence. The previously mentioned photographic data shows a change in the alignment of the “butcher shop” from its original, mostly square layout to an undoubtedly rectangular and north-south oriented design built after or right around 1906.

WAS NAVS FURTHER TO THE SOUTHWEST?






Without a doubt, the most insightful data was collected from the southern grids, and it becomes difficult to discuss general trends for an area that produced such varied results. A clear overall observation, however, is that most of the structured data is grouped into what looks like an outer layer of distinct higher readings extending broadly across the road in a westward direction. This information could possibly resolve the question regarding the spatial ethnographic descriptions for the sizable interethnic Alaskan households on the cliff terrace (Lightfoot, Wake, Schiff 1991:23). Hence, a

series of clear linear and circular features that registered prominently in the survey fall within a restricted area which could indicate the presence of a closely knit community (A, figure 5.14). Unfortunately, only the area to the east of the road has been investigated, either archaeologically or by the soil resistivity survey. Because the analysis has concentrated on the original predicted location of the NAVS, future research should include the areas lying to the west of the beach road in an attempt to validate the geophysical results.

The southernmost units recorded (160S, 60W and 160S, 40W) have an equally massive cluster of high resistivity results (B, figure 5.14) much like the north section’s “mystery square.” Yet, unlike its northern counterpart, this area also contains a clearly exposed and seemingly “stacked” rock pile on the surface, situated within the space immediately south and outside of these end grids and the road’s sharp hairpin turn. By virtue of its proximity to what might well be a deliberate assemblage, the aforementioned buried resistivity feature could, by direct association, be interpreted as evidence of some

Figure 5.14 South Section Map Indicating the Dominant Resistivity Features

MAP LEGEND

-  Datum Point (0S, 0E)
-  Grass Field
-  Fort Ross Cove Road
-  Cliff with Rock Outcroppings
-  Beach Sand and Rocks

Excavation Units

Trench Reference Points
Represent Extension Corners

East Central Trench Area

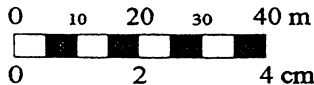


NW = 71S, 2W NE = 71S, 5E
SW = 75S, 2W SE = 75S, 5E

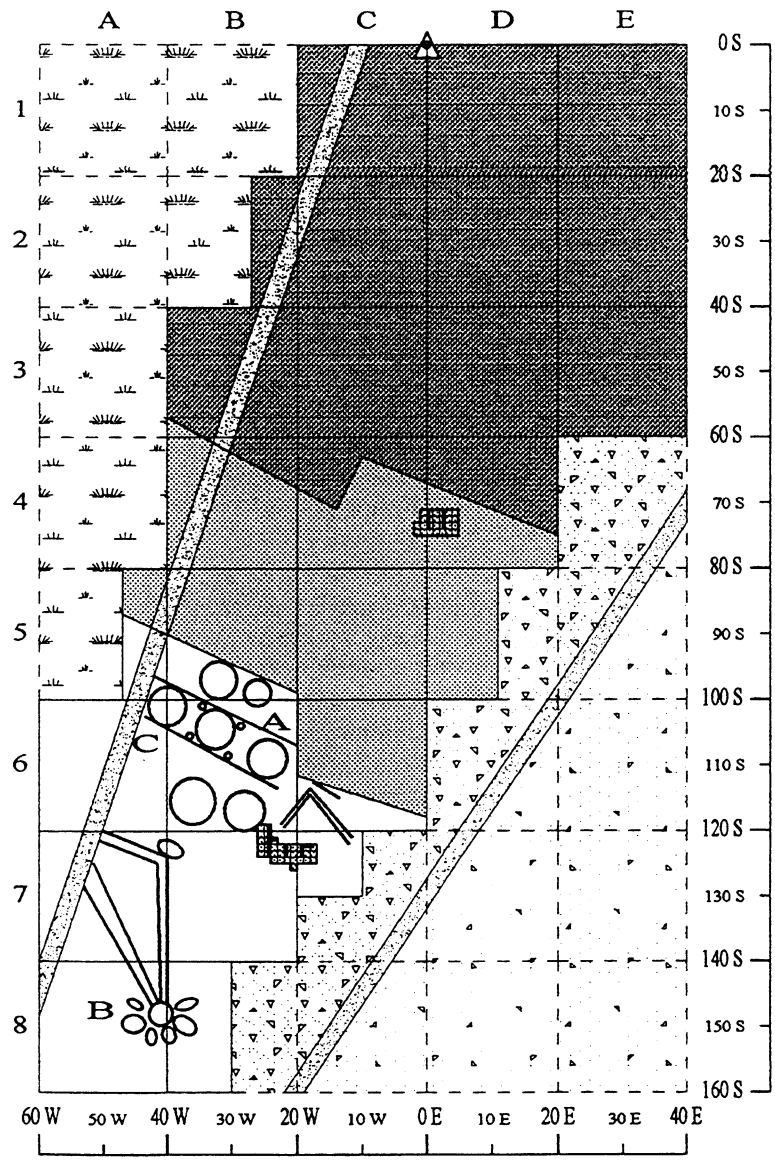
South Trench Area






NW = 119S, 26W NE = 119S, 17W
SW = 126S, 26W SE = 126S, 17W



Modified from Original
Compass Design by
Edward C. Mack



-  North Section
-  Middle Section
-  South Section

utilitarian formation process.

In order to establish any direct correlation with this subsurface anomaly, the exact nature of the visible assemblage outside the survey area must be determined. This large rock pile, which marks the 180 degree turn in the road, may have been placed deliberately as part of modern use of the site, or it may merely represent natural, geological processes. If their placement is the result of human activity, then the origin of the boulders is important, since deliberate deposition generates suspicion about geological explanations for the geophysical anomalies found in the surrounding survey area. Heavy subsurface disturbances could be the consequence of raw material procurement and its transport. A fairly well-structured and spider-shaped high resistivity feature clearly dominates the two southernmost grids. Were these features a solely geological contribution to the data, one normally would assume greater irregularity in design.

During the 1992 field season, the discovery of rock rubble in the South Trench and a similar drainage system that assisted construction inside the Fort (Farris 1981:17) may have constituted a unique resistivity signature across the area. This human introduction of fist-sized stone fragments never exceeded in depth the maximum subsurface penetration of one half meter (0.5 m) reached by the current of the RM15. Unfortunately, the 1992 geophysical survey which detected the anomalies in the excavation units prior to the actual foundations being unearthed has the stigma of severe unreliability in terms of data interpretation. The subsequent resistivity testing conducted in 1993 could therefore only register, albeit vigorously, the plastic-lined and stream-gravel-filled trenches due to the post-excavational clean-up procedures on the site. The resulting high readings also persisted in the immediate vicinity of the excavation units—the consequence of filler material spilled around the edges. At this point, the principal data set will serve as a reference to which all upcoming excavational discoveries can be correlated. If these foundations are spatially restricted structures, specific to the dimensions of single dwellings, then further households may be located by focusing on similar anomalies in the electronic maps.

OBJECT-SPECIFIC DATA INTERPRETATION (SOUTH SECTION)

There are enough anomalies discernible in this last section to hint at a one-time only occupation of the cliff terrace by fur-hunting laborers. As the most potentially insightful research target, it provides spatial clues about what may have been the Native Alaskan Village Site. The obvious structural features that dominate the area are two very long parallel lines reaching a maximum extension of perhaps 30 m aligned in a northwest-southeast direction (C, figure 5.14). Four round “corner posts” and two additional dividers perpendicular to these baselines partition the entire feature into three equal

segments. In addition, the whole center seems to be composed of a large circular depression. All these components together form a slim, elongated barn-like structure (plank house) possibly extending across the road in a westward direction.

Grouped around this European or American design pattern are at least three, perhaps four, circular anomalies with a diameter of about 5 m. The furthest westward extension of the South Area Excavation seems to have penetrated the outer perimeter of one of these structures. This coincides with a stone “foundation” and the remains of a pit excavated at this exact location. If the electronic data and the actual archaeological evidence retrieved support each other, then these features may indicate the presence of a traditional Alaskan semi-subterranean structure. At the least, the deliberate layout of these archaeological remains could be used to identify any additional, similar structures within the resistivity map.

Lastly, the spider-like anomaly, some 10 to 15 m in diameter at the southernmost tip of the survey area also seems to be connected to what might be a pathway coming from across the road. This could indicate the presence of a now long-gone residential or utilitarian object (B, figure 5.14). It exhibits a clear central area with “legs” extending around it in all directions. As mentioned before, whether or not a natural rock formation produced these high resistance readings remains to be seen through future investigations. Any geometric pattern in a geophysical survey, however, should be treated with suspicion and, in this particular instance, it may well be a pile of deliberately deposited rocks assembled for a currently unknown purpose.

ADDITIONAL RELATED RESULTS

Additional information was obtained in regard to how weather affects the data collected in resistivity surveys. Even without a controlled measurement scheme lasting for at least a year with readings collected in monthly intervals, the resistivity set obtained during the wet December of 1993 starkly differs from its counterpart recorded during the hot June of the previous year. Consequently, a survey scheme on a Native Californian site undertaken in February and May of 1993 was geared at specifically investigating climactic influences for remote sensing along this region’s system of ridge top sites in an attempt to determine the range of productive months versus the less rewarding calendric choices for a resistivity survey. Within this short time period, the weather pattern generally shifted from very wet to less frequent but persistent precipitation. As a result, there was a considerable difference in the data sets, and the closer it got to summer, the fainter the features registered in the resistivity maps. A study into the Californian north coast’s geophysical potential has yet to achieve the necessary scientific recognition by use of a rigorous

control system, however. Future research into this area could fill a dire need for remote sensing parameters to govern this otherwise geophysically neglected, but archaeologically most intriguing, region of the Pacific Rim.

CONCLUSION







The spatial distribution of the Village established by the Native Alaskans was the primary focus of the resistivity survey at this site. The particular research

objective consisted of a search for distinct boundary lines and architectural demarcations. Interpretation of the collected remote sensing data is a puzzling, challenging, and complicated affair (figure 5.15). The vast amount of information that has been obtained at NAVS, however, may answer some of the most pressing questions regarding the spatial layout and organization of the site. As such, this resistivity survey has allowed the separation of NAVS into three characteristically distinct areas:

1. North = The most actively used area in the past

Figure 5.15 Entire Site Map Indicating the Dominant Resistivity Survey Features


MAP LEGEND

-  Datum Point (0S, 0E)
-  Grass Field
-  Fort Ross Cove Road
-  Cliff with Rock Outcroppings
-  Beach Sand and Rocks
-  NAVS According to 1817 Map


Excavation Units

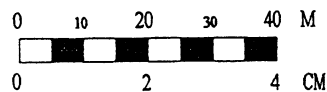
Trench Reference Points
Represent Extension Corners

East Central Trench Area

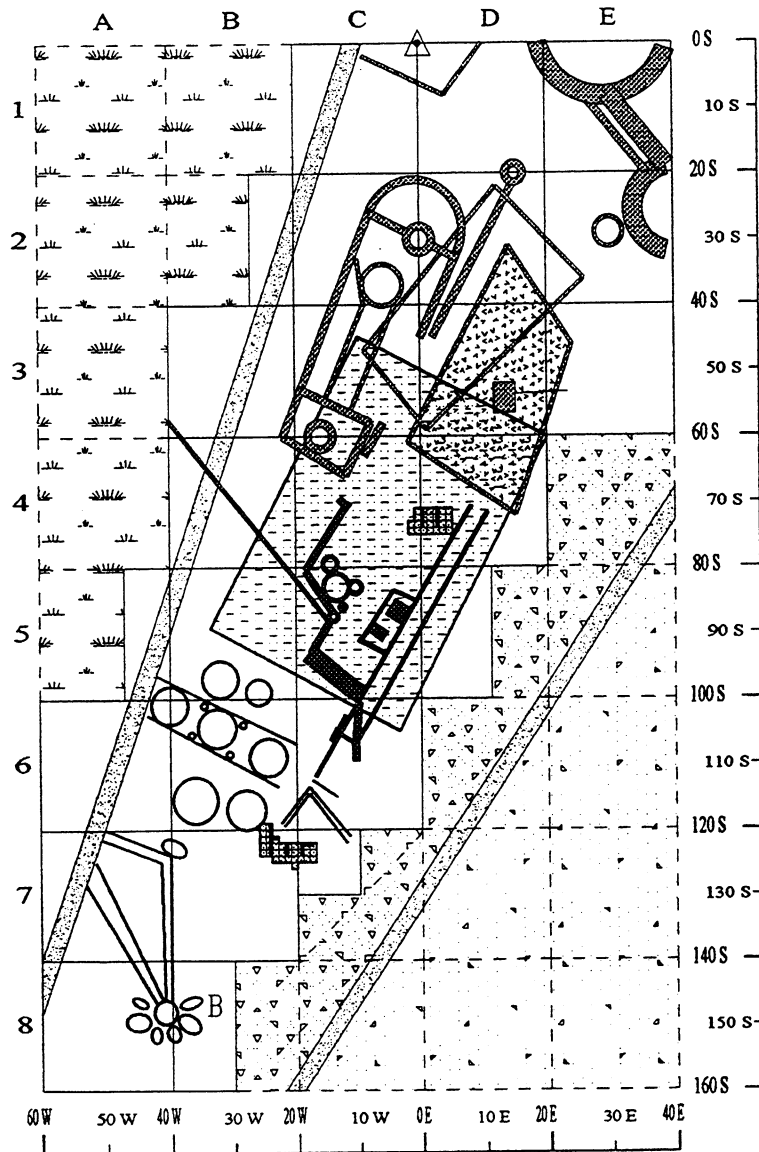
-  NW = 71S, 2W NE = 71S, 5E
SW = 75S, 2W SE = 75S, 5E

South Trench Area

-  NW = 119S, 26W NE = 119S, 17W
SW = 126S, 26W SE = 126S, 17W



Modified from Original
Compass Design by
Edward C. Mack



as well as the most complex area of the resistivity survey. Modern features may dominate this section, yet Russian or Alaskan materials likely lay adjacent to or beneath these later occupational remains;

2. Middle = An "open" tract of land devoid of extensive resistivity features, aside from occasional fence scars. Nonetheless, there may be a chance of earlier materials underlying this area, including settlement remains

3. South = This section is the most likely candidate for an occupational site established by Native Alaskan hunters due to the numerous structural patterns noted in the resistivity data.

Unfortunately, the vast quantity of data presented in the Geoplot maps of the Fort Ross cliff terrace make it virtually impossible to address additional, often merely pixel-sized, anomalies. My aim, therefore, was to provide some analytical conclusions regarding the major resistivity features and to avoid undue geophysical analysis and hedging.

ACKNOWLEDGEMENTS

Throughout this work, the assistance of the principal Fort Ross research staff, including Professor Lightfoot, Staff Archaeologist Ann Schiff, and graduate students Nette Martinez, Peter Mills, and Tom Wake, proved instrumental. Their interpretational input when examining the electronic maps was essential to the success of this project. Furthermore, the staff of the California Department of State Parks and Recreation, including Glenn Farris, Dan Murley, and Bill Walton, were of great help in providing written, photographic, and personal documentation. Nick Jones was responsible for capturing the available maps of Fort Ross on film which then were used in subsequent, computer-related image processing. As a professional photographer he worked miracles with the often dismal cartographic documents, and it was thanks to his talents that such a high standard was achieved. David Wheatley, lecturer at the University of Southampton, and Johan Wikman at Autodesk also assisted in some tricky computer aspects of graphical software programs and output interfaces. Both are appreciatively mentioned as helpful contributors. My research partners John Anderson and Lisa Holm, however, undoubtedly deserve most of the credit, for without their personal sacrifices and their unconditional enthusiasm, this work could not have been completed successfully.

Any complex computer-related problems were resolved mainly by my wife Colleen. She was ingenious at arriving at solutions to software and hardware difficulties. Her patience kept me sane during the most hectic of times; as a companion and helpmate, she was and continues to be my most invaluable asset. Finally, the

individuals without whom this project would never have become reality should be mentioned: Dr. Lewis Somers of Geoscan Research USA—our educational source for remote sensing techniques, instrument handling, and data analysis, as well as the generous provider of the necessary equipment—has been the main guiding force behind all of the work undertaken. Dr. Somers and his wife Elizabeth have tolerated the repeated and lengthy invasion of their private residence by myself and my partners. The unconditional hospitality, magnificent knowledge base, and extensive training they bestowed have been appreciated on a personal and professional level by all parties far beyond what these few lines may credit. Therefore my special thanks go to Geoscan Research USA and all its affiliates.

REFERENCES

- Clark, Anthony
1990 *Seeing Beneath the Soil—Prospecting Methods in Archaeology*. B. T. Batsford Ltd., London.
- Farris, Glenn J.
1981 *Preliminary Report of the 1981 Excavations of the Fort Ross Fur Warehouse*. Cultural Resources Management Unit, Resource Protection Division. California Department of Parks and Recreation, Sacramento.
- Halliday, David, Robert Resnick, and Jearl Walker
1993 *Fundamentals of Physics - Fourth Edition*. John Wiley & Sons, Inc. New York.
- Lightfoot, Kent G., Thomas A. Wake, and Ann M. Schiff
1991 *The Archaeology and Ethnohistory of Fort Ross, California: Vol.1, Introduction*. Contributions of the University of California Archaeological Research Facility no. 49, Berkeley.
- Sears, Francis W., Hugh D. Young, and Mark W. Zemansky
1983 *University Physics Part II*. Addison-Wesley Publishing Co., Chicago.
- Tschan, André
1994 *Sensing the Past and the Remoteness of the Future*. Unpublished honor's thesis. Copy at the Anthropology Library, University of California, Berkeley.
- Weymouth, John
1986 Geophysical Methods of Archaeological Site Surveying. In *Advances in Archaeological Method and Theory*, vol. 9. Academic Press, Inc., New York.
- Personal interviews were also conducted throughout this project. The main contributors included: Dan Murley, Park Ranger, Fort Ross, California; Dr. Lewis Somers, Geoscan Research USA, Sea Ranch, California; and Bill Walton, Park Ranger, Fort Ross, California.

Historical Archaeology of the Native Alaskan Village Site

GLENN J. FARRIS

AS AN OUTPOST OF EMPIRE, Fort Ross was at the farthest extremity of the control of the Russian czars in the early 19th century. It had been established under the impetus of private enterprise to effect practical rather than political goals. The desperate supply situation faced by the Russian-American Company in their Alaskan settlements in the first decade of the 1800s required action. Through cooperative enterprises with American shipmasters, Russian-American Company employees had learned about the sea otter hunting possibilities of the California coast. Alexander Baranov, the Russian-American Company's able Alaskan governor, entered into an arrangement with Captain Joseph O'Cain in 1803 to provide *baidarkas* and their crews to be used to kill sea otters in various parts of the lengthy, ill-defended coasts of California ranging from San Francisco Bay down to Cabo San Lucas at the southern tip of Baja California. The offshore islands were particularly exploited due to the incapacity of the Spanish to defend them. No standing naval force was available in California, only the occasional ship sailing up from the Pacific ports of San Blas or Acapulco to deliver supplies.

In order to safeguard its interests, Russian-American Company sent along certain employees to be in charge of the *baidarka* crews. These men gained invaluable knowledge of the strengths and weaknesses of the Spanish along the coast. One particularly able *promyshlennik*, as these jacks-of-all-trades were called, was a man named Timofei Tarakanov (Owens 1990; Owens and Donnelly 1985). His actions paved the way for the eventual settlement of Fort Ross (Farris 1993). Tarakanov visited California on numerous occasions. Of particular interest was the sea otter hunting expedition of the American ship *Peacock* under the command of Oliver Kimball in 1806-07 and based at Bodega Bay. Tarakanov

was the Russian-American Company representative on that trip (Ogden 1941:50). Since he later provided critical information to Baranov concerning Bodega Bay which the latter used in briefing Kuskov before his expedition in 1808, it may well have been on this occasion that Tarakanov negotiated with the local native chiefs for use of their lands (cf. Farris 1993; Payeras 1995:335).

Apart from furthering the fur hunting goals of the Russian-American Company, Baranov was faced with a critical food shortage for his Alaska-based employees. They were lucky if one ship a year arrived from Mother Russia (Gibson 1976:76-82). If that one failed to arrive, the situation for food supplies other than meat and fish was dire. In 1805, when Court Chamberlain (and a major shareholder in the Russian-American Company) Nikolai Rezanov arrived in New Archangel as part of a world voyage, he was pressed into service by Baranov to sail down to Spanish California to purchase grain. Thus, in 1806, Rezanov sailed into San Francisco Bay and eventually managed to obtain from Commandant Antonio Argüello a shipment to carry back to Alaska. Following this episode, Baranov organized two expeditions to explore the possibility of further settlement along the Pacific Coast in the area known since Francis Drake's visit as New Albion. Although the Spanish thought differently, much of the rest of the world saw the area north of San Francisco Bay as land of problematic ownership. In 1808 two ships were outfitted and sent south. One, the *Sviatoi Nikolai*, was destined for the Oregon Country and the other, the *Kad'iak*, under the command of Ivan Kuskov, went to California. Whereas the *Sv. Nikolai* had a disastrous expedition when it ran aground in what is now Washington state, Kuskov had a successful trip to California (Owens and Donnelly 1985).

During the next several years Kuskov returned annually to Bodega Bay (renamed for Rumiantsev) and finally, in 1812, began work on the fortified establishment which from then on became the headquarters of Russian California. Although a base with a few buildings was maintained at Bodega Bay, the bulk of the population, including most of the Native Alaskans, settled in at *Selenie Ross* (or Colony Ross).

THE NATIVE ALASKAN VILLAGE SITE

Thanks to a plan map of the Russian commercial colony of Fort Ross dated 1817 (Fedorova 1971, 1973), a specific placement for the village of the Native Alaskans working and living at Fort Ross exists. The exposed nature of the Native Alaskan Village Site (NAVS), lying immediately to the south of the Stockade at Fort Ross, inhibited archaeological investigation in the past. The work conditions at the site can be less than ideal, but the selection of this spot by the Alaskans is natural and fully consistent with their familiarity with the wind-swept islands of the north.

The Village site produced a *mélange* of artifacts of both native manufacture and imports coming from Europe and China. The clear indications of adaptation to European and Chinese items supplied through the Russian administration of Colony Ross are sometimes obvious, such as in the case of trade beads. The large quantity of ceramic and glass fragments found at the site, however, requires closer consideration. The implication is that the Native Alaskans and their Kashaya Pomo or Coast Miwok wives had at their disposal whole ceramic or glassware vessels that were broken and discarded in the course of use. It is more probable, however, that few if any whole items of either of these materials (and then only selected vessel forms) were in the possession of Native Americans. Instead, the broken sherds of glass and ceramics were obtained secondhand for uses analogous to familiar raw materials of stone (chert, basalt, slate, granite, etc.) and volcanic glass (obsidian) to be rendered into useful tools, decorations, and playthings.

European manufactured goods came to Fort Ross through various sources (cf. Gibson 1976). The Russian-American Company ships brought periodic cargoes. Other supplies came from the Yankee traders (often referred to by the Russians as "Boston Men") trading via Sitka or Monterey. In fact, the English merchant, William Hartnell based in Monterey, had close connections with chief agent Kirill Khlebnikov by 1824 and functioned as a representative of the Russian-American Company (Dakin 1949:122-23; Khlebnikov 1990:152-54, *passim*). Also, supplies brought in to Yerba Buena (San Francisco) were available for trade. Occasionally, ships of other nations would make an appearance (cf. Khlebnikov 1990; LaPlace 1854; Ogden 1941) as well, adding to the goods available. The American ships, having access to the Canton trade, would be a continuing

source of Chinese porcelain. Khlebnikov (1976, 1990) provides several lists of trade goods, giving a sense of the variety of types of items (i.e., dishes, glassware), but without reference to the actual makers. He even made a wonderfully direct statement that the Company should send certain color trade beads to California (Fedorova 1985:205). The archaeological record helps to clarify details not covered by archival lists, though the archival record is invaluable to fill out the picture, especially in cases of items that do not survive in most archaeological contexts (cloth, paper, etc.).

NATIVE ALASKAN RESIDENTS

The relation of the Native Alaskans at Fort Ross to the dominant Russian and Creole inhabitants, though certainly subordinate, differed greatly from the master-slave relationship found in various parts of the world and even from the missionary-neophyte relationship found in neighboring Spanish California. True, the Native Alaskans were largely brought to Fort Ross under some form of duress and were not free to leave at any time. They served seven-year stints working for the Company but were decidedly not Company employees. Rather they were "in service to the Company," much like contract employees. Another aspect of the relationship that differed particularly from the situation in Spanish California was that the Native Alaskans at Fort Ross were not being proselytized by the Russian Orthodox Church on a regular basis. In fact, there was no resident priest at Fort Ross, but rather a layperson (for much of the time, Fedor Svin'in) who would take care of periodic religious needs as required (Payeras 1995:333). For the most part, their culture was not being assailed directly by the Russians, although the disruption created by separating most of the men from their families, wives, and their own culture forced them to adapt somewhat to the cultures of their Coast Miwok, Southern Pomo, and Kashaya Pomo wives. From the evidence, the California Indian women were able to adjust remarkably to the needs of their maritime hunter husbands, but it is just as likely that they introduced a number of their own traditions into these households, especially since they were on home ground with family members nearby. In a number of cases, the California women chose not to stay with their Alaskan husbands when their periods of service with the Company were finished, and instead returned to their home villages (cf. Istomin 1992).

Since little or no effort was made to effect cultural change on the Native Alaskans (in strong contrast to the California Indians in the missions), they were more likely to pick and choose what items of material culture would fit in best with their own needs. Unlike the Creole population in Russian America who tried to emulate the dominant Russian overlords, the Native Alaskans generally were not so inclined. This is not to say that while they were in Alaska they were not subjected to

some level of proselytizing by the missionary Russian Orthodox priests and monks. It certainly happened, and many of the Native Alaskans had been at least nominally baptized into the Orthodox church. The Spanish priests recognized this when Natives Alaskans (called by them *Codiacas*) were either captured or fled to Spanish California. Many of them were baptized *sub conditione*, meaning that their Orthodox baptism was recognized, although the priest could not vouch for the level of knowledge of Christianity of the individual. In fact, many of the Alutiiq had received only the most rudimentary knowledge of their faith, hardly more than how to make the sign of the cross in the Orthodox manner (i.e., forehead, heart, right shoulder, left shoulder). When speaking of an Unangas who was believed to have been martyred by the Spanish Catholic priests in California, the governor of Alaska, Semyon I. Ianovsky, stated in a report dated February 15, 1820, "One must note that this victim though baptized like the others was not taught Christianity, probably did not even know the dogmas of faith except God the Father, Son and Holy Ghost" (Bearne 1978:177; Farris 1990). When Fr. Mariano Payeras, the one-time father-president of the missions in California, visited the Fort Ross cemetery in October 1822, he noted the presence of a number of Alutiiq graves there; their graves were said to be marked by simple crosses rather than the wooden boxes that marked the Russians (Payeras 1995:332). Two tangible items of faith found at NAVS included a part of a silver cross and a broken portion of a mold for casting crosses made of a soft stone (figure 6.1). They were identified by Dr. Oleg Bychkov (personal communication 1993) as being of an "old style" Baroque design which probably indicated that the wearers were of the lower class.

The social order at Fort Ross followed Russian custom with each person being ranked according to certain rules. A most important division of the population would have occurred between those who lived inside the Stockade (officers of the Company) and those who lived outside: lower-class Russians, Creoles, Native Alaskans, and Native Californians. A Russian scholar familiar with early 19th century life in Siberia has stated that the Stockade at Ross would have been most used to keep the lower-class populace at bay. He pointed out that it would have been customary to read out proclamations, particularly ones that might not have been well received, outside the Stockade gate rather than within to provide a place for the ruling group to retreat to in case of violence (Oleg Bychkov, personal communication 1993).

NAVS HISTORIC ARCHAEOLOGICAL MATERIAL

Linguist Robert Oswalt has shown that the Russian words learned by the Native Californians were transmitted to them via the Native Alaskans (1988). In other instances, the main interaction between the people of Fort Ross and the Native Californians was apparently at the

Figure 6.1 Russian Cross Fragment from the Native Alaskan Village Site

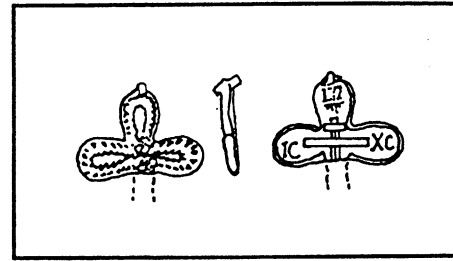


Illustration by Judith Ogden (actual size)

level of the common people (cf. Farris 1992). A particular example of the transmission of a word is the Kashaya word now meaning broken glass, *p'utitka*, which was derived from the Russian for glass bottle, (*bytilka*). Elsewhere, I have commented on the significance of this shift as an indicator of the importance of broken glass as a raw material simulating obsidian (cf. Oswalt 1971; Farris 1989:492). Such a situation also seems to have applied to ceramic vessels, wherein the broken sherds, rather than complete vessels, were the main and most important items being obtained by the Native Alaskans. This hypothesis is supported by the very small number of ceramic fragments found at NAVS, even in the trash dumps. Likewise, finding a number of pieces of broken ceramic that had been fashioned into artifacts both at NAVS and at the site of Mad-shui-Nui (a corruption of the Russian rendering of Med-eny-ny for the Kashaya name of Métini) (cf. Dmytryshyn and Crownhart-Vaughan 1989:296; Smith 1974; White 1977; Ballard 1995) reinforces the hypothesis that many refuse artifacts of certain material found their way to the native sites rather than ending up in a Russian trash pit. Although it is possible that a few whole items might have been obtained by non-Europeans, the majority were most likely to have come in a broken state. The many pieces that do not show intentional flaking or other modification are almost certainly part of the debitage in the reduction of the larger broken bits.

One type of trade artifact that was certainly utilized as it was intended was the glass and ceramic trade beads. Lester Ross (chapter 8) has provided an excellent description and discussion of not only the beads themselves, but probable sources and the unusual color makeup of the collection. This latter quality led him to suggest that the color preferences of NAVS residents may match preferences of Western Pomo and/or Coast Miwok rather than Alutiiq, Unangas or Tanaina hunters. In such a case, we must not forget the interaction of the local Californian women who formed a key part of the community at NAVS. In fact, when one thinks of the frequent journeys being made by the Native Alaskan men, one could state that the California women may have

been principal contributors to the archaeological materials at this site.

Considering the glass and ceramic artifacts in this light, we must not apply the normal analytic techniques of historic archaeology to them without a certain caution. If these objects are being used by the inhabitants of NAVS as raw materials, then the normal concerns about proportions of certain types of vessels, relative value of ceramics, contents of bottles, minimum number of vessels, and so forth are of little or no importance. These pieces represent redeposition of the scavenged refuse of the people leading a more European existence. Consider the analogy of the site of a shantytown at the edge of a large city. One might carefully collect a vast number of flattened tin cans and perhaps be able to analyze them in terms of tomato cans, condensed milk cans, soup cans, etc. and work up a proposed consumption pattern for the populace when in fact, one is looking at roofing and siding material from the point of view of the inhabitants of the shantytown. Whereas some of the cans may have been whole with their contents intact and subsequently flattened out for use, the vast majority of them represent re-use of the leavings of a neighboring dominant group.

TRADE GOODS BROUGHT OR MANUFACTURED BY THE RUSSIANS AT FORT ROSS

Thanks primarily to the journals of Kirill Khlebnikov, an important agent of the Russian-American Company, we have detailed lists of a number of goods that were brought to California on Company ships for trade. These provide a sense of some of the items that would have been available in the area (and which could show up in the archaeological record). The overwhelming majority of these goods, however, were targeted for trade with the residents of Spanish California and so would hardly be expected to end up in the living sites of Native Alaskan hunters. We must also consider that a large proportion of the goods are unlikely to survive such as cloth items which were a major part of each shipment. Khlebnikov (1990:70-74) provides a list of a remarkable selection of items along with their prices (see appendix 6.1).

Lester Ross (chapter 8) discusses the broader trade potential with the Hudson's Bay Company, headquartered in Vancouver. Although the Hudson's Bay Company only became the primary supplier to the Russian-American Company following the treaty of 1838 (Gibson 1990), there were numerous opportunities for exchange through trade ships visiting Monterey and to some extent through the annual overland beaver-hunting expeditions.

Coming closer to home is the list of items provided by the Company to an individual *promyshlennik* (Vasily Permitin) for himself, his wife, and his five children for the year 1832 (Gibson 1969:211). Eliminating items of food and clothing, leaves the following: tallow candles,

copper utensils, Circassian tobacco, and soap. Unfortunately, few of these materials, except the copper utensils, would survive in the archaeological record.

Domestic production must not be overlooked. Fort Ross had an active industrial base wherein a number of items were produced for local consumption, trade with Native Alaskans and Californians, trade with the Spanish, and export to other parts of Russian America. Enterprises such as shipbuilding required a variety of materials including copper tacks to attach copper sheeting to the ships (these show up in considerable numbers at NAVS). Other enterprises included a tannery, a brickworks, a blacksmith shop, an armorer, and a coppersmith. Many locally made items from these shops would be expected to show up at NAVS. In fact, it is remarkable that more copper items are not found.

Each of the "Counters" of the Russian-American Company had its own special mark. The one for Fort Ross was the infinity sign (∞) (Gibson 1976:back cover). As reported by Mills, (chapter 10), a similar symbol is incised on a ground slate artifact from the Farallon Islands. Although this mark was mainly used on lead bale seals for skins, it is conceivable that it could show up in other contexts. Former Ranger/Curator John McKenzie reported finding such a bale seal at Fort Ross, though it has unfortunately been misplaced. Other examples of lead bale seals have been found in excavations on the Kurile Islands (Shubin 1990:444).

CONCLUDING REMARKS

The Native Alaskan Village Site is best termed "proto-historic" considering the essentially non-literate population composed of Native Alaskans and Native Californians. Little direct information in the way of descriptions is available to us concerning this site, and it will be up to the archaeology to tell 99% of the story. We have just enough clues to give some structure and identification to the area and its former use, but little in the way of details. In many respects, this site is analogous to former village locations or living areas of Native Californians residing in the vicinity of missions (cf. Allen 1995; Deetz 1978; Farnsworth 1992; Farris 1991; Layton 1990; Smith 1974). This means that despite the frequent appearance of European and Chinese artifacts at the site, the approach to their study must be carefully tempered with an understanding of the means of their acquisition and their pattern of use which would have been very different in a purely historical setting. Perhaps the item of trade that was most thoroughly incorporated into Native American culture, due to its identical use as ornamentation, was the trade bead. Lester Ross's (chapter 8) excellent analysis of the glass and ceramic beads derived from the NAVS deposit points out certain unexpected aspects (lack of Chinese beads) and the unusual frequencies of certain colors.

Steve Silliman's fine study of the historical artifacts recovered from NAVS (chapter 7) provides the real meat of this analysis. It examines the range of what was present and what was not present in this rare site that, because of its exposed position, was not built over in subsequent years. NAVS is virtually uncontaminated with post-1841 occupation debris, a situation not shared by other contact period sites that have been studied in the Fort Ross area (cf. Riddell 1955; Smith 1974; White 1970, 1977). All in all, NAVS is a key source of comparative data to help sort out these other sites and to provide relevant information for other North Pacific studies of analogous locales.

REFERENCES

- Allen, Rebecca
1995 An Archaeological Study of Neophyte Cultural Adaptation and Modification at Mission Santa Cruz, California. Unpublished Ph.D. dissertation in American Civilization, University of Pennsylvania, Philadelphia.
- Ballard, Hannah S.
1995 Searching for Metini: Synthesis and Analysis of Unreported Archaeological Collections from Fort Ross State Historic Park, California. B.A. honors thesis in Anthropology, University of California Berkeley.
- Bearne, Colin (Transl.)
1978 *The Russian Orthodox Religious Mission in America, 1794-1837, with Materials Concerning the Life and Works of the Monk German, and Ethnographic Notes by the Hieromonk Gedeon*. Edited by Richard Pierce. *Materials for the Study of Alaska History, no. 11*. Limestone Press, Kingston, Ontario.
- Dakin, Susanna Bryant
1949 *The Lives of William Hartnell*. Stanford University Press, Stanford.
- Deetz, James J. F.
1978 Archaeological Investigations at La Purísima Mission. In *Historical Archaeology: A Guide to Substantive and Theoretical Contributions*, ed. by Robert L. Schuyler. Baywood Publishing Company, Inc., Farmingdale, NY.
- Dymytryshyn, Basil, E.A.P. Crownhart-Vaughan, and Thomas Vaughan
1989 *The Russian American Colonies: Three Centuries of Russian Eastward Expansion 1798-1867, Volume 3, A Documentary Record*. Oregon Historical Society Press, Portland.
- Farnsworth, Paul
1992 Missions, Indians, and Cultural Continuity. *Historical Archaeology* 26(1):22-36.
- Farris, Glenn J.
1989 The Russian Imprint on the Colonization of California. In *Columbian Consequences, vol. 1, Archaeological and Historical Perspectives on the Spanish Borderlands West*, chapter 30, edited by David Hurst Thomas. Smithsonian Institution Press.
- 1990 The Strange Tale of Saint Peter, the Aleut: A Russian Orthodox Martyr on the California Frontier. Paper given at "The Spanish Missions and California Indians" symposium, D-Q University, March 3, 1990.
- 1991 Archeological Testing in the Neophyte Family Housing Area at Mission San Juan Bautista, California. Ms. on file, Archeology Lab, DPR, West Sacramento.
- 1992 The Day of the Tall Strangers and other Events at Fort Ross in 1833. *The Californians* 9(6):13-19.
- 1993 Talacani, the Man Who Purchased Fort Ross. *Fort Ross Interpretive Association Newsletter* September/October 1993, unnumbered pages (7-9).
- Fedorova, Svetlana G.
1971 *Russkoe naselenie Aliaski i Kalifornii*. Moskva: Nauka.
1973 *The Russian Population in Alaska and California, Late 18th Century—1867*. Translated and edited by Richard A. Pierce and Alton S. Donnelly. Limestone Press, Kingston, Ontario.
1985 *Novokangelsk*. Moscow: Nauka.
- Gibson, James R.
1969 Russia in California, 1833: Report of Governor Wrangel. *Pacific Northwest Quarterly* 60:205-15.
1976 *Imperial Russia in Frontier America: The Changing Geography of Supply in Russian America, 1784-1867*. Oxford University Press, New York.
1990 The "Russian Contract": the Agreement of 1838 between the Hudson's Bay Company and Russian-American Companies. In *Russia in North America: Proceedings of the 2nd International Conference on Russian America*, pp. 157-80, edited by Richard A. Pierce. Limestone Press, Kingston, Ontario.
- Istomin, Alexei A.
1992 *The Indians at the Ross Settlement: According to the Censuses by Kuskov, 1820-1821*. Fort Ross Interpretive Association, Fort Ross, CA.
- Khlebnikov, Kirill T.
1976 *Colonial Russian America: Kyrill T. Khlebnikov's Reports, 1817-1832*. Translated and with introduction and notes by Basil Dymytryshyn and E. A. P. Crownhart-Vaughan. Oregon Historical Society, Portland.
1990 *The Khlebnikov Archive: Unpublished Journal (1800-1837) and Travel Notes (1820, 1822, and 1824)*. Edited with introduction and notes by Leonid Shur; translated by John Bisk. University of Alaska Press.
- LaPlace, Cyrille
1854 *Campagne de Circumnavigation de la Frégate*

L'Artémise pendant les années 1837, 1838, 1839, et 1840 sous le commandement de M. LaPlace, capitaine de vaisseau, vol. 6. Arthur Bertrand, Paris.

Layton, Thomas N.

1990 Western Pomo Prehistory: Excavations at Albion Head, Nightbird's Retreat, and Three Chop Village, Mendocino County, California. *Institute of Archaeology, Monograph 32*, University of California, Los Angeles.

Ogden, Adele

1941 *The California Sea Otter Trade: 1784-1848*. University of California Press, Berkeley.

Oswalt Robert L.

1971 The Case of the Broken Bottle. *International Journal of American Linguistics* 37(1):48-49.

1988 History Through the Words Brought to California by the Fort Ross Colony. *News from Native California* 2(3):20-2.

Owens, Kenneth N.

1990 Timofei Tarakanov: Frontiersman for the Tsar. In *Russia in North America: Proceedings of the 2nd International Conference on Russian America, Sitka, Alaska*, August 19-22, 1987, ed. by Richard A. Pierce, pp. 136-43. Limestone Press, Fairbanks, AK.

Owens, Kenneth N., and Alton S. Donnelly

1985 *The Wreck of the Sv. Nikolai*. Western Imprints, The Press of the Oregon Historical Society, Portland.

Payeras, Fr. Mariano

1995 *The Writings of Mariano Payeras*. Edited and translated by Donald C. Cutter. Bellerophon Books, Santa Barbara, CA.

Riddell, Francis A.

1955 Archaeological Excavations on the Farallon Islands, California. *Papers on California Archaeology*, 34, *Reports of the University of California Archaeological Survey*, no. 32. Berkeley.

Shubin, Valery O.

1990 Russian Settlements in the Kurile Islands in the 18th and 19th Centuries. In *Russia in North America: Proceedings of the 2nd International Conference on Russian America*, pp. 425-50, edited by Richard A. Pierce. Limestone Press, Kingston, Ontario.

Smith, Janice Christina

1974 Pomo and Promyshlenniki: Time and Trade Goods at Fort Ross. Unpublished M.A. thesis in Archaeology, University of California, Los Angeles.

White, John R.

1970 Historic Contact Sites as Laboratories for the Study of Culture Change—Fort Ross. Paper presented at the annual meetings of the Society for Historical Archaeology, Bethlehem, Pennsylvania, January 10, 1970.

1977 Aboriginal Artifacts on Non-Traditional Material: Six Specimens from Fort Ross, California. *Northwest Anthropological Research Notes* 11(2):240-47.

APPENDIX 6.1: *LISTS OF TRADE GOODS BROUGHT ON THE BULDAKOV, 1820 (KHLEBNIKOV 1990:70-4).*

GLASSWARE

First quality glasses
 Second quality glasses
 Half-a-dozen glasses in cases
 First quality wine glasses
 Second quality wine glasses
 Plates (dozen)
 Plates with cups
 First quality salt shakers (dozen)
 Second quality salt shakers (dozen)
 Third quality salt shakers (dozen)
 First quality mugs (each)
 Second quality mugs (each)
 Third quality mugs (each)
 Pepper shakers (dozen)
 First quality sugar bowls (dozen)
 Second quality sugar bowls (dozen)
 Third quality sugar bowls (dozen)
 First quality butter dish (dozen)
 Second quality butter dish (dozen)
 First quality carafe (dozen)
 Second quality carafe (dozen)
 Goblets (dozen)
 Green bottles (dozen)

VARIOUS GOODS

White wax (arroba [25 lbs])
 Wax candles (arroba)
 Copper vessels (funt [.9 lb.])
 Coffee (funt)
 Olive oil (bottle)
 Sharpening stone (dozen)
 Nutmeg (funt)
 Millet (arroba)
 Granulated sugar
 Lump sugar
 Fine paper
 Virginia tobacco (arroba)
 Russian tobacco (arroba)
 First quality pencils (dozen)
 Second quality pencils (dozen)
 Gloves (pair)
 Down hat (each)

COPPER AND IRON PRODUCTS

Iron shovel (each)
 Steel (arroba)

Bar-iron (quintal [101.2 lbs])
 Copper bell (quintal)
 Sickle (each)
 Simple knife (each)
 Koporulia (each) [plow share cleaner]
 Plowshare (each)
 Saw (each)
 Crosscut saw (each)
 Copper door locks (each)
 Second quality locks
 First quality iron door locks
 Second quality iron door locks
 Padlocks with springs (each)
 First quality simple locks
 Second quality simple locks
 Third quality simple locks
 First quality door-hinges
 Second quality door-hinges
 Third quality door-hinges
 Iron wire (funt)
 Fine copper wire
 Medium copper wire
 Wire brushes (pair)
 Clothes brush (each)
 Corkscrew (each)
 Corks (100)
 Large copper taps (each)
 Small copper taps (each)
 Steel for striking fire from flint
 First quality files (dozen)
 Second quality files (dozen)
 Gimlet (dozen)
 First quality razors (dozen)
 Second quality razors (dozen)
 Third quality razors (dozen)
 Fourth quality razors (dozen)
 First quality scissors (dozen)
 Second quality scissors (dozen)
 Third quality scissors (dozen)
 Sheep shears (pair)
 First quality table knife (dozen)
 First quality dessert knives (dozen)
 First quality simple knives (dozen)
 First quality simple dessert knives
 Bronze candlesticks (pair)
 Tall gilt candlesticks

Medium-sized gilt candlesticks
 Short gilt candlesticks
 Needles (1000)

CARPENTRY TOOLS

Rasp (each)
 Double metal plates (each)
 Single metal plates
 Cornices with shoes
 Iron cornices
 Saws with iron spines
 Large frame saws
 Small frame saws
 Medium-sized one-man saws
 Small one-man saws
 Metal saws with mounting
 Metal saws without mounting
 Chisels (each)
 Large axes
 Medium-sized axes
 Small axes
 Barrel-making tools and screws
 Large adzes
 Small and round adzes

SILK, COTTON AND LINEN ARTICLES

(Left out because of unlikely archaeological preservation)

HABERDASHERY

(Selected items likely to survive)
 First quality watch chain
 Second quality watch chain
 Stamp, carried on watch chain (dozen)
 Keys, carried on watch chain (dozen)
 Buttons for uniform (dozen)
 Small buttons
 Package of pins
 First quality earrings (dozen)
 Second quality earrings (dozen)
 Copper thimbles (dozen)
 First quality copper rings (dozen)
 Second quality copper rings (dozen)
 Combs (dozen)

7

European Origins and Native Destinations: Historical Artifacts from the Native Alaskan Village and Fort Ross Beach Sites

STEPHEN W. SILLIMAN

THE HISTORICAL ARTIFACTS¹ recovered from the excavation of the Fort Ross Beach Site (FRBS) and the Native Alaskan Village Site (NAVS) provide the potential to address a multitude of questions concerning Native Alaskan and Native Californian lives during the Russian occupation of Colony Ross. These artifacts—ceramics, glass, beads, and metal—supply the information needed to trace intrasite distributions of material available to native people only through direct or indirect contact with Russians or other Europeans. The relations of these artifacts to ones recovered from other areas of the Fort Ross locale can be probed. Thus, historical artifacts not only allow a glimpse of Native Alaskan and probable Native Californian life outside of the Fort Ross Stockade, but also a depiction of their lives in comparison with Russian and Creole occupants of the Stockade and Russian Village. Since the historical materials date by their nature to post-contact situations, the assemblage allows an analysis of native life after European contact with minimal presence of pre-contact material culture. In this chapter the only exceptions covered are shell beads.

Lithic or faunal materials associated with the historical artifacts are more difficult to place in the pre-versus post-contact continuum, though their association and presence can provide invaluable information (see Schiff, chapter 9; Wake, chapters 11, 12). In many ways, the isolation of “historical artifacts” from other aspects of native material culture is arbitrary, but a number of factors make the division acceptable. These include the temporal resolution offered by historical artifacts, the novelty of the items to at least Native Californians who traditionally dealt only with goods that were not industrially mass-produced, and the synthesis of all materials provided by Lightfoot and others at the end of the volume.

The presentation of historical materials from the 1988-92 excavations in this chapter takes place in three sections: description and methodology, quantities and distribution, and interpretation. The first section contains descriptions of artifacts by the categories of historical ceramics, glass, worked glass, glass beads, shell beads, and metal. Distinctions made within these categories are outlined as they pertain to later discussion of distribution and interpretation. Next, the amount and distribution of the materials are discussed and presented for both NAVS and FRBS based on area, unit, and stratigraphic layer. This section is necessarily dense and replete with quantification. Finally, interpretations of the materials and context are provided, allowing the relations existing in and among the “historical” materials to be examined as a step toward more synthetic interpretations.

DESCRIPTION AND METHODOLOGY

CERAMICS

The historical ceramics recovered from the Fort Ross Archaeological Project excavations are categorized into a hierarchical framework of class, group, and type.

Class. The ceramics are divided into general classes based on body, or paste, characteristics. Classes are arranged in order of increasing vitrification and include earthenware, stoneware, and porcelain. The distinction between the three was based on differences in the ceramic body resulting from chemical composition and condition of firing, especially temperature. The earthenware class is ubiquitously refined earthenware. Recognition of earthenware is facilitated by crazing in the glaze from water absorption by the ceramic body, relative softness of paste, and tendency to absorb moisture (Deetz 1977; M. Praetzelis 1980). A small number of sherds appear to be more vitrified, thus less porous, than the

average refined earthenware, but for purposes here they are considered refined earthenware and often include ironstone. In this chapter, ironstone, though a refined earthenware, is considered in a separate category from general earthenware for tabulation purposes. As a highly refined earthenware, ironstone occurs in very small numbers in the collection. These sherds are, however, the later forms of ironstone (ca. 1850s) rather than the forms first manufactured in the 1810s and 1820s. Stoneware is classified based on its higher vitrification, higher density, and non-porous paste as compared to earthenware. Porcelain, the most vitrified of all ceramic classes, is easily recognizable by its hardness and density (A. Praetzelis 1981). In addition, the shiny, granular appearance of the body in cross section makes assignment of fragments to the category relatively straightforward. Although there is debate on the distinction between Chinese porcelains and some highly vitrified stonewares with suggestions to refer to them all as "porcelaineous stoneware" (see A. Praetzelis 1981:9), I have chosen not to use the term to refer to this more inclusive group.²

Group. The sequential division of class into groups is made on the basis of color of the ceramic body, color of the glaze, or both (O'Connor 1984; M. Praetzelis 1980). In the case of porcelain, subdivision is into white and non-white. White is considered European, American, or less likely Russian manufactured, and non-white is associated with Chinese export³ (Barclay & Olivares n.d.:15; cf. M. Praetzelis 1980). In these assemblages, stoneware is either salt-glazed grey with a brown or clear glaze, or a red-bodied ware with mottled black glaze. Jackfield is present as well and is assigned based on its black body and surface, shiny glaze, and incised and sprigged decorative style from machine-turning (Godden 1965:xiv; Noel Hume 1970:123-24).

Though the traditional classification of earthenware during the early to mid-1800s established on ware types has been criticized (Majewski & O'Brien 1987), I subdivide sherds into ware groups of white, pearl, cream, and yellow. I do not venture into the suggestion of using nonvitreous, semi-vitreous, and vitreous white-bodied wares, which are grounded in the technological development of material production in the ceramic industry (see Majewski & O'Brien 1987), but such an approach appears to warrant attention in future studies. For purposes here, such refinement is unnecessary.

Creamware refers predominantly to a generally undecorated cream-colored refined earthenware (Miller 1991), but it is not the classic "CC Ware" (Majewski & O'Brien 1987:117). Though a distinction exists historically and physically between whitewares and pearlwares (Noel Hume 1970; Majewski & O'Brien 1987; Miller 1980, 1991; Sussman 1977), I find it particularly difficult to identify in the assemblage under analysis (see O'Connor 1984:35). This is attributable to the physical as well as temporal continuum involving the change from

the classic bluish glaze of pearlware (1780-1830) to whiteware with reduced cobalt as a result of growing popularity of white porcelains (ca. 1820) to the return of a whiteware with a bluish tinge (ca. 1840) (Miller 1980, 1991; Towner 1957). The problem is especially acute since pearlwares became indistinguishable from whitewares after the cobalt blue was removed from the glaze (Sussman 1977:111). Placement of whiteware under short-wave ultraviolet light, however, greatly assists in its identification since it reflects a dull to bright white rather than the grey of pearlware or mustard yellow of creamware (Laurie Wilkie, personal communication 1995). As such, I used this technique to make the identifications. Noel Hume (1970) claims that the predominance of whiteware around 1820 serves a rough chronological marker, but its applicability is restricted in cases of high vessel fragmentation as found in the assemblage under analysis. The best chronological marker for this category is the introduction of different transferprint colors (Majewski & O'Brien 1987:119; Miller 1991).

Discussion in this chapter often relates to refined earthenware as an analytical category including all whiteware, pearlware, and creamware; yellowware, though a refined earthenware, is excluded. Yellowware is easily recognizable by the buff-colored paste which gives the ceramic a mustard color beneath a transparent glaze, and it dates from approximately 1830 to the beginning to mid-20th Century (Hughes & Hughes 1968:113; Noel Hume 1970:131; M. Praetzelis 1980:7-8). In addition, delftware is identified in the collection based on the reddish tan paste, bluish tin glaze, ease of glaze chipping, and soft body. Its manufacturing date falls somewhere between 1600 and 1802 (Noel Hume 1971:105-111)

Type. Finally, groups are further subdivided into types based on the method and kind of decoration. Unfortunately, undecorated forms are difficult to monitor because they may represent the undecorated sections of decorated ceramic vessels, but no other choice is available. For non-white porcelain, types include overglaze polychrome enameled, underglaze blue painted, and undecorated. In order to expedite analysis, underglaze blue painted is referred to generically as "Chinese Porcelain"⁴ without further refinement to differentiate Canton, Nanking, and Fitzhugh motifs (see Noel Hume 1970:262-63; O'Connor 1984). This is done because the designs are not significant temporally, since all three occur from approximately 1800-30, nor behaviorally, since the highly fragmented nature of the ceramic assemblage makes assignment difficult. White porcelain includes undecorated and overglaze enameled forms.

Refined earthenware receives type designation based on categories of edge decoration, handpainted blue, flow blue, handpainted polychrome, transferprint, annular, mocha, and undecorated. Edge decoration is subdivided into colors of blue and green and into distinctions of

textured (shell-edged) or non-textured. Handpainted blue typically consists of floral patterns, while flow blue has the classic appearance of transferprint blue ink having diffused into a blurred effect. Handpainted polychromes entail primarily earthen tones of brownish green, tan, earthen orange, and yellow, all of which are characteristic of early 1800s earthenware (Lofstrom et al. 1982:6). A few possess blue in the polychrome suite, and bright orange and red hues, which complete the pattern often referred to as "Gaudy Dutch" and which date from 1810 to 1830 (see Boger 1971:126).

Transferprint ceramics, formed by the application of engraved designs by way of a paper transfer, are classified by the colors of blue, black, purple, red, and brown. Significant dates for transferprint colors and flow blue are as follows: transferprint blue peaked in the 1820s (Miller 1991:9); transferprint black, red, brown, and purple were produced from 1829 to the late 1840s, predominantly on whitewares (Godden 1963:115; Lofstrom et al. 1982:9; Majewski & O'Brien 1987:119; Shaw 1968 cited in Miller 1991); and flow blue made its appearance in the 1840s (Miller 1974:201, 1991:9; Price 1979:22). Annular forms are characterized by concentric bands of colored slip and occur frequently on yellowware, which is often considered to be a simple kitchen or household ware and tends to postdate 1840 when displaying horizontal bands of white, brown, or blue slip (see p. 137). Mocha, one of the most common forms of annular ware, is identified by the dendritic brown pattern produced by "a secret mixture . . . said to consist of tobacco juice, turpentine, manganese, and urine" (Lewis 1969:165); the design is usually bounded by colored bands. It is characterized in the literature as an inexpensive, utilitarian ware (Godden 1974:222; Noel Hume 1970:131).

The stoneware has no decorative styles to speak of save the sprigged and incised designs found on Jackfield wares. Interior grooves and other features on some stoneware sherds assisted vessel identification, but no decorations are present. The other stonewares are European grey-bodied or brown salt-glazed grey-bodied mineral water/ale bottles and an unidentifiable red-bodied stoneware. Neither of the grey stonewares appear to be fragments of Chinese overseas wares noted from the Stockade by O'Connor (1984:29). In fact, the brown glazed form is probably an English salt-glazed stoneware bottle because of the mottled surface and presence of spiral scarring left by a jiggering tool on the interior surface (see A. Praetzellis 1981:8). Both were manufactured from the 1820s throughout the 19th century (Noel Hume 1970:78-79). The unidentified stoneware possesses a red paste with a coarse temper, a fairly thick mottled black and tan glaze, and ribbed features on the probable exterior of the vessel. It may represent an unknown Spanish ceramic form traded into the Ross area from the missions, or it may derive from an unrecognized

Russian manufacturing center.

Pipe stems and bowl fragments, manufactured from mold-pressed kaolin clay, are given a separate category and are discussed in the ceramic section. In addition, the presence of intentionally modified ceramic sherds warrants future discussion. They are initially separated according to their characteristic material condition of paste, color, and decoration for tabulations. I deal with them fully in later sections of the chapter.

Vessel forms were determined through a series of analytical steps. First, only pieces diagnostic of a vessel type are included in the sample; these include fragments of rims, footrings, or textured features and handles. No pieces are included without these features even if the sherd might be placed in a general category of vessel based on wall size or general shape. This method provides an accurate classification of vessel forms by relying on specific feature recognition and not on approximations based simply on wall thickness. In addition, the sampling procedure is not expected to bias the sample from the overall population because there is no reason to posit, for example, more rims from teacups than from bowls being present due to breakage patterns or post-depositional disturbance. Second, rim and footing sherds were compared to the relatively contemporaneous Cooper-Molera archaeological collection at the State Parks Archaeology Laboratory in Sacramento, California (see Felton & Schultz 1983), to visually reconstruct aperture or base diameters, respectively, and to associate shape, thickness, and diameter with vessel form. Third, handles and textured features were compared to the above-noted collection in order to isolate vessel type for the sherd. Fourth, double-sided decoration was used to verify assignment to a hollowware category.

Finally, as discussed below, the only crossmending and refit successes are between three pairs of sherds from FRBS and three pairs and one triad from NAVS. Though no other crossmends were discovered, undoubtedly due to high fragmentation of the assemblage, further analysis might allow an estimated Minimum Number of Vessels based on slight color variations, different decorative forms, surface scars, etc. This procedure is not included here, however.

GLASS

In this analysis, glass is separated into three groups: window glass, vessel glass, and lamp/globe glass. High fragmentation prevents unequivocal assignment of glass potentially derived from lamp chimney globes, but where pieces are extremely thin with substantial curvature, I feel reasonably confident in assigning them to the category. It should be noted here that totals reflect the addition of worked glass for absolute counts and densities since the same is done for worked ceramics. My distinction serves to isolate the architectural from the non-architectural glass, a difference allowing an investigation into the

potential locations of past structures at NAVS. Vessel glass is further divided by colors of green (both “black” or dark green and light green), brown, colorless, blue, red, purple, and other.

As a note on methodology, vessel and architectural glass pieces are analyzed only as absolute numbers and densities even though simple counts cannot adequately account for varying stages of fragmentation. In other words, more smaller pieces may be equivalent to fewer pieces of larger size. I considered weighing the pieces to accommodate variable breakage, but the highly fragmented nature of the overall assemblage (except for a very small number of large specimens) obviates the need for such refinement. Nonetheless, window glass is often more fragmented than vessel glass, and the comparison between the two glass categories should be undertaken with caution. Some intergroup comparison is done in this chapter, and later corrections for weight might reveal variations in the patterns suggested here.

As with the ceramics, some glass vessels are identifiable, but there is no sampling of the assemblage as with the ceramics. Glass vessels are identified based on diagnostic characteristics such as necks and bases when possible. However, the fragmented nature of the assemblage makes this almost impossible, additionally precluding the use of the standard Minimum Number of Vessels.

Window glass is not extensively considered in this report since Allison Cohen (1992) expanded on it in detail in her senior honors thesis at the University of California at Berkeley. Her results are incorporated in the description and interpretation as necessary, but readers are referred to it for a detailed description of the majority of flat glass recovered from FRBS and NAVS prior to the 1992 excavations. In her thesis, she discusses aspects of the excavated window glass, including color (colorless, light blue, light green, light blue-green, and yellow), surface textures, and imperfections, especially those related to the process of crizzling which appears as linear cracks with often characteristic branching patterns (Cohen 1992:28-29). She aptly demonstrates the potential of window glass for chronology, sourcing, and evaluation of subsurface archaeological chemical context by virtue of chemical deterioration.

WORKED GLASS

Worked glass is designated in the same manner as non-worked glass in terms of material (i.e., vessel or window glass), and it is included in the glass category for summation. It receives separate treatment as a category for re-counting and analyzing, however. I consider only the glass artifacts possessing relatively unambiguous features of intentional modification in this category. Though more of the artifacts included in the “Glass” category may actually be modified, the difficulty of differentiating those features from pre- and post-depositional factors keeps counts conservative in the “Worked

Glass” category. A modest number from the glass database (as catalogued in appendices 7.1 & 7.2) are classified and interpreted here as modified. Description of the worked glass follows the manner in which lithic tools and debitage are characterized (see Schiff, chapter 9). For example, I use descriptive categories such as flake, interior flake, cortical flake, core, shatter, projectile point, unifacially and bifacially worked, and edge-modified. Determination of cortical flakes on bottle glass is difficult, however, since the exterior of the fragments from which flakes were detached may not show any “cortex,” manifest on vessel glass as patination. As such, very few cortical flakes (those possessing flake scars through patina) are noted in the collection even though they may actually represent the same stage of reduction on non-weathered glass.

SHELL AND BONE BEADS

Lester Ross fully describes and analyzes the glass trade beads and the single ceramic bead recovered from NAVS and FRBS in chapter 8. Other beads are divided into the two categories of shell and bone beads. The latter is represented by only three specimens, and the former consists of clamshell disk beads, spire-lopped *Olivella*, and miscellaneous forms. These materials are the only equivocal “historical” ones recovered in the excavations, but their occasional association with historical materials in sealed contexts, such as the bone beds described in other sections of this volume, suggests that at least some are not intrusive from an earlier time in coastal California prehistory. Measurements of maximum diameter and maximum height of the clamshell disk beads are provided to monitor size variability.

METAL

Metal artifacts recovered from the NAVS/FRBS excavations run the range from well-defined items to unidentifiable masses of melted or heavily oxidized iron or slag. Therefore, description of materials focuses exclusively on identifiable forms, which include items such as nails, thimbles, lead shot, copper and iron wire, brass buttons, copper and lead foil, ranch wire, spikes, and hooks. Nails and spikes are differentiated by size, and both are separated by composition as either iron or brass. Though “brass” is used to refer to the material of some nails, actual composition may be of varying copper alloys. Throughout the quantification in this chapter, the category of nail refers to not only whole or almost complete nails, but also to stock, tip, and head fragments. Unless portions are determined likely to refit with nearby pieces, this procedure serves as a kind of Number of Individual Specimens Present. No attempt is made to refine the categorization to include “tacks,” though one iron artifact is referred to as a tack because of its large head relative to small stock body. In appendices 7.5 and 7.6, additional analyses on nail forms (i.e., head or stock

shape; some measurements) are provided, but in this chapter, I do not extensively use those characteristics.

Although the introduction of cut nails into a wrought nail world may be temporally significant (Nelson 1968), no attempt is made to quantify these differences given the highly corroded and broken state of the metal materials in the NAVS/FRBS collection. When such a distinction could be made, however, it was noted in the appendices. In a general sense, most of the iron nails appear to be wrought, many brass ones are cast nails, and no modern "wire-cut" nails are present. Although many heads and tips are missing from the oxidizing nail fragments, the tendency for the nails to be disintegrating by longitudinal sheets hints that their manufacturing type is probably wrought. In contrast to most cut or cast nails, wrought nails have iron fibers trending along the long axis of the nail (Nelson 1968).

QUANTITIES AND DISTRIBUTIONS

Quantities and distributions of materials found at NAVS and FRBS are described in this section. Description proceeds by excavation area, by unit within areas of multiple units, and by stratigraphic layer. Densities are provided in artifacts per cubic meter, even though this artificially inflates the number of recovered items since stratigraphic layers were often less than 1 m³. Density figures are calculated by taking the total number of artifacts collected per unit, trench, or stratum and dividing this number by the total volume of sediment in the entity considered. It should be noted here as well that the densities for pit fill deposits may be problematic since these features are not always contained in all units of a trench nor in superposition to other "natural" layers such as dark sandy loam. Density estimates are designed only to standardize artifact numbers by excavated sediment volume and are *not* meant to predict the number of artifacts expected from a full one cubic meter excavation. Also, extensive bioturbation, primarily by gophers, across the site may have rendered vertical stratigraphy uncertain. Therefore, though I include divisions based on stratigraphic layers, discussion often refers to the units or trenches as a whole. More detailed information on all artifacts is located in appendices 7.1-7.6

NAVS is divided into the South Central Test Unit

(110S, 11W), the three-unit West Central Trench (75S, 16W; 75S, 18W; 75S, 20W), the five-unit East Central Trench (75S, 0-4E), and the South Trench (125S, 18-24W) with 7 contiguous units. Two 3 x 0.5 m extension trenches placed perpendicularly to the East Central and South trenches are analyzed as well, and these include the three 1 x 0.5 m units of the East Central Extension Trench (74S, 3E; 73S, 3E; 72S, 3E) and the three 1 x 0.5 m units of the South Extension Trench (124S, 24W; 123S, 24W; 122S, 24W) excavated in 1992. These extension trenches are not considered in density estimates for the East Central or South trenches as a whole, but their assemblages are represented in total counts and percentages for analysis of the two main trenches. Care must be exercised, though, because the extension trenches did not have one-quarter of the materials screened through the 1/16" control screen as in the main trenches. Two features referred to as bone beds are also located within the East Central Trench (East Central Bone Bed) and South Trench (South Bone Bed), and they are discussed as important depositional units.

FRBS is divided into five sections: East Bench (0N, 12W), East Profile (P1-9), Middle Profile (P11-18), West Profile (P20-30), and Southwest Bench (Units 7S, 17-19W; 8S, 17-19W). No densities are calculated for these units given the highly variable sediment densities in the scarp profile units and the different screen sizes used.

CERAMICS AT NAVS

SOUTH CENTRAL TEST UNIT

For this unit, 101 ceramic sherds were excavated with a total density for the unit of 202 sherds/m³. More specifically, density of ceramics in the dark sandy loam was 375/m³, which is more than twice the density of 170/m³ recovered in the overlying topsoil (table 7.1). In addition, refined earthenware predominates in the assemblage with percentages of 70-87% (not considering the one from the clay layer), while porcelains and other ceramics occur with frequencies of 11-25% and 3-6%, respectively (table 7.1). Ceramic types for refined earthenware are primarily, in descending order, undecorated, handpainted blue, transferprint blue, flow blue, and handpainted polychrome forms (figure 7.1)⁵. The undecorated condition occurs predominantly on

Table 7.1 *South Central Test Unit - Ceramics*

Stratigraphic Layer	# of Sherds	Density of Artifacts	% RE ^a	% POR ^b	% Other
Topsoil	17	170/m ³	70.6	23.5	5.9
Dark Sandy Loam	75	375/m ³	86.7	10.7	2.7
Rock Rubble	8	80/m ³	75.0	25.0	0.0
Clay	1	10/m ³	100.0	0.0	0.0
Total	101	202/m ³	83.2	3.0	3.0

^a RE = Refined Earthenware, relative percentage

^b POR = Porcelain, relative percentage

creamware and whiteware while most handpainted blues and polychromes are found on pearlware. Underglaze transferprint brown and flow blue indicate whiteware. A single specimen each of Jackfield ware and yellowware were recovered from the dark sandy loam making up 2.7% of the layer's total sherd count. In reference to porcelain, sample size is too small ($n=15$) to unequivocally show a significant pattern, but it appears that most (80%) are non-white with the underglaze Chinese blue design (53% of non-white). In the dark sandy loam, three refitting transferprint blue pearlware sherds were recovered.

WEST CENTRAL TRENCH

Located in the central portion of NAVS, the West Central Trench provides a total of 94 sherds from the three 1 m x 1 m units with all but 1 ceramic deriving from the dark sandy loam layer (table 7.2). Ceramic density for the trench as a whole is 85 sherds/m³ with unit values ranging from 73 to 93 sherds/m³ (table 7.2). Considering dark sandy loam alone as the zone from which all but one sherd derived, the ceramic artifact density for the three differs from that obtained in the test unit in that all three units have a density of 93-113/m³, with a total trench density of 102/m³ (table 7.2). Density values reflect an apparently non-differentiated subsurface distribution of historical ceramics in terms of absolute numbers and relative densities. These figures are, however, approximately one-third the density of that derived from the same stratum of the South Central Test Unit.

Nonetheless, relative frequencies of refined earthenware, porcelains, and other ceramics reproduce the pattern unearthed in the Test Unit; refined earthenware has a total frequency across the three units of 81.5%, porcelains have 16.3%, and the "other" category rests at 2.2% (table 7.2). The last category includes both a Jackfield ware and a pipe fragment. In addition, though the range of ceramic decorative types ($n=6$) is less than that in the South Central Test Unit ($n=8$), the distribution of types show a similar pattern to the Test Unit (figure 7.2). That is, undecorated forms are the most numerous followed by handpainted blue, transferprint blue, and handpainted polychrome. Porcelains ($n=15$) are primarily (73.3%) non-white with 81.8% (9/11) of those as underglaze Chinese blue.

EAST CENTRAL TRENCH AND EXTENSION TRENCH

Two hundred and twenty-eight sherds were excavated from the five units of the East Central Trench and three units of the Extension Trench. They are distributed vertically with 22 (9.6%) sherds in the topsoil, 161 (70.1%) in the dark sandy loam, 36 (15.8%) in the pit fill, and 10 (4.4%) in the silty loam. Density for the main five-unit trench (75S, 0-4E) is 49 ceramics/m³ throughout the entire vertical section, and individual densities per

unit range from 37 to 62 sherds/m³ (table 7.3)⁶. It should be noted here that this is one of the only areas of NAVS to have refit successes—one pair of refined earthenware in the dark sandy loam of both 75S, 0E and 72S, 3E.

In the topsoil of the main five-unit trench, artifact density hovers around 55 per cubic meter (table 7.4). In the dark sandy loam, artifact density for the main trench fluctuates from 53 to 110 sherds/m³ with a total trench/stratum density of 80/m³ (table 7.5); in the pit fill of the main trench, sherd densities remain at or below 60/m³ (table 7.6). No densities are calculated for the silty loam layer because of the small sample size. However, nine of the ten ceramics are refined earthenware, and the tenth piece is a non-white porcelain.

Ceramic density in the topsoil of the East Central Trench is considerably lower than that of the topsoil in the South Central Test Unit, and the dark sandy loam density in the East Central Trench is significantly lower than the same layer's density at the Test Unit and only slightly lower than the West Central Trench, especially in unit 75S, 1E. Given the substantial sample in the dark sandy loam, there appears to be a difference in ceramics per volume of sediment in the units, especially between 75S, 3E and 75S, 1E. Though samples are small in the topsoil and pit fill layer, ceramics seem to be roughly uniform in density across the units.

In terms of relative proportions of refined earthenware, porcelain, and other ceramics, the topsoil of the East Central Trench and the Extension Trench has unit frequencies of refined earthenware ranging from 67-80% (trench total, 68.1%), with associated porcelains being 17-29% (trench total, 22.7%) of the entire assemblage (table 7.4). The large sample size of the dark sandy loam in the East Central Trench and the extension trench seems to have a more varied pattern as refined earthenware fluctuates from 57-85% with a trench total of 74.9%, while porcelain maintains percentages of 10-43%, having a trench total of 21.99% (table 7.5). The "Other" category holds 3% and contains three yellowware sherds, the one and only delftware sherd, the only evidence of the red-bodied stoneware, and several pipestem and bowl fragments. As for the pit fill, refined earthenware and porcelain both range from 0-100%, but the small sample makes comparison problematic (table 7.6).

The range of decorative types varies across the units of the East Central Trench and Extension Trench, but predominant forms are handpainted blue, transferprint blue, and undecorated (figure 7.3). In addition, types vary vertically in the East Central Trench. The topsoil in this trench possesses only handpainted blue and undecorated forms for refined earthenware; the former occurs only on identified pearlware while the latter appears on creamware, whiteware, and pearlware. Of the five porcelain pieces, only one is white porcelain with overglaze enameling; the rest are undecorated and underglaze Chinese porcelain. In the dark sandy loam of

Figure 7.1 *Counts of Refined Earthenware Types per Stratigraphic Layer for the South Central Test Unit*

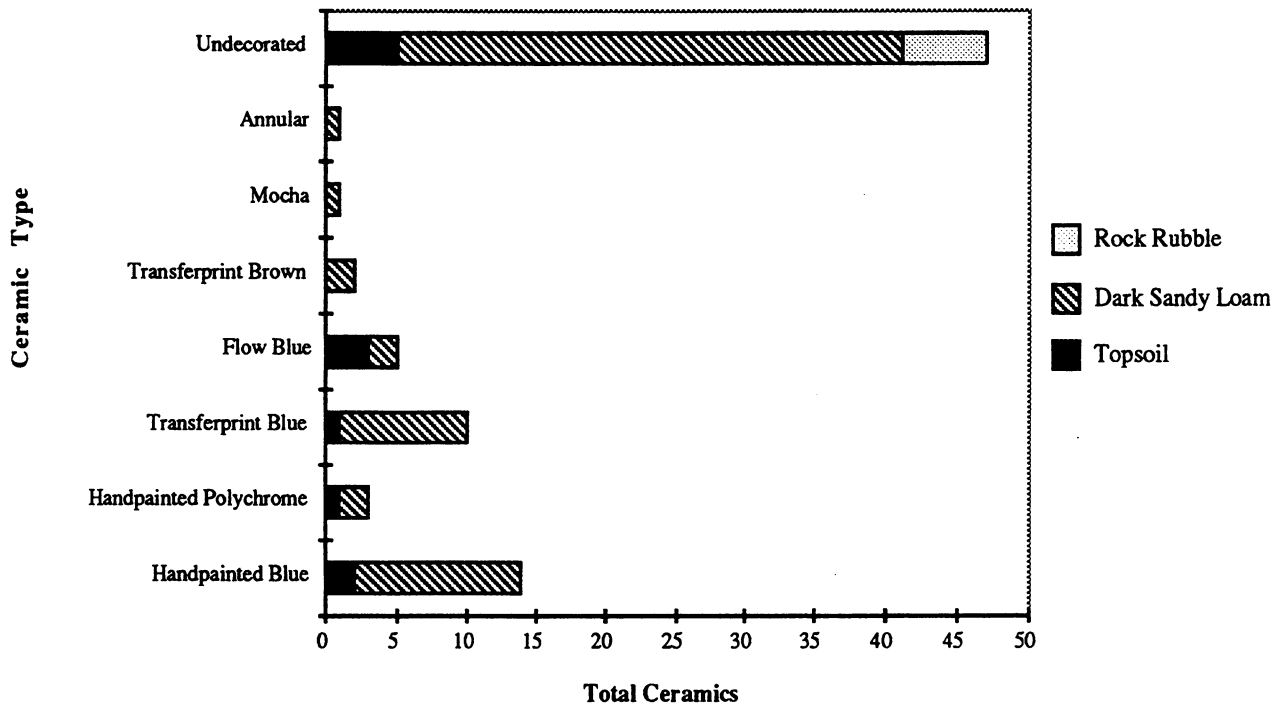


Figure 7.2 *Counts of Refined Earthenware Types per Unit in the West Central Trench*

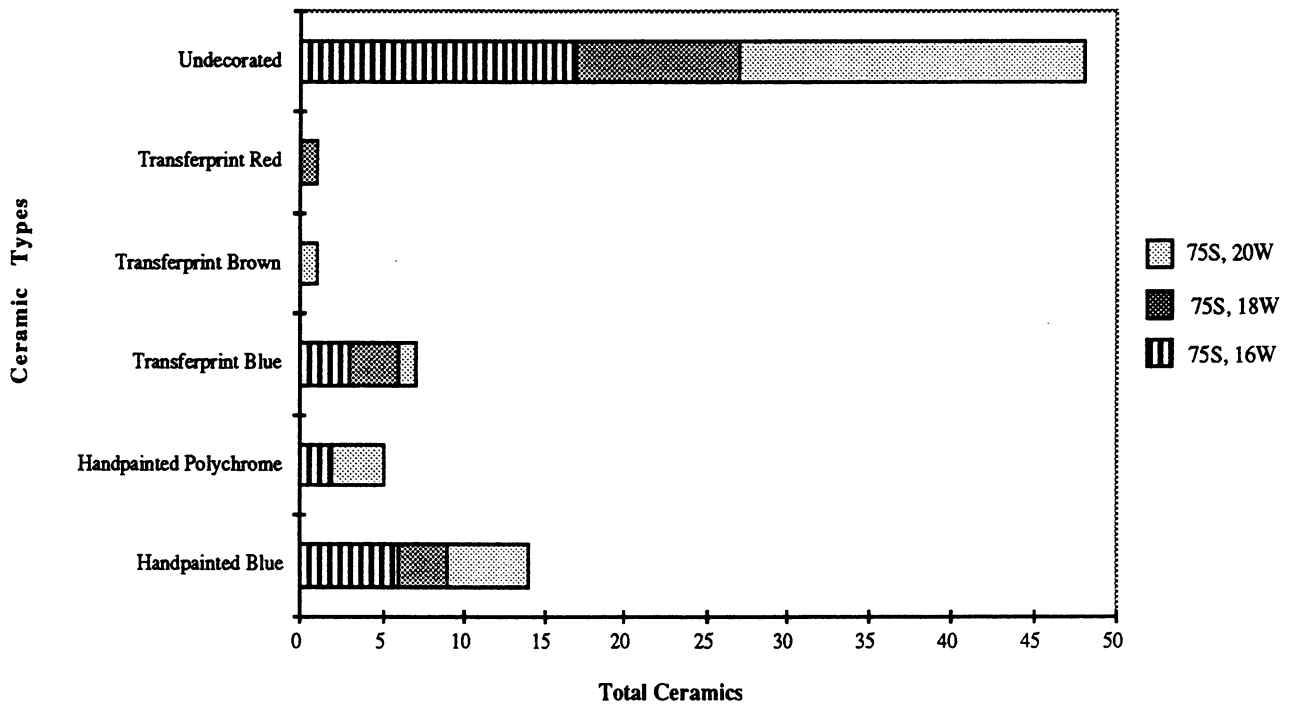


Table 7.2 West Central Trench - Ceramics

Excavation Unit	# of Sherds	Density of Artifacts ^a	Density of Artifacts ^b	% RE ^c	% POR ^d	% Other
75S, 16W	37	93/m ³	93/m ³	77.7	16.7	5.6
75S, 18W	22	110/m ³	73/m ³	77.2	22.7	0
75S, 20W	34	113/m ³	85/m ³	88.2	13.3	0
All Units	94	102/m ³	85/m ³	81.5	16.3	2.2

^a Dark Sandy Loam ^c RE = Refined Earthenware, relative percentage

^b Total Trench ^dPOR = Porcelain, relative percentage

Table 7.3 East Central Trench and Extension - Ceramics

Excavation Unit	# of Sherds	Artifact Density ^a	Artifact Density ^b	% RE ^c	% POR ^d	% Other
75S, 0E	38	54.3/m ³	63/m ³	81.6	15.8	2.6
75S, 1E	26	37.1/m ³	37/m ³	80.8	15.4	3.8
75S, 2E	37	61.7/m ³	62/m ³	73.0	21.6	5.4
75S, 3E	35	43.8/m ³	44/m ³	77.1	20.0	2.9
75S, 4E	29	41.4/m ³	58/m ³	72.4	24.1	3.4
Subtotal	165	48.5/m ³	52/m ³	77.0	19.4	3.6
74S, 3E	24	—	—	75.0	25.0	0.0
73S, 3E	21	—	—	85.7	9.5	4.8
72S, 3E	19	—	—	52.6	42.1	5.3
Total ^e	228	—	—	75.4	24.1	3.5

^a Density combines the entire stratigraphic section, regardless of the presence of ceramics.

^b Density is only for the strata bearing historical materials.

^c RE = Refined Earthenware, relative percentage

^d POR = Porcelain, relative percentage

^e The extension trench (74-72S, 3E) counts are summed with the East Central Trench counts to give the "Total" counts and relative percentages.

Table 7.4 East Central Trench - Ceramics: Topsoil

Excavation Unit	# of Sherds	Artifact Density	% RE ^a	% POR ^b	% Other
75S, 0E	0	0/m ³	0.0	0.0	0.0
75S, 1E	5	50/m ³	80.0	20.0	0.0
75S, 2E	6	60/m ³	66.7	16.7	16.7
75S, 3E	7	70/m ³	71.4	28.6	0.0
75S, 4E	4	40/m ³	75.0	25.0	0.0
Total	22	55/m ³	68.1	22.7	9.2

Note: no ceramics recorded for the topsoil of the extension trench.

^a RE = Refined Earthenware, relative percentage

^b POR = Porcelain, relative percentage

the East Central Trench and the Extension Trench, refined earthenware decorative types include handpainted blue and polychrome, transferprint blue, annular, blue shell-edged, and undecorated forms in quantities similar to other previously discussed units. Only 1 of the 25 sherds with handpainted blue, handpainted polychrome, and transferprint blue is not pearlware. The annular type (n=5) occurs primarily on creamware and yellowware, and the blue shell-edged design occurs on pearlware.

Moreover, the majority of undecorated refined earthenware belongs to the creamware and whiteware group. In addition, porcelains (n=28) are predominantly Chinese (67.9%), though undecorated porcelains of both groups exist, and one overglaze painted type appears on non-white porcelain.

In reference to the pit fill of both the East Central Trench and Extension Trench, all refined earthenware is either handpainted blue, handpainted polychrome,

transferprint blue, or undecorated. Undecorated and handpainted blue dominate the assemblage again. In addition, all porcelain sherds ($n=4$) are non-white and underglaze painted Chinese porcelains. As for the silty loam of the East Central Trench ($n=10$), refined earthenware consists of 3 handpainted blue pearlwares, 1 handpainted polychrome pearlware, 1 mocha, and 4 undecorated creamwares. The one porcelain sherd is non-white and overglazed painted.

As a subcomponent of the East Central Trench, the East Central Bone Bed contains 34 ceramics with a total density of 68 sherds/ m^3 , which is close to the average density for the entire East Central Trench. Relative frequencies of refined earthenware are slightly below the site and trench total at 73.5%, with porcelain occupying the other 26.5%. Of the 25 refined earthenware sherds, pearlware and creamware categories hold 12 apiece, and one is burned beyond further recognition. All creamware are undecorated, while the pearlware has 50% handpainted blue, 25% transferprint blue, and 25% undecorated. Nine porcelains were recovered, all of which are non-white, with underglaze blue forms predominating (88.9%).

SOUTH TRENCH AND EXTENSION TRENCH

A total of 617 sherds was recovered from the 10 units of the South Trench (seven units) and Extension Trench (three units), with 98 (15.9%) from the topsoil, 489 (79.3%) from the dark sandy loam, and 30 (4.9%) from the pit fill. Total density for the South Trench ($n=477$), regardless of unit or stratum, is 145 sherds/ m^3 ; densities for the entire vertical section of the individual units of 125S, 18-24W have values from 106-228 sherds/ m^3 (table 7.7). In the topsoil of the seven-unit South Trench, ceramic sherd densities vary in those units containing historical artifacts from 120/ m^3 to 270/ m^3 with

an average of 196/ m^3 (table 7.8). In the dark sandy loam of the South Trench, densities approximate those of the overlying stratum with a range of 130 to 240 sherds per cubic meter, with a total trench density of 184/ m^3 (table 7.9). In addition, density of the pit fill deposits is consistently below 80 sherds per cubic meter in the three units containing pit fill material (table 7.10). In the South Trench, only one refittable pair was recovered in the dark sandy loam of 125S, 18W.

Ceramic density for the topsoil in the South Trench closely resembles that found in the South Central Test Unit, but it is significantly higher than densities in the East Central Trench. Comparing dark sandy loam, density in the South Trench is significantly lower than in the Test Unit, and slightly higher than in either the West Central or East Central Trenches. Finally, in terms of pit fill, density in the South Trench is almost identical to that recovered from the East Central Trench.

In terms of ceramic groups, units in both the South Trench and Extension Trench range from 75%-88% refined earthenware, 10-25% porcelain, and 2-6% other ceramics (table 7.7). In the topsoil of the South Trench, percentages range from 70-100% for refined earthenware, 0-30% for porcelain, and 0-17% for other ceramics with respective total percentages of 85.9%, 12.1%, and 2.0% (table 7.8). The latter category here refers to pipe fragments. Dark sandy loam in the South Trench and Extension Trench has refined earthenware consistently higher with ranges of 75-92% with a total trench percentage of 80.6%, porcelain with slightly higher proportions of 4-25% with a total of 17.6%, and "others" with a range of 0-8% around a total percentage of 1.8% (table 7.9). "Other" contains 1 Jackfield ware sherd, 3 yellowware pieces, and 4 pipestems. As for the pit fill stratum, the three units with historical ceramics have a range of 74-100% refined earthenware and 0-26% porcelain, totaling

Table 7.5 *East Central Trench and Extension - Ceramics: Dark Sandy Loam*

Excavation Unit	# of Sherds	Artifact Density	% RE ^a	% POR ^b	% Other
75S, 0E	33	83/ m^3	81.3	15.6	3.1
75S, 1E	16	53/ m^3	81.3	18.7	0.0
75S, 2E	18	90/ m^3	68.8	24.9	6.3
75S, 3E	22	110/ m^3	72.7	22.7	4.5
75S, 4E	15	75/ m^3	57.1	42.9	0
Subtotal	104	80/ m^3	73.8	23.2	3.0
74S, 3E	18	—	66.7	33.3	0
73S, 3E	20	—	85.0	10.0	5.0
72S, 3E	18	—	77.8	16.7	5.6
Total ^c	161	—	74.9	21.9	3.2

^a RE = Refined Earthenware, relative percentage

^b POR = Porcelain, relative percentage

^c The "Total" counts and percentages include both the East Central Trench and extension units.

Table 7.6 East Central Trench and Extension - Ceramics: Pit Fill

Excavation Unit	# of Sherds	Artifact Density	% RE ^a	% POR ^b	% Other
75S, 0E	5	25/m ³	80.0	20.0	0.0
75S, 1E	3	30/m ³	100.0	0.0	0.0
75S, 2E	12	60/m ³	91.7	8.3	0.0
75S, 3E	6	20/m ³	100.0	0.0	0.0
75S, 4E	5	50/m ³	80.0	0.0	20.0
Subtotal	31	40/m ³	90.0	6.5	3.2
74S, 3E	4	—	75.0	25.0	0.0
73S, 3E	1	—	0.0	100.0	0.0
72S, 3E	0	—	0.0	0.0	0.0
Total	36	—	86.1	11.1	2.8

^a RE = Refined Earthenware, relative percentage

^b POR = Porcelain, relative percentage

Table 7.7 South Trench and Extension - Ceramics

Excavation Unit	# of Sherds	Artifact Density ^a	Artifact Density ^b	% RE ^c	% POR ^d	% Other
125S, 18W	114	228/m ³	228/m ³	78.9	19.3	1.8
125S, 19W	59	196/m ³	196/m ³	88.1	10.2	1.7
125S, 20W	53	133/m ³	177/m ³	75.5	24.5	0.0
125S, 21W	47	118/m ³	157/m ³	87.2	12.8	2.1
125S, 22W	72	144/m ³	240/m ³	81.9	18.1	2.7
125S, 23W	53	106/m ³	133/m ³	75.5	18.9	5.7
125S, 24W	79	113/m ³	132/m ³	85.5	13.9	2.5
Total	477	145/m ³	191/m ³	80.7	17.0	2.3
Total ^e	617	—	—	80.7	17.2	2.1

^a Density is for the entire vertical section, regardless of the presence of ceramic materials.

^b Density is comprised of ceramic-bearing stratigraphic layers only.

^c RE = Refined Earthenware, relative percentage

^d POR = Porcelain, relative percentage

^e Total here includes the extension trench's (74S-72S, 3E) ceramics from the dark sandy loam.

Table 7.8 South Trench - Ceramics: Topsoil

Excavation Unit	# of Sherds	Artifact Density	% RE ^a	% POR ^b	% Other
125S, 18W	27	270/m ³	77.7	18.5	3.7
125S, 19W	0	0/m ³	0.0	0.0	0.0
125S, 20W	23	230/m ³	69.6	30.4	0.0
125S, 21W	15	150/m ³	100.0	0.0	0.0
125S, 22W	0	0/m ³	0.0	0.0	0.0
125S, 23W	12	120/m ³	75.0	8.8	16.7
125S, 24W	21	210/m ³	85.7	9.5	4.8
Total	98	196/m ³	85.9	12.1	2.0

Note: no topsoil ceramics recorded for the extension trench.

^a RE = Refined Earthenware, relative percentage

^b POR = Porcelain, relative percentage

Table 7.9 *South Trench and Extension - Ceramics: Dark Sandy Loam*

Excavation Unit	# of Sherds	Artifact Density	% RE ^a	% POR ^b	% Other
125S, 18W	87	218/m ³	79.3	19.5	1.1
125S, 19W	55	183/m ³	87.3	10.9	1.8
125S, 20W	30	155/m ³	80.0	20.0	0
125S, 21W	13	130/m ³	84.6	7.7	7.7
125S, 22W	72	240/m ³	79.1	18.1	2.8
125S, 23W	41	137/m ³	75.6	22.0	2.4
125S, 24W	51	170/m ³	82.3	15.7	2.0
Subtotal	349	184/m ³	80.5	17.5	2.0
124S, 24W	55	—	81.8	16.4	1.8
123S, 24W	59	—	74.6	25.4	0
122S, 24W	26	—	92.3	3.8	3.8
Total ^c	489	—	80.6	17.6	1.8

^a RE = Refined Earthenware, relative percentage

^b POR = Porcelain, relative percentage

^c Includes the South Trench and extension units.

Table 7.10 *South Trench - Ceramics: Pit Fill*

Excavation Unit	# of Sherds	Artifact Density	% RE ^a	% POR ^b	% Other
125S, 18W	0	0/m ³	0	0	0
125S, 19W	4	80/m ³	100.0	0	0
125S, 20W	0	0/m ³	0	0	0
125S, 21W	19	63/m ³	73.7	26.3	0
125S, 22W	0	0/m ³	0	0	0
125S, 23W	0	0/m ³	0	0	0
125S, 24W	7	35/m ³	85.7	14.3	0
Total	30	54/m ³	80.0	20.0	0

Question marks denote the difficulty in projecting pit fill densities (see text).

^a RE = Refined Earthenware, relative percentage

^b POR = Porcelain, relative percentage

80% and 20%, respectively, for the entire South Trench and Extension Trench assemblage (table 7.10). Comparing the relative proportions between the South Trench and Extension Trench and other units previously discussed, it becomes obvious that ratios of refined earthenware to porcelain consistently approach or exceed 3:1, regardless of the layer.

Decorative types again vary across the units, though predominant again are handpainted blues, transferprint blues, handpainted polychromes, and undecorated forms (figure 7.4). For the topsoil of the South Trench, decorative types are widely varying with the primary ones being handpainted blue and undecorated, though handpainted polychrome and mocha forms are present. Porcelains (n=15) are predominately non-white (67%) with undecorated (1/10) or underglaze Chinese blue decorations (9/10). In the dark sandy loam of the South Trench and Extension Trench, decorative types have an even larger

range than the overlying topsoil, but the main categories remain handpainted blue and polychrome, transferprint blue, and undecorated forms. With porcelains (n=86), the predominance is again non-white forms (58.0%), but forms range in non-white (NWP) and white (WP) groups with undecorated (31/50 or 61.7% of NWP, 26/36 or 73.3% of WP), overglaze enameled (5/50 or 10.6% of NWP, 10/36 or 26.5% of WP), and underglaze painted types (14/50 or 27.7% of NWP). Finally, the pit fill stratum of the South Trench contains only handpainted blue; transferprint blue, brown, and black; and undecorated types of refined earthenware.

The South Bone Bed contained within the South Trench is similar to the East Central Bone Bed with a density of 70 sherds per cubic meter (n=35), but relative frequency of ceramic classes is different with refined earthenware lower at 68.5%, porcelain at 28.6%, and others at 2.9%. This density is half as much as the South

Trench as a whole or most of the other individual units. The 24 refined earthenware ceramics involve 9 pearlware sherds, 8 creamware ones, 5 whiteware sherds, and 2 unidentifiable ones. All creamware are undecorated, while pearlware is either handpainted blue (66.7%) or transferprint blue (33.3%). Whiteware is composed of 3 undecorated sherds and 2 handpainted blue sherds. Ten pieces of porcelain were excavated as six non-white and four white sherds. Two sherds of each are undecorated, but four of the non-white porcelains are underglaze blue while two of the white porcelain are overglaze enameled. In addition, one sherd of stoneware was recovered.

FURTHER NAVS CERAMIC CONSIDERATIONS

To facilitate comparison, ceramic densities calculated for all main trenches and units, excluding extension trenches, are displayed in figure 7.5. These densities are for the entire vertical excavation volume, regardless of whether historical materials are present in each stratigraphic layer. As mentioned in the previous discussion, highest densities occur in the South Central Test Unit and the South Trench. The East Central Trench, in contrast, has the lowest density of any excavation area or approximately one-third the density of either the South Trench or the South Central Test Unit.

Vessel form analysis for all NAVS excavations provides a glimpse of the potential ceramic vessels available to residents of the Native Alaskan Village. In general, predominant vessel forms for all units irrespective of layer are plates, teacups, saucers, and bowls (figure 7.6). As discussed previously, dark sandy loam contains the most vessels by absolute number, but an area by area discussion may prove useful. Teacups and saucers predominate in the South Central Test Unit; saucers, especially, and plates and bowls far outnumber teacups in the West Central Trench; teacups, saucers, and plates surpass bowls, with teacups in slightly lower proportions, in the East Central Trench and Extension Trench; and teacups and plates are comparable in presence in the South Trench and Extension Trench, but saucers outnumber them and all outnumber bowls.

Sample size is small across all units in the topsoil sample, but vessels do tend to occur in the same forms as in the dark sandy loam underlying it. The same trend holds for the pit fill, though there may be a slight preference for teacups, saucers, and plates, in that order. Other vessels include pitchers, mugs, platters, chamber pots, and teapots; the latter occur exclusively in the context of the South Trench and the South Central Test Unit. In addition, pipe stems (n=7) occur in all excavation areas except the Test Unit—though this unit contains one pipe bowl fragment—but only as one specimen each in the West Central and East Central trenches. In the bone beds, teacups, plates, and saucers are the primary forms. The East Central Bone Bed has 5 plate fragments, 1 teacup sherd, 1 bowl fragment, and 3 saucer pieces. In

comparison, the South Bone Bed has 3 identifiable plate fragments, 4 teacup sherds, 4 saucer sherds, and 1 pipe bowl fragment.

Another area of information concerns burned or highly eroded ceramics at NAVS. Of the total 1,040 sherds excavated across the site, 66 sherds (6.3%) are heavily waterworn and 35 (3.4%) are burned. Refined earthenware as a whole shows the most erosion (93.4%) and burning (85.7%). Within this ceramic group, whiteware occupies over half (59.7%) of the total waterworn refined earthenwares, while pearlware displays the most burning (50%). Though not quantified, it appears that most burning is post-breakage since charring and discoloration exist on both the face and the paste cross section of sherds. The units with the most waterworn ceramics are 125S, 18W (n=14) and 75S, 20W (n=9) both in absolute numbers and in densities. In terms of waterworn and burned, the South Central Test Unit has 6/101 and 1/101, the West Central Trench has 12/94 and 1/94, the East Central Trench and Extension Trench have 10/228 and 6/228, and the South Trench and Extension Trench have 38/617 and 27/617, respectively. Compared to earthenware, porcelain and other ceramics demonstrate few highly worn or burned features, though the low proportion of “other ceramics” in the collection may indicate a higher relative percentage of burned stoneware.

Finally, a number of historical ceramics require individual description due to their uniqueness in the collection and/or their importance to later interpretation. While elaboration on each piece is found in table 7.11, I want to point out briefly the significance of these ceramics. Particularly important are utilized or modified ceramics. Note that “utilized” refers not to a ceramic vessel’s original function but to the use of the ceramic as raw material. First, out of the 12 worked ceramics, slightly more are refined earthenware (58.3%) than porcelain (41.6%). Interestingly, the total percentage of refined earthenware and porcelain in the entire assemblage is 79.6% and 18.3%, indicating that though refined earthenware dominates the worked ceramics, a slight preference seems to exist for porcelains. Considering all worked ceramics except for the one derived from surface collection, the percentage of worked ceramics in the total collection is 1.1%. Second, creamware is the dominant modified earthenware, and non-white porcelain is the only modified porcelain recovered from NAVS excavations. Third, though some sherds appear to be shaped into specific forms, such as a possible projectile point preform (figure 7.7a) or a bead blank (figure 7.7b), most are fragments either with utilized edges or evidence of notching or thinning (figure 7.7c-f). The “bead blank” may, in fact, represent a gaming piece, as suggested by White (1977). Both the preform and bead blank derive from the South Trench dark sandy loam, while the rest derive from all other excavation areas, *except* the West

Figure 7.5 Ceramic Density for Excavation Units and Trenches at the Native Alaskan Village Site

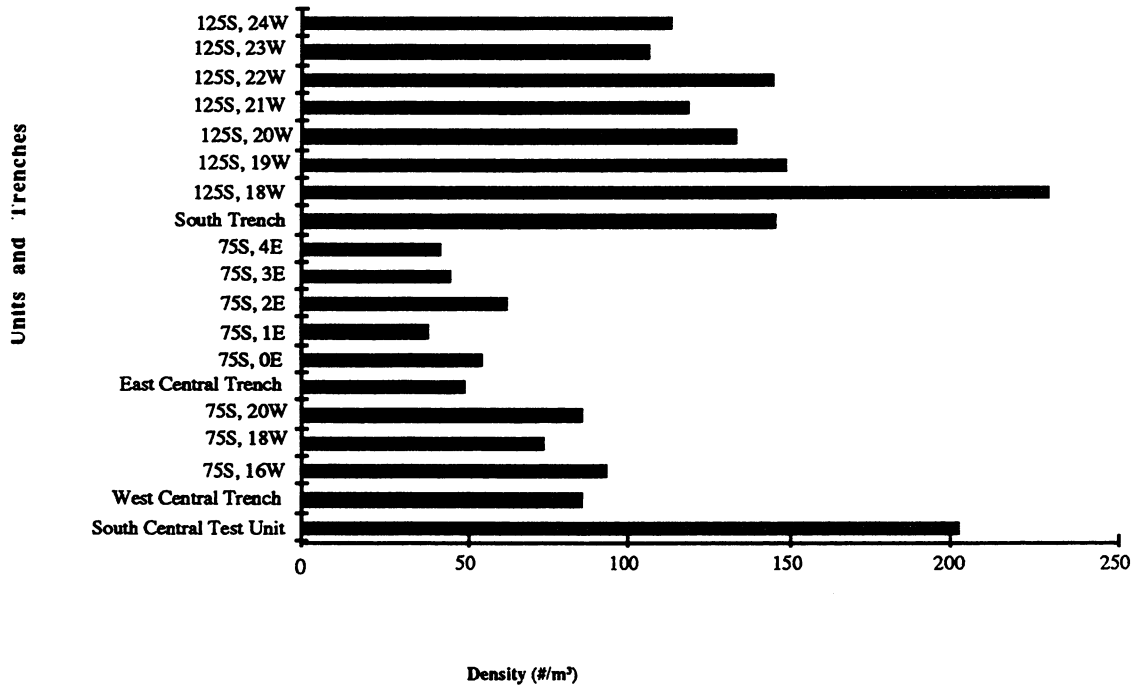
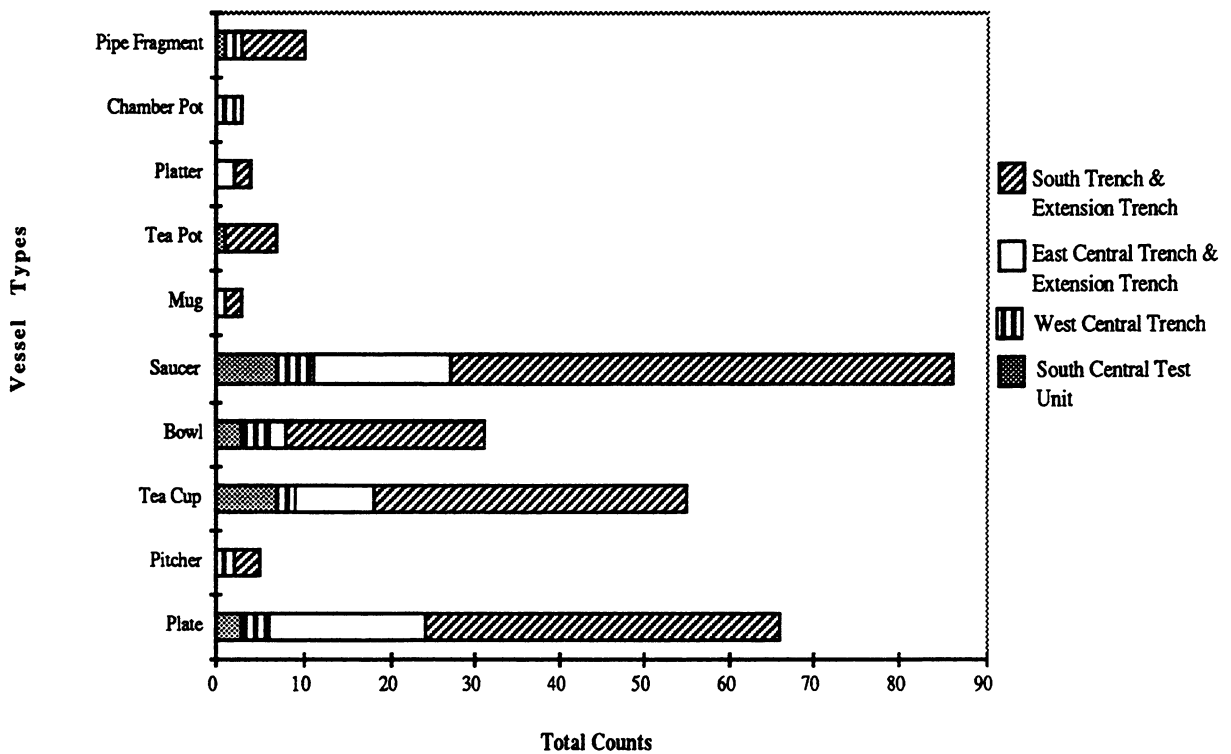


Figure 7.6 Vessel Counts per Excavation Area at the Native Alaskan Village Site



Central Trench, in varying stratigraphic contexts. Most modified sherds, however, were recovered from dark sandy loam and topsoil. Fourth, one of the few ceramic specimens recovered with a distinct maker's mark appears in 123S, 24W (figure 7.7g). It is a fragment of a Clews Warranted Staffordshire "often found on good quality blue printed earthenwares," thus having a manufacture date circa 1818-1834 (Godden 1964:152).

Before departing from the ceramics from NAVS, it is useful to consider those sherds recovered from the 1989 surface collection. Provenience is not noted here (except for one specimen), because it is provided in appendices 7.3 and 7.4. First, the surface collection resulted in finding two of the few unequivocal ironstone wares in the classic form of paneled cups (see Majewski & O'Brien 1987:121 for discussion). Non-ironstone vessels collected are represented by fragments—in descending order of proportion—of saucers, tea cups, plates, bowls, pipe stems, teapots, and mugs. Second, the surface collection also produced one of the few stoneware mineral bottle fragments. Third, another sherd modified into a quasi-circular shape as a possible bead blank or gaming piece was discovered about 28 m south of the South Trench. Unlike the previously described piece, this particular example is whiteware and ground on the edges to highlight the transferprint black floral-like design on the face (see table 7.11; figure 7.7h). Fourth, Jackfield ware was again recovered in forms reminiscent of the sherds excavated from the subsurface. Fifth, a wing portion of a white porcelain figurine was located on the ground surface. Finally, a sherd of Russian refined earthenware (figure 7.7i) bearing the Cyrillic mark of the Poskochin Factory operating in the village of Morye in the St. Petersburg Province from 1817-42 (see Bubnova 1973:74) was collected on the surface of 125S, 23W.

CERAMICS AT FRBS

Similar to the NAVS material and patterns described above, FRBS ceramics consist primarily of refined earthenware with the predominant decorative types being handpainted blue and undecorated. In addition, some transferprint and annular as well as infrequent shell-edged or flow blue specimens do occur. Densities are not calculated for the reasons given above.

EAST BENCH

In the East Bench, 20 sherds in all were excavated from the three general soil levels of topsoil (n=5), midden (n=9), and mottled brown clay (n=6). In each level, refined earthenware is consistently at or above 80% of the total, leaving porcelain, which is only non-white, at less than 20% (table 7.12). Other than undecorated forms, refined earthenware decoration is primarily handpainted blue (figure 7.8). Porcelain is all undecorated save one underglaze blue Chinese non-white porcelain.

EAST PROFILE

In the East Profile, refined earthenware is 78.6% of the total 14 sherds recovered, and non-white porcelain holds only 21.4% (table 7.12). Five of the sherds are from the midden layer, one from the topsoil, and the other eight are unprovenienced from wall cleaning. Undecorated and handpainted blue sherds are the prominent decorative type, and one piece each of annular and transferprint brown is present (figure 7.8). Porcelain is all underglaze Chinese blue forms.

MIDDLE PROFILE

In the Middle Profile, a slightly wider range of ceramic materials was recovered, even though the sum is still low with 38 sherds. Interestingly, 47.2% of the total non-surface collected material derives from the midden of P15 and 25.0% from P13, and only one sherd, a transferprint blue pearlware, was recovered from the clay layer. Other than four sherds, the rest derive from the midden. Nine sherds are porcelain, mostly non-white with both undecorated and underglaze Chinese blue designs. Stoneware appears as a single piece of a waterworn mineral bottle (table 7.12). The range of refined earthenware decorative types include undecorated, handpainted blue and polychrome, transferprint blue and brown, annular, and flow blue (figure 7.8). As such, the type diversity of the Middle Profile is much higher than the East and West profiles, but this may be a function of increased sample size. Other than five non-white underglaze blue porcelain sherds, all porcelain is undecorated.

WEST PROFILE

In the West Profile with 11 recovered ceramics, refined earthenware is undecorated save 1 handpainted blue sherd (figure 7.8). Porcelain, which is again non-white, has both undecorated and underglaze Chinese forms (table 7.12). No ceramics were recovered from the lowest lying layer of beach gravel, and other than two excavated from the fill, all are from the mottled brown clay.

SOUTHWEST BENCH

The Southwest Bench is represented by slightly more ceramics as a whole, but per unit and soil, the amount is not much higher (table 7.13). One hundred and thirty sherds were excavated from this area, and all units have almost the entire ceramic assemblage residing in the mottled brown clay layer. Of the total, 88.4% are refined earthenware, 8.5% are porcelain, and 3.1% are yellowware. Undecorated forms predominate among refined earthenware but handpainted blue ceramics are very widespread (figure 7.8). Handpainted polychrome, transferprint blue, and annular occur in approximately equal numbers across the area, and transferprint brown, transferprint red, and blue shell-edge decoration make

Table 7.11 Sherds from NAVS Exhibiting Intentional Modification, Utilization, or Distinctive Historical Attributes

Field Specimen ^a	Ware/ Decoration	Unit	Stratum	Description
7/3/92-49-HC	RE PW/TBE	123S, 24W	DSL	Maker's mark embossed with portions of Clews Stafford shire Warranted seal (Godden 1964:152), ca. 1818-1834
6/29/89-19-HC-2	RE ??/UND	125S, 23W	SUR	Earthenware (Russian faience) with part of Cyrillic trademark, identified for the Poskochin Factory manufacturing between 1817 and 1842 (Bubnova 1973:74)
6/26/89-17-HC	WP/UND		SUR	Portion of angel? wing of porcelain figurine
Worked Sherds				
6/15/89-1-HC-1	RE WW/TBL	28m S of ST ^b	SUR	Sherd ground into circular shape, emphasizing floral black design on one face, probable bead blank or gaming piece
7/13/92-33-HC	RE PW/HPB?	125S, 23W	DSL	Triangular sherd with flaking to form projectile point?; unifacial thinning flakes on one side, bifacial thinning on base
7/25/91-1-HC-1	NWP/UCE	110S, 11W	A	Sherd with utilized edge (small chipped flake scars)
7/25/91-1-HC-2	NWP/UCE	110S, 11W	A	Sherd with utilized edge (small chipped flake scars)
7/31/91-2-HC-1	RE CW/UND	75S, 20W	DSL	Semi-triangular sherd with slight notching near one apex, probable grinding striations
7/31/91-2-HC-2	RE CW/UND	75S, 20W	DSL	Semi-triangular sherd with two rounded corners, possible grinding striations
8/1/91-7-HC-1	RE CW/UND	75S, 4E	DSL	Bowl fragment with small chipped flakes removed from one side, probably through its use as chopping or scraping tool
8/6/91-10-HC	RE CW/UND	125S, 22W	DSL	Small, relatively shallow grooves on convex edge, probably from grinding or from notching with small metal (?) tool
8/6/91-72-HC	RE PW/UND	125S, 22W	DSL	Pitcher handle fragment with grinding incision on both sides of handle, slightly offset in relative placement
8/7/91-3-HC	NWP/UCE	125S, 24W	DSL	Bowl rim sherd with utilized edge (chipping on exterior surface)
8/12/91-88-HC	NWP/UCE	125S, 23W	SUR	Semi-triangular sherd with utilized edge (slight chipping) and possible flaking on opposite face
8/13/91-3-HC	NWP/UCE	125S, 21W	DSL	Cut into polygonal circle; 1.1 cm maximum diameter x 0.19 cm maximum height; probable bead blank or gamepiece

^a The specimen numbers are preceded by a NAVS prefix in the catalog system and succeeded by radicals based on subgroupings of ceramics.

^b ST = South Trench

Stratigraphic codes are as follows: DSL = Dark Sandy Loam; SUR = Surface; and A = Topsoil.

Ceramic codes are as follows: RE = Refined Earthenware; PW = pearlware; CW = Creamware; WW = Whiteware; WP = White Porcelain; NWP = Non-white Porcelain; TBE = Transferprint Blue; UND = Undecorated; TBL = Transferprint Black; UCE = Underglaze Blue Chinese Export.

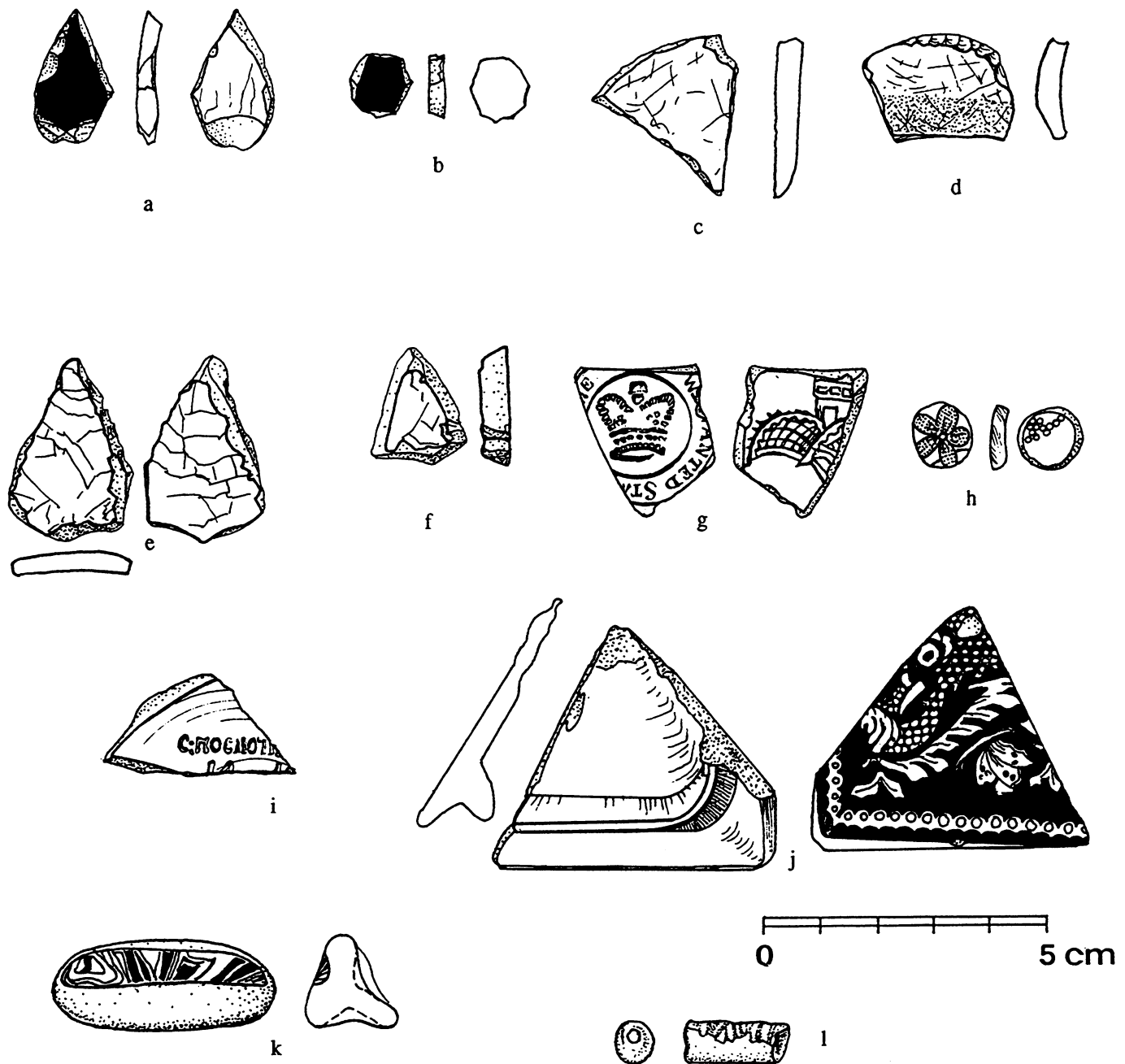
Table 7.12 Profile and East Bench - Ceramics

Excavation Unit	# of Sherds	% RE ^a	% POR ^b	% Other
East Bench	20	85.0	15.0	0.0
East Profile	14	78.6	21.4	0.0
Middle Profile	38	73.7	23.7	2.6
West Profile	11	81.8	18.2	0.0
Total	83	78.3	20.5	1.2

^a RE = Refined earthenware, relative percentage

^b POR = Porcelain, relative percentage

Figure 7.7 *Historic Ceramics*



a. Projectile point attempt, NAVS-7/13/92-33-HC-1. *b.* Worked porcelain, NAVS-8/13/91-3-HC-1. *c.* Grooved refined earthenware, NAVS-8/6/91-10-HC-1. *d.* Refined earthenware with scraping edge, NAVS-8/1/91-7-HC-1. *e.* Refined earthenware with possible grinding striations, NAVS-7/31/91-2-HC-2. *f.* Refined earthenware sherd with notching, NAVS-7/31/91-2-HC-1. *g.* Clews Staffordshire refined earthenware, NAVS-7/3/92-49-HC-1. *h.* Ground whiteware, NAVS-6/15/89-1-HC-1. *i.* Russian-manufactured ceramic, NAVS-6/29/89-19-HC-2. *j.* Refined earthenware cover fragment, FRBS-6/9/89-9-HC-1. *k.* Mug basal sherd (?), FRBS-6/14/89-19-HC-6. *l.* Notched pipestem fragment, NAVS-8/13/91-48-HC-1. (Illustrations by Judith Ogden)

token appearances on whitewares and pearlwares (figure 7.8). Moreover, yellowware shows up in the mottled brown clay in four of the seven units, and a fair amount of unclassified (because of burning) earthenware occurs in the same contexts except for 7S, 17W. Non-white porcelain (n=8) is 75% underglaze blue Chinese and 25% undecorated, while white porcelain appears as undecorated sherds (n=3).

FURTHER FRBS CERAMIC CONSIDERATIONS

Of the FRBS ceramics, 61 vessel-specific, though non-refittable, fragments are identifiable across the multiple excavation areas. The total includes 32.8% saucers, 24.6% tea cups, 18.0% plates, 18.0% bowls, 3.1% pitchers, and only one specimen each of pipestem and teapot (1.8% each). The pipestem and teapot occur in the East Bench, and the profiles contain only saucers, teacups, plates, and bowls. In the Southwest Bench, vessel representation is similar to the profiles except for the three pitcher fragments. In the Southwest Bench, percentages vary with 38% of all vessels recovered in the six units deriving from the mottled brown clay of 7S, 19W. For the entire FRBS collection it appears that saucers and teacups occur in relatively similar proportion, though saucers may slightly exceed tea cups in some units, and that plates and bowls, when they occur, do so in similar yet usually lower percentages than either saucers or tea cups.

Other significant patterns, as well as several individual ceramics, are worth considering here. All but two of the recognizably burned (n=16) and all waterworn (n=3) ceramics were recovered from the Southwest Bench. In addition, the only recognized crossmends are between two creamwares and two pearlwares in the mottled brown clay stratum of 7S, 17W and between two pearlwares in the same layer of 7S, 19W. Also, a fragment of a pearlware teapot or other elaborate serving container was recovered in the mottled brown clay of 7S, 19W, and it is the most complete ceramic recovered anywhere in FRBS or NAVS (figure 7.7j). Finally, a particularly odd ceramic item was recovered from the mottled brown clay of 7S, 18W (figure 7.7k). It is heavily waterworn and probably represents a basal sherd with a remnant footring. However, the variegated brown, white, and black (overglaze?) painted decoration contained in a distinct oval on one face is unlike anything recovered from these or other Fort Ross excavations. Its character suggests that the ceramic form may have been a mug with a coiled texture on the exterior, providing indentations in which the decoration was able to survive erosion.

GLASS AT NAVS'

SOUTH CENTRAL TEST UNIT

At the South Central Test Unit, 183 glass artifacts were recovered. Of the total, 30 (16.4%) derive from the

topsoil, 140 (76.5%) from the dark sandy loam, 12 (6.6%) from the rock rubble, and 1 (0.5%) from the clay layer (table 7.14). Density for the test unit as a whole is 366 pieces/m³, and window and vessel glass have relative frequencies of 70.5% and 28.5%, respectively (table 7.14). Variation around this total is minor as all levels generally have a predominant window glass component. The dark sandy loam with 700 artifacts/m³ has over two times the density of glass as the topsoil (300/m³) and over five times that of the rock rubble stratum (120/m³) (table 7.14). For the Test Unit, 75.0% of the vessel glass is green with 69.2% of the green glass as the dark green, "black" glass. A small percentage of colorless (21.2%) and two pieces of blue bottle glass occur only in the dark sandy loam of the Test Unit. In addition, one piece of lamp globe glass was recovered from the dark sandy loam/rock rubble strata.

WEST CENTRAL TRENCH

The West Central Trench produces a slightly different glass assemblage of 214 glass fragments with an overall density of 195 fragments/m³ and unit densities ranging from 153 to 230 pieces/m³ (table 7.15). Most of the glass (n=203) derives from the dark sandy loam. All three units consist of similar absolute numbers of glass, but dark sandy loam densities vary from 153/m³ to 345/m³ (table 7.15). Relative frequencies of window versus bottle glass produce a tight range by unit with total percentages of 66.8% window and 32.2% bottle, differing little from the range derived from the South Central Test Unit. Two lamp globe fragments were recovered from units 75S, 16W and 75S, 20W. The only glass artifacts recovered from the topsoil are from 75S, 20W and include six window pieces and five vessel fragments. As in the Test Unit, vessel glass (n=69) from this excavation trench is predominantly green (82.6%) with dark green "black" glass occupying 56.1% of the total green. One piece of blue and of brown do appear in the dark sandy loam, and 10 colorless pieces (14.5%) are present.

EAST CENTRAL TRENCH AND EXTENSION TRENCH

Units in the East Central Trench and Extension Trench provide another range of glass materials that do not directly mimic those of other areas. Total count for both the East Central Trench and Extension Trench is 410 artifacts, and trench density of glass for only the five-unit East Central Trench is 93 pieces/m³ for the 324 pieces recovered. The individual units of 75S, 0E-4E contain total densities of 110, 86, 98, 96, and 73 fragments/m³. In the topsoil of the East Central Trench (n=63 glass fragments), the densities of artifacts range primarily from 90-210 artifacts per cubic meter, except for the lack of glass in 75S, 0E (table 7.16). Relative frequency of window versus bottle glass for the East Central Trench and Extension Trench show a reverse trend from that seen in the above two excavation areas with window

Table 7.13 Southwest Bench - Ceramics

Excavation Unit	# of Sherds	% RE ^a	% POR ^b	% Other
17S, 17W	14	92.9	0.0	7.1
17S, 18W	19	84.2	10.5	5.3
17S, 19W	36	91.7	8.3	0.0
18S, 17W	11	90.9	9.1	0.0
18S, 18W	21	85.7	9.5	4.8
18S, 19W	29	86.2	10.3	3.4
Total	130	88.5	8.4	3.1

^a RE = Refined Earthenware, relative percentage

^b POR = Porcelain, relative percentage

Table 7.14 South Central Test Unit - Glass

Stratum	# of Artifacts	Density	Window %	Vessel %	Lamp %
A	30	300/m ³	70.0	30.0	0.0
DSL	140	700/m ³	70.7	28.6	0.7
RR	12	120/m ³	66.7	25.0	8.3
CL	1	10/m ³	100.0	0.0	0.0
Total	183	366/m ³	70.5	28.5	0.1

Stratigraphic codes are as follows: A = Topsoil; DSL = Dark sandy loam; RR = Rock Rubble; and CL = Clay.

Table 7.15 West Central Trench - Glass

Excavation Unit	# of Artifacts	Density ^a	Density ^b	Window %	Vessel %	Lamp %
75S, 16W	61	153/m ³	153/m ³	72.1	26.2	1.6
75S, 18W	69	345/m ³	230/m ³	70.6	30.4	0.0
75S, 20W	84	280/m ^{3c}	210/m ³	60.7	38.1	1.2
All units	214	290/m ^{3d}	195/m ³	66.8	32.2	1.0

A total of 6 window and 5 vessel sherds were recovered from the topsoil of 75S, 20W; see text for details.

^a Density of glass in the dark sandy loam

^b Density of glass in entire stratigraphic column

^c Includes only 73 sherds from the dark sandy loam since the other 11 derive from the topsoil

^d Includes only 203 sherds from the dark sandy loam since the other 11 derive from the topsoil

Table 7.16 East Central Trench - Glass: Topsoil

Excavation Unit	# of Artifacts	Density	Window %	Vessel %
75S, 0E	0	0/m ³	0.0	0.0
75S, 1E	20	200/m ³	45.0	55.0
75S, 2E	13	130/m ³	46.2	53.8
75S, 3E	21	210/m ³	42.9	57.1
75S, 4E	9	90/m ³	44.4	55.6
Total	63	155/m ³	44.4	55.6

percentages averaging approximately 44% and bottle glass, 56%. Once again, however, the predominant form of vessel glass is the green variety (74.3%) with 56% of the total green being dark “black” glass, and colorless forms are present in small quantities (25.7%).

In the dark sandy loam of the East Central Trench and Extension Trench, glass artifacts total 259, and densities range across the five East Central Trench units from 103 to 170 pieces/m³, giving an average of 136/m³ (table 7.17). In contrast to the layer stratigraphically above, the dark sandy loam layer of both East Central and Extension trenches has a higher average relative percentage of window glass (64%) than vessel glass (36%). One lamp globe fragment does appear in 75S, 0E. Green vessel glass again dominates the collection (83.7%) with 62.3% of the green as “black glass.” Colorless occupies 15.2% and brown occurs as only one piece (1.1%). As for the pit fill, 68 artifacts in all were excavated across the units from the East Central and Extension trenches. East Central Trench unit densities fluctuate from 40-100 artifacts per cubic meter, providing a total of 73/m³, and relative frequencies are extremely varied in their presence (table 7.18). Average frequencies place window glass (59%) higher than vessel glass (40%), but the proportion of vessel glass exceeds that of window glass in several units (table 7.18). The primary reason for this fluctuation may relate to small sample size and vagaries of chance. Moreover, another lamp globe piece was uncovered, this time in 75S, 3E. Green holds 88.8% of the vessel glass, leaving colorless with 11.1%; black glass is 41.7% of the green glass.

Since small sample size characterizes the glass recovered from the silty loam of the East Central and Extension trenches, a table is not necessary. Suffice it to say that in all 20 sherds were recovered from the East Central Trench in densities of less than 90 glass artifacts per cubic meter. Only 6 (30.0%) of the fragments are vessel glass, while the other 14 (70.0%) derive from architectural material. All six bottle glass fragments are green with 67% of those as dark “black” glass. The Extension Trench has only two window glass fragments.

Lastly, the East Central Bone Bed contains 45 glass artifacts, of which 57.8% are window and 42.2% are vessel. Density for the bone bed is 90 artifacts per cubic meter. Of the 19 glass vessel artifacts, colors include 89.5% green (64.7% of which is “black” glass), 5.3% brown, and 5.3% colorless.

SOUTH TRENCH AND EXTENSION TRENCH

Finally, the units excavated in the South Trench and Extension Trench provide yet another picture of glass deposition at NAVS. The total count of glass artifacts recovered from both the South and Extension trenches equals 1,011 pieces. Density for the South Trench recovery of 831 glass artifacts is 252 pieces per cubic meter with specific units ranging from 182 to 413

artifacts/m³ (table 7.19). In units of the South Trench with topsoil recorded, glass density varies from 220-470 pieces/m³ with a total trench density of 374 pieces/m³ (table 7.20). In these units, relative frequencies between window and vessel glass hover at an average of 78.7% and 20.9%, respectively, with a moderate variation around the total density. As in the topsoil of the South Central Test Unit but *not* in the East Central Trench, window glass percentages greatly exceed those of vessel glass. Vessel glass color varies slightly more than in previous units—green glass makes up 41% (43.8% of this is black glass); brown, 2.6%; colorless, 51.3%, and purple, 5.1%. Of significance is the lower relative percentage of green bottle glass compared to the topsoil in previous units.

The dark sandy loam of the South Trench has a slightly lower density than the above topsoil with a range between 170-353 pieces per cubic meter and a total density of 302/m³ for the 573 artifacts excavated from the main trench (table 7.21). Even though densities vary, average relative percentages of window and vessel glass in both the South Trench and Extension Trench (n=753) almost perfectly mirror those above in the topsoil with 78.0% and 21.6%, respectively. The exception is that ranges are slightly higher with a span of 64.7-91.3% for window glass and one of 8.7-29.4% for vessel glass. These percentages are close to all other excavation areas in general range, but slightly higher. Furthermore, lamp globe glass only appears as three pieces (0.4%) of the total. Of vessel glass, green forms occur as 63.2% (47.6% of green is dark green), colorless as 33.1%, purple as 1.8%, blue as 0.6%, brown as 0.6%, and other as 0.6%.

Though actual soil volumes are difficult to calculate for the pit fill layer in the South Trench, I estimate that densities are lower (total of 140/m³) than in the dark sandy loam or topsoil (table 7.22). Nonetheless, relative percentages of window (85.9%) and vessel (14.1%) are similar, if not slightly higher, than those above it stratigraphically and those in the pit fill of the East Central Trench. Green holds 70% of the bottle glass with only 28.6% of that total as black glass, colorless has 20%, and 10% belongs to other.

In the South Bone Bed, 65 glass artifacts were excavated from a total of 0.5 cubic meters of sediment and artifact context, giving a density of 130 items/m³. Window and vessel glass relative percentages are 89.2% and 10.8%, respectively. Colors of the seven bottle glass fragments are green (71.4%), colorless (14.3%), and other (14.3%). Black glass is not a component of the green glass in this depositional context.

FURTHER NAVS GLASS CONSIDERATIONS

For comparative purposes, densities of glass for all units and trench totals are provided in figure 7.9. Densities of the South Trench and East Central Trench are only

Table 7.17 *East Central Trench and Extension - Glass: Dark Sandy Loam*

Excavation Unit	# of Artifacts	Density	Window %	Vessel %	Lamp %
75S, 0E	56	140/m ³	53.6	44.6	1.8
75S, 1E	31	103/m ³	58.1	41.9	0.0
75S, 2E	28	140/m ³	60.7	39.3	0.0
75S, 3E	34	170/m ³	61.8	38.2	0.0
75S, 4E	34	170/m ³	68.6	29.4	0.0
Subtotal	183	136/m ³	59.6	39.8	0.6
74S, 3E	14	—	78.6	21.4	0.0
73S, 3E	36	—	72.2	27.8	0.0
73S, 2E	26	—	73.1	26.4	0.0
Total	259	—	64.1	35.5	0.4

Total includes East Central trenches and extension.

Table 7.18 *East Central Trench and Extension - Glass: Pit Fill*

Excavation Unit	# of Artifacts	Density	Window %	Vessel %	Lamp %
75S, 0E	20	100/m ³	60.0	40.0	0.0
75S, 1E	4	40/m ³	25.0	75.0	0.0
75S, 2E	15	75/m ³	66.7	33.3	0.0
75S, 3E	13	65/m ³	30.7	61.5	7.7
75S, 4E	6	60/m ³	67.7	33.3	0.0
Subtotal	58	73/m ³	53.4	44.9	1.7
74S, 3E	3	—	100.0	0.0	0.0
73S, 3E	6	—	100.0	0.0	0.0
72S, 3E	1	—	0.0	100.0	0.0
Total	68	—	58.8	39.7	1.5

Total includes East Central Trench and extension.

Table 7.19 *South Trench and Extension - Glass*

Excavation Unit	# of Artifacts	Density	Window %	Vessel %	Lamp %
125S, 18W	165	413/m ³	71.8	27.6	0.6
125S, 19W	122	406/m ³	76.2	23.8	0.0
125S, 20W	89	223/m ³	82.0	18.0	0.0
125S, 21W	108	270/m ³	78.7	20.4	0.9
125S, 22W	107	208/m ³	83.2	15.9	0.9
125S, 23W	92	182/m ³	77.2	22.8	0.0
125S, 24W	148	211/m ³	77.7	21.6	0.7
Subtotal	831	252/m ³	77.4	22.1	0.5
124S, 23W	73	—	76.7	23.2	0.0
123S, 23W	84	—	84.5	15.5	0.0
122S, 23W	23	—	91.3	8.7	0.0
Total	1011	—	78.2	21.4	0.4

Total includes South Trench and extension counts and relative frequencies.

Table 7.20 South Trench - Glass: Topsoil

Excavation Unit	# of Artifacts	Density	Window %	Vessel %	Lamp %
125S, 18W	44	440/m ³	72.7	25.0	2.3
125S, 19W	0	0/m ³	0.0	0.0	0.0
125S, 20W	40	400/m ³	82.5	17.5	0.0
125S, 21W	47	470/m ³	76.6	23.4	0.0
125S, 22W	0	0/m ³	0.0	0.0	0.0
125S, 23W	22	220/m ³	72.7	27.3	0.0
125S, 24W	34	340/m ³	85.3	14.7	0.0
Total	187	374/m ³	78.7	20.9	0.5

No glass was recorded for the topsoil of the extension trench.

Table 7.21 South Trench and Extension - Glass: Dark Sandy Loam

Excavation Unit	# of Artifacts	Density	Window %	Vessel %	Lamp %
125S, 18W	121	303/m ³	72.7	27.3	0.0
125S, 19W	106	353/m ³	73.6	26.4	0.0
125S, 20W	49	245/m ³	81.6	18.4	0.0
125S, 21W	17	170/m ³	64.7	29.4	5.9
125S, 22W	106	353/m ³	84.0	15.1	0.9
125S, 23W	69	230/m ³	78.2	21.7	0.0
125S, 24W	105	350/m ³	75.2	23.8	1.0
Subtotal	573	302/m ³	76.6	22.9	0.5
124S, 24W	73	—	76.7	23.2	0.0
123S, 24W	84	—	84.5	15.5	0.0
122S, 24W	23	—	91.3	8.7	0.0
Total	753	—	78.0	21.6	0.4

The total includes the South Trench and extension for the counts and relative frequencies.

Table 7.22 South Trench - Glass: Pit Fill

Excavation Unit	# of Sherds	Density	Window %	Vessel %
125S, 18W	0	0/m ³	0.0	0.0
125S, 19W	16	160/m ³	93.8	6.2
125S, 20W	0	0/m ³	0.0	0.0
125S, 21W	44	220/m ³	86.4	13.6
125S, 22W	1	10/m ³	0.0	100.0
125S, 23W	1	10/m ³	100.0	0.0
125S, 24W	9	50/m ³	77.8	22.2
Total	71	140/m ³	85.9	14.1

Figure 7.8 *Counts of Refined Earthenware Types for the East Bench, East Profile, Middle Profile, West Profile, and Southwest Bench at the Fort Ross Beach Site*

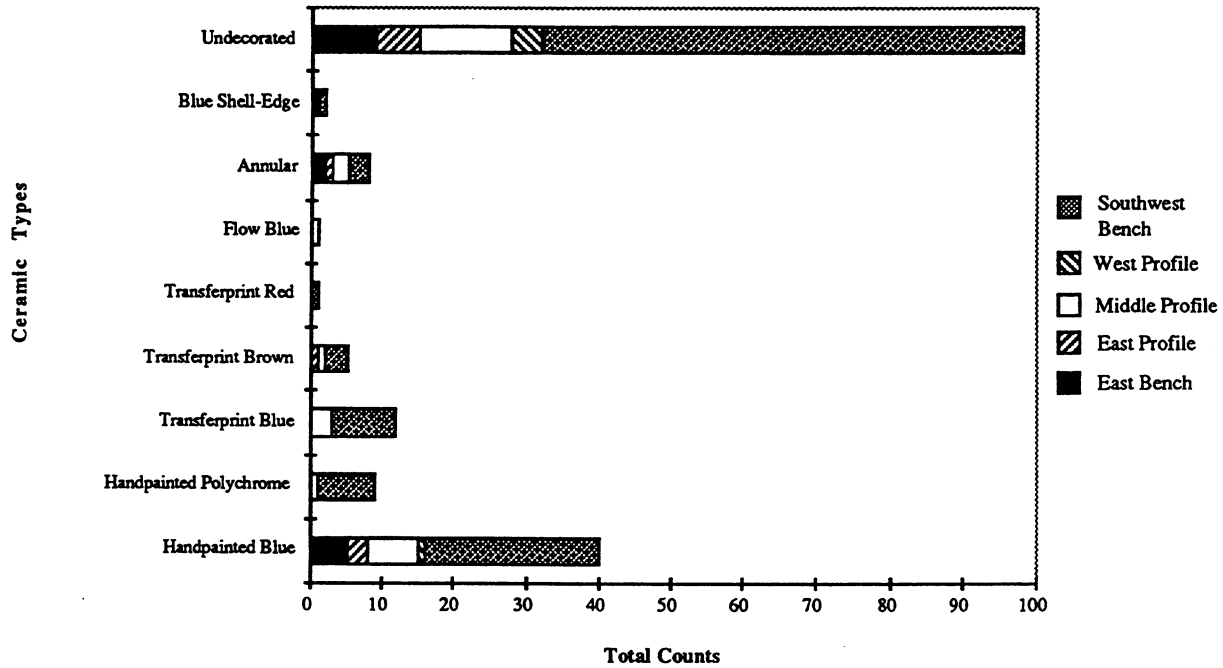
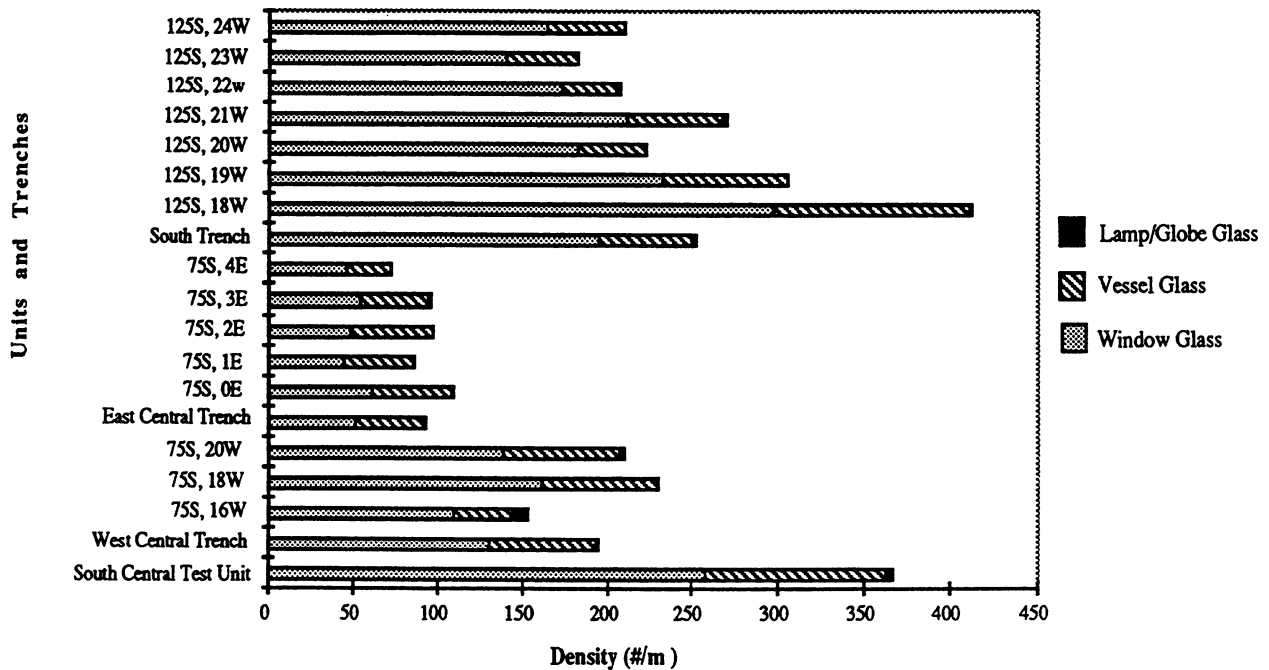


Figure 7.9 *Glass Density for Excavation Units and Trenches at the Native Alaskan Village Site*



from the main trenches (i.e. no extension trenches), and the density values of all units and trenches reflect the entire sediment volume excavated. As with ceramics, densities in the South Trench and the South Central Test Unit are comparable; they are also higher than the other two excavation areas. In addition, the more westerly units of the South Trench compare generally with the West Central Trench. The East Central Trench has the lowest glass densities of all. Yet, it is here that vessel and window glass percentages are relatively equal, problems with intergroup comparison aside.

Identification of glass vessels was attempted, but often in vain. The assemblage is too fragmented to be productively or even possibly identified. Two identifications and several observations can be provided, however. One neck fragment (NAVS-8/6/91-28-G-2) from the South Trench in the dark sandy loam matches a form inferred to be manufactured in the 1820s and 1830s based on rounded lip and string rim shapes (Jones 1986:figure 53). A second bottle neck fragment (NAVS-8/5/91-21-G-2) from the surface of the East Central Trench is from a bottle manufactured between 1819 and 1840 with down-tooled lip and string rim shapes (Jones 1986:figure 50). Though visual matches are extremely close, the only published comparisons are English vessels, whereas bottles in the NAVS may have been manufactured elsewhere. In addition, the only vessel "discovered" in the low quantity of fragmentary glass from the surface collection of NAVS is a two-piece mold mustard bottle neck fragment (figure 7.10a). The bottle type is known to occur from the middle to late 19th century (Peter Schulz, personal communication, 1995). Its lack of chemical alteration or weathering hint at a relatively recent date compared to heavily decomposing glass otherwise generally recovered.

Several additional observations may shed light on the vessel issue. Most "black glass" fragments, though no specific bottles are identifiable, are probably pieces of case-transported bottles, especially the examples that have remnant planar faces (e.g., NAVS-7/31/91-1-G-2) or concave bases (NAVS-7/31/91-11-G-2). These generally contained gin or other alcoholic beverages (Felton & Schulz 1983:47), although they may have been shipped empty (Glenn Farris, personal communication, 1995). Blown dark green glass "carboy" fragments also seem to be present, although only in a few instances. In addition, four clear glass tumbler fragments (NAVS-7/24/91-2-G-2, NAVS-7/31/91-13-G-2, NAVS-8/5/91-1-G-2, NAVS-8/10/91-9-G-2), identified by the ribbed exterior curved faces (see Felton & Schulz 1983:figure 7.21e), were recovered from the upper 10 cm of the South Central Test Unit, the East Central Trench, and the South Trench (n=2). The actual date is unknown, but the glass tableware may date to the mid- to late 19th century.

GLASS AT FRBS

The FRBS glass can best be described by stratum within general excavation areas, with specific units noted where necessary. Considering the site in its entirety, a total of 292 glass artifacts was recovered during excavation. Vessel glass composes 45.9% of that total, and window glass, the other 53.8%. Lamp/globe glass occurs as only one piece (0.3%).

EAST BENCH

In the East Bench, division between the total of 29 window and vessel glass artifacts is 37.9% and 62.1%, respectively. As for color representation, green is 55.6% with 40% of that fraction being "black" glass fragments, colorless is 16.7%, and brown is 27.8%.

EAST PROFILE

In the East Profile, window glass occupies 23.1% of the total 26 glass artifacts in the unit, and vessel glass makes up the other 76.9%. Consideration of glass in strict midden context produces almost identical results.

MIDDLE PROFILE

The Middle Profile had similar percentages of window and vessel glass (n=54): 35.2% and 64.8%, respectively. The clay layer in P11 has one piece of vessel glass, the topsoil in P12 and P13 has two pieces of window glass, and the mottled brown clay layer in P18 has two pieces of vessel glass. Otherwise all were recovered from the midden layer.

WEST PROFILE

The West Profile differs tremendously from the other two profile areas because of the higher proportion of window glass (77.3%) to vessel glass (22.7%) in the 22-specimen assemblage. All but one piece of both kinds of glass occur in the mottled brown clay.

TOTAL PROFILE SECTION

Colors of vessel glass are tabulated only for the entire profile (n=60), and they include 60% green, 15% colorless, 21.7% brown, and 3.3% blue. Of the 36 pieces of green glass, 38.9% are "black" glass fragments occurring only in the East and Middle profiles.

SOUTHWEST BENCH

As for the Southwest Bench with 161 glass artifacts, window and vessel glass are virtually identical in representation with 50.3% and 49.1%, respectively. Lamp globe glass, occurring in 7S, 19W in the mottled brown clay, occupies 0.6%. Viewing mottled brown clay as a stratigraphic entity, window glass drops slightly to 42.9% of the stratum total, thus augmenting vessel to 57.1%. Only one unit, 7S, 17W, has more than one glass

artifact in the topsoil, but the sample size of 36 makes the claim that window has 63.9% of the total a fairly realistic estimate. Units 7S, 17W and 7S, 19W contain 57.7% of the glass artifacts. For the total window and vessel glass from this excavation area, the color distribution is 81.0%, green; 10.1%, colorless; 3.8%, brown; 3.8%, blue; and 1.3%, purple. Of the green, 41.3% is dark green or "black" glass.

FURTHER FRBS GLASS CONSIDERATIONS

Vessel identifications are difficult here for similar reasons as in NAVS. No definite vessels are noted. Like the terrace above, FRBS appears to have a number of case-type "black glass" alcohol bottles present, but further specificity is not possible. One neck fragment of such a bottle was collected, but identification of the small piece is problematic. In addition, one embossed olive green glass fragment was recovered, but no identification was made (figure 7.10o).

WORKED GLASS AT NAVS

The most efficient way to describe the range of modified vessel and window glass artifacts is in table form (table 7.23). The majority of modified glass artifacts are vessel, and as expected from the high relative frequencies of green vessel glass in the "Glass" category, most of the worked vessel glass artifacts are (dark) green. The three definite projectile points or point fragments are located only in the East Central Trench (figure 7.10b-d). Several examples of worked window glass are provided in the same figure (figure 7.10e-i) as well as an anomalous flake with an apparently drilled hole (figure 7.10j). Comparison of the relative number of worked to non-worked glass artifacts provides additional information. The South Central Test Unit has 0.5% of the total glass assemblage as modified, with 0.7% modified in the dark sandy loam. Only 3.3% of the glass contained in the West Central Trench is modified, with 3.4% of the total glass in the dark sandy loam. The East Central Trench and Extension Trench have as modified 10.0% of the total glass (9.5% in the topsoil, 10.0% in dark sandy loam, 11.8% in pit fill, and 5.0% in silty loam). Moreover, the South Trench and Extension Trench have 4.5% of the total glass as modified (1.6% in topsoil, 4.5% in dark sandy loam, 7.0% in pit fill).

The surface collection in 1989 resulted in the discovery of six pieces of modified glass. They are not presented in a table because they are so few in number, but a brief description is provided here. All but one piece are green bottle glass, and all but one of the total worked glass are either unworked, interior, or edge-modified flakes. The anomaly is a possible base of a biface crafted from light green bottle glass. Also, two worked glass vessel fragments were recovered from the surface of the South Trench prior to excavation.

WORKED GLASS AT FRBS

All but 1 of the 16 pieces of unambiguously modified bottle and window glass are green vessel glass (table 7.24). By far, most of the worked material consists of flakes with and without edge modification or use, but the collection does contain 2 projectile point fragments made from green bottle glass (figure 7.10k, l) and a bifacially-worked bottle rim, or finish (figure 7.10m). With the exception of 3 flakes, all of the worked glass fragments occur in the Southwest Bench, and within that area, all but 2 of the artifacts derive from the mottled brown clay. Among the sample, most items (>60%) were excavated from units 8S, 17W and 8S, 18W, which are the units containing projectile point forms. Of the total FRBS glass collection, 5.2% is modified. In the Southwest Bench, 6.9% of the total glass recovered is worked, but only 2.9% of the glass from the profile area is worked. In addition, no unequivocal worked glass derives from the East Bench. One burin-like glass artifact was also recovered, but no provenience could be noted (figure 7.10n).

GLASS BEADS AT NAVS AND FRBS

The reader is referred to chapter 8 by Lester Ross for the complete bead analysis, but I briefly summarize some of his findings here. First, the 564 beads represent 79 varieties with 46 as drawn, 30 as wound, 1 as Prosser-molded (ceramic), and 2 as blown beads. Second, the predominant bead colors are white, green, red, and black with relatively few blue, purple, or yellow/yellowish-brown beads. This contrasts markedly with other Native Alaskan bead assemblages during times of Russian contact and may have reflected color preferences of Native Californians. Third, no Chinese manufactured beads are present, further accentuating the uniqueness of NAVS compared to other Russian American Company-affiliated Native Alaskan sites. The blue ceramic Prosser bead was recovered from the mottled brown clay of 8S, 18W at FRBS and undoubtedly represents post-Russian activity. However, it is the only bead to truly do so. Finally, the only large (23.5 mm maximum diameter x 17.4 mm height) glass bead is represented by a fragment, and this dark blue bead fragment derives from the dark sandy loam of the South Central Test Unit.

In addition, glass beads removed from the bone beds require discussion. In the East Central Bone Bed, 13 glass beads were recovered at a density of 26 beads/m³. Of the total, 1 is drawn and cut, 1 is drawn and faceted, 10 are drawn and hot-tumbled, and 1 is wound and spherical; all are undecorated. General color schemes are 38.5% (5) white, 23.1% (3) brownish-red on green or black, 15.4% (2) blue to bluish-green, 7.7% (1) purplish-red, 7.7% (1) purplish-blue, and 7.7% (1) yellowish. No black beads were recovered here. In the South Bone Bed, the glass bead total reaches 23 for a density of 46 beads/m³. All

Table 7.23 Worked Glass at the Native Alaskan Village Site

Field Spec. No	Unit	Soil	Count	Description
7/26/91-1-G-2	110S, 11W	DSL	1.00	Light green interior flake (vessel)
7/31/91-1-WG-1	75S, 18W	DSL	1.00	Unifacially edge-modified (window)
7/31/91-20-G-2	75S, 18W	DSL	1.00	Clear interior flake (vessel)
7/31/91-2-G-2	75S, 20W	DSL	1.00	Dark green interior flake (vessel)
7/31/91-14-G-2	75S, 20W	DSL	4.00	Dark green 2 interior flakes, light green interior flake, light green with chipped edge (vessel)
7/31/91-16-WG-1	75S, 0E	DSL	1.00	Colorless with thinning flakes, removed (vessel)
8/5/91-17-WG-1	75S, 0E	DSL	1.00	Dark green projectile point (vessel)
8/7/91-84-WG-1	75S, 0E	DSL	1.00	Dark green secondary cortical flake (vessel)
7/31/91-11-G-2	75S, 0E	DSL	1.00	Dark green flaked base fragment (vessel)
8/1/91-5-G-2	75S, 0E	DSL	1.00	Light green interior flake (vessel)
8/15/91-42-WG-1	75S, 0E	PF	1.00	Dark green core with flake scars (vessel)
8/6/91-1-WG-1	75S, 1E	A	1.00	Dark green interior flake w/bifacial thinning (vessel)
8/5/91-27-G-2	75S, 1E	A	1.00	Dark green large flaked fragment (vessel)
8/7/91-7-WG-1	75S, 1E	DSL	1.00	Colorless core (vessel)
8/7/91-9-WG-1	75S, 1E	DSL	1.00	Dark green edge-modified flake (vessel)
8/13/91-7-WG-1	75S, 1E	DSL	1.00	Dark green secondary cortical flake (vessel)
7/31/91-29-WG-1	75S, 2E	DSL	1.00	Bifacially edge-modified (window)
8/9/91-3-G-2	75S, 2E	DSL	1.00	Dark green interior thinning flake (vessel)
8/10/91-2-G-2	75S, 2E	PF	2.00	Dark green interior flake, colorless, interior flake (vessel)
8/5/91-30-G-2	75S, 3E	A	4.00	Dark green shatter, 3 light green thinning flakes (vessel)
8/9/91-4-WG-1	75S, 3E	DSL	1.00	Bifacially edge-modified (window)
8/9/91-28-WG-1	75S, 3E	PF	1.00	Bifacially edge-modified (window)
8/10/91-3-WG-1	75S, 3E	PF	1.00	Dark green projectile point tip (vessel)
8/10/91-16-WG-1	75S, 3E	PF	1.00	Dark green bifacially edge-modified (vessel)
8/12/91-11-WG-1	75S, 4E	DSL	1.00	Projectile point fragment (window)
8/1/91-7-G-2	75S, 4E	DSL	1.00	Light green interior flake (vessel)
8/13/91-38-WG-1	75S, 4E	SL	1.00	Bifacially edge-modified (vessel)
6/29/92-24-WG-1	74S, 3E	DSL	1.00	Dark green with edge modification and burned (vessel)
6/30/92-12-WG-1	74S, 3E	DSL	3.00	Dark green: 1 interior flake, 2 shatter (vessel)
7/10/92-5-WG-1	74S, 3E	DSL	1.00	Dark green interior thinning flake (vessel)
7/15/92-37-WG-1	74S, 3E	PF	1.00	Dark green heavily eroded flake (vessel)
7/16/92-2-WG-1	74S, 3E	PF	1.00	Dark green shatter (vessel)
7/3/92-34-WG-1	73S, 3E	DSL	1.00	Dark green interior flake (vessel)
7/3/92-41-WG-1	73S, 3E	DSL	1.00	Colorless, edge-modified (window?)
7/3/92-47-WG-1	73S, 3E	DSL	3.00	Dark green: 2 interior flakes, 1 shatter (vessel)

All field specimen numbers are preceded by the prefix "NAVS" in their actual catalog form.

Stratigraphic codes are as follows: A = Topsoil; DSL = Dark Sandy Loam; PF = Pit Fill; SL = Silty Loam.

beads are undecorated. One is a drawn and cut bead, 21 are drawn and hot-tumbled varieties, and 1 is a wound and ovoid bead. Color representation consists of 43.5% (10) white, 13.0% (3) blue to bluish-green, 13.0% (3) brownish-red on green, 13.0% (3) green, 8.7% (2) purple, and 8.7% (2) yellowish. Again, no black beads were recovered.

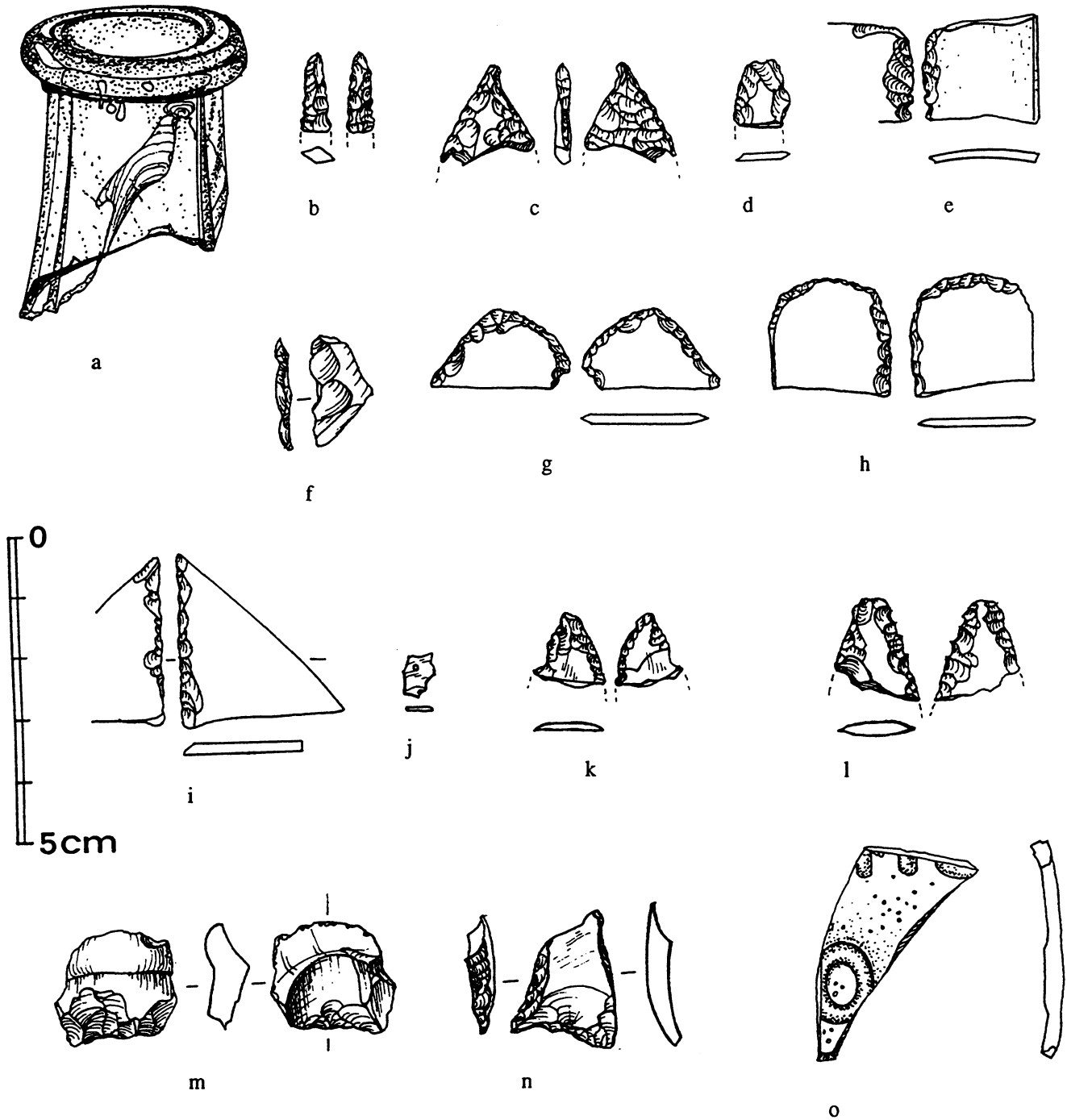
NON-GLASS BEADS AT NAVS

A total of 33 shell and 2 bone beads was recovered from excavations and surface collection at NAVS. In terms of spatial position, several aspects can be noted. Two clamshell disk beads derive from the South Central Test Unit from dark sandy loam. No non-glass beads were recovered in excavations of the West Central Trench. Fifteen clamshell disk beads come from the East Central Trench and Extension Trench, distributed as 1 on

the surface, 4 in dark sandy loam, 7 in pit fill, and 3 in silty loam. Recovery was fairly equal (approximately 3 beads) for each excavated unit save 75S, 1E which holds no bone or shell beads. Four clamshell disk beads were retrieved from the East Central Extension Trench. In addition, only 1 clamshell disk bead was excavated from the East Central Bone Bed.

Finally, the South Trench and Extension Trench produced 7 clamshell disk beads, 3 spire-topped *Olivella* beads, 2 beads fashioned from unidentified mollusk, and 2 bone beads. All beads were recovered from dark sandy loam except for 1 *Olivella* in the topsoil and 2 clamshell disk beads in pit fill. In this area, 2 clamshell disk beads are associated with the South Bone Bed in units 125S, 21W and 125S, 23W. The unidentified mollusk beads are cylindrical and very fragile. As for bone beads, one was manufactured from a fish vertebrae with minimal

Figure 7.10 *Glass and Worked Glass*



a. "Mustard bottle" neck, NAVS-6/15/89-2-G-1. b. PPF (vessel), NAVS-8/10/91-3-WG-1. c. PPF (vessel), NAVS-8/15/91-17-WG-1. d. PPF (window), NAVS-8/12/91-11-WG-1. e. BFW (vessel), NAVS-8/10/91-16-WG-1. f. Worked (vessel), NAVS-8/5/91-39-WG-1. g. BFW (window), NAVS-8/9/91-28-WG-1. h. BFW (window), NAVS-8/13/91-38-WG-1. i. BFW (window), 7/31/91-29-WG-1. j. Drilled flake (window?), NAVS-8/6/91-63-WG-1. k. PPF (vessel), FRBS-6/12/89-2-WG-1. l. PPF (vessel), FRBS-6/14/89-22-WG-1. m. BFW finish, FRBS-6/12/89-2-WG-1. n. Worked (vessel), provenience unknown, FRBS-10/18/90-1-WG-1. o. Embossed vessel sherd, FRBS-6/9/89-10-G-3. PPF = projectile point fragment; BFW = bifacially worked (Illustrations by Judith Ogden)

Table 7.24 Worked Glass at the Fort Ross Beach Site

Item Code	Unit	Level	Soil	Description
7/16/88-WG-7	P 06	—	—	Light green edge-modified (vessel)
6/23/88-WG-51	P 15	—	M	Dark green interior flake (vessel)
6/28/88-WG-27	P 15	—	M	Dark green shatter (vessel)
6/05/89-7-WG-1	—	—	—	Dark green interior flake (vessel)
6/08/89-7-WG-1	8S, 17W	01	A	Light green edge-modified flake (vessel)
6/12/89-2-WG-1	8S, 18W	01	MBC	Dark green projectile point attempt, perhaps broken in manufacture (vessel)
6/12/89-2-WG-2	8S, 18W	01	MBC	Light green shatter (vessel)
6/12/89-2-WG-3	8S, 18W	01	MBC	Bifacially worked bottle rim (vessel)
6/14/89-22-WG-1	8S, 17W	02	MBC	Dark green projectile point (vessel)
6/14/89-22-WG-2	8S, 17W	02	MBC	Dark green edge-modified flake (vessel)
6/14/89-24-WG-1	8S, 19W	02	MBC	Colorless edge-modified flake (window?)
6/14/89-25-WG-1	8S, 17W	02	MBC	Dark green edge-modified flake (vessel)
6/19/89-22-WG-1	7S, 19W	04	MBC	Light green interior flake (vessel)
6/19/89-22-WG-2	7S, 19W	04	MBC	Light green interior flake (vessel)
6/20/89-13-WG-1	8S, 19W	04	MBC	Light green shatter (vessel)
6/20/89-20-WG-1	7S, 17W	05	MBC	Dark green edge-modified flake (vessel)

Note: the prefix "FRBS" precedes all item codes in the actual catalog system, and "P" in the unit column refers to "profile unit." Stratigraphic codes are as follows: A = Topsoil; MBC = Mottled Brown Clay; and M = Midden.

modification other than perforation of the original bone form while the other, probably mammalian, was manufactured through grinding and smoothing of the bead's surface. Essentially, the latter was produced in a way reminiscent of clamshell disk bead manufacture with the center drilled out of a disk form. Interestingly, no unequivocal clamshell disk bead blanks are present.

Clamshell disk beads are measured to provide information on size variability, but no measurements are taken on the small samples of spire-topped *Olivella* and bone beads. The mean diameter of clamshell disk beads (n=20) derived from all units and trenches except for extension trenches is 6.72 mm (SD=1.11) with a mean height of 2.07 mm (SD=0.54). There is no apparent association between bead size and provenience. Though a smaller sample size than previous assemblages, the extension trenches' clamshell disk beads (n=5) appear to be larger and more variable with a mean diameter of 9.52 mm (SD=2.23) and a mean height of 3.2 mm (SD=1.38). Due to the small number (n=2) of clamshell beads in the NAVS 1989 surface collection, no measurements are provided.

NON-GLASS BEADS AT FRBS

Since the collection of FRBS excavated non-glass beads is small (n=4), no measurements are taken. Suffice it to note that the beads are slightly larger than previous samples. Two clamshell disk beads, one bone bead, and one spire-topped *Olivella* bead were recovered.

METAL AT NAVS

The metal artifacts include a number of items occurring in high frequencies (e.g., nails, wire, platy iron

fragments) and many of relatively rare appearance (e.g., copper strips, lead foil, lead bullet sprues). Of the common metal artifacts recovered from excavation, nails are the most ubiquitous. Iron is the predominant nail material, but a number of brass forms are present. Densities of nails for the areas range from 9.0 nails/m³ in the South Central Test Unit to 12.7 in the West Central Trench and from 14.7 in the East Central Trench to 30.3 nails/m³ in the South Trench.

SOUTH CENTRAL TEST UNIT

Here, nails are 26.3% (n=10) of the tabulated metal artifacts (n=38), with 8 manufactured from iron, 1 from brass, and another from an unidentified material. One each was recovered from the categories of iron spike and iron wire fragment. Two lead bullet sprues were discovered along with 3 pieces of lead shot. In addition, other copper (n=3) and iron (n=6) fragments were excavated. Ten platy iron pieces were recovered, as well as a thimble and an elongated iron piece with an eyelet. All but four pieces were recovered from the dark sandy loam. The four include a sprue and an iron nail from the topsoil and an iron nail and two lead shots from the rock rubble.

WEST CENTRAL TRENCH

In this trench, nails (n=14) again predominate in the metal artifacts as 58.3% of the 24 recovered items. The nails are evenly divided between iron and brass forms. Questionable iron nail/wire fragments number 2 items, iron wire and platy fragments number 1 apiece, and unidentified iron fragments number 5. One copper sheet fragment was retrieved. A unique item is a heavy brass attachment screw with a sturdy eyelet opposite the

threaded point. All artifacts derive from the dark sandy loam except an iron nail, an iron wire, and one iron fragment which were recovered from the topsoil.

EAST CENTRAL TRENCH AND EXTENSION TRENCH

As for the East Central Trench and Extension Trench, only 35.8% of the 176 metal artifacts involve nails. However, iron nails occupy a full 77.8% of those nail forms. Questionable iron nail/wire fragments appear as 18 items, iron wire as 11, and iron platy fragments as 28. Three iron spikes were also recovered. Three lead bullet sprues and 1 piece of lead shot were retrieved in addition to 3 brass/copper buttons. Finally, 13 pieces total of either copper strips, copper sheets, or lead foil were excavated. Unique single items here include possible brass/copper button hook, iron tack, copper bowl fragment (figure 7.11f), sturdy iron strap fragment (wooden barrel strap?), large iron possible post-hinge, large and heavy iron (pulley?) hook, and an iron wire barb. Two metal artifacts of further interest are the wooden dowel wrapped in copper or brass sheeting, possibly used as a punch tool (figure 7.11g), and a nail stock fragment inserted through three leather disks (figure 7.11h). In the pit fill of 75S, 4E, an iron nail was located adjacent to a redwood post fragment.

The copper bowl fragment, copper sheet around the dowel, iron tack, and leather-punched nail stock all occur in pit fill deposits. Nine nails are from the topsoil, as are 8 iron pieces and 1 copper sheet. In the silty loam are 4 nails, 1 iron wire, and 4 unknown iron pieces. Everything else is from the dark sandy loam. In general, the number of metal artifacts increases per unit in the South Trench along an easterly direction, peaking in 75S, 3E.

In the East Central Bone Bed, metal items include 5 iron nails, 2 brass nails, 1 piece of lead shot, 1 copper strip, 3 flat iron fragments, the possible copper/brass button hook, and 1 unidentifiable iron fragment. In addition, 1 iron wire was located in probable association with an abalone shell. Nail density in the bone bed is 14 artifacts/m³.

SOUTH TRENCH AND EXTENSION TRENCH

The South Trench and Extension Trench have a total of 238 metal artifacts. Here, nails occupy 44.5% of the total of which 77.4% are iron and 22.6% are brass. Questionable iron/wire fragments number 20 while undecipherable iron fragments total 37. Iron wire appears as 4 items along with 3 iron spikes and 30 platy iron fragments. Lead bullet sprues number 4 while lead shot number 2 pieces. In addition, 4 brass/copper buttons were excavated. Copper sheet, wire, and strip fragments sum 17, while 1 piece of possible lead foil was found. Distinctly unique items include an iron probable door hinge plate, 2 rolled copper sheets, 1 decorative wishbone-shaped brass/copper item (figure 7.11a), 1 pierced thimble fragment, a defective musket ball, a lead musket

ball fragment, a possibly lead ring item, a copper rod with club-shaped head (figure 7.11b), a heavy iron U-shaped item, a broken lead tube or barrel (figure 7.11c), 2 iron tacks, 1 delicate engraved levering object (figure 7.11d), 2 iron hooks or bent nails, a brass linked-ball trim fragment (figure 7.11e), an iron fishhook, a possible piece of gold wire, a brass ring (non-finger), a brass rod with a catch, 2 iron strap fragments, an iron post-hinge plate, and a lead firearm artifact.

As with the South Central and West Central trenches, most of the metal artifacts from the East Central Trench derive from the dark sandy loam. Exceptions are the brass trim, possible door-hinge, iron U-shaped object, and the iron rod in the topsoil, and from the pit fill the iron strap fragment and lead ring. The topsoil also contains 13 nails, 4 nail/wire fragments, 3 iron wire fragments, 13 unidentified iron pieces, 2 sprues, 4 copper artifacts, and 2 unidentifiable lead pieces. The pit fill contains 10 nails, 1 iron wire, 8 general iron artifacts, 1 button, and 1 copper sheet fragment. Of all units 125S, 18W sports the highest number of nails at 23; the next highest is 125S, 24W with 17; and 125S, 19W and 22W tie with 14. The provenience for some unique items are: iron nail bent into hook, 125S, 21W; iron fishhook, 125S, 18W; iron hook, 125S, 22W; engraved object 125S, 23W; defective musket ball, 124S, 24W; wishbone-shaped ornamental piece, 123S, 24W; iron post-hinge plate, 122S, 24W; and lead sprues, 125S, 18W.

In the bone bed deposits, 11 iron but no brass nails were excavated. General iron fragments number 6, while platy pieces total 2. One artifact each was recovered from the categories of iron strap fragment, iron hook/nail, brass button, and iron undifferentiated nail/wire. Nail density equals 22 artifacts per cubic meter.

METAL AT FRBS

The 71 metal artifacts recovered from FRBS are described here by area. In general, most metal artifacts derive from the mottled brown clay though seven of the nine from the Middle Profile are from the pit fill. No metal was found in the East Bench.

EAST PROFILE

Recovered here were 1 iron nail, 1 copper strip, 1 lead bullet, 1 .22 caliber shell casing, and 3 platy iron fragments.

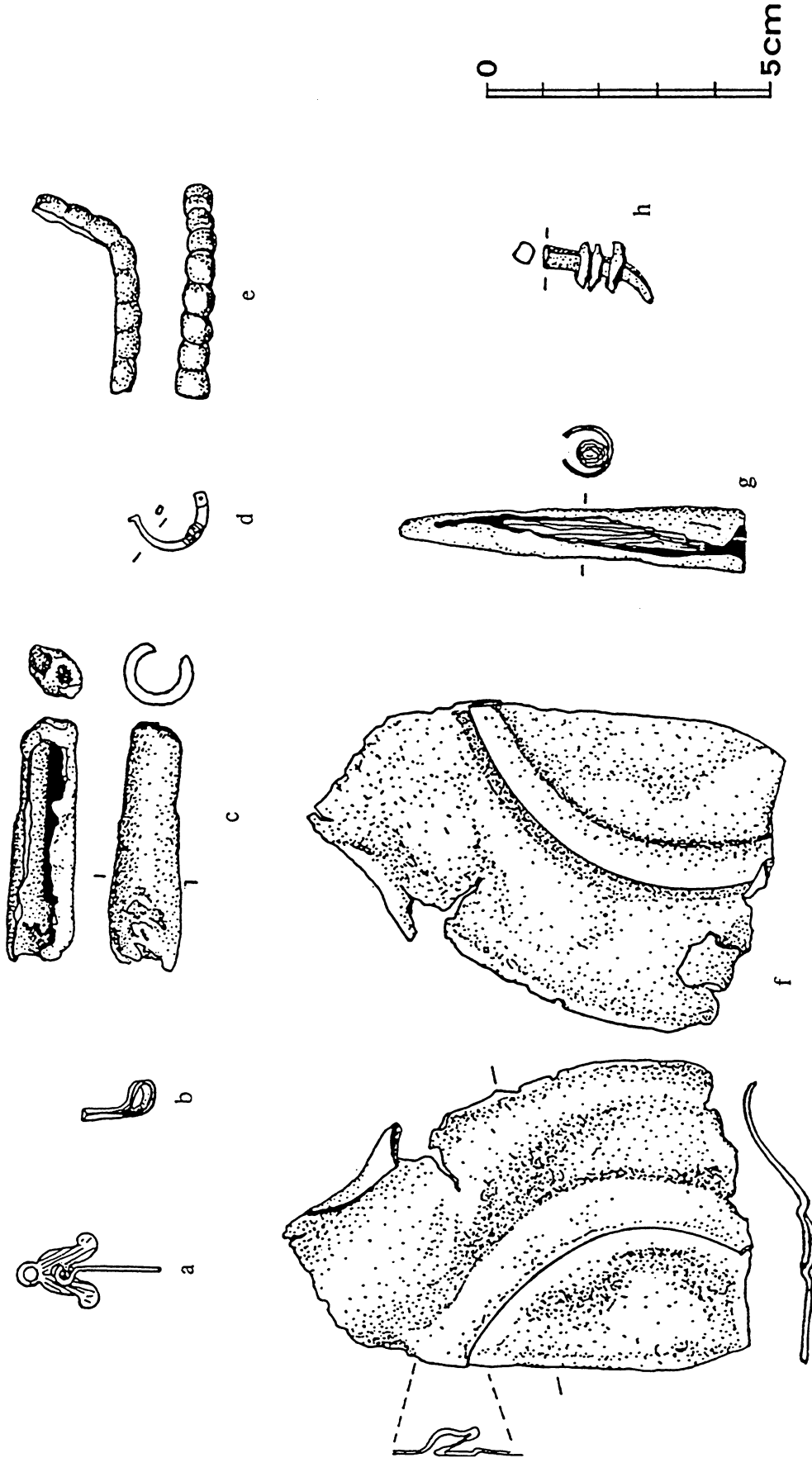
MIDDLE PROFILE

These units produced 4 iron wire/nail possibilities, 2 iron nails, 1 iron spike, 1 piece of iron (?) foil, and 1 piece of miscellaneous, unidentifiable iron.

WEST PROFILE

Similar to other profile units, this area possesses 3 iron nails, 2 fragments of iron sheet-like material, 1 piece of iron slag, and 1 specimen each of brass nail and brass spike.

Figure 7.11 Metal Artifacts



- a. Brass or copper decorative piece, NAVS-7/13/92-55-ME-1.
- b. Rod-shaped copper or brass artifact, NAVS-8/6/91-9-ME-1.
- c. Lead tube/barrel fragment, NAVS-7/13/92-54-ME-1.
- d. Unidentified stamped levering artifact, NAVS-8/14/91-92-ME-1.
- e. Brass linked-ball trim (?), NAVS-8/15/91-6-ME-1.
- f. Copper vessel fragment, NAVS-8/9/91-54-ME-1.
- g. Wooden dowel wrapped with sheeting, NAVS-8/10/91-10-ME-1.
- h. Three leather disks on brass nail stock, NAVS-8/9/91-61-ME-1. (Illustrations by Judith Ogden)

SOUTHWEST BENCH

The more numerous and spatially extensive units in this excavation area produce a proportionately higher quantity of metal artifacts. Nails themselves number 24, with 87.5% as iron and 12.5% as brass. Four iron spikes, 4 platy iron fragments, 1 iron wire/nail, and 1 iron sheet-like fragment were excavated. Other iron items include 2 pieces of ore and slag, 1 heavy iron ring-like object, 1 iron wire bent into a squared U-shape, and 5 unidentifiable pieces. In addition, 3 copper sheet fragments and another .22 caliber shell casing were located.

INTERPRETATIONS OF MATERIALS AND DISTRIBUTIONS

Interpretation of the historical archaeological materials derived from NAVS and FRBS can follow along a number of different lines. First, the materials allow an investigation into the general chronology of the site, or at least the historical context from which the materials such as ceramics and beads derived. Second, patterns in the distribution of ceramics, glass, metal, and beads across the two sites permit a discussion of potential site organization and use. Within this context, I investigate the historical assemblage as a raw material source for Native Alaskan and Native Californian implements. Third, issues of interethnic cohabitation and cultural change will be addressed. Finally, the historical materials provide a particularly large window through which to hypothesize about the participation of Native Alaskans or Californians in the wider world culture repertoires of the Russians and Europeans. This window is framed by comparing historical artifacts from NAVS and FRBS with other assemblages at Fort Ross. Though the discussions will inevitably interdigitate, I will try to treat them separately.

CHRONOLOGY

Though historical artifacts are excellent sources from which to document the behavior of the individuals residing at the Native Alaskan Village Site, it is still necessary to remember that intensive use of the Fort Ross area for more than a century after Russian abandonment of the Colony may have provided an influx of "contaminating" artifacts. This problem is partially avoided by not excavating in the north area of NAVS where historical records and the high density of metal artifacts on the surface attest to such intensive post-Russian use (see chapter 5 in this volume). Discussion here deals primarily with the artifact categories of ceramics, beads, and window glass since they allow more precise age estimations than do the fragmented vessel glass and metal artifacts as currently studied.

Ceramics. The time-span suggested by the ceramic material equates well with the 1812-41 Russian occupation of Fort Ross. South's ceramic date formula (1977:201-275; see Carlson 1983) might have proven useful, but the short duration of the Russian occupation

and the nature of disagreement over the formula's usage (see discussion in Majewski & O'Brien 1987:171-2) render it unnecessary. The predominance of transferprint and handpainted blues point to an early 19th century date (ca. 1820s and 1830s) of deposition as do the blue and green shell-edged types of pearlware flatwares. These pieces could be heirlooms introduced later than the Russian presence, but the ubiquity and relatively large quantity of the blue transferprint and handpainted sherds are part of a trend that cannot be explained by heirloom pieces alone. In addition, the predominant hues of "brown, mustard yellow, and olive green" present on the NAVS and FRBS handpainted polychromes suggest a date prior to the introduction of red, black, and lighter blues and green around the early 1830s (Lofstrom et al. 1982; Miller 1991:8). All later colors do occur but in small quantities. Furthermore, the one recovered maker's mark on earthenware of Clews Warranted Staffordshire from the dark sandy loam of the South Extension Trench indicates a definite Russian Period date of manufacture (1818-34, see above). Moreover, the Russian ceramic with the identified Cyrillic trademark also indicates deposition within the Russian Period.

Underglaze printed ceramics that could suggest a later age of deposition, though probably still falling within the last decade of Russian occupation at Ross, are few in number. They include refined earthenware of flow blue and transferprint black, purple, red, and brown (see discussion above with Miller 1980, 1991; Noel Hume 1970; Sussman 1977). It should also be noted that *no* sherds of polychrome transferprint, which post-date 1840 (Godden 1963:115), were recovered from excavations at either site, though they were recovered from excavations in the Stockade (Barclay & Olivares n.d.). Flow blue designs (1830+) occur unequivocally on only eight sherds in the entire collection, but the difficulty of assigning small sherds with a face of dark blue to either flow blue or handpainted blue may have resulted in slight underestimation of flow blue presence. In addition, transferprints of black, purple, red, and brown (post-1829) occur as only 3, 2, 5, and 17 sherds, respectively, in the collection. Black transferprints derive only from the South Trench and South Extension Trench of NAVS. Purple prints appear in both the South Trench and the East Central Trench of NAVS as 1 sherd apiece. Red occurs only at NAVS in the West Central Trench and South Trench; and brown occurs as only 2 specimens in the South Central Test Unit, 9 from the South Trench and South Extension Trench, and 6 from FRBS.

Although the presence of these three decorative types may indicate a post-1841 date, their relatively small number more likely suggests a date of deposition during Russian residence. It might be hypothesized that the paucity of definite post-1829 ceramics in the excavations hints at a depositional context early in the Russian occupation. The presence of these transferprint ceramics

either in pit fill or (more often) dark sandy loam, however, suggests that the constructed features and subsurface loam denoted activity after circa 1830. As tabulated earlier, both bone beds contain only handpainted blue, transferprint blue, and undecorated refined earthenware; thus, they do not provide substantial evidence for either conclusion.

Methodologically, the preceding speculation harbors some difficulties. The presence of an artifact with a known date of manufacture indicates the date *terminus post quem* (Noel Hume 1970:11). The absence of particular forms (such as polychrome transferprints or sponge decoration) may also indicate a *terminus ante quem*, a date before which an artifact became available, but interpretations based on absence cannot entirely account for the behavioral reasons that might weigh against its presence in a particular site. For example, it may be that the Russian counter at Ross did not receive many shipments of transferprint brown, red, black, and purple ceramics during the last decade of occupation. This is equivocal given that the Official's Quarters excavation in the Stockade produced 108 transferprint earthenware sherds expressing similar quantities as at NAVS/FRBS with 4 brown, 15 red, 1 black, and 2 purple (Barclay & Olivares n.d.:table 2a). Or, perhaps transferprint polychromes entered the market near the end of Russian occupation in California, but Ross inhabitants had no desire for the wares. This is fully contradicted in the Official's Quarters with 21 of 108 transferprint earthenwares as polychrome (Barclay & Olivares n.d.:table 2a), though these additions could be post-Russian. Therefore, a final option, that the depositional context of those wares at NAVS/FRBS may yet be undiscovered, must await future excavations.

In essence, before chronological conclusions based on absences can be accepted as highly plausible, evidence for the lack of behavioral explanations on the part of individual consumers or users must be presented. According to the evidence, the ceramic types and absences at NAVS and FRBS may arise from differential deposition rather than from the simple lack of such ceramics anywhere at Fort Ross. Thus, the lack of these items in the NAVS/FRBS deposits appears not to indicate a particular *terminus*. The differential deposition may ultimately relate to the lack of access, whether by choice or wealth, to these particular wares by Native Alaskans and Native Californians residing at or near Fort Ross.

In addition to general ceramic date representation across the site, the pit fill and bone bed deposits excavated at NAVS in the East Central Trench and South Trench contain historical ceramics, and their decorative types may provide an estimate of their age of infilling. Fill deposits in the East Central Trench and Extension Trench contain handpainted blue, handpainted polychrome, transferprint blue, and undecorated forms of refined earthenware. As such, no unequivocal indication

of later material is supplied. In the pit fill of the South Trench, decorative types are the same as the East Central Trench and Extension Trench except that handpainted polychromes are absent and a transferprint black refined earthenware was recovered. If bioturbation is not the source of the latter, transferprint black may suggest a later date for the filling of the South Pit Feature. In addition, the bone beds overlying the two different pit features display primarily handpainted blue and transferprint blue refined earthenware, and as such, do not *necessarily* indicate a later date of deposition for the probable trash dumping locales. However, stratigraphic position of the bone beds over pit features indicates that filling of the pit had to predate the construction of the bone beds.

The presence of ware types, especially yellowware and ironstone, provides an additional entry point for discussion of chronology. Yellowware, postdating the late 1830s and 1840s (see above) is represented by only ten pieces in the entire assemblage, four of which occur in the mottled brown clay of the FRBS Southwest Bench. At NAVS, yellowware occurs only in dark sandy loam strata as three pieces each in the East Central and South trenches. The annular decoration present on almost all of the yellowware pieces may point to a date after 1840. Finally, the lack of more than a handful of mid-19th century ironstones, or "stone china," sherds suggests a solid Russian Period date (i.e., prior to American Period), especially given their presence in the Metini site, which contains American Period artifacts (Ballard 1995; Smith 1974)⁸. However, several recovered ironstone pieces appear to be early attempts at very refined earthenware-like vessels and thus may date from 1800-1820s (see discussion in Miller 1991:9-10). The two pieces of later ironstone paneled cups recovered from the *surface* of NAVS suggest a late 1840s date (Majewski & O'Brien 1987:114), but they are the only unambiguous fragments of the ware recovered from the excavations.

Interestingly, the one sherd of delftware recovered in the dark sandy loam of the East Central Extension Trench has a terminating manufacture date at least 10 years and perhaps as many as 80-100 years before Russian occupation of the California coast. Whether this is an heirloom piece introduced by Russians, Creoles, or Native Alaskans or whether it represents earlier trade contacts of Native Californians with Europeans is unknown. The unidentifiable red-bodied stoneware described earlier may reflect such earlier trade. Therefore, the indication is still that the ceramics recovered from the NAVS and FRBS excavations are predominantly those of the 1812-41 occupation of the Russian counter headquartered at Ross.

Beads. Beads provide another source for chronology, and Lester Ross's chapter 8 supplies information needed to address this issue. Suffice it to note here that he concludes that the NAVS bead assemblage rests

comfortably within the 1812-41 date bracket. The recovery of a fragment of a ceramic blue "Prosser" bead (FRBS-6/15/89-7-BE) from the subsurface of 8S, 18W at FRBS, however, indicates an intrusive element as it postdates 1840.

Glass. A third artifact category casting light on the general dating of the NAVS and FRBS assemblages is window glass. As mentioned earlier, a study at UC-Berkeley has elucidated the potential of window glass as a chronological tool (Cohen 1992). Using Roenke's (1978) pilot study determining the relationship between window glass thickness and dates of manufacture, Cohen (1992) relies on the variable thickness of window glass recovered from NAVS, FRBS, and the Kuskov House (located within the Stockade walls) to demonstrate statistically the high probability that the window glass recovered from the Fort Ross excavations does indeed fall within the 1812-41 date range. Though only preliminary, the study tends to confirm that the archaeological deposits from NAVS and FRBS are representative of the time in question with only minor occurrence of post-Russian materials.

Finally, the only three bottle neck fragments recovered from the excavations provide additional support. The two black glass necks from NAVS, as discussed in the preceding section, suggest a date of manufacture from 1820-40. The mustard bottle neck from the surface of NAVS, on the other hand, suggests a later time of manufacture.

Summary. Three things are suggested for the chronology of the NAVS and FRBS deposits. First, very little post-1840 material was recovered from excavations, suggesting that at least a high percentage of the artifacts were deposited during Russian occupation. Second, most of the both possible and definite post-1840 materials were recovered either from the surface of NAVS (mid-19th century ironstone, mustard bottle) or from FRBS (Prosser bead, yellowware). This appears to indicate that though some post-Russian material is undoubtedly present at both sites, the highest influx is probably at the Beach Site. Third, pit feature and bone bed deposits from the East Central and South trenches at NAVS are equivocal in dating, though they may date before the last decade of Russian residence based on the presence of only one black transferprint ware and the absence of other "later" material. However, the black transferprint ware from the pit fill of the South Trench may indicate a component of a late dumping episode, if bioturbation is not a problem.

SITE ORGANIZATION AND USE

Based on distribution of historical materials across the two sites, interpretations of site use and patterning can be suggested. Though this organization extends into the next section on native participation in European material culture, I find it essential to highlight what is known and not known about the distribution of materials

across the site. In the beginning, it is necessary to reiterate that density of ceramics in the South Trench indicates more intensive use or dumping than other excavation areas, while glass in the South Central Test Unit displays higher densities than the others (except unit 12SS,18W). In either case, these two excavation areas have generated far more material per volume of sediment than the other two. Interestingly, the South Central Test Unit offers the highest density of historical material within the dark sandy loam, while the South Trench had its highest densities in the overlying topsoil. Perhaps this suggests a later use of the South Trench area during the occupation of NAVS, or perhaps more intense bioturbation.

Evidence of Refuse Deposition. Evidence is compelling that a majority of the ceramic and glass artifacts recovered from NAVS represent discarded material as secondary trash deposition. Generally, the stratigraphic interpretations in chapters 3 and 16 suggest that dumping episodes are present in several areas of NAVS above a constructed substrate of pits and other features. In reference to ceramics, my inability to refit any but a handful of sherds (0.96%) across both sites intimates that the assemblage resides in a secondary context. The highest proportion is at FRBS with 2.8% (6/211), while NAVS only had 0.85% (9/1040). This may indicate that the former resided in a more primary trash context, or at least an undisturbed secondary one with downslope movement of ceramics causing their breakage. In a qualitative sense, the ceramic collection as an expression of complete vessels compares poorly with other historical archaeological collections in which whole vessels are usually located or reconstructible (see Felton & Schulz 1983; M. Praetzelis 1980). More specifically, highly complete or reconstructible vessels have been recovered from inside the Fort Ross Stockade (Barclay & Olivares n.d.; O'Connor 1984) and from Russian-American Company associated Native Alaskan sites in southwestern Alaska (Jackson 1991), the Kurile Islands (Jackson 1994), and Three Saints Harbor (Crowell 1994), though the latter ceramic assemblage is quite small. Although no quantitative measures are performed on the NAVS and FRBS ceramics to determine mean size of sherds, it is apparent through visual observation that fragmentation is very high.

The situation with the glass artifacts is even more acute. The assemblage of both vessel and window glass is extremely fragmented, with only a few large pieces recovered. Most fragments are minute, and vessel identification is virtually impossible for the majority of the artifacts. Although high fragmentation is easily achieved for glass, ceramics are more resilient to excessive fragmentation without high stress loads. Merely dropping a plate on the ground will undoubtedly break it, but the act will probably not fragment the plate into a multitude of tiny sherds to the exclusion of any large

pieces. In addition, the presence of a number of bent nails (see below) may further relate to the presence of material discarded, perhaps by Russian and Creole inhabitants of the Stockade or Russian Village, as ineffective or no longer useful.

Based on ceramics, the NAVS/FRBS collections can be compared to the previous excavations of the Stockade to ascertain context of deposition. As demonstrated in the descriptive section above, all four areas excavated at NAVS average approximately 80% refined earthenware, 16% porcelain, and 4% other ceramics. This trend may be important, even though individual units fluctuate widely at times. At FRBS, however, there are more than 90% refined earthenware in the Southwest Bench but only about 73% earthenware in the profiles. Nonetheless, all excavation areas covered in this chapter range from 70-90% earthenware. The ceramic group percentages of NAVS alone closely resemble those recovered from the Metini site outside the northwest corner of the Stockade, the trash dump site located northeast of Metini and the Stockade, and the "Highway Area" excavation near Highway 1 (table 7.25; see O'Connor 1984:50). Unfortunately, the latter two are problematic and extend beyond the occupation of Ross by the Russians.

Percentages are higher for earthenware in the NAVS assemblages than in any excavation conducted inside the Stockade, with the possible exception of 75% in the Kuskov House (table 7.25). The percentages of porcelain, however, are not considerably lower in NAVS than in the areas inside the Stockade walls, except perhaps for the Barn or Official's Quarters (table 7.25). Excavations within the Stockade have produced a number of grey, buff, and white stoneware and earthenware ceramics that are rare or completely absent in the NAVS and FRBS excavations (Barclay & Olivares n.d.; O'Connor 1984).

As such, the diversity of ceramic materials is much lower in the NAVS/FRBS collection than that recovered from inside the Stockade. The presence of non-European artifacts—bone and shell beads, marine invertebrate remains, obsidian and chert lithics, modified glass and ceramic, worked bone—in discrete bone bed deposits and intermixed with less definable ones reflects a substantial contribution of Native American refuse. If this scenario depicts discard behavior at the Stockade and its occupied perimeter, the NAVS assemblage may generally reflect ceramics discarded from Native Alaskan and Native Californian and possibly Russian/Creole inhabitants.

The Possibilities of Recycling. A different conclusion that could be drawn is that Native Californians and Native Alaskans were recycling the discarded materials of Russian residents and depositing them in their general residential area. Even though no complete or even reconstructible vessels were recovered from research described here, this does not preclude the possibility that residents of the Native Alaskan Neighborhood used complete ceramic vessels in their everyday lives. It may just be that appropriate residential areas have not yet been thoroughly excavated. Even if primary use of vessels led directly to intentional modification early in their use, some relatively complete vessels should have been reconstructible. Note that the only unequivocal refuse dumping areas are the bone bed features and the underlying pit features. Therefore, artifact distribution in the South Central Test Unit and the West Central Trench, due to the lack of bone bed deposits, may have to do more with intensity of residential use than with discrete trash dumping locations. The high density of materials in the South Central Test Unit may reflect a generalized deposition of secondary refuse materials (see Wilson 1994:44).

Table 7.25 Ceramic Comparison: Frequencies of Ceramic Types for Other Areas Inside and Outside the Fort Ross Stockade (compiled from O'Connor 1984:table 2)

Site	Total	RE % ^a	POR % ^b	Other % ^c
<i>Inside Stockade</i>				
Barns	488	63.3	25.8	10.9
Southeast Area	184	67.4	17.9	14.7
Kuskov House	647	75.0	17.2	8.3
Official's Quarters	4393	70.7	20.9	8.4
Chapel	51	64.7	17.6	17.6
<i>North of Stockade</i>				
Metini ^d	371	81.6	16.2	2.2
"Trash Dump"	215	81.0	11.6	7.4
Highway Area	1459	80.2	19.7	0.1

^a RE = Refined Earthenwares

^b POR = Porcelain

^c Other = all stonewares, yellowware, and pipe fragments (see text for details)

^d This site is called Mad-Shui-Nui in O'Connor's thesis, but Ballard (1995) has since refined archaeological interpretations of the site and considers it an extension of the Metini site located slightly further to the north.

If Native Alaskans and/or Californians were truly recycling the Russian trash deposits, then the following conditions would be likely: 1) selectivity on the part of the collectors for raw material; 2) the presence of minimal to no complete vessels; 3) high fragmentation as a result of relocating the refuse to a secondary or even tertiary deposit; and 4) modification of some recovered historical material. The first condition is equivocal in the NAVS/FRBS assemblage in that even though it has less diversity in the ceramic materials compared to excavations inside the Stockade, the relative frequency of particular classes of historic ceramics is fairly consistent with excavations outside the Stockade. In addition, there may be reason to suspect that a diversity of materials was being sought, rather than select items. Yet, selectivity is suggested in the differing percentages between the frequency of a particular class of material and the frequency of that same class in the category of worked artifacts. The strongest example is given in the earlier section of the chapter on worked ceramics.

The criteria of minimal to no reconstructible vessels or refittable portions is easily upheld with the vessel glass and ceramic assemblages, though a secondary depositional context alone could produce that pattern. Excessively high fragmentation, as seen in the ceramic and glass materials, does tend to support the notion that further repositioning of refuse increases chances of additional breakage. It may be that the NAVS terrace has received sedimentary compaction due to grazing sheep or agricultural activities, but if this were true, then more refittable sherds would be expected than the three pairs and one triad recovered from NAVS. In addition, the large number of worn and highly eroded sherds recovered from NAVS hints at the likelihood of recycling. These ceramics appear to be waterworn, and their presence on the NAVS terrace far upslope from the nearest moving water sources of Fort Ross Creek and the ocean shoreline suggests human transport of already broken vessels.

Furthermore, the high incidence of breakage among the materials may relate to a process of modification by their new users. Though worked glass and ceramics are not in abundance, their presence indicates the importance of ceramic and glass items as raw material for Native Californian and Alaskan manufacturing techniques. To reiterate, worked glass is 0.5% of the 183 glass artifacts in the South Central Test Unit, 3.3% of the 212 glass artifacts in the West Central Trench, 10.0% of the 410 artifacts in the East Central Trench and Extension Trench, and 4.5% of the 1011 glass pieces in the South Trench and Extension Trench. In sum, a total of 5.2% of the total NAVS glass assemblage is worked. At FRBS, the same percentage of 5.2% of the total glass is modified, with all but three pieces in the Southwest Bench, which has 6.9% of its total glass assemblage as worked. Worked ceramics are 1.1% of the total 1040 excavated NAVS ceramics.

It can be hypothesized as well that high fragmentation of both glass (primarily vessel) and ceramic artifacts derives from purposeful reduction of vessels and other sherds garnered from refuse deposits. With glass, this may relate to blank or preform creation; with ceramics, reduction may involve preparation of bead blanks (see Layton 1990:figure 4.13; Shangraw & Von der Porten 1981:71; Von der Porten 1972:5, figure 19), similar to the process by which abalone and clam shells are broken down into polygonal sections for later bead drilling. Of the Drake's Bay assemblage recovered in the Coast Miwok area of Pt. Reyes National Seashore, Von der Porten (1972:5) suggests that the highly fragmented porcelain assemblage may relate to an attempt to "release the spirit" of the previous European possessors or to reduce the size to facilitate bead and scraper manufacture. Although the first proposition is unknowable at this point, the latter may be manifested at NAVS and FRBS.

Moreover, the presence of non-refitting pipestem fragments may reflect use of those stems as raw material for "preformed" bead sources, requiring only a detaching incision. This supposition is not unambiguously supported given the lack of either pipestem beads or pipestem fragments with unequivocal traces of intentional cutting. One pipestem (figure 7.7-1) does show evidence of chopping on one of the exterior surfaces, but it could possibly be the marks of a user biting off the end of a saturated pipestem.

Consideration of the bone beds, recognized as discrete dumping episodes on raised pit fill deposits, may shed light on the issue of recycling. The East Central Bone Bed contains 34 ceramics with a total density of 68 sherds/m³, which is very close to the average density for the East Central Trench as a whole. The South Bone Bed is similar with a density of 70 sherds per cubic meter (n=35). This density is half as much as the South Trench as a whole or most of the other units.

Vessel and window glass occur in the two bone beds (East Central [n=45] and South [n=65]) as 90 pieces/m³ and 130 pieces/m³, respectively. Density of glass artifacts in the East Central Bone Bed is approximately the average for East Central Trench, although this density is lower than that in the stratum in which the bone bed generally occurs. In the South Trench, the density of glass in the South Bone Bed is about 50% less than the density in the entire South Trench, specific units therein, or the stratigraphic layer. Percentage of window glass in the East Central Bone Bed (57.8%) hovers between the percentages recovered for the trench as a whole (44%) and for the dark sandy loam (64%) from which most material is derived. The reverse trend in the topsoil and part of the pit fill may be significant. In the South Bone Bed, window glass is also higher than vessel glass in percentage (89.2% vs. 10.8%) but in a much more visible way. Window glass in the entire trench is 75.4%, though some of the units containing the bone bed have percent-

ages approaching and sometimes exceeding 80% depending on soil stratum. In addition, worked glass recovered from the bone beds includes a flake of window glass (South Bone Bed), a green projectile point, an edge-modified flake, and a flake (East Central Bone Bed).

Though sample size is relatively small, three things might be interpreted. First, the higher percentage of porcelain found in the bone beds than found in any of the strata, units, or trenches may indicate a selectivity for porcelain within the trash dumping episode. This, in turn, may reflect a selectivity for porcelain as a raw material collected from other refuse deposits, though only a few porcelain worked pieces support this claim. Second, the lower density of ceramics in the South Bone Bed than in surrounding strata or units is intriguing. Since the bone beds appear to represent cooking refuse, the lack of ceramic sherds may indicate that few ceramics (as vessels) were actually being used for cooking purposes. Cooking refuse, however, may not contain elements of cooking technology if the implements were not broken or were baskets. Additionally, vessel fragments recovered (e.g., bowls, teacups) may relate to food consumption rather than processing. Third, the possibility that window glass was obtained primarily for raw material is weakened by two facts. (1) Based on frequencies, more window glass was deposited in the South Trench and Extension Trench both within the bone bed specifically and in the area generally than in the East Central Bone Bed; and (2) the percentage of worked window glass within the worked glass is only 16% for both areas, indicating that the predominance of window glass in the South Trench, Extension Trench, and South Bone Bed does not reflect a preference for window glass as raw material in either depositional context.

Rather than suggesting the recycling of glass, the pattern may point to the likelihood that more architectural structures were present near this southern area. Documentary support exists with Payeras's (1995) record of the presence of "good glass" in windows of Native Alaskan residences south of the Fort. In addition, the presence of structures on NAVS is further suggested from the high to relatively equal percentages of window glass compared to vessel glass given that the percentage of window glass is extremely low at FRBS where no structures were noted or projected. In chapter 3, it is suggested that deposition of the South Bone Bed may relate to final abandonment of the site, and as such, this pattern may reflect dismantling of glass windowed structures in that area. (See discussion above about the ceramic-related chronology in bone bed contexts.) Though not in large enough numbers in the bone bed itself for lengthy discussion, density of nails in the South Trench ($30.3/m^3$) far exceeds that of either the South Central Test Unit ($9.0/m^3$), East Central Trench ($14.7/m^3$), or the West Central Trench ($12.70/m^3$). Such a pattern offers more evidence of structures with nails in the

vicinity of the South Trench, especially given that iron nails are 76% of the total iron and brass nails. Brass nails may actually reflect forms either for ship construction or for attaching metal siding or sheets to wood.

Interestingly, however, the number of bent nails is only 8.3% of the South Trench and Extension Trench total nails while 15.9% of that recovered in the East Central Trench and Extension Trench. As such, I believe that this can indicate intentional bending of nails as they are reworked as raw material, or discarding of unusable nails in general trash dumping areas in which potentially related window glass was deposited, or accidental bending of nails as they are pulled from wooden substrates. A broken tip of a square-stock cast brass nail, recovered from the pit fill of the East Central Trench, seems as though it may have been a leather punching tool, given the presence of leather disks remaining on the item (see figure 7.11h). In addition, nails bent into hook-like shapes may have been done so intentionally to form usable hooks (NAVS-7/15/92-38-Me-1, NAVS-8/10/91-15-Me-1, NAVS-8/14/91-178-Me-1, NAVS-8/7/91-47-Me-1). Whether these forms were ever hooks is questionable, but one specimen (NAVS-8/10/91-15-Me-1) is a brad type of nail with an L-shaped head, which could easily provide an anchor for line attachment.

INTERETHNIC COHABITATION AND CULTURE CHANGE

The extent and implications of cohabitation between Alaskan (mainly) men and Native Californian (mainly) women is of prime importance in this research. The historical materials, especially as secondary refuse, thus provide a way of entering the discourse on ethnicity (Wilson 1994:58). The presence of certain items of material culture may provide an inferential link to notions of identity, though simple artifact ratios are not sufficient (Lightfoot 1995; cf. South 1988:53). In fact, ambiguity existing at these boundaries is not at all unexpected given the individuality and contextuality surrounding cultural contact in a frontier situation (Lightfoot and Martinez 1995). At the same time, distinct boundaries reflected in material culture could have been actively maintained to transmit information (Wobst 1977). Given this ambiguity, I want to address traditional Native Alaskan and Native Californian practices and preferences that appear to be represented in the archaeological record at NAVS. As such, my search will be more for identity than for ethnicity, more for the presence of behaviors with a history rather than for personal histories themselves (see chapter 1). Statements made are preliminary and reliant on future archaeological work to verify or reject.

An important line of evidence for a large amount of Californian influence derives from the bead assemblage. Lester Ross's analysis has demonstrated that the color preference at the site of white, red, green, and black beads is uncharacteristic of bead assemblages reported for other Russian-American Company affiliated Native

Alaskans, especially the notable absence of large quantities of blue beads or any Chinese beads. Historically, Cyrille LaPlace reported that a Native Californian chief wore around his neck "several necklaces of small glass red or black beads" (Farris 1986:77-78). Thus, this may indicate a substantial Native Californian presence at NAVS and FRBS, at least in terms of material culture.

It is unclear based on the bead assemblage alone, however, whether the pattern represents 1) instances of cohabitation of Kashaya Pomo or Coast Miwok women with Native Alaskan men suggesting the beads represent "her" loss, 2) cases of Native Californian men's or women's cultural preference altering the traditional bead color preferences of Native Alaskans, or 3) the fact that the presence of Pomo or Coast Miwok individuals, whether male or female, on the site has been underestimated in the ethnohistorical and historical literature. Distribution of colored beads across the site may help resolve the issue, but such analysis is not included here. Moreover, the presence of clamshell disk beads further points to a Native Californian presence, though it is unclear whether they truly entered the deposit during Russian occupation. Since no clamshell disk bead blanks were recovered from the NAVS or FRBS excavations, this may indicate that the beads were entering NAVS prefabricated, suggesting a definite Native Californian origin.

Worked vessel and window glass provide further areas for consideration. The transposition of traditional lithic technology onto a new raw material may reflect a strategy of Native Californians. The presence of worked glass at presumably contemporaneous Kashaya Pomo sites throughout the Fort Ross survey area (Lightfoot et al. 1991) and on the first major coastal ridge overlooking the Fort and coastline (Martinez 1995), further suggests that this technology was at least a Native Californian practice. Moreover, Ballard's (1995) and Smith's (1974) research provides more examples of the Kashaya Pomo near Fort Ross using historic glass as a raw material for production of projectile points, scrapers, and utilized flakes. Examples south and north of Fort Ross in Coast Miwok (Slaymaker 1977:164) and Mitom Pomo (Layton 1990:184) sites, respectively, of modified bottle glass further strengthen the trend. On the other hand, Crowell (1994) discusses the working of manufactured glass, though in small quantities, in the early Russian-American Company affiliated Native Alaskan site at Three Saints Harbor. Other examples include the Tikchik site on the Nushagak River (VanStone 1968) and Kiaviak (Clark 1974). Nonetheless, overall quantities of worked glass from these three sites is small ($n < 6$) with diversity of tools correspondingly low.

Evidence for glass working and deposition appears to occur primarily in the East Central Trench and Extension Trench of NAVS and the Southwest Bench at FRBS. As previously discussed, the East Central Trench

and Extension Trench have 10.0% of the total glass as modified, while the South Trench and Extension Trench only have 4.5%. In the pit fill of the East Central Trench and Extension Trench and the South Trench and Extension Trench, modified glass is 9.1% and 6.6%, respectively. If Native Californians were the primary glass flakers, then they may have been more concentrated in the east central area, though the south area has similar percentages in the pit fill. However, FRBS provides a different picture. The Southwest Bench at FRBS has 9.0% of the total glass as modified while the East Bench and profiles have only 2.1%. If higher percentage reflects more glass working and deposition on the relatively level exposure, were Native Californians spending time there? As a probable trash accumulation from downslope movement from NAVS, such a conclusion is highly speculative.

In addition, the nature of modified ceramic sherds is reminiscent of the style of ceramic reduction noted on porcelains at Drake's Bay (Shangraw & Von der Porten 1981; Von der Porten 1972) and at the Metini site of Fort Ross (Ballard 1995; Smith 1974:figure 17; White 1977). The Coast Miwok at Fort Ross originated from the coast south of the Colony in the area of Drake's Bay. Thus, the two potential ceramic bead blanks (NAVS-8/13/91-3-HC, NAVS-6/15/89-1-HC), probable ceramic projectile point attempt (NAVS-7/13/92-33-HC), and several ceramic scraping implements (NAVS-8/1/91-7-HC-1, NAVS-8/1/91-7-HC-2, NAVS-8/7/91-3-HC) recovered from NAVS may reflect such a "tradition."

In essence, this type of ceramic modification is not unlike the use and reduction of ceramic sherds in other Native Californian sites. The dates for that modification may be inferred only broadly, however, based on what is *not* worked, to fall during or immediately after Russian occupation (Ballard 1995:169). Though I believe that Native Californians may have been the primary users of ceramic refuse as raw material, there is no reason to suspect total absence of that behavior in Native Alaskans. Evidential lines leading to it are just less secure, especially given that, to the best of my knowledge, only one worked ceramic has been located in a Native Alaskan site. As the last Russian-American Company outpost established, Kolmakovskiy Redoubt produced through excavation a circular, perhaps ground, piece of what appears to be a transferprint ware (see Oswalt 1980:plate 37s), but Oswalt does not note it as such. Interestingly, Jackson notes the potential for studying "lateral cycling" and recycling of vessels and sherds at Russian-American Company affiliated native sites in Southwestern Alaska (1991:261), but she does not indicate anything elsewhere, such as in the Kurile Islands, other than mending holes to maintain containers in usable form (see Jackson 1994).

A final avenue for analysis is the frequency of teacup/saucer vessels in the ceramic collection. This is important due to the significance of tea for Native

Alaskans at other Russian colonies, though this pattern appears to manifest primarily in mid- to late 19th century Russian-American Company associated Native Alaskan settlements (Jackson 1991). In many ways, tea served as a status marker (Jackson 1991:203-204). Though sample size is small, the South Central Test Unit displays the only real NAVS prevalence of teacups and saucers over other frequent vessels such as plates and bowls. In other excavation areas across NAVS, frequency varies, but plates and saucers appear to dominate the assemblage though teacups are comparable to plates in the South Trench and Extension Trench and all are relatively equal in the West Central Trench. It may be that the presence of mainly tablewares without a predominance of teawares indicates a lack of importance of tea for Native Alaskans at Fort Ross. As discussed before, the patterns may actually reflect recycling and reuse instead. Additionally, the lack of refitting with teacups does not support their use in primary form, but it does not discount it either. Prevalence of teacups and saucers in the large excavation at FRBS, however, may indicate either a Native Alaskan use of those materials in the cove near their *baidarkas*. More appropriately, use of tea vessels may reflect a Native Alaskan *pattern* rather than *ethnic attribute* per se, perhaps followed by Native Californians. However, the FRBS deposits may be primarily the downhill slump of NAVS material, though the presence of three pairs of refitted (non-vessel specific) ceramic sherds in the Southwest Bench may indicate some primary deposition at FRBS.

Though only alluded to above, gender relations may play an important role in the formation of the archaeological record. Not only is cohabitation/marriage an interethnic mixing, but it is also undoubtedly a highly gendered interaction as the women were predominantly Native Californian and the men almost exclusively Native Alaskan (see chapter 1). Given this context and the likelihood that Native Californian women were cultural mediators between their Alaskan husbands and their Native Californian families (Martinez 1994), it is critical to consider the role of women as agents of change at NAVS. I hinted at the possibility that beads may reflect gender relations at NAVS, but that remains an area for future research. In addition, if Alaskan men truly spent most of their time away from the settlement hunting sea otters (Khlebnikov 1976:101, 131; Golovnin 1979:162; Lightfoot et al. 1991:24), then a majority of the archaeological record at NAVS may be a result of female and non-hunter activities. Undoubtedly, men present during their brief respites and tool refurbishing would have produced their share of material remains, but whether or not actual episodes of filling and dumping are gendered is not clear.

PARTICIPATION IN THE SYSTEM OF EUROPEAN GOODS

The historical artifacts provide valuable evidence

pertaining to the question of acculturation or resistance by Native Alaskans and Californians living within the purview of the Fort Ross Stockade. Taking into consideration the data and interpretations thus far discussed, it is highly likely that Native Alaskans and Californians were participating in the system of European goods and services yet within their particular cultural frame of reference. If refuse deposits located across NAVS, particularly in the South Trench and Extension Trench and the East Central Trench and Extension Trench, truly reflect some of the dumping patterns of people living in the Native Alaskan Neighborhood, then those residents had access to commercial goods of porcelain, common refined earthenware, stoneware, yellowware, and basaltware ceramics; glass of both architectural and vessel nature, the latter coming primarily in green and colorless, though brown and blue forms occurred; glass trade beads in a variety of types and colors; and metal items such as iron and brass nails, buttons, and copper bowls. In a *general* way, these items reflect what has been located archaeologically in the Stockade and what is known historically to have entered the Colony (e.g., Khlebnikov 1990:70-74, see Appendix 6.1).

Of course, it is still difficult to discern whether residents were obtaining the goods in primary or complete form, but the above discussion on the nature of the archaeological deposits suggests that they were primarily dealing with items secondarily deposited by others. This matches the statement in Volume 1 that ethnohistoric accounts suggest that Native Californians had little interest in obtaining European metal, glass, and ceramic goods (Lightfoot et al. 1991:142). In addition, it meshes with other early 19th century Russian-American Company situations in which ceramics were not readily available to non-Russian workers because of their high costs and their potentially high value in other Russian endeavors, such as trading with European colonists (Jackson 1991:46).

NAVS, however, is lacking a number of items recovered from or known to be shipped to the Stockade such as grey or buff earthenware and stoneware, saws, axes, adzes, shovels, razors, scissors, earrings, and other items (see Appendix 6.1). Many of these metal items have appeared in other Russian-American Company associated Native Alaskan sites (see review in Schiff 1995; Shubin 1990). The absence of these may indicate that the NAVS refuse deposits contain items of relatively short use-lives due to fragility and often single-use functions. Therefore, we may have recovered mainly ceramics and glass rather than more durable metal saws, axes, scissors, and other tools because the latter had much longer use-lives. Nails are an exception for metal, but these can be seen in relation to architectural structures on NAVS and to recycling by Native Alaskans and Californians of items that are easily bent, especially when being pulled from wood, and discarded by the primary users.

The NAVS/FRBS collection produced two further patterns worth noting. First, the sherds of Jackfield ware are particularly intriguing in that this ware has not been recovered from any other Fort Ross excavation. The significance of the find is unknown at this point, however, except that Jackfield is not a common find in historical sites in general. Second, a fragment of a blue transferprint pearlware vessel cover was recovered from the FRBS excavations which matched a pattern, though in smaller proportions, located on a pearlware vessel from the Officials' Quarters inside the Stockade⁹. This indicates that the two fragments derive from the same decorative set of dishes, though the actual relation between them is as of yet undiscerned. It may further indicate that the FRBS assemblage received only those ceramic items considered as refuse, since the cover sherd may have been broken and discarded by its user from the Stockade.

Historical records document that Native Alaskan workers received small salaries (Khlebnikov 1990:133; Fedorova 1975:16-18) in the form of scrip that could be used in the Company store (Khlebnikov 1990:99, 186; Tikhmenev 1978:144) and that Native Californian workers generally received only payment in kind by beads, clothing, and food (Khlebnikov 1990:193-94; Kostromitinov 1974:9; Wrangell 1969:211). Therefore, the extent to which Native Alaskans or even Native Californians had the economic capability to purchase ceramic or glass goods in any quantity from the Company store is questionable. Yet, it has been suggested that the majority of commercial commodities being shipped to the Russian-American Company colonies was destined for consumption by Native Alaskans and Californians (Gibson 1976:172). How can this contradiction be resolved, for we must also entertain the notion that these people may have had no desire or necessity to acquire European goods?

The presence of relatively complete ceramic or glass vessels might have suggested primary access, but such evidence does not exist for these excavations. Yet, the recovery of primarily fragmented ceramics and glass, bent nails, and defective metal items all point to refuse deposition. On the other hand, beads are likely to represent items intended for trade, especially as payment to Native Pomo and Coast Miwok workers. In the end, future excavations may produce household materials that speak more forcefully to this issue than does the assemblage from the predominantly trash deposits covered in this chapter.

CONCLUSIONS

Although equivocal in a number of ways, the historical materials offer a glimpse into the lives of Native Alaskans and Native Californians residing at the Russian Colony Ross. First, the ceramic, bead, window glass, and vessel glass collections appear to attest to a

deposition of NAVS material primarily during the Russian occupation from 1812-41. Date ranges overlap and some extend beyond the early 1840s, but the general appearance is of Russian era material. Second, the assemblages at NAVS and FRBS seem to point to historic items that are secondarily deposited. The pit features and bone bed historic deposits are highly indicative of such a situation, and the high fragmentation and general non-reconstructibility of the ceramic and glass artifacts further support the argument. Third, the historical materials may have served purposes similar to those for which they were designed—that is, as eating, serving, storage, or cooking vessels—but the high fragmentation and intentional modification of these by the inhabitants of NAVS suggest that this commonly assumed use of historical ceramics may be seriously questioned (see Farris, chapter 6).

As is always the case with archaeological interpretation, a multitude of unstudied aspects and unanswered questions remain for future researchers. In terms of the material itself, further analysis would be enlightening in the following areas. (1) Ceramic analyses could be conducted for use wear on the exterior and interior surfaces of the sherds to try to isolate whether the vessels had some manifestation of “typical” usage, though the users might still be unidentifiable. (2) With glass artifacts, chemical sourcing might be conducted to look at wider trade and supply issues at Fort Ross. (3) The glass flakes dominating the assemblage might be considered from a “lithic” technology perspective to determine if more of the herein labeled “glass” artifacts might be a collection of debitage from bottle and window glass reduction into usable tools. (4) Finally, with future completion of the bead analysis from the Fort Ross Cemetery excavation conducted by Lynne Goldstein (1992, n.d.), the NAVS and FRBS bead collections may be compared to beads found in a primary decorative context in the individual graves. Such an attempt may isolate the ways that different kinds and colors of beads were used, at least by individuals interred in the presumably Russian Orthodox graveyard.

In a wider context than NAVS/FRBS materials alone, further research is in order for the Fort Ross locale as a whole. For instance, since NAVS appears to bracket dates for Russian occupation, NAVS excavations provide a rough baseline for what is definitely present in the Fort Ross Counter during the early to mid 19th century. Native Alaskan and Californian consumption and use are not expected to mimic that of Russian or Creole individuals, but artifacts recovered from the site at least attest to the types of material physically present. In other words, the FRBS and NAVS excavations may provide a limiting case.

In addition, more detailed comparison of the NAVS/FRBS historical assemblages to other excavations inside the Stockade may provide more thorough perspectives on

contrasts and similarities among and between the lifestyles of the interacting groups. Since boundaries between colonizers and indigenous peoples cannot be considered distinct nor impermeable with acculturation as the only direction of change from Russians/Creoles to Native Alaskans/Californians (see Lightfoot and Martinez 1995), such a comparison might prove fruitful to the question of cultural change in frontier situations. Finally, the artifact assemblage and spatial arrangement of the sites, especially NAVS, undoubtedly offer opportunities to consider social, political, and gender relations within and between the multiple ethnic identities represented.

ACKNOWLEDGEMENTS

Research for this chapter was partially supported by a National Science Foundation Graduate Fellowship. A number of important people must be thanked for their contribution to the formation of this chapter. First, individuals at the Department of Parks and Recreation in Sacramento—Glenn Farris, Larry Felton, Lee Motz, and Peter Schulz—deserve recognition for their assistance in tracking down various items or their insights into ways to tackle this material. As an initial collaborator, Glenn Farris deserves many thanks for his input and thoughts on the material provided here and an early draft of this chapter. Also, discussions with Hannah Ballard, Antoinette Martinez, and Peter Mills helped to clarify issues and materials presented here. Technical assistance with cataloging and preparing the artifacts for analysis was provided by Lisa Holm and Erin Mulholland; their help is much appreciated and was essential to the completion of this project. Lisa Holm and Ann Schiff are especially thanked for insights into the workings of PARADOX and excellent laboratory organization, respectively. Of course, thanks is extended to Kent Lightfoot and Ann Schiff for the opportunity to complete this analysis and for their thoughtful insights into its form and content. Finally, I thank Tracey Spoon for her patience and support while I finished the project, long though it was. In the end, any faulty logic, misperceptions, or mistakes remain my own.

NOTES

¹Artifacts covered in this chapter are called “historical artifacts” only by convention. Materials presented here tend to cleave along traditional lines of designating European artifacts as markers of the “historic” period. Especially in the case of coastal California with the arrival of Russian merchants, the designation is appropriate. However, calling them historical artifacts and carrying the interpretive baggage of “European social life and use” is problematic. As I will demonstrate in later sections of the chapter, use of these materials is clearly non-European in many respects. Thus, “historical” means only derived from, though not necessarily used by, Europeans, Russians, or Chinese.

²“Porcellaneous stoneware” was used in the first monograph to refer to these ceramic items (Lightfoot et al. 1991). Nonetheless, such an analytical difference between this chapter and the first volume in the Fort Ross series will not negatively affect any interpretations.

³This strategy may in fact require reconsideration when considering wider trade networks between Fort Ross and Europe, Russia, and China.

⁴These non-white porcelains may include both Chinese and European porcelain, though I would suggest it is mostly the former. The underglaze blue could actually be either the Chinese or English variety from 1660-1800 or 1745-95, respectively (Noel Hume 1970:263, 137), or the Canton/Nanking styles manufactured from 1800-30 (Noel Hume 1970:262-3). The latter is the most likely choice for the vast majority of ceramics recovered. Although not noted in the text, the Canton/Nanking styles are present on a number of sherds. Due to the fragmented nature of the decorated pieces, no attempt is made to address whether English “Willow Pattern” porcelains are present. The formal label “Chinese Export Porcelain” or Lowestoft (cf. Boger 1971:67; Savage & Newman 1974:64) is not used here for it would close debate on whether the porcelain assemblage is all Chinese in origin and whether some sherds could predate the early 19th century (see Noel Hume 1970:258-62).

⁵Density-adjusted counts of decorative types were originally included to control absolute counts for varying sediment volume. After graphing them, however, I realized that they really did not convey any more information than did absolute counts. Of course, relative amounts per trench or per unit varied, depending on which area was being presented, but the differences from the count-based figures added little refinement.

⁶Computations were also performed on the densities of historical artifacts per volume of sediment containing only historical materials. This was done to try and counter the problem of using the entire volume for the historical materials because the strata without historical materials may have been a pre-Russian use of the terrace and thus the density of historical materials would be diluted by using that larger value, especially in areas with intrusive cultural features. These adjusted values did not add considerable clarity to the interpretations, however, and have thus been excluded here to avoid confusion.

⁷This section will deal specifically with the unmodified historic bottle and window glass, but the counts will include modified fragments such that a full representation of total glass is achieved. Modified glass artifacts are dealt with more fully in a subsequent section, and their composition relative to the entire glass assemblage will be noted there.

⁸Actually, the site that I refer to as Metini has previously been known as Mad-Shui-Nui. Research into this site just north of the stockade (i.e. Ballard 1995; Glenn Farris, personal communication, 1995) suggests that it is related to the site officially known as Metini (CA-Son-175) at Fort Ross.

⁹This item is housed at the Archeology Laboratory, California Department of Parks and Recreation, Sacramento, under lab number 211-A-246.

REFERENCES

- Ballard, Hannah
1995 Searching for Metini: Synthesis and Analysis of Unreported Archaeological Collections from Fort Ross

- State Historic Park, California. Unpublished senior honors thesis, Department of Anthropology, University of California, Berkeley.
- Barclay, Paulette, and Sylvia M. Olivares
n.d. *Ceramic Analysis from Fort Ross Officials' Quarters*. Draft report on file at Archaeology Division, Department of Parks and Recreation, Sacramento, California.
- Boger, Louise A.
1971 *The Dictionary of World Pottery and Porcelain*. Charles Scribner's Sons, New York.
- Bubnova, E.
1973 *Old Russian Faience*. Iskusstvo, Russia.
- Carlson, David
1983 Computer Analysis of Dated Ceramics: Estimating Dates and Occupational Ranges. *Southeastern Archaeology* 2:8-20.
- Clark, D. W.
1974 *Contributions to the Later Prehistory of Kodiak Island, Alaska*. National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper no. 20. Ottawa, Canada.
- Cohen, Allison
1992 *Using Window Glass to Interpret Archaeological Context*. Unpublished senior honors thesis, Department of Anthropology, University of California, Berkeley.
- Crowell, Aron
1994 *World System Archaeology at Three Saints Harbor, An 18th Century Russian Fur Trade Site on Kodiak Island*. Unpublished PhD dissertation, Department of Anthropology, University of California, Berkeley.
- Deetz, James
1977 *In Small Things Forgotten: The Archaeology of Early American Life*. Anchor Books, New York.
- Farris, Glenn J.
1986 Description of a Visit to an Indian Village Adjacent to Fort Ross by Cyrille LaPlace, 1839. Appendix B in *Cultural Resource Management Survey at the Fort Ross Campground, Sonoma County, California*, by Glenn J. Farris, pp. 65-80. Report on file, Cultural Heritage Section, Archaeology Laboratory, Department of Parks and Recreation, Sacramento, California.
- Fedorova, Svetlana G.
1973 *The Russian Population in Alaska and California Late 18th Century—1867*. Translated by Richard A. Pierce and Alton S. Donnelly. Limestone Press, Kingston, Ontario.
- Felton, David L., and Peter D. Schulz
1983 *The Diaz Collection: Material Culture and Social Change in Mid-Nineteenth-Century Monterey*. California Archeological Reports, no. 23. Cultural Resource Management Unit, California Department of Parks and Recreation, Sacramento.
- Gibson, James
1976 *Imperial Russia in Frontier America: The Changing Geography of Supply in Russian America, 1784-1867*. Oxford University Press, New York.
- Godden, Geoffrey A.
1963 *British Pottery and Porcelain 1780-1850*. Baker, London.
- 1964 *Encyclopedia of British Pottery and Porcelain Marks*. Schiffer Publishing Ltd, Pennsylvania.
- 1965 *British Pottery and Porcelain: An Illustrated Encyclopedia of Marked Specimens*. Bonanza Books, New York.
- 1974 *British Pottery: An Illustrated Guide*. Barrie and Jenkins, London.
- Goldstein, Lynne
1992 Spatial Organization and Frontier Cemeteries: An Example from a Russian Colonial Settlement. Paper presented at the Society for Historical Archaeology Conference on Historical and Underwater Archaeology, Kingston, Jamaica.
- n.d. Fort Ross Clothing: New Data from Old Sources. Manuscript on file with the author, Department of Anthropology, University of Wisconsin, Milwaukee.
- Golovnin, Vasilii M.
1979 *Around the World on the Kamchatka 1817-1819*. Translation of the original 1822 edition by Ella L. Wiswell. The Hawaiian Historical Society and The University of Hawaii Press, Honolulu.
- Hughes, G., and T. Hughes
1968 *The Collector's Encyclopedia of English Ceramics*. Abbey Library, London.
- Istomin, Alexei
1992 *The Indians at the Ross Settlement, According to the Censuses by Kuskov in 1820 and 1821*. Fort Ross Interpretive Association, Inc. Fort Ross State Historic Park, California.
- Jackson, Louise M.
1991 *Nineteenth Century British Ceramics: A Key to Cultural Dynamics in Southwestern Alaska*. Unpublished PhD dissertation, Department of Anthropology, University of California, Los Angeles. University Microfilms, Ann Arbor, Michigan.
- 1994 Ceramics in Russian America: Insights from the Kurile Islands—A Preliminary Investigation. Paper presented at the 26th Annual Meeting of the Society for Historical Archaeology, Vancouver, British Columbia.
- Jones, Olive R.
1986 *Cylindrical English Wine and Beer Bottles 1735-1850*. Studies in Archaeology, Architecture, and History. National Historic Parks and Sites Branch, Environment Canada - Parks, Ottawa, Canada.

- Khlebnikov, Kirill
1976 *Colonial Russian America: Kyrill T. Khlebnikov's Reports, 1817-1832*. Translating and editing of original 1861 publication by Basil Dmytryshyn and E. A. P. Crownhart-Vaughan. Oregon Historical Society, Portland.
- 1990 *The Khlebnikov Archive. Unpublished Journal (1800-1837) and Travel Notes (1820, 1822, and 1824)*. Translating and editing of original notes by Leonid Shur and John Bisk. University of Alaska Press, Fairbanks.
- Kostromitinov, Peter
1974 Notes on the Indians in Upper California. In *Ethnographic Observations on the Coast Miwok and Pomo by Contre-Admiral F. P. Von Wrangell and P. Kostromitinov of the Russian Colony Ross, 1839*, pp. 7-18. Translation of 1839 publication by Fred Stross and Robert Heizer. Archaeological Research Facility, University of California, Berkeley.
- Layton, Thomas N.
1990 *Western Pomo Prehistory: Excavations at Albion Head, Nighbirds' Retreat, and Three Chop Village, Mendocino County, California*. Institute of Archaeology, Monograph 32. University of California, Los Angeles.
- Lewis, Griselda
1969 *A Collector's History of English Pottery*. The Viking Press, New York.
- Lightfoot, Kent G.
1995 Culture Contact Studies in North American Archaeology. *American Antiquity* 60:199-217.
- Lightfoot, Kent G., and Antoinette Martinez
1995 Frontiers and Boundaries in Archaeological Perspective. *Annual Review of Anthropology*, 24:471-492.
- Lightfoot, Kent G., Thomas A. Wake, and Ann M. Schiff
1991 *The Archaeology and Ethnohistory of Fort Ross, California: Vol 1, Introduction*. Contributions of the Archaeological Research Facility no. 49, Berkeley.
- Lofstrom, E., Tordoff, J. P., and D. C. George
1982 A Seriation of Historic Earthenwares in the Midwest, 1780-1870. *The Minnesota Archaeologist* 41:3-29.
- Majewski, Teresita, and Michael J. O'Brien
1987 The Use and Misuse of Nineteenth-Century English and American Ceramics in Archaeological Analysis. In *Advances in Archaeological Method and Theory*, vol. 11, edited by Michael B. Schiffer, pp. 98-209. Academic Press, New York.
- Martinez, Antoinette
1994 Native California Women as Cultural Mediators. *Proceedings of the Society for California Archaeology* 7:41-46.
- 1995 Blurred Boundaries of the Nineteenth Century Kashaya Pomo. Paper presented at the 29th Annual Meetings of the Society for California Archaeology, April 5-9, Eureka, California.
- Miller, George L.
1974 Tenant Farmer's Tableware: Nineteenth-Century Ceramics from Tabb's Purchase. *Maryland Historical Magazine* 69:197-210.
- 1980 Classification and Economic Scaling of 19th Century Ceramics. *Historical Archaeology* 14:1-40.
- 1991 A Revised Set of CC Index Values for Classification and Economic Scaling of English Ceramics from 1787 to 1880. *Historical Archaeology* 25:4-25.
- Nelson, Lee H.
1968 *Nail Chronology as an Aid to Dating Old Buildings*. American Association for State and Local History Technical Leaflet 48, *History News*, volume 24, no. 11. Nashville, Tennessee.
- Noel Hume, Ivor
1970 *A Guide to Artifacts of Colonial America*. Alfred A. Knopf, Inc., New York.
- O'Connor, Denise Maureen
1984 *Trade and Tableware: A Historical and Distributional Analysis of the Ceramics from Fort Ross, California*. Unpublished M.A. thesis, California State University, Sacramento.
- Oswalt, Wendell H.
1980 *Kolmakovskiy Redoubt: The Ethnoarchaeology of a Russian Fort in Alaska*. Monumenta Archaeologica 8. Institute of Archaeology, University of California, Los Angeles.
- Payeras, Mariano
1995 *The Writings of Mariano Payeras*. Edited and translated by Donald C. Cutter. Bellerophon Books, Santa Barbara, California.
- Praetzellis, Adrian
1981 *An Elementary Guide to Mid- and Late-19th Century Archaeological Ceramics*. Manuscript on file, Department of Anthropology, University of California, Berkeley.
- Praetzellis, Mary
1980 Ceramics. In *Historical Archaeology at the Golden Eagle Site*, edited by Mary Praetzellis, Adrian Praetzellis, and Marley R. Brown, III, pp. 7-1 to 7-84. Cultural Resources Facility, Anthropological Studies Center, Sonoma State University, Ronherth Park.
- Price, C. R.
1979 *19th Century Ceramics in the Eastern Ozark Border Region*. Southwest Missouri State University, Center for Archaeological Research, Monograph Series, no. 1.
- Roenke, Karl G.
1978 *Flat Glass: Its Use as a Dating Tool for Nineteenth Century Archaeological Sites in the Pacific Northwest and*

- Elsewhere*. Northwest Anthropological Research Notes, Memoir no. 4, vol. 12, part 2. Moscow, Idaho.
- Savage, George, and Harold Newman
1974 *An Illustrated Dictionary of Ceramics*. Thames and Hudson, London.
- Schiff, Ann M.
1995 Geographic Variation in Native Alaskan Ethnic Boundary Markers. Paper presented at the 29th Annual Meeting of the Society for California Archaeology, April 6-9, Eureka, California.
- Shangraw, Clarence, and Edward P. Von der Porten
1981 *The Drake and Cermeño Expeditions' Chinese Porcelains at Drake's Bay, California, 1579 and 1595*. Santa Rosa Junior College and Drake Navigators Guild, Santa Rosa, California.
- Shaw, Simeon
1968 *History of the Staffordshire Potteries and the Rise and Progress of the Manufacture of Pottery and Porcelain*. Reprint of the 1829 edition. Beatrice C. Weinstock, Great Neck, New York.
- Shubin, Valery O.
1990 Russian Settlements in the Kurile Islands in the 18th and 19th Centuries. In *Russia in North America: Proceedings of the 2nd International Conference on Russian America*, edited by Richard A. Pierce, pp. 425-50. Limestone Press, Kingston, Ontario.
- Slaymaker, Charles M.
1977 *The Material Culture of Cotomko'tca: A Coast Miwok Tribelet in Marin County, California*. MAPOM Paper #3. Miwok Archaeological Preserve of Marin, California.
- Smith, Janice C.
1974 *Pomo and Promyshlenniki: Time and Trade Goods at Fort Ross*. Unpublished M.A. thesis, University of California, Los Angeles.
- South, Stanley
1977 *Method and Theory in Historical Archaeology*. Academic Press, New York.
- 1988 Santa Elena: Threshold of Conquest. In *The Recovery of Meaning: Historical Archaeology in the Eastern United States*, edited by M. P. Leone and P. B. Potter, Jr., pp. 27-71. Smithsonian Institution Press, Washington D.C.
- Sussman, Lynne
1977 Changes in Pearlware Dinnerware, 1780-1830. *Historical Archaeology* 11:105-111.
- Tikhmenev, P. A.
1978 *A History of the Russian-American Company*. Translating and editing of original 1861-63 publications by Richard A. Pierce and Alton S. Donnelly. University of Washington Press, Seattle.
- Towner, Donald
1957 *English Cream Colored Earthenware*. Faber and Faber, London.
- VanStone, James W.
1968 *Tikchik Village, A Nineteenth Century Riverine Community in Southwestern Alaska*. Fieldiana: Anthropology 56(3). Field Museum of Natural History, Chicago.
- Von der Porten, Edward P.
1972 Drake and Cermeño in California: Sixteenth Century Chinese Ceramics. *Historical Archaeology* 6:1-22.
- White, John R.
1977 Aboriginal Artifacts on Non-Traditional Material: Six Specimens from Fort Ross, California. *Northwest Anthropological Research Notes* 11:240-47.
- Wilson, Douglas C.
1994 Identification and Assessment of Secondary Refuse Aggregates. *Journal of Archaeological Method and Theory* 1:41-68.
- Wobst, Martin
1977 Stylistic Behavior and Information Exchange. In *Papers for the Director: Research Essays in Honor of James B. Griffin*, edited by C. E. Cleland, pp. 317-42. Anthropological Papers of the Museum of Anthropology, no. 61, Ann Arbor.
- Wrangel, F. P. von
1976 Some Remarks on the Savages on the Northwest Coast of America. The Indians of Upper California. In *Ethnographic Observations on the Coast Miwok and Pomo by Centre-Admiral F. P. Von Wrangell and P. Kostromitinov of the Russian Colony Ross, 1839*, pp. 1-6. Translation of 1839 publication by Fred Stross and Robert Heizer. Archaeological Research Facility, University of California, Berkeley.

Glass and Ceramic Trade Beads from the Native Alaskan Neighborhood

LESTER A. ROSS

ARCHAEOLOGICAL EXCAVATIONS conducted in 1989, 1991, and 1992 at the Native Alaskan Village Site (NAVS) and in 1988 and 1989 at the Fort Ross Beach Site (FRBS) recovered 564 glass and ceramic beads of 79 varieties, including 46 varieties of drawn glass beads, 30 varieties of wound glass beads, 2 varieties of blown glass beads, and 1 of Prosser-molded ceramic beads. The assemblage from Native Alaskan Neighborhood is composed of unique percentages of colors for Native American and Euro-American fur trade sites in the continental western United States. This assemblage contains no beads post-dating 1840, but does date to the period of Russian-American Company (RAC) occupation of Fort Ross, 1812-1841. None of the beads appear to be of Chinese manufacture, some were probably manufactured in Bohemia, and most appear to be varieties commonly manufactured in Europe, specifically Venice and Murano, Italy. Many of the beads are similar to varieties recovered from the archaeological site of the Hudson Bay Company's (HBC) 1829-1860 western headquarters at Fort Vancouver. On the basis of known historical documentation, it appears premature to attribute the acquisition of beads recovered from the Native Alaskan Neighborhood to Hudson's Bay Company manufacturers sent to the Russian-American Company in New Archangel (Sitka) during 1840-1841.

BEAD CLASSIFICATION SYSTEMS AND METHODOLOGY

The identification and description of beads under consideration in this chapter utilizes procedures based upon a combination of classification systems and strategies developed for archaeologists by Kenneth and Martha Kidd (1970), Karlis Karklins (1982, 1985, 1994), Roderick Sprague (1983, 1985, 1994), and the author

(Ross 1994a; Ross with Pflanz 1989). Additional descriptive nomenclature follows various authors who have addressed specific bead shapes, groups, and classes (e.g., Allen 1983; Beck 1928). Colors are identified using a simplified set of color terms for general reference and Munsell color notations for more specific designations (Munsell Color 1994). Prior to identifying colors, bead surfaces were moistened to reduce frosted appearances caused by glass deterioration. Beads were analyzed for a variety of attributes, following a four-fold, hierarchic classification scheme:

1. material and manufacturing techniques;
2. stylistic attributes, including color layering, shape, and presence or absence of decoration;
3. stylistic variety attributes consisting of the type of decoration; diaphanousness; type of finish; range of bead color hue, value, and chroma; variability in shape and length; the probable type of original luster; and post-depositional erosion; and
4. bead sizes as defined from measurements of bead least diameter (LD) and length (L).

To easily discuss stylistic types and subtypes of beads in this report, the following code is employed:

Manufacturing Technique

- D/ = Drawn (glass)
- W/ = Wound (glass)
- Ws/ = Wound-and-Shaped (glass)
- B/ = Blown (glass)
- PM/ = Prosser Molded (ceramic)

Type of Layering

- M = Monochrome
- P = Polychrome

Shape, for example,

- Bp = Bipyramidal
- C = Cylindrical

- O = Ovoidal
 M = Multi-Sided
 M2 = Molded sides and two rows of ground facets
 M4 = Molded sides and four rows of ground facets
 S = Spheroidal
 T = Toroidal

Type of Finishing

- C = Cut
 H = Hot-Tumbled

Presence or Absence of Decoration

- D = Decorated
 Dcl = Combed Loops
 Db = Banded
 Df = Faceted
 Ds = Striped
 Dsf = Striped and Faceted
 U = Undecorated
 Uc = Conjoined (beads of the same variety fused during manufacture)

Thus, drawn, monochrome, cylindrical, cut, undecorated beads are designated as Type D/MCCU beads. In an attempt to compare bead varieties to earlier bead classification systems of Kidd and Kidd (1970) and Karklins (1985), comparative class numbers are provided when possible. However, because of the difficulties in comparing varieties without precise color notations, no attempt is made to provide the comparative variety numbers employed by Kidd and Kidd (1970). For ease of reference, bead variety numbers used in this report consist of a single unique number (e.g., 1, 45, 64) assigned strictly for use with Native Alaskan Neighborhood collections. The descriptions accompanying these variety numbers do not correspond to similar numbers used for other sites.

Bead data is presented by bead class, type, subtype, and variety in tabular format, together with a graphic representation of the bead shape (e.g., figure 8.1). The plates referenced in the figures are on file at the Archaeological Research Facility, Berkeley, California. Bead manufacturing techniques are discussed, and relevant comparative data is provided for the occurrence of similar beads from other dated contexts. This comparative information regarding bead varieties in other archaeological contexts is neither exhaustive nor complete. Rather, varieties which are regarded as unique or possibly significant for geographical, cultural or temporal affiliations are documented.

Bead sizes are defined for the beads analyzed in this study only, using least diameter and length. Sizes were determined by measuring beads with the smallest and largest least diameters and lengths for probable sizes as observed visually. The scope of the project did not allow for individual measurements to be made for each bead. To obtain more precise data for the sizes perceived visually, all beads within a variety, or from a representa-

tive sample for each variety, will have to be measured. When multiple sizes are reported for a single variety, no beads with measurements outside the sizes reported were observed.

Opinions regarding historic values, temporal ascriptions and the frequency of occurrence at archaeological sites are based upon the personal knowledge of the author. Published literature documenting the precise temporal placement of beads in the nineteenth century for western North America is limited. This does not imply a lack of documentary reports (e.g., see Karklins and Sprague 1980, 1987), but rather the lack of comparable bead classifications and descriptions used by various authors who have written descriptive reports, combined with the lack of tightly dated contexts. No authoritative temporal studies for western North America have been published, and extant interpretations vary considerably based upon the experience of each author. Until a major effort is undertaken to review existing historical and archaeological literature, and to document tightly dated collections using a standard classification system, temporal and functional interpretations for glass beads from western North American sites can only be regarded as informative speculation.

GLASS BEADS IN THE ASSEMBLAGE

The entire assemblage of 564 beads consists of 563 glass beads and 1 ceramic bead. The 563 glass beads were manufactured by three techniques: drawn (n = 510), wound (n = 51), and blown (n = 2).

DRAWN BEADS

The 510 drawn beads are grouped into 46 varieties of eight types, grouped into four classes. During the nineteenth century, drawn beads were manufactured from hollow canes drawn from a molten gather of glass. The canes were chopped into bead-length segments for subsequent finishing, sorting, and packaging. Drawn beads are the most common beads, comprising 90.4% of the bead assemblage.

Monochrome Beads with Chopped Ends

Nine beads of this class are identified and subdivided into two types.

Type DIMCCU - Undecorated Cylindrical Beads (n = 7). These are the simplest of the undecorated monochrome beads. They have circular cross sections, consist of short to long segments chopped from drawn glass canes, and do not appear to have been fire-polished or hot-tumbled. Five varieties are identified (figure 8.1). Variety 25 beads are also reported from 1829-1860 Hudson's Bay Company Fort Vancouver, Washington (Ross 1990:Variety Ia-tpl-1).

Type DIMMCDf - Complex, Multi-Sided Beads with Ground Facets (n = 2). The tubes used to make these

beads were manufactured from a gather of glass that was probably pushed into a multi-sided mold to create a polyhedral form, and then drawn into a multi-sided, hollow cane. In an earlier report, it was speculated that the multi-sided shape may have resulted from marvering or an extrusion process (Ross 1976:686, figure 338). No historical evidence for these alternatives has been located. Two subtypes are identified by the number of rows of facets present.

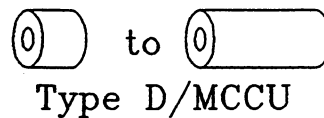
Subtype DIMM2CDf - Beads with Two Rows of Ground Facets ($n = 1$). These are manufactured by grinding two rows of facets, one facet on each corner of each end. These facets are probably ground before the individual beads are snapped or chopped from their glass cane. With this technique, a 6-sided bead will have 18 flat surfaces, consisting of 6 molded sides and 12 ground facets. Both Subtype D/MM2CDf beads and their polychrome counterparts (Subtype D/PM2CDf below) are referenced incorrectly, as "Russian," "Bristol," "Hudson's Bay," "chief," and "ambassador" beads. They also are described as "cornerless hexagonal, septagonal or octagonal," "short bugle," "multi-faceted," or "cut"

beads (e.g., Mille 1975; Pfeiffer 1983:209-10; Woodward 1965:12). One variety of a 6-sided, transparent beads is identified (figure 8.2). Variety 12 beads are also reported from 1829-1860 Hudson's Bay Company Fort Vancouver, Washington (Ross 1990: Variety If-d6/7tps/1-2).

In the Pacific Northwest, these beads along with their polychrome equivalents (Subtype D/PM2CDf beads) have been identified incorrectly as "Russian" faceted beads, due to their late 18th and early 19th century introduction into the Alaskan region by Russian fur traders. The Russian-American Company did trade these beads, but the Russians probably did not manufacture them. Arthur Woodward (1965:9) stated that:

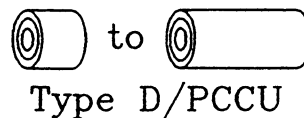
Other beads, such as the large ultra marine blue faceted beads found along the coast of southern Alaska and British Columbia and as far south as Washington and Oregon, became "Russian beads", in spite of the fact that original packages of these beads, wrapped in grey coarse paper, were found unopened in the warehouse of the Russian American Fur Company at Sitka in 1867, marked "Brussels". In the latter case it was probably a repackaging job done by an export company in the Belgian city.

Figure 8.1 Drawn, Cut, Undecorated Beads from the Native Alaskan Neighborhood ($n = 12$)



Type D/MCCU

VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSELL NOTATION	SHAPE LENGTH FINISH	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
25	Undecorated	Transparent Fibrous Patina: No	Monochrome Clear N 8.0/	Cylindrical Long Cut - Struck	3.1 x 5.4	Plate 1a	Kidds' Ia	1
44	Undecorated	Transparent Shiny Patina: No	Monochrome Yellowish-green 10GY 5/8	Cylindrical Long Cut	2.0 x 3.2	Plate 1b	Kidds' Ia	1
11	Undecorated	Transparent Shiny Patina: No	Monochrome Bluish-green 7.5G 4/6	Cylindrical Long Cut - Struck	2.0-2.4 x 2.9-3.4	Plate 1c	Kidds' Ia	2
68	Undecorated Some beads may be hot tumbled, and this variety may be a variation of Variety 5.	Translucent Dull Patina: No	Monochrome Bluish-green 5B 4/6	Cylindrical Short Irregular Cut	2.5-3.1 x 2.1-2.6	Plate 1d	Kidds' Ia	2
78	Undecorated Cut edges are slightly rounded, bead may be hot tumbled.	Translucent Dull Patina: No	Monochrome Blue 7.5B 4/6	Cylindrical Short Cut	4.2 x 3.7	Plate 1e	Kidds' Ia	1



Type D/PCCU

24	Undecorated Some beads may be hot tumbled.	Translucent on Translucent Dull Patina: No	Polychrome (2) V. Lt. Yellowish-white 10Y 9/1 V. Lt. Yellowish-white 10Y 9/1	Cylindrical Short to Long Cut - Struck	2.8-3.0 x 2.4-2.5 2.8-2.9 x 4.1-4.4 3.8 x 5.9	Plate 1f	Kidds' IIIa	5
----	--	--	--	--	---	----------	-------------	---

Figure 8.2 *Drawn, Faceted Beads from the Native Alaskan Neighborhood (n = 6)*

Type D/MCHDf

VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSELL NOTATION	SHAPE LENGTH FINISH	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
28	Decorated; 5-11 random ground facets.	Transparent Dull to Shiny Patina: No	Monochrome V. Dk. Purplish-red 2.5R 2/2	Cylindrical Short Hot Tumbled	2.1 x 1.4 3.9-4.0 x 3.0-3.6	Plate 2a	Karkins III	3



Subtype D/MM2CDf

12	Decorated; Hexagonal with one row of 6 molded sides and 2 rows of ground corner facets (12 ground facets).	Transparent Dull Patina: No	Monochrome Yellowish-brown 10YR 4/8	Cylindrical Long Cut	6.2 x 7.9	Plate 2b	Kidds' II	1
----	--	-----------------------------	-------------------------------------	----------------------	-----------	----------	-----------	---



Subtype D/MM4CDf

77	Decorated; Hexagonal with one row of 6 molded sides, 2 rows of ground facets, and 2 rows of ground corner facets (24 ground facets).	Transparent to Opaque Dull Patina: No	Monochrome V. Dk. Purplish-red 2.5R 2/2	Cylindrical Long Cut	6.7 x 8.0	Plate 2c	Kidds' II	1
----	--	---------------------------------------	---	----------------------	-----------	----------	-----------	---



Subtype D/PM2CDf

74	Decorated; Hexagonal with one row of 6 molded sides and 2 rows of ground corner facets (12 ground facets).	Transparent to Translucent Shiny Patina: No	Polychrome (M) Purplish-blue 7.5PB 3/8 on Lt. Purplish-blue 7.5PB 5/8	Cylindrical Short Cut	6.1 x 8.0	Plate 2d	Kidds' III	1
----	--	---	---	-----------------------	-----------	----------	------------	---

James Hanson (1994:7) commented on a string of blue, green, and red cut beads of this subtype:

...they are often referred to as Russian beads, even though they were made in Venice [probably Bohemia rather than Venice]. When Governor Etolin of the Russian American Company [governor from 1840 to 1845] donated a dazzling chandelier to the Russian Orthodox church in Sitka, the glittering robes and pendants of colored crystal were made from this type of bead. Even though the church has burned down twice, the chandelier has survived and is preserved in the Alaska State Museum at Juneau.

Subtype D/MM2CDf and D/PM2CDf beads probably represent items manufactured in Bohemia or possibly Venice, but are of doubtful Russian manufacture. The Russian-American Company was not the primary source of these beads for the Pacific Northwest, at least not for areas beyond Alaska and the region of northern California near the Russian trading site of Fort Ross. In the Pacific Northwest, these bead types are associated primarily with post-1820 fur trade and Native American

sites, none of which were associated with the Russian trade. It would be just as incorrect to identify them as "Roman" beads because of their association with the Late Roman period site of Corinth in southern Greece (Davidson 1952:294, pl. 122) or as "Viking" beads because of their association with tenth-century Viking sites in Europe (Klindt-Jensen 1970:170-71).

Subtype DIMM4CDf - Beads with Four Rows of Ground Facets (n = 1). These beads are manufactured by grinding four rows of facets, consisting of two rows with a facet on each corner of each end and two rows between the end rows and the molded sides. This results in a 6-sided bead having 30 flat surfaces, consisting of 6 molded sides and 24 ground facets. One variety is identified (figure 8.2). No examples of Variety 77 beads are known for other western North American contexts.

Polychrome Beads with Chopped Ends

Six beads of this class are identified and subdivided into two types. These beads have multicolored layers produced in at least two manners: 1) when one or more

layers of glass were applied to a central core and 2) when layers were fortuitously created. Beads with applied layers were drawn from a gather of glass of one color, covered with one or more layers of differently colored glass. Beads with fortuitous layers appear to have been produced from a gather of one color, which upon cooling created multicolored layers (generally of the same color hue, but with a different chroma, color value, and/or diaphanousness). It is speculated that this phenomenon results as glass cools from its surface to its interior, causing different chemical elements to migrate slower or faster. As coalescing elements “freeze,” concentric layers which are brighter or duller, lighter or darker, or more opaque, translucent, or transparent than adjacent layers are created. Whether or not beadmakers consciously created polychrome beads to exhibit these traits remains unknown, but because beads of this class have fortuitous layers that are easily distinguished, they are classified as polychrome beads. Once cooled, the polychrome canes were chopped into bead-length segments for subsequent sorting and packaging. Beads of this class do not appear to have been fire-polished or hot-tumbled. Two types are identified.

Type D/PCCU - Undecorated Cylindrical Beads ($n = 5$). These beads have a circular cross section with a central core and an outer covering that can be of a color either similar to or different from the color of the core. One variety (Variety 24) is identified (figure 8.1). Similar examples are not known from other western North American contexts.

Type D/PMCDf - Complex, Multi-Sided Beads with Ground Facets ($n = 1$). This fortuitously layered, polychrome bead is created in the same manner as the equivalent Type D/MMCDf discussed above. The single bead identified belongs to the following subtype.

Subtype D/PM2CDf - Beads with Two Rows of Ground Facets. It is a transparent or translucent bead (figure 8.2). For further discussion on this bead subtype, its sizes, and cultural affiliation, see the discussion above for Subtype D/MM2CDf beads. Variety 74 beads are reported from 1829-1860 Hudson's Bay Company Fort Vancouver (Ross 1990: Variety IIIIf-d6/7tp/tls-2).

Monochrome Beads with a Hot-Tumbled Finish

Of this class, 271 beads are identified and subdivided into two types. They are hot-tumbled versions of monochrome beads with chopped ends. Some specimens may exhibit a second layer of glass similar in color to its principal color (Kidd and Kidd 1970:48-49). Even though these might be described as double-layer polychrome beads (e.g., Type D/PCHU beads), they appear to represent fortuitous coloration perhaps due to the cooling of the glass. Whether or not beadmakers consciously created these polychrome beads to exhibit these traits remains unknown, but due to the fortuitous layers that are difficult to distinguish in these beads, they are classified

as monochrome beads (e.g., D/MCHU beads). After drawn canes were cut into bead-length segments, these segments were tumbled over a fire in a rotating container or drum that, during the mid-19th century, may have contained ash and sand (Hoppe and Hornschuch 1818), lime and charcoal (Anonymous 1835; Bussolin 1847; Carroll 1917; Karklins with Adams 1990:72), or plaster and graphite or clay and charcoal dust (Francis 1979:10). This method of rounding sharp edges of beads cut from a drawn cane was invented by the Italian Luigi Pusinich and perfected in 1864 by Antonio Frigo (Gasparetto 1958:198). Prior to the invention of hot tumbling, or the rotating-drum method, a less efficient furnace method was used:

In this process, the tubes [cut bead segments] were placed in a large copper pan with a mixture of powdered charcoal or ash and sand. The pan was placed in a *ferraccia* (*ferrazza*) furnace and the contents stirred until the tube segments were sufficiently rounded (Karklins and Adams 1990:72-73; Karklins and Jordan 1990:6). Although this method was used to round large and very large beads as well (Karklins and Adams 1990:73), it was a time-consuming operation as it took a long time for the thick tube segments to soften and become rounded (Karklins 1993:27).

It is difficult to impossible to distinguish furnace-rounded and hot-tumbled beads from one another. Most rounded drawn beads manufactured prior to the adoption of hot tumbling were assumed to be generally larger and sometimes exhibited flat surfaces caused by contact of bead surfaces with the rounding pan. Hot-tumbled beads also can have flattened surfaces, generally created when a hot and plastic drawn cane was placed too quickly on a cooling floor or table. An earlier process for rounding drawn beads was in use at least from the early seventeenth century to the late eighteenth century. This method, called the *a speo* method, is used to round bead segments generally larger than 4 mm in diameter (Karklins 1993). For western North American sites, *a speo*-rounded beads have yet to be recognized from archaeological assemblages.

Type D/MCHU - Undecorated Cylindrical Beads

Of this type, 268 beads are identified. They represent the simplest type of finished, monochrome, drawn beads, an undecorated type with a circular cross section. This is the most common type in western archaeological sites, and in the Native Alaskan Neighborhood where it makes up 47.5% of the bead assemblage. It exists in two forms—short (with a torus to round shape) and long (with a rounded cylindrical shape)—and was manufactured from transparent, translucent, and opaque glass. Twenty-eight varieties are identified (figures 8.3 and 8.4). Many of these varieties are reported from other western North American contexts, but because of subtle variations in colors and the difficulty in comparing reported colors, it

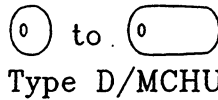
is not possible to provide accurate comparative data among sites.

From the analysis of beads from other archaeological sites (e.g., Ross 1990), it has been ascertained that bead sizes can occur at regular intervals (e.g., 0.45-0.56 and 0.8-mm intervals). For beadmakers to obtain sizes measured to such fine intervals, they sorted beads by sieving, using stacked, graded wire screens (Bussolin 1847; Karklins with Adams 1990:73) with mesh openings decreasing 0.4 to 0.8 mm per screen. Hand-sorting might have resulted in the creation of these subtle and regular sizes, but it would have been labor intensive, more costly,

and perhaps not as accurate. Multiple sizes appear to exist for a few of the varieties at the Native Alaskan Neighborhood (e.g., Varieties 2, 16, and 19), but because of the low frequencies of beads for each size, it is premature to define size sorting intervals.

Type D/MCHDf - Cylindrical Beads with Ground Facets (n = 3). These monochrome "seed" beads (Type D/MCHU beads) have 5 to 11 randomly ground facets. One variety is identified (figure 8.2). Variety 28 beads are also reported from 1829-1860 Hudson's Bay Company, Fort Vancouver, Washington (Ross 1990: Variety IIf-tps-2).

Figure 8.3 Drawn, Hot-Tumbled, Undecorated Opaque and Translucent, Monochrome Beads from the Native Alaskan Neighborhood (n = 153)



VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSSELL NOTATION	SHAPE LENGTH FINISH	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
16	Undecorated Based on color, this variety may include Varieties 2, 32, and 46. Based on diaphaneity, this variety may include Varieties 17 and 45.	Opaque Dull Patina: No	Monochrome White N 9.5/	Cylindrical Short Hot Tumbled	1.7-1.9 x 0.8-1.1 2.0-3.0 x 1.6-2.0 3.0-3.9 x 2.4-2.8 4.1 x 3.2 5.2 x 2.5	Plate 3a	Kiddr' IIa	26
2	Undecorated Beads may be soil-stained. Based on color, this variety may be a variation of Variety 16.	Opaque Dull to Pitted Patina: No	Monochrome Lt. Grayish-white N 8/	Cylindrical Short to Long Hot Tumbled	2.2-2.6 x 1.3-1.4 3.3-3.5 x 1.3-3.7 3.9 x 2.1	Plate 3b	Kiddr' IIa	21
32	Undecorated Bead may be soil-stained. Based on color, this variety may be a variation of Variety 16.	Opaque Dull Patina: No	Monochrome Brownish-gray 10Y 6/1	Cylindrical Short Hot Tumbled	2.8 x 2.1	Plate 3c	Kiddr' IIa	1
46	Undecorated Beads may be soil-stained. Based on color, this variety may be a variation of Variety 16.	Opaque Pitted Patina: No	Monochrome Lt. Yellowish-white 10Y 9/1	Cylindrical Short Irregular Hot Tumbled	2.9 x 2.5 3.8-4.1 x 2.3-2.6	Plate 3d	Kiddr' IIa	4
4	Undecorated A few beads have fortuitous facets pressed into their surface.	Opaque to Transparent Dull to Shiny Patina: No	Monochrome V. Dk. Purplish-red 5R 2/2 to Black N 1.25/	Cylindrical Short to Long Irregular Hot Tumbled	3.3-4.0 x 1.7-4.0 4.6-5.0 x 3.1-3.3	Plate 3e	Kiddr' IIa	85
51	Undecorated	Opaque Dull to Pitted Patina: No	Monochrome Dk. Brownish-red 7.5R 3/4	Cylindrical Short Hot Tumbled	2.5-3.1 x 1.1-2.4	Plate 3f	Kiddr' IIa	3
23	Undecorated	Opaque Pitted Patina: No	Monochrome Dk. Orangish-red 7.5R 3/8	Cylindrical Short Hot Tumbled	3.2 x 1.5	Plate 3g	Kiddr' IIa	1
27	Undecorated	Opaque Dull Patina: No	Monochrome Lt. Grayish-blue 2.5PB 6/4	Cylindrical Short Hot Tumbled	3.2-3.4 x 1.4-1.9	Plate 3h	Kiddr' IIa	2
31	Undecorated	Translucent Dull Patina: Yes	Monochrome Yellowish-brown 10YR 5/8	Cylindrical Short Hot Tumbled	---	Plate 3i	Kiddr' IIa	1
52	Undecorated	Translucent Dull Patina: No	Monochrome Bluish-green 5BG 4/8	Cylindrical Short Hot Tumbled	3.2 x 2.0-2.9	Plate 3j	Kiddr' IIa	2
5	Undecorated Based on finish, this variety may include Variety 86 beads. Based on color, this variety may include Variety 28 beads.	Translucent Dull Patina: No	Monochrome Greenish-blue 7.5BG 4/8	Cylindrical Short Hot Tumbled	2.4-3.0 x 1.7-2.9 3.9 x 3.3	Plate 3k	Kiddr' IIa	22
28	Undecorated Based on color, this variety may be a variation of Variety 5.	Translucent Dull Patina: No	Monochrome Greenish-blue 10BG 4/8	Cylindrical Short to Long Hot Tumbled	2.6-3.3 x 2.6-3.6	Plate 3l	Kiddr' IIa	3
53	Undecorated	Translucent Dull Patina: No	Monochrome Br. Greenish-blue 2.5B 4/8	Cylindrical Short Hot Tumbled	---	Plate 3m	Kiddr' IIa	2

Polychrome Beads with a Hot-Tumbled Finish

Of this class, 224 beads are identified and subdivided into one type (D/PCHU). They are hot-tumbled versions of polychrome beads with chopped ends, finished in the same manner as the monochrome beads with a hot-tumbled finish. Only polychrome beads with distinctive layers of color are included within this class. This is the second most common bead type recovered from western archaeological sites. In the Native Alaskan Neighborhood, it makes up 39.7% of the bead assemblage and consists of eight varieties (figure 8.5). The brownish-red on light green (Variety 3) and red on white (Variety 56) varieties are often termed "cornaline d'Aleppo" or "Hudson's Bay Company" beads (e.g., Jenkins 1975; Mille 1975). They are frequently associated with Native American sites and are especially common in the early and mid-19th century. Beads of this type are reported from a variety of relatively tightly dated, western North American contexts:

Variety 45 Beads (opaque white on opaque white)

- 1829-1860 Hudson's Bay Company Fort Vancouver, Washington (Ross 1990:Variety IVa-op/ops-1)
- post-1812 Fort Ross, California (Smith 1974:Items 20-33)
- post-contact to ca. 20th century San Buenaventura Mission site (CA-VEN-87), Ventura, California (Gibson, R. O. 1975:Types C4a)
- ca. 1784-early 20th century Mission Santa Clara de Assis, Santa Clara County, California (Bone 1975:Type C4a and C4f)
- 1885-1900 context in Old Sacramento, California (Motz and Schulz 1980:52, Type 13, figure 3b)
- 1809-1868 Mission San Jose (CA-ALA-1), Fremont, California (Dietz 1983)
- post-1838 CA-CAL-S-286 and post-1856 CA-TUO-395, New Melones Reservoir, California (Van Bueren 1983:Type IVa20)

Variety 3 Beads (opaque brownish-red on very light green)

- 1829-1860 Hudson's Bay Company Fort Vancouver, Washington (Ross 1990:Variety IVa-op/tps-1)
- post-1812 Fort Ross, California (Smith 1974:Items 34-36)
- ca. 1771-ca. early 20th century Mission San Antonio (CA-MNT-100; Meighan 1985:Type 105)
- post-contact to ca. 20th century San Buenaventura Mission site (CA-VEN-87), Ventura, California (Gibson, R. O. 1975:Types C4a, C6a, C6b; 1976:Types C6a and C6a')
- ca. 1784-early 20th century Mission Santa Clara de Assis, Santa Clara County, California (Bone 1975:Type C6a)

Variety 18 Beads (opaque brownish-red on dark red to

black)

- post-1856 CA-TUO-395, New Melones Reservoir, California (Van Bueren 1983:Type IVa1)
- Variety 56 Beads** (transparent red on opaque white)
- 1829-1860 Hudson's Bay Company Fort Vancouver, Washington (Ross 1990:Variety IVa-tp/ops-1)
 - post-contact to ca. 20th century San Buenaventura Mission site (CA-VEN-87), Ventura, California (Gibson, R. O. 1975:Types C4a, C6a, C6b; 1976:Types C6b and C6b')
 - 1809-1868 Mission San Jose (CA-ALA-1), Fremont, California (Dietz 1983)
 - post-1838 CA-CAL-S-286 and post-1856 CA-TUO-395, New Melones Reservoir, California (Van Bueren 1983:Type IVa5/6/7).

WOUND BEADS

Fifty-one wound beads are identified and grouped into thirty varieties of eight types constituting one class. Simple wound beads were manufactured by wrapping or winding molten glass around a rotating mandrel, such as a wire, rod, or straw coated with a clay slip. Beads were produced individually, or conjoined (probably accidentally), were then removed from their shafts, annealed, cleaned, sorted, and packaged. Complex and decorated wound beads were altered by molding or shaping, by applying stripes, by faceting, etc. Shaped wound beads were manufactured by winding glass on a mandrel and then, by using: 1) an open mold, the decoration was pressed into the surface while the glass turned or 2) a pinching tool with molded faces (similar to a bullet mold) to press the decoration into the surface while the glass was stationary. Wound beads are the third most common group at western archaeological sites, and at the Native Alaskan Neighborhood they make up 9.0% of the bead assemblage.

Undecorated and Decorated Monochrome Wound Beads (n= 51)

Beads of this class, subdivided into eight types, have a monochrome body, either unshaped or shaped and undecorated or decorated.

Type WIMSU - Undecorated Spheroidal Beads (n = 10). Roughly spheroidal and without decoration, four varieties of these have been identified (figure 8.6). Varieties 36 and 72 are also reported from 1829-60 Hudson's Bay Company Fort Vancouver, Washington (Ross 1990:Variety W1b-stps-5 and W1b-stis-1).

Type Ws/MSDf - Decorated Spheroidal Bead with Shaped Facets (n = 1). This is a roughly spheroidal, 5-sided bead with 10 shaped facets in two rows. Only one variety is identified (figure 8.9). No Variety 71 beads are known for other western North American contexts (see Ross 1990 for discussion of possible specimens from the Kanaka Village site adjacent to Hudson's Bay Company

Fort Vancouver).

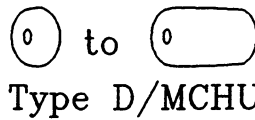
Type WIMSDcl - Decorated Spheroidal Beads with Combed Loops (n = 4). These are roughly spheroidal, and were decorated by trailing molten glass onto the viscous surface, and then dragging a wire through the applique to form a single string of combed loops around the circumference. Two varieties are identified (figure 8.8). No Variety 14 or 35 beads are known from other western North American contexts.

Type WIMOU - Undecorated Ovoidal Beads (n =

28). These are roughly ovoidal or barrel-shaped, and 18 varieties are identified (figure 8.7) as well as one subtype. Varieties 34, 37, 61, 63, 68, and 80 also are reported from 1829-1860 Hudson's Bay Company Fort Vancouver, Washington (Ross 1990: Varieties W1c-btps-5, W1c-btps/1-4, and W1c-btps-6, W1c-bops-2, W1c-btps/1-3, and W1c-btps-1).

Subtype WIMOUc - Conjoined, Undecorated Ovoidal Beads. One bead (Variety 76) of this subtype is identified. This subtype is two beads that touched one

Figure 8.4 Drawn, Hot-Tumbled, Undecorated Transparent, Monochrome Beads from the Native Alaskan Neighborhood (N = 115)



VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSELL NOTATION	SHAPE LENGTH FINISH	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
21	Undecorated Some beads may be soil stained.	Transparent Dull to Shiny Patina: No	Monochrome Clear N 9/	Cylindrical Short Hot Tumbled	2.6-3.1 x 1.6-2.5 3.9 x 2.0	Plate 4a	Kidds' IIa	6
55	Undecorated	Transparent Dull & Pitted Patina: No	Monochrome Purplish-red 2.5R 3/4	Cylindrical Short Hot Tumbled	2.7 x 1.4	Plate 4b	Kidds' IIa	1
67	Undecorated	Transparent Dull to Shiny Patina: No	Monochrome Dk. Purplish-red 2.5B 2/2	Cylindrical Short Irregular Hot Tumbled	3.7 x 2.7	Plate 4c	Kidds' IIa	1
29	Undecorated One beads fused to a Variety 40 bead.	Transparent Pitted Patina: Some	Monochrome Dk. Brownish-red 10R 2/2	Cylindrical Short Hot Tumbled	2.7-3.2 x 1.6-1.7	Plate 4d	Kidds' IIa	4
50	Undecorated	Transparent Pitted Patina: No	Monochrome Brownish-yellow 7.5YR 5/8	Cylindrical Short Hot Tumbled	2.5 x 1.1	Plate 4e	Kidds' IIa	1
49	Undecorated	Transparent Pitted Patina: Yes	Monochrome Ll. Yellow 5Y 8.5/6	Cylindrical Short Hot Tumbled	3.5 x 1.7	Plate 4f	Kidds' IIa	1
42	Undecorated	Transparent Dull Patina: Some	Monochrome Ll. Yellowish-green 10GY 4/8	Cylindrical Short Hot Tumbled	1.9-2.2 x 1.2-1.9	Plate 4g	Kidds' IIa	5
9	Undecorated	Transparent Dull to Pitted Patina: Some	Monochrome Yellowish-green 2.5G 3/6	Cylindrical Short Hot Tumbled	2.5-3.3 x 1.5-2.3 3.7-4.0 x 2.4-2.8	Plate 4h	Kidds' IIa	66
10	Undecorated Based on color, this variety may include Variety 43 beads.	Transparent Dull, Shiny & Pitted Patina: No	Monochrome Green 7.5G 3/6	Cylindrical Short to Long Hot Tumbled	3.2-3.4 x 2.7-3.8	Plate 4i	Kidds' IIa	2
43	Undecorated Based on color, this variety may be a variation of Variety 10.	Transparent Dull & Pitted Patina: No	Monochrome Dk. Green 10G 3/6	Cylindrical Short Hot Tumbled	3.7-4.2 x 1.9-2.6	Plate 4j	Kidds' IIa	3
54	Undecorated	Transparent Shiny Patina: No	Monochrome Bluish-green 2.5BG 4/8	Cylindrical Short Hot Tumbled	3.6 x 2.9	Plate 4k	Kidds' IIa	1
41	Undecorated	Transparent Dull to Shiny Patina: Yes	Monochrome Greenish-blue 7.5BG 4/8	Cylindrical Short Hot Tumbled	2.9-3.0 x 1.8-2.9	Plate 4l	Kidds' IIa	4
48	Undecorated Based on color, this variety may include Variety 19 beads.	Transparent Dull Patina: No	Monochrome Purplish-blue 5PB 3/8	Cylindrical Short Hot Tumbled	2.2 x 1.2 3.8 x 2.6	Plate 4m	Kidds' IIa	2
19	Undecorated Based on color, this variety may be a variation of Variety 48.	Transparent Dull to Pitted Patina: No	Monochrome Bluish-purple 7.5PB 3/8	Cylindrical Short to Long Irregular Hot Tumbled	2.2-2.3 x 1.4-1.5 2.9-3.6 x 2.4-3.6 4.1 x 3.4	Plate 4n	Kidds' IIa	6
20	Undecorated	Transparent Dull Patina: Some	Monochrome Dk. Purple 7.5PB 2/4	Cylindrical Short Hot Tumbled	2.5-2.6 x 1.3-1.7 2.9-3.6 x 1.7-2.5	Plate 4o	Kidds' IIa	12

another during manufacture and became fused or conjoined (figure 8.7). No similar beads are known from other western North American contexts.

Type Ws/MOU - Undecorated Ovoidal Beads (n = 2). These are ovoidal or barrel-shaped beads contoured while turning with a forming tool to complete the shape, with only one variety identified (figure 8.9). No Variety 33 beads are known from other western North American contexts.

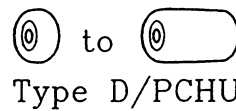
Type Ws/MTU - Undecorated Toroidal Bead (n = 1). This doughnut-shaped bead was contoured while turning with a forming tool to complete the shape, with only one

variety identified (figure 8.9). No Variety 58 beads are known from other western North American contexts.

Type WIMEDs - Decorated Ellipsoidal Bead with a Complex Spiral Stripe (n = 1). This bead, roughly ellipsoidal in shape, has a complex polychrome stripe spiralled around and pressed into the body. Only one variety is identified (figure 8.8). No Variety 40 beads are known for other western North American contexts.

Type Ws/MBpDf - Decorated Bipyramidal Beads with Quadrilateral Facets (n = 3). A flat-sided tool was employed to shape these beads into a roughly bipyramidal shape with four sides (or eight shaped

Figure 8.5 Drawn, Hot-Tumbled, Undecorated Polychrome Beads from the Native Alaskan Neighborhood (n = 224)



VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSELL NOTATION	SHAPE LENGTH FINISH	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
45	Undecorated One bead fused to a Variety 65 bead. Based on color, this variety may include Variety 1 and 17 beads. Based on diaphaneity, this variety may be a variation of Variety 16.	Opaque on Opaque Dull Patina: No	Polychrome (2) White N 9.25/ on White N 9/	Cylindrical Short to Long Irregular Hot Tumbled	1.8-2.4 x 0.8-1.5 2.9-3.6 x 2.0-2.5 3.4 x 5.0	Plate 5a	Kidds' IVa	27
17	Undecorated Beads may be soil-stained. Based on color, this variety may be a variation of Variety 45. Based on diaphaneity, this variety may be a variation of Variety 16.	Opaque on Opaque Pitted Patina: No	Polychrome (2) Ll. Yellowish-white 2.5Y 9/2 on Ll. Yellowish-white 2.5Y 9/2	Cylindrical Short Hot Tumbled	3.5 x 2.0	Plate 5b	Kidds' IVa	2
1	Undecorated Based on color, this variety may be a variation of Variety 45.	Opaque to Translucent on Opaque Dull, Shiny, & Pitted Patina: No	Polychrome (2) V. Ll. Grayish-white to Yellowish-white N 9-9.5/ to 5Y 9/1 on V. Ll. Grayish-white to Yellowish-white N 9-9.5/ to 5Y 9/1	Cylindrical Short Irregular Hot Tumbled	2.2-4.5 x 1.4-4.3	Plate 5c	Kidds' IVa	78
47	Undecorated	Opaque on Opaque Satiny Patina: No	Polychrome (2) Ll. Yellowish-white 2.5Y 9/4 on Ll. Yellowish-white 2.5Y 9/4	Cylindrical Short Hot Tumbled	1.9-3.1 x 1.1-2.0 3.7-3.8 x 2.5-3.2	Plate 5d	Kidds' IVa	10
3	Undecorated Based on color, this variety may include Variety 18 beads.	Opaque on Transparent Dull, Shiny, & Pitted Patina: Some	Polychrome (2) Brownish-red 10R 3/8 on V. Ll. Green (almost clear) to Ll. Green 2.5GY 8/4	Cylindrical Short Irregular Hot Tumbled	1.7-2.1 x 1.2-1.6 2.5-2.9 x 1.7-1.8 2.9-4.3 x 2.6-3.2 5.0 x 4.0	Plate 5e	Kidds' IVa	86
18	Undecorated Based on color, this variety may be a variation of Variety 3; the inner core appears to have been altered from a transparent green to an opaque dk. red or black.	Opaque on Opaque to Translucent Dull Patina: No	Polychrome (2) Brownish-red 10R 3/8 on Dk. Red to Black 10R 1-2/1-6	Cylindrical Short to Long Irregular Hot Tumbled	2.1-3.2 x 1.4-2.5 3.4-3.5 x 2.8-3.5	Plate 5f	Kidds' IVa	18
56	Undecorated Interior surface of perforation is coated with an opaque white substance (carbonates or kaolin clay?).	Transparent on Opaque Shiny Patina: No	Polychrome (2) Red 5R 4/14 on White N 9.5/	Cylindrical Short Hot Tumbled	2.2-2.4 x 1.4-1.9	Plate 5g	Kidds' IVa	2
22	Undecorated Inner black layer does not appear to be glass (may be a residue). May be a Type D/MCHU bead.	Transparent on Opaque Dull & Pitted Patina: No	Polychrome (2?) Ll. Brownish-yellow 10YR 3/6 on Black (?) 5YR 2/1	Cylindrical Short Hot Tumbled	3.8 x 2.3	Plate 5h	Kidds' IVa? or Kidds' IIa	1

Figure 8.6 *Wound, Spheroidal, Undecorated Beads from the Native Alaskan Neighborhood (n = 10)*

(0)

Type W/MSU

VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSELL NOTATION	SHAPE	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
72	Undecorated	Translucent Dull Patina: No	Monochrome White N 8.75/	Spheroidal Irregular	8.9 x 8.9	Plate 6a	Kidds' Wtb	1
67	Undecorated Interior surface of perforation is coated with an opaque white substance (carbonates or kaolin clay?).	Translucent Dull Patina: Yes	Monochrome Reddish-orange 7.5R 4/8	Spheroidal Irregular	8.4 x 8.9	Plate 6b	Kidds' Wtb	1
65	Undecorated Bead fused to a Variety 45 bead.	Transparent Pitted Patina: No	Monochrome Clear	Spheroidal	---	---	Kidds' Wtb?	1
38	Undecorated	Transparent Dull Patina: No	Monochrome Dk. Purplish-blue 7.5PB 2/2-6	Spheroidal Irregular	7.3-7.7 x 5.7-6.4	Plate 6c	Kidds' Wtb	7

facets), with only one variety identified (figure 8.9). Called Variety 30, a similar red variety is reported from 1829-1860 Hudson's Bay Company Fort Vancouver, Washington (Ross 1990:Type WIIq-qbptl-1).

BLOWN BEADS

Two blown beads are identified and grouped into two varieties of two types making up one class. Blown beads are created by various techniques (Karklins 1982:98). Beads from this site appear to have been freeblown.

Simple Monochrome Beads

Two beads of this class are identified and grouped into two types.

Type B/M?Df - Decorated Bead of an Unknown Shape with Ground Facets (n = 1). This bead was manufactured by freeblowing glass either individually or in a series, with a random number of ground facets. One variety is identified (figure 8.10).

Type B/M?Dsf - Decorated Bead of an Unknown Shape with a Stripe and Ground Facets (n = 1). This variety of bead (figure 8.10) was manufactured by freeblowing glass either individually or in a series, inlaying a horizontal stripe, and grinding random facets.

THE CERAMIC BEAD IN THE ASSEMBLAGE

Ceramic beads are distinguished from glass beads on the basis of their composition and manufacturing techniques. Glass beads are generally manufactured from a molten gather that is shaped into a finished form, or may be manufactured by pressing and melting or fusing broken, crushed, or powdered glass in a mold. Ceramic beads may be manufactured from a dry or moist powder or cold liquid that is packed or poured into a mold,

subsequently removed from the mold and fired, with or without a glaze or slip. Only one class is identified.

PROSSER-MOLDED BEADS

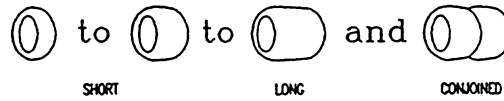
One bead is identified. Prosser-molded beads were manufactured variously by pressing a dry or moist mixture of powdered clay, flint, feldspar, metallic oxides, and "other earthy materials" in a mold. Upon removal from the mold, the bead would then have been bisque fired. Whether this firing produced the glossy surface of the bead at the Fort Ross Beach Site, or whether the bead was subsequently glazed and glost fired is not known. Historical accounts of the "Prosser" techniques indicate that after bisque firing, the molded objects could be decorated, fired again, glazed, and fired for the final time. The process was originally patented in 1840 by Richard Prosser but may have been invented in 1832 by his brother Thomas, who claimed to have made the first button by this process in 1837. The process was used in Great Britain, America, France, and Bohemia from the 19th century, and was employed primarily for the manufacture of "china" or "calico" buttons (Sprague 1983).

The only recovered ceramic bead belongs to the simple monochrome class. A decorated spheroid bead with a band, its type is designated PM/MSDb. It is a slightly tapered, spheroidal bead with a relatively broad band circumscribing its mid-line. One variety is identified (figure 8.11). Variety 7 beads are also reported for the 1846-1847 Murphy Cabin site in California (Ross 1993:Variety PM-1).

SPATIAL AND TEMPORAL COMPARISONS

Of the 564 beads analyzed, 16 came from FRBS and

Figure 8.7 Wound, Ovoidal, Undecorated Beads from the Native Alaskan Neighborhood (n = 29)



Type W/MOU and W/MOUc

VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSSELL NOTATION	SHAPE LENGTH	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
73	Undecorated	Opaque Pitted and Eroded Patina: Yes	Monochrome Black N 0.75/	Ovoidal, Irregular Short	5.6-5.8 x 3.3-3.4 8.5 x 4.8	Plate 7a	Kidds' Wic	3
83	Undecorated Interior surface of perforation is coated with a dark material (ferrous staining?).	Opaque Dull Patina: No	Monochrome Black N 0.5/	Ovoidal, Irregular Long	6.2 x 7.7	Plate 7b	Kidds' Wic	1
62	Undecorated	Translucent Dull & Eroded Patina: Yes	Monochrome Orangish-red 7.5R 3/10	Ovoidal Long	4.2 x 13.6	Plate 7c	Kidds' Wic	1
69	Undecorated Based on color, may include Variety 6.	Translucent Dull Patina: Yes	Monochrome Ll. Yellowish-brown 10YR 6/8	Ovoidal Short	6.0-6.7 x 6.3-6.9	Plate 7d	Kidds' Wic	2
6	Undecorated Based on color, may be a variation of Variety 69.	Translucent Dull & Eroded Patina: Yes	Monochrome Yellowish-brown 10YR 4/8	Ovoidal Short	7.5 x 6.2	Plate 7e	Kidds' Wic	1
76	Undecorated Conjoined beads, fused during manufacture.	Translucent Dull Patina: Yes	Monochrome Dk. Yellowish-brown 10YR 3/6	Ovoidal, Irregular Long	8.6 x 10.7	Plate 7f	---	1
70	Undecorated	Translucent Dull Patina: Yes	Monochrome V. Ll. Brownish-yellow 10YR 6/6	Ovoidal Short	7.8 x 6.9	Plate 7g	Kidds' Wic	1
13	Undecorated	Transparent Dull & Pitted Patina: Yes	Monochrome Red 7.5R 3/10	Ovoidal Short	4.0 x 3.1	Plate 7h	Kidds' Wic	1
68	Undecorated	Transparent Dull Patina: Yes	Monochrome Yellowish-brown 7.5YR 4/8	Ovoidal, Irregular Short	5.8 x 4.3 6.9 x 6.3 7.9 x 6.5	Plate 7i	Kidds' Wic	4
15	Undecorated	Transparent Dull Patina: Yes	Monochrome Dk. Yellowish-brown 7.5YR 2/2	Ovoidal Short	6.7 x 5.6	Plate 7j	Kidds' Wic	2
37	Undecorated	Transparent Dull & Eroded Patina: No	Monochrome V. Ll. Yellowish-brown 2.5Y 6/6	Ovoidal Short	8.1 x 6.7	Plate 7k	Kidds' Wic	1
79	Undecorated	Transparent Dull & Pitted Patina: No	Monochrome V. Ll. Yellow 5Y 9/2	Ovoidal Short	6.7 x 6.4	Plate 7l	Kidds' Wic	1
34	Undecorated	Transparent Dull Patina: No	Monochrome Green 2.5G 3/10	Ovoidal, Irregular Short	---	Plate 7m	Kidds' Wic	2
59	Undecorated Interior surface of perforation is coated with a dark material (ferrous staining?).	Transparent Pitted Patina: Yes	Monochrome Bluish-green 7.5G 3/8	Ovoidal Short	6.0 x 4.3	Plate 7n	Kidds' Wic	1
64	Undecorated Interior surface of perforation is coated with a dark material (ferrous staining?).	Transparent Dull & Pitted Patina: Yes	Monochrome Purplish-blue 10B 2/4	Ovoidal, Irregular Short	6.5 x 4.9	Plate 7o	Kidds' Wic	1
80	Undecorated Interior surface of perforation is coated with a dark material (ferrous staining?).	Transparent Pitted Patina: No	Monochrome Purplish-blue 2.5PB 2/6	Ovoidal Short	6.2 x 4.7	Plate 7p	Kidds' Wic	1
61	Undecorated Interior surface of perforation is coated with a dark material (ferrous staining?).	Transparent Pitted Patina: Yes	Monochrome Bluish-purple 5PB 2/6	Ovoidal Short	6.2 x 4.4	Plate 7q	Kidds' Wic	2
8	Undecorated	Transparent Dull Patina: No	Monochrome Dk. Purple 7.5PB 2/6	Ovoidal, Irregular Short	8.2 x 5.2 23.8 x >17.5	Plate 7r	Kidds' Wic	2
75	Undecorated	Transparent Dull Patina: No	Monochrome Bluish-green 2.5B 5/6	Ovoidal? ---	---	---	Kidds' Wic?	1

Figure 8.8 Wound, Decorated Beads from the Native Alaskan Neighborhood (n = 5)



Type W/MSDcl

VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSELL NOTATION	SHAPE LENGTH	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
14	Decorated; inlaid with horizontal opaque white (N 9/) combed loops.	Transparent Shiny Patina: No	Monochrome Purplish-red 6R 3/6	Spheroidal Irregular	8.8 x 6.9	Plate 8a	Karklins WIIIb	1
36	Decorated; inlaid with horizontal opaque white (---) combed loops.	Transparent Dull & Eroded Patina: No	Monochrome Dk. Purple 7.5PB 2/4	Spheroidal Irregular	8.1-9.1 x 7.1-7.4	Plate 8b	Karklins WIIIb	3



Type W/MEDs

40	Decorated; inlaid complex spiral comprised of a thin opaque red (---) stripe on a thick opaque white (---) stripe. Bead fused to a Variety 29 bead.	Transparent Pitted Patina: No	Monochrome Green 5G 3/8	Ellipsoidal	3.3 x 6.6	---	Karklins WIIIb	1
----	---	-------------------------------	-------------------------	-------------	-----------	-----	----------------	---

Figure 8.9 Wound-and-Shaped Beads from the Native Alaskan Neighborhood (n = 7)



Type Ws/MOU

VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSELL NOTATION	SHAPE LENGTH	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
33	Undecorated Interior surface of perforation is coated with an opaque white substance (carbonates or kaolin clay?).	Translucent Dull & Eroded Patina: Yes	Monochrome Yellowish-brown 7.5YR 4/8	Ovoidal Short	6.6-6.7 x 6.3-6.4	Plate 8c	Kidds' WIIc	2



Type Ws/MTU

58	Undecorated Interior surface of perforation is coated with an opaque white substance (carbonates or kaolin clay?).	Translucent Dull Patina: Yes	Monochrome Yellowish-brown 7.5YR 4/8	Toroidal Irregular	9.2 x 5.6	Plate 8d	Kidds' WId	1
----	--	------------------------------	--------------------------------------	--------------------	-----------	----------	------------	---



Type Ws/MBpDf

30	Decorated; faceted with 8 shaped facets.	Transparent Pitted Patina: Yes	Monochrome Dk. Purplish-red 5R 3/8	Quadrilateral-bipyramidal Long	3.5-4.1 x 6.2-6.8	Plate 8e	Karklins WIIq	3
----	--	--------------------------------	------------------------------------	--------------------------------	-------------------	----------	---------------	---



Type Ws/MSDf

71	Decorated; faceted with 10 shaped facets.	Transparent Dull Patina: No	Monochrome Dk. Brownish-red 2.5YR 2/2	Spheroidal Irregular	8.5 x 8.4	Plate 8f	Kidds' WIIc	1
----	---	-----------------------------	---------------------------------------	----------------------	-----------	----------	-------------	---

548 were recovered from NAVS.

FORT ROSS BEACH SITE BEAD ASSEMBLAGE

The bead assemblage from FRBS consists of 16 beads of 9 varieties (table 8.1). Because of the low frequency of beads and possible disturbed and secondary contexts of this site's deposits, little cultural information can be obtained from this assemblage. All but Variety 7 also were found in the NAVS bead assemblage. Because FRBS is located downslope from NAVS, and because of the comparable varieties of beads at both sites, there is a high likelihood that FRBS is a secondary deposit from NAVS. Importantly, the only variety not recovered from the Village site (Variety 7) is a Prosser-molded ceramic bead dating post-1840, i.e., after abandonment of Fort Ross by the Russians. One melted bead (P1020-253) of an unknown variety was noted, and is not included in the bead assemblage count.

NATIVE ALASKAN VILLAGE SITE ASSEMBLAGE

There are 548 beads in the assemblage, consisting of 78 bead varieties (table 8.2). Percentage comparisons for selected attributes include:

Manufacturing Types (figure 8.12)

- Drawn Beads - 90.7% (n = 497)
- Wound Beads - 8.9% (n = 49)

Blown Beads - 0.4% (n = 2)

Decoration

- Undecorated Beads - 96.9% (n = 531)
- Decorated Beads - 3.1% (n = 17)
- Faceted - 70.5% (n = 12)
- Other - 29.5% (n = 5)

Relative Sizes

- Embroidery Beads (small; approximately 0.5-6.0 mm) - 92.7% (n = 508)
- Necklace (large; generally >6.0 mm) - 7.3% (n = 40)

Colors (figure 8.12)

- White/Clear/Gray - 33.0% (n = 181)
- Red - 23.0% (n = 126)
- Green - 16.2% (n = 89)
- Black - 12.2% (n = 67)
- Blue - 8.0% (n = 44)
- Purple - 4.0% (n = 22)
- Yellow/Amber - 3.5% (n = 19)

Color Layering

- Monochrome - 80.8% (n = 443)
- Polychrome - 19.2% (n = 105)

Four of the beads were fused after manufacture, presumably by inadvertent heating at the Village. One Variety 29 bead is fused to a Variety 40 bead (P1019-505), and one possible Variety 45 bead is fused to a Variety 65 bead

Figure 8.10 Blown Beads from the Native Alaskan Neighborhood (n = 2)

Shapes Unknown

Type B/M?Df and B/M?Dsf

VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSELL NOTATION	SHAPE LENGTH FINISH	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
38	Decorated; faceted with an unknown number of random ground facets.	Transparent Dull Patina: No	Monochrome Purplish-red 2.5R 3/10	--- --- ---	---	---	Karklins EIIa	1
39	Decorated; faceted with an unknown number of ground facets, and inlaid with one opaque white (N 9/) horizontal stripe.	Translucent Dull Patina: No	Monochrome V. Dk. Purplish-red to Black 10RP 2/1	--- --- ---	---	---	Karklins EII	1

Figure 8.11 Prosser-Molded Ceramic Bead from the Fort Ross Beach Site (n = 1)



Type PM/MSDb

VARIETY NUMBER	DECORATION COMMENTS	DIAPHANEITY LUSTER PATINA	LAYERING COLOR MUNSELL NOTATION	SHAPE	SIZE LEAST DIAMETER x LENGTH (mm)	PLATE NUMBER	COMPARATIVE NUMBERS	QUANTITY
7	Decorated; banded with one horizontal band at circumference. Very glasslike fabric that is very slightly granular.	Translucent Shiny Patina: No	Monochrome Greenish-blue 2.5B 6/8	Spherical Banded	---	---	Karklins PM	1

(P1019-573). Each of these four beads are included with the total variety counts for the assemblage. One melted bead (P1019-461) of an unknown variety is noted, and is not included in the bead assemblage count.

NATIVE AMERICAN BEAD COLOR PREFERENCES

Prior to the arrival of Europeans to western North America, Native Americans manufactured beads from white clam and dentalia shells, bone, and ivory; purple mussel shell; multicolored olivella and abalone shells; buff to red magnesite and catlinite; black steatite and argillite; blue turquoise; and yellowish-brown amber. The predominant color across North America was white, reflecting the common usage of shell beads (Bennyhoff and Hughes 1987; also see the 20-volume *Handbook of North American Indians*, edited by William C. Sturtevant, published by the Smithsonian Institution, Washington D.C.; individual volumes variously dated with some still unpublished).

With the arrival of Europeans and their glass beads, initial colors of choice among most Native Americans in western North America appear to have been principally white and secondarily blue (e.g., Ahler and Drybred 1993; Davis 1972; Moulton 1983):

When European traders offered their Indian partners glass beads, silver brooches, silk ribbons, and colored cloth, these materials were interpreted in terms of their symbolic implications and potential for power. The most frequently encountered trade materials on early (eighteenth-century) dress include white glass beads, red and blue cloth, tin and copper cones with vermil-

ion-dyed tassels of deer hair, brass hawk bells, and vermilion pigment. Glass beads and brass or silver pendants compared closely with ornaments made of white shell, copper, red jasper, and catlinite, that had been exchanged intertribally across the continent for thousands of years before European trade began. The "trinkets and baubles," dismissed as trivial when traded away by Europeans, were transformed into expressions of wealth and power when incorporated into Indian dress and worn on the body as ornaments. European traders looked on in astonishment as Indians suspended iron axes around their necks, used house keys for ornaments, or hung papers of bins from their hair (Bailey 1969:60; Keating 1959:383) but without comprehension of how these had been evaluated by their new owners. As the fur trade formalized into patterns that dispersed quantities of ornamental trade goods across the continent, women began to develop techniques for incorporating these invaluable materials into expressions of dress (Penney 1992:36).

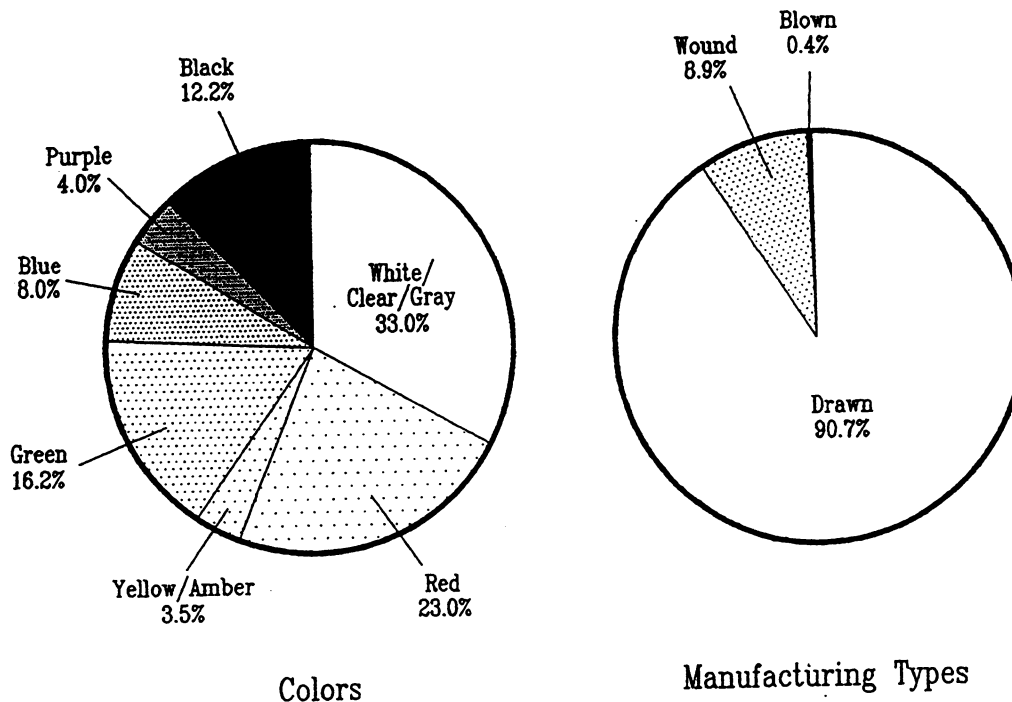
Perhaps within one generation of contact, red, green, red-on-green, red-on-yellow, red-on-white (if available), and purple colors became accepted. Pastel colors, decorated beads, and faceted beads also became accepted relatively quickly (e.g., Combes 1964; Kidd 1970; Ross 1990). This pattern of acceptance represents a working hypothesis for bead colors, and until a definitive study of bead color preferences is completed, any comments represent interpretive speculation.

At the Village site, the dominant bead colors were white/clear/gray, red, green, and black, with minimal blue, purple, and yellow/yellowish-brown beads (fig-

Table 8.1 Glass and Ceramic Beads from the Fort Ross Beach Site

MATERIAL Manufacture (N1) Class (N2) Type (N3) Variety (N4)	N4	N3	N2	N1
GLASS				15
Drawn Beads			13	
Monochrome Beads with a Hot-Tumbled Finish				
Type D/MCHU		9		
Variety 2	2			
Variety 4	3			
Variety 5	3			
Variety 41	1			
Polychrome Beads with a Hot-tumbled Finish				
Type D/PCHU		4		
Variety 1	1			
Variety 3	3			
Wound Beads			2	
Monochrome Beads				
Type W/MOU		2		
Variety 6	1			
Variety 8	1			
CERAMIC BEADS				1
Prosser-Molded Beads			1	
Simple Monochrome Beads				
Type PM/MSDb		1		
Variety 7	1			
TOTAL				16

Figure 8.12 Percentage Comparisons of Bead Colors and Manufacturing Types for the Native Alaskan Village Site



ure 8.12). This color pattern may be unique for the northern California coastal area, with a relatively high frequency of non-white beads, especially black and red beads, and a distinct paucity of blue beads. Black and red may represent the prominent colors either of Russian dress or Native Californian ornamentation. It is possible that green, blue, and purple beads may have been regarded as blue beads. If so, then their combined total of 155 beads for 28.3% of the colors could be considered relatively normal for Native American groups. However, bead colors historically chosen by the Russians for the California trade (i.e., red, white, and black) appear to reflect the preferences of Native Californians. For example, one order placed for beads by the Russian-American Company (date unknown to the author) stated that:

Of the amount intended for Sitka - 6 pudov [221-248 lbs] - California is to get up to 5 pudov [184-206 lbs], where should be sent red, white and black beads; the remaining (beads) for trading with the Chukchi Native Siberians and North Americans Native Alaskans, light blue and white colors (Fedorovoi and Aleksandrov 1985:205).

To ascertain whose color preferences these red, white, and black beads sent to California represented, comparative research on the colors used and preferred by Russians, Unangan, Alutiit, Tanaina, Coast Miwoks, and Kashaya Pomos would have to be undertaken. From existing accounts of bead colors from archaeological

contexts (see below), ethnographical specimens, iconographical illustrations, and historical accounts, it is anticipated that color preferences for beads from NAVS reflect preferences of Pomo and Coast Miwok women (assuming they were the beadworkers) who lived with the Alaskan male hunters. These color preferences likely will be distinctive for the region surrounding Fort Ross and for the temporal period of Russian occupation.

Beads recovered within the Fort Ross Stockade (incorrectly attributed to a possible Kashaya Pomo village site displaced by the construction of the Stockade by Smith [1974] and corrected by Lightfoot et al. [1991:76-78]) indicate that the dominant colors were white (54.1%), green/blue/purple (28.3%), red (13.5%), and amber (8.1%), with minimal black. Other bead samples from Fort Ross, but not yet studied in detail, came from the Old "Magasin" within the fort (Farris 1987) and from burials at the Russian-American Company cemetery (Goldstein 1992). Whether the colors of beads from these "Russian" contexts reflect preferences of local Kashaya Pomo and Coast Miwok; immigrant Unangan, Alutiit, and Tanaina; or resident Russians is unknown.

In comparison, beads from the Russian fur trading settlement of Three Saints Harbor, Kodiak Island, Alaska (Crowell 1994:tables 5.1 and 5.2) indicate that dominant colors for the 1784-ca. 1820 Russian period were blue/purple (60.5%), white/clear (27.9%), red, (9.4%), green (1.4%), and yellow/amber (0.8%). Beads from the site of the Russian-American Company Kolmakovskiy Redoubt,

Table 8.2 *Glass Beads from the Native Alaskan Village Site*

Manufacture (N1) Class (N2) Type (N3) Variety (N4)	N4	N3	N2	N1
Drawn Beads				497
Monochrome Beads with Chopped Ends			9	
Type D/MCCU		7		
Variety 11	2			
Variety 25	1			
Variety 44	1			
Variety 66	2			
Variety 78	1			
Subtype D/MM2CDf		1		
Variety 12	1			
Subtype D/MM4CDf		1		
Variety 77	1			
Polychrome Beads with Chopped Ends			6	
Type D/PCCU		5		
Variety 24	5			
Subtype D/PM2CDf		1		
Variety 74	1			
Monochrome Beads with a Hot-Tumbled Finish			262	
Type D/MCHU		259		
Variety 2	19			
Variety 4	62			
Variety 5	19			
Variety 9	66			
Variety 10	2			
Variety 16	26			
Variety 19	6			
Variety 20	12			
Variety 21	6			
Variety 23	1			
Variety 26	3			
Variety 27	2			
Variety 29	4			
Variety 31	1			
Variety 32	1			
Variety 41	3			
Variety 42	5			
Variety 43	3			
Variety 46	4			
Variety 48	2			
Variety 49	1			
Variety 50	1			
Variety 51	3			
Variety 52	2			
Variety 53	2			
Variety 54	1			
Variety 55	1			
Variety 67	1			
Type D/MCHDf		3		
Variety 28	3			
Polychrome Beads with a Hot-Tumbled Finish			220	
Type D/PCHU		220		
Variety 1	77			
Variety 3	83			
Variety 17	2			

cont'd.

Table 8.2 - continued

Manufacture (N1) Class (N2) Type (N3) Variety (N4)	N4	N3	N2	N1
Variety 18	18			
Variety 22	1			
Variety 45	27			
Variety 47	10			
Variety 56	2			
Wound Beads				49
Monochrome Beads			49	
Type W/MSU		10		
Variety 36	7			
Variety 57	1			
Variety 65	1			
Variety 72	1			
Type Ws/MSDf		1		
Variety 71	1			
Type W/MSDcl		4		
Variety 14	1			
Variety 35	3			
Type W/MOU		26		
Variety 6	1			
Variety 8	1			
Variety 13	1			
Variety 15	2			
Variety 34	2			
Variety 37	1			
Variety 59	1			
Variety 60	1			
Variety 61	2			
Variety 62	1			
Variety 63	1			
Variety 64	1			
Variety 68	4			
Variety 69	1			
Variety 70	1			
Variety 73	3			
Variety 75	1			
Variety 62	1			
Variety 79	1			
Type W/MOUc		1		
Variety 76	1			
Type Ws/MOU		2		
Variety 33	2			
Type Ws/MTU		1		
Variety 58	1			
Type W/MEDs		1		
Variety 40	1			
Type Ws/MBpDf		3		
Variety 30	3			
Blown Beads				2
Simple Monochrome Beads			2	
Type B/M?Df		1		
Variety 38	1			
Type B/M?Dsf		1		
Variety 39	1			
Total				548

Kuskokwim River, western Alaska (Oswalt 1980) indicate that dominant colors for the 1841-1866 Russian Period were white (54.6%), blue (23.8%), and red (8.7%), with minimal pink, purple, black, green, yellow, and amber beads; while dominant colors for the ca. 1870-1917 Anglo-American period were white (36.5%), blue (7.9%), and red (5.1%). Whether these colors reflect preferences of local Alutiit, inland Native Alaskans, or Russians is unknown. What is obvious is that color percentages change through time, and this change could be related to ethnic preferences.

Inhabitants living at the Native Alaskan Village Site included Unangan from the Aleutian Islands; Tanainas from Cook Inlet, Alaska; Alutiit (Qikertarmiut) from Kodiak Island, Alaska; and Kashaya Pomo and Coast Miwok from California (Lightfoot et al. 1991:3). How were beads used historically by these ethnic groups? To address this question, a partial review of ethnohistorical, iconographical, and historical evidence by individual ethnic group was undertaken. This review included the examination of published ethnohistorical catalogues and descriptions of approximately 20 beaded artifacts collected by Captain James Cook in 1778, George Vancouver in the early 1790s, Hans Georg Langsdorff in 1805, Captain William Osgood prior to 1829, at least two unnamed collectors prior to 1843, Russian-American Company Director Adolf K. Etolin prior to 1847, and an unnamed collector ca. 1850.

Iconographical illustrations of beaded objects examined included black-and-white and color reproductions attributed to Luka Alekseevich Voronin ca. 1790-1792, Georg Heinrich von Langsdorff ca. 1805-1806, Ludovik Choris ca. 1815-16, Mikhail Tikhonov ca. 1817-1819, and Pavel Mikhailov ca. 1826-29.

Historical accounts examined generally consisted of diaries of seamen, priests, and travelers. Approximately forty accounts mentioning the use of beads in trade were reviewed, ranging from the 1741 voyage of Vitus Bering to the 1839 voyage and overland trek of Ferdinand Petrovich von Wrangel. Data from these sources were documented in the original draft of this study, but are not included in this published version.

HISTORICAL BACKGROUND OF THE RUSSIAN BEAD TRADE

Hundreds of Russian traders sailed to the Aleutian Islands and Alaska during the last half of the 18th century, and many of their fur returns have been compiled (e.g., Berkh 1974; Coxe 1780; Golder 1914; Makarova 1975; Masterson and Brower 1948; Pallas 1781-1796). Perhaps the most thorough account of this trade was undertaken by Raisa Makarova (1975:209-16), who documented 92 voyages of Russian fur traders during the 18th century. During the 1740s, at least 12 Russian voyages were undertaken to the far western tip of the Aleutian Islands. During the 1750s and 1760s,

most voyages were confined west of Unalaska Island, with fur traders reaching Kodiak Island as early as 1762 (VanStone 1984:149). In the 1770s and 1780s, voyages were occurring regularly as far east as Kodiak Island. Alexei Chirikov, of the Bering-Chirikov Russian voyage of 1741-1742, reached the Northwest Coast (in the vicinity of Sitka, Alaska) in 1741. However, not until the 1790s were Russian voyages routinely undertaken to the northwest American coastline, ten to twenty years after extensive Spanish and English trade in the region (e.g., Beaglehole 1967; Dixon 1789; Hezeta 1985; Pérez 1989; Portlock 1789).

With the Russian discovery of the Aleutian Islands by Vitus Bering and Aleksei Chirikov in 1741, glass beads, including Chinese beads, were introduced to Unangan and Alutiit (Golder 1922:99, 147). At this time, Unangas bentwood hats and facial ornaments lacked glass beads (Golder 1922:305; 1925:103). In his log on September 9, 1741, Alexei Chirikov (captain of the *St. Paul*, the second ship of Bering's expedition) described the hats worn by the people of Adak Island, Alaska:

They wear on their heads a kind of hat made of thin birch boards, which are decorated with various colors and feathers. Some of these dippers (hats) had in the top small ivory statues (Golder 1922:305).

Steller observed residents of Bird Island (in the Aleutian Islands?) on September 5, 1741 who "... pierce holes anywhere in their faces, as we do in the lobes of the ear, and to insert in them various stones and bones" (Golder 1925:103).

To gain an idea of the quantity of beads carried aboard Russian fur trading vessels, consider the account provided by Stephen Glotoff during his Russian voyage of 1762-1766. In May 1763, Glotoff had his crew salvage the remains of Vitus Bering's 1740s wrecked vessel, the *St. Peter*, at Commander's Island:

They brought back with them twenty-two puds [794 lbs Avoirdupois] of iron, ten of old cordage fit for caulker's use, some lead and copper, and several thousand beads (J.L.S. 1776:107).

On a later Russian fur trading expedition, the 1773-1779 Russian voyage of the vessel *Evpl* to the Aleutian Islands in the vicinity of Fox Island under contract to a company belonging to Moscow merchant Vasilii Serebrennikov, the only beads listed were "3,189 metal beads [*korol' kov*]" and "1-1/4 pounds of rosary beads [*bisera*]" (Makarova 1975:187; see appendix 8.1 for a discussion of bead terminology). In this translation, it is assumed that the term "pound" is from the Russian term *funt* (1/40 of a *pud*, or 409 g [14.4 ozs avoirdupois]), and that a 1-1/4 *funts* of glass beads would equal 15 *sazhans* or strings of beads (see the discussion of Russian weights and bead strings below). Assuming the *bisera* were small to medium necklace beads, there could be approximately

200-600 beads per string, for a total of 3000-9000 beads.

UNANGAS BEAD USAGE

By the 1760s, Unangas men were wearing beaded hats and nose, lip, and ear ornaments; and women wore beaded necklaces, and nose and ear ornaments (Coxe 1780:256-57; J. L. S. 1776:151; Krenitsyn and Levashev 1771:248, 249).

During the 1770s, Unangan expressed preferences for white, blue, and brown beads (Beaglehole 1967:1427; Klichka 1790:266); and hunting hats attributed to the 1778 visit of James Cook appear to exhibit blue, white, possibly black and green wound beads, and white drawn beads (Black 1991:plates 8, 16, and 20). Commonly reported materials for ornamentation included ivory (teeth), bone, stone, amber, paint, ocher, and feathers. White beads appear to have been substituted for white ivory and bone, with brown beads substituted for amber. Blue was used during pre-contact periods in paints, but does not appear to have had an equivalent material for ornaments.

During the 1790s, Unangan preferred white, blue, and red beads (Sarytschew 1807:56), variously termed corals, enamels, pearl-enamels, and garnets by English translators (see appendix 8.1). Women were sewing beads around the edges of their ears and were decorating parkas and waist, wrist, and ankle bands with beads (Billings 1980:200, 201; Langsdorff 1814[2]:39-40; Merck 1980:78, 79-80, 170; Sarytschew 1802:plates 16-18; Sauer 1802).

During the 1800s, beads were still worn as lip, nose, ear ornaments (including beaded ears), bracelets, and anklets, and were used to decorate clothing and hats (Campbell 1816:110; Langsdorff 1814[2]:39, 39-40, plate II, nos. 4-6). At least one bentwood hat collected in 1805 was decorated with what appears to be blue wound beads (Black 1991:plate 20).

In the 1810s, beads adorned garments and hats, were still worn as nose ornaments, earrings, and necklaces (Choris 1822:plates III-IV; Comey 1896[1821]:53; Fitzhugh and Crowell 1988:frontispiece, 105; Shur and Pierce 1975:42, top).

From the 1820s, one beaded hunting hat survives with what appear to be blue, white, red, black, and possibly green spheroidal wound beads (Black 1991:plate 15; Miller 1994:n.p.).

By the 1830s, Unangas lip, nose, and ear (i.e., beads sewn to the ears) ornamentation had disappeared, supplanted by more modest earrings, as well as necklaces similar to those worn by Europeans (Veniaminov 1984:213-14). At least one Unangas hat from a pre-1840s context (Black 1991:plate 13) has bead decoration, a black wound bead with a white spiral stripe.

From the 1840s, numerous beaded hats exhibit a wide variety of colored beads, including what appear to be clear, white, black, amber, yellow, blue, purple, and

possibly red wound beads, and white and possibly other colors of drawn beads (Black 1991:plates 7, 17, 26, and 28-29; Miller 1994:front cover).

KODIAK ISLAND ALUTIIQ BEAD USAGE

Alutiit from Kodiak Island may have received glass beads as early as the 1740s when Bering and Chirikov sailed through the region. Definitely by the 1760s beads were in use (J. L. S. 1776:113-14). During the 1770s, beaded bentwood hats were reported, and both men and women were wearing bead necklaces (Pallas 1782:91). In the 1780s, men had beaded nose, lip, and ear ornaments; and young men wore bead necklaces (Shelikhov 1971:316, 1981:53). During the 1790s, Kodiak Island Alutiit were using white, blue, and red beads; and women were reported to be wearing beaded nose, lip, and ear ornaments, as well as necklaces (Merck 1980:103; Sarytschew 1802:plate 38). During this same period, Joseph Billings (1791:397, 399) also noted that beads were buried with the dead and that wooden dishes and plates were decorated with beads.

In the 1800s, they expressed a preference for black and red beads, but used many colors. Lip and nose ornaments were disappearing, yet they were still in use. Beaded ear ornaments were still worn, as well as beads sewn to the ears and hunting hats were still decorated with beads. Women were wearing beads around their necks, arms, wrists, and ankles (Black 1991:figure 41; Davydov 1977:149; Gideon 1989:58, 66; Langsdorff 1814[2]:63; Lisiansky 1814:194-5). Archimandrite Ioasaf noted in 1805 that the Alutiit had no concept of money, presumably indicating that beads were not used for monetary exchange (Black 1977:85); yet beads were used to indicate wealth (Gideon 1989:41-42).

During the 1810s men were depicted wearing beaded lip ornaments, earrings, bracelets, and beaded feathered headdresses; while at least one woman was depicted wearing a blue and white beaded dance headdress (Fitzhugh and Crowell 1988:69, 141, 313, plate 49; Shur and Pierce 1975:44-45, top).

TANAINA BEAD USAGE

During the 1770s and 1780s, the Tanaina of Cook's Inlet expressed a strong preference for blue beads; and the only beaded articles reported were nose, lip, and ear ornaments (Beaglehole 1967:365, 1115; Dixon 1789:68, 240; Portlock 1789:113, 115).

KASHAYA POMO BEAD USAGE

Beads were presumably known and traded to the Kashaya Pomo at least by 1812 when the Russians established Fort Ross, but the earliest known account of bead use is a reference by Kirill Khlebnikov (1990:193-94) in 1824 to payments of beads to Native Californians (presumably Pomo). Ferdinand Petrovich von Wrangell (1839:77), during his Russian voyage of 1839, noted that

beads were used for gambling by Native Californians, an observation also made by Cyrille LaPlace (1986:70-71). The only historical account for Kashaya Pomo bead preferences was the 1839 statement of Cyrille LaPlace (Farris 1988:23 citing LaPlace 1854[1841]:144-62) of the red and black bead necklaces worn by a male chief, and the undated reference above for red, white, and black beads to be sent to California (Fedorovoi and Aleksandrov 1985:205).

The Pomo were manufacturers of beads, both from shell and magnesite (Hudson 1897). It is recounted that as early as 1816, when the Russian explorer Kuskoff ordered glass beads for the local trade, they were regarded as counterfeit beads by the Pomo. Purportedly, three Russian traders had their heads branded with their counterfeit beads (Hudson 1897:107). Similar reactions by Native Americans to perceived counterfeit beads are noted historically (e.g., the rejection of porcelain beads by Tlingit in 1805; Langsdorff 1814[2]:132-33).

One difficulty in identifying the use of glass beads among the Pomo is that 20th-century ethnographers (Gifford 1967; Kroeber 1925; Loeb 1926) apparently did not document glass bead usage, concentrating instead upon the documentation of more traditional material culture. Gifford did describe one necklace used as a badge of membership in the Maru ceremonial group and observed (ca. 1958-59) it as having opaque white and transparent red beads. He also states that glass beads were termed *walholyo*. From personal observation of one Pomo basket on display in the Smithsonian Institution of Museum of Natural History during January 1994, glass beads do appear to have been used to decorate some feathered baskets.

COAST MIWOK BEAD USAGE

For the Coast Miwok, no historical accounts of bead use were found, but archaeological evidence from the Echa-Tamal Village site indicates that dominant colors were white (77.0%), red (18.1%), and purple (2.8%), with minimal blue, black, and green beads (Dietz 1976). These colors presumably reflect preferences of the Coast Miwok inhabitants, but for which periods of time is unknown.

NATIVE ALASKAN VILLAGE RESIDENT PREFERENCES

It is hypothesized that the color preferences of residents at NAVS may reflect preferences of Kashaya Pomo and/or Coast Miwok rather than Unangas, Alutiiq, or Tanaina hunters. More exhaustive historical and archaeological comparative studies of local Native Californian sites are required to evaluate this hypothesis. The Native Alaskans from Kodiak Island living at the Village appear to have accepted beads in a broad range of colors by 1812-1840. The red or black beads noted by LaPlace in 1839 reflect the preferences of Native Californians at Fort Ross, a preference also expressed in

the undated Russian-American Company bead order above (Fedorovoi and Aleksandrov 1985:205). Because of the presence of Alutiiq from Kodiak Island, these preferences may not reflect the choices of local Native Californians alone. Bead colors from Alaskan sites occupied by Native Alaskans during the period of 1812-1841 (e.g., the Ahtna Village of Dakah De'Nin [Yarborough and Yarborough 1992]) and from northwest coastal California sites occupied by Pomo and Coast Miwok will have to be compared to the Native Alaskan Village Site assemblage to see if regional color patterns can be defined. Moreover, care will have to be taken to compare beads from similar cultural and temporal contexts.

Monochrome, undecorated, and embroidery beads often represent the least expensive beads available during the 19th century, and these beads dominate the NAVS assemblage. Because of the high value of large, multicolored decorated beads, lost or discarded specimens of these more expensive beads are an anomaly within habitation refuse, usually consisting of broken beads. Prized and valuable beads would be anticipated from ceremonial features (e.g., burials, cremations, sacred sites) or within archaeological deposits created by catastrophic events such as mudslides, floods, or fires.

MANUFACTURING AND SUPPLY SOURCES FOR RUSSIAN TRADE BEADS

Iron has been regarded as a possible indicator for the presence of other Asian trade goods such as beads. In 1741, the naturalist George Wilhelm Stellar, on the Bering-Chirikov Russian voyage of 1741-1742, noted that two Unangan at Bird Island ". . . had hanging on their belt, like the Russian peasants [sic], a long iron knife in a sheath of very poor workmanship" (Golder 1925:97). He speculated that these iron knives were of their own workmanship because they were not of European design. As Lydia Black (1984) notes, pre-contact iron, and copper as well, could either consist of cold-beaten native metals; reworked drift metal from Japan, Korea, or China; or direct or indirect Asian-Aleutian trade goods. None of the accounts of pre-Russian native material culture from the Bering expedition mentions the presence of glass beads. From later accounts, glass beads commonly were reported with hunting hats, earrings, and labrets. Similar objects described by members of Bering's expedition lacked glass beads.

Lydia Black (1984) has argued that trade between populations occupying the Asian mainland and Aleutian Islands may have occurred prior to the arrival of the Russians in 1741. She cites the presence of iron at pre-contact native sites as the principal evidence:

The provenience of any pre-contact metal in the Aleutians is customarily explained as wreckage, the so-called drift-iron. On the other hand, the use of iron

spread slowly along the Okhotsk and Bering Sea littoral toward the end of the B.C.-beginning A.D. (Levin and Sergeev 1960; Arutiunov et al. 1977), and provenience other than by shipwreck must be considered as a possible alternative explanation, especially when the linguistic evidence cited above is taken into account [here the author is referring to linguistic similarities in Eskimo and Aleut for iron and copper, and in Eskimo, Aleut, and Japanese for copper; citing Arutiunov et al. 1977:104]. . . . direct NE Asian contact should be considered (Black 1984:31).

William Fitzhugh (1994:36) noted that:

Archaeological finds suggest that metal, shamanistic paraphernalia, and ornamental objects from Siberia were important in the Eskimo culture of western Alaska for more than 2,000 years (citing Collins 1937; Larsen and Rainey 1948; McCartney 1988).

This trade appears to have been conducted between natives of Siberia and Alaska, and may have included some items of Asian and/or European manufacture:

. . . Athapaskans had obtained some European goods and artifacts from the peoples of Eastern Siberia long before the early Europeans came to Alaska [evidence of these goods, their age, and origins are uncited by the author]. These goods arrived through exchanges with Malemiut Eskimos, who were closer to Bering Strait than any other peoples and for a long time had acted as mediators in the exchange operations with the northeastern inhabitants of Asia. The collecting point for the Asiatic and American traders were the Diomed Islands, which the Indians could reach by canoe or by dog sled in the winter. To Chukchi traders, the trip across the Bering Strait was a routine part of life and it was timed to coincide with the end of winter or the beginning of spring (Dzeniskevich 1994:56, citing Anonymous 1978:121 and Wrangell n.d.:d.341, I. 30-32 ob.).

The earliest documented occurrence of glass beads known among coastal Native Americans north of San Francisco to the tip of the Aleutian Islands was at Kayak Island (east of the Kenai Peninsula), Alaska, in the territory of the Alutiiq, on July 21, 1741, when Vitus Bering presented local residents with “. . . 20 Chinese strings of beads . . .” (Golder 1922:99). Prior to contact, the beads of Native Alaskans were:

. . . made of soft stones, bone, ivory and other teeth, shell, and amber. After contact, beads came into the region from many quarters: Venice (Italy), Bohemia (now part of Czechoslovakia [again reverted to Bohemia]), China, and perhaps Central Asia or Russia (Francis 1994:281).

During the 1740s-1770s, Russian contact in the Aleutian Islands and along the southern coast of Alaska, continually increased, resulting in the spread of trade

goods, including beads, within the region. With the arrival of Captain James Cook in 1778, followed by other explorers and traders, the presence of European trade goods and Chinese beads among all indigenous groups along the Pacific coast of North America increased. Among these goods also may have been Russian-manufactured beads.

RUSSIAN-MADE GLASS BEADS

Oleg Bychkov (Bychkov 1994; Farris 1992; Ross 1994b) noted that glass beads manufactured after 1785 at the Tal'tsinsk glass factory outside Irkutsk, Russia (a factory whose original investors and co-owners were Lt. Col. Erik Gustavovich Laxman and Aleksandr Andreevich Baranov), went to the Golikov-Shelikhov Company. This company, also known as the Northeastern American Company, had been established by Ivan Larionovich Golikov and Grigorii Ivanovich Shelikhov in 1781. It later combined with other smaller Russian companies at the direction of the Russian government to form the United American Company in 1797, which under the governorship of Aleksandr Baranov became the Russian-American Company in 1799 (Black 1988:75-79; Chevigny 1965:53; Gibson, J. R. 1976:4-5; Solovjova 1995). If a source for Russian beads from Irkutsk, and their sale to the Company, can be verified, then it is possible that Russian-manufactured beads may have found their way to Fort Ross and may survive in archaeological assemblages. European beads also are known to have been imported to Sitka from Brussels (Woodward 1965:9), probably through St. Petersburg and then to Fort Ross (Fedorovoi and Aleksandrov 1985:205). Russian beads were manufactured later at glass works in the Demetrieveff district of Moscow in 1881 (*Pottery and Glassware Reporter* 1885), but whether these glass works existed earlier, during the Russian (1741-1867) and Colony Ross (1812-1841) eras, remains to be ascertained.

Most beads at Fort Ross are presumed to have been supplied through the Russian-American Company, but some probably were acquired from Boston merchants trading along the shores of the Pacific (also see discussion below for possible trade with the Hudson's Bay Company). As John Hussey (1957:73) noted: “. . . Boston vessels were able to carry on a very profitable business supplying provisions and trade goods to the Russian American Company in Alaska.” The extent of this trade has been well documented, and during the Colony Ross era, trade was conducted with no less than 85 ships of American registry (Gibson, J. R. 1976:169-71, table 9). Less well documented is the quantity and type of beads sold. In one example, John Jacob Astor's American Fur Company sold goods off the ship *Beaver* to Russian-American Company Governor Baranov in Sitka in 1812, including 290 lbs of small blue beads (Porter 1931:513-21). Undoubtedly, these mercantile sources had access to beads manufactured both in Europe

and China. It is reasonable to suspect that some of these American-supplied beads could have found their way to Fort Ross. The Americans may not have been the only merchants who provided beads to the Russian-American Company.

The Russian-American Company is known to have acquired provisions and/or goods from Europe, from at least one French vessel, from Spanish merchants in Alta California and South America, from Kanakas in the Sandwich Islands, and from the Chinese in Kiakhta, on the border of Russia and China just southeast of Irkutsk (Chevigny 1965; Coxe 1780:241; Gibson, J. R. 1976:170, 174-98, 209-11; Pierce 1990). Coxe (1780:241) listed all classes of goods exchanged between the Russians and Chinese in Kiakhta, noting that the Russians acquired from the Chinese at no duty: "glass corals" and beads. "Corals" may have been opaque wound beads, mimicking true red coral beads; but by the 18th century the term appears to have signified large, as opposed to small, glass beads (following van der Sleen 1967:56). Coral beads came in at least two colors: red and blue (Merck 1980:103). Other beads from China may have been translucent to opaque beads, commonly colored blue, yellow, and green. Beads from various sources undoubtedly found their way to Fort Ross, except perhaps for Chinese beads.

None of the bead varieties from NAVS can be precisely dated, and only a few can be attributed to their country of origin. The cornerless hexagonal beads (Subtypes D/MM2CDf and D/PM2CDF, and possibly Subtype D/MM4CDf), probably originated in Bohemia, with varieties of Subtypes D/MM2CDf and D/PM2CDF possibly being the same as those noted by Arthur Woodward (1965:9) as being shipped from Brussels. Missing from the assemblage, however, are Bohemian mold-pressed beads which post-date 1820-1830s (Ross 1988, 1989, 1990); English, French, European, and American Prosser-molded beads which post-date 1840 (Sprague 1983); and Chinese beads. Although not yet found at Fort Ross, Bohemian mold-pressed beads can be anticipated. They have been recovered from at least one archaeological context dating ca. 1804-1835: Santa Ines Mission (CA-SBR-518), California (Ross 1989:156, Type MPIIa-2 bead). The Prosser-molded beads, however, are assumed to be too recent for the Russian-American Company era at Fort Ross. One Prosser-molded bead was recovered from the Fort Ross Beach Site, presumably from a post-Colony Ross era context. The lack of Chinese beads is uncharacteristic, and it is curious that they also were nonexistent in a bead assemblage previously excavated at Fort Ross (Smith 1974).

CHINESE-MADE GLASS BEADS

Chinese beads were imported to Alaska by Russians as early as 1741 (Golder 1922:99), and probably by the earliest Spanish, American, British, and French explorers

and merchants. As discussed above, glass beads do not appear to have been present in the Aleutian Islands prior to the arrival of the Bering and Chirikov voyages during the summer of 1741. Soon thereafter, Russian fur traders from Okhotsk supplied a plethora of beads, presumably of Chinese, European, and perhaps Russian manufacture.

Chinese wound beads have been recovered in West Coast assemblages dating during the middle to late 19th century (e.g., Ross 1990) and in Alaska during the 18th and 19th centuries (e.g., Jenkins 1972, 1975; Miller 1994). Elizabeth Shapiro (1988) noted that 55 Canton beads (defined by Shapiro as opaque spheroidal beads) were recovered from the ca. 1785-1780s Russian, Unangas, and Alutiiq village site of Nunakakhnak, northwestern Kodiak Island, Alaska. It remains to be ascertained if these beads were indeed manufactured in and imported from China, associated with European imports from the Golikov-Shelikhov Company from 1781 to 1797, or supplied from other smaller Russian companies such as the Irkutsk Company of Nicholas Mylnikov, Lebedev-Lastochkin Company prior to 1797, or the United American Company from 1797 to 1799, or the Russian-American Company after 1799.

What appear to be Chinese beads are displayed prominently on ethnographic Unangas bentwood hunting hats or visors dated to the 1820-1840s, and as early as 1778 (Black 1991:plate 8). Similar hats or visors and earrings, probably with Chinese beads, also are illustrated by:

- Mikhail Tikhanov in 1817 of Unangas inhabitants of Unimak Island, Alaska (I. E. Repin Institute of Painting, Sculpture, and Architecture, Leningrad #2123; reproduced in Fitzhugh and Crowell 1988:105); and
- possibly by Ludovik Choris, ca. 1818, the artist with the Kotzebue expedition to the Unangas settlement of Illiliuk, Unalaska Island, Alaska (Anchorage Museum of History and Art; reproduced in Fisher 1990:29).

At least two traditional hats with what appear to be Chinese beads have been collected from the Alutiiq (Kodiak Island) or Chugach (Prince William Sound), pre-1847 and ca. 1850 (Black 1991:plate 7; Fisher 1990:23).

In 1816, Ludovik Choris noted "... large Chinese blue and white beads" among the Shishmaref, north of Cape Prince of Wales (VanStone 1960:147). Kotzebue (1821[I]:211) similarly noted for the Alutiiq just to the north at Kotzebue Sound "... the glass beads, also, with which they adorn themselves, are of the same kind as those worn in Asia ..."

Examinations of Russian-American Company period ethnographic and archaeological bead collections will have to be undertaken by researchers familiar with Chinese beads to date the occurrences of specific varieties. Some of the best ethnographic collections are

at the Muzei Etnografiyi Antropologiyi Akademiyi nauk in St. Petersburg and at the British Museum in London. Determining the presence of Chinese beads using archaeological reports is nearly impossible because beads are poorly described and illustrated. Why Chinese beads are not found at Fort Ross remains unexplained, but it is anticipated that they should be recovered from future archaeological excavations.

HUDSON'S BAY COMPANY TRADE WITH THE RUSSIAN-AMERICAN COMPANY

Many of the bead varieties recovered from the Native Alaskan Neighborhood have been reported from other western North American sites, most notably from the Hudson's Bay Company (HBC) 1829-1860 western department headquarters at Fort Vancouver (Ross 1990). It has been suggested that some beads traded by the Russian-American Company (RAC) came from the HBC (Francis 1988a; Mille 1975:21). The RAC and HBC were rivals for adjacent trading territories along the western North American coast, and until 1834 the Anglo-Russian Convention of 1825 kept both companies from major conflict. In 1829, HBC Governor Simpson attempted to open trade with the RAC, but RAC headquarters in St. Petersburg refused approval (Hussey 1957:68). In 1834, an HBC vessel was refused access to the Stikine River, within territory claimed by the RAC. This initiated a five-year disagreement between the two companies. In 1839, two years before the RAC abandoned its California enterprise, HBC Governor Simpson and RAC Baron von Wrangell concluded a ten-year trade agreement in Hamburg which, in part, provided that the HBC would supply the RAC with manufactured and agricultural products between June 1, 1840 and May 31, 1850 (Gibson, J. R. 1969:206, 1976:199-208, 1990a, 1990b; Hussey 1957:73).

The first shipment of manufactured goods and provisions from the HBC to the RAC occurred in 1840 when the barque *Vancouver* delivered wheat and butter to Sitka (Gibson, J. R. 1976:203, table 11). A second ship, the barque *Columbia*, arrived in Sitka with provisions and manufactured goods (Gibson, J. R. 1976:203, table 11), but the identity of the manufactured commodities remains unknown. No historical records have yet been located to document the exchange of trade beads between the HBC and RAC prior to the 1841 abandonment of Fort Ross.

Manufactured goods were provided to the RAC by the HBC, but the type of goods and their quantities have yet to be ascertained from HBC archival documents. As noted above, some researchers have speculated that Russians purchased or acquired trade beads from the HBC, but primary historical documentation to support this speculation has not been cited. The best documentation for specific manufactured items provided by the

HBC exists from research on transfer-printed English ceramics (Spodeware).

Louise Jackson (1991:53-54) infers that the RAC acquired ceramics from the HBC after the conclusion of the 1839 RAC-HBC treaty and through the 1840s, probably ceasing in 1850. This inference is based upon the diversity of English ceramics recovered from RAC and HBC sites around the northern Pacific Rim. For the period of Russian occupation of Fort Ross, 1812-1841, the RAC could only have acquired goods from the HBC through its western headquarters at Fort Vancouver during the period 1824 to 1841; and historical records suggest that if any goods were acquired, they had to be acquired in 1840 and/or 1841. A review of ceramic acquisitions and their occurrences in relevant sites clarifies the historical and archaeological evidence.

James Gibson (1976: 200-208, 1990a, 1990b) provides evidence that the RAC acquired manufactured goods after the 1839 HBC-RAC treaty became effective on June 1, 1840. The range of goods supplied remains to be documented historically, but from the archaeological evidence, Spodeware undoubtedly was included, at least after 1843. This evidence is offered as proof that the HBC did supply the RAC at least with British goods, per the 1839 agreement for European manufactured materials. Future historical research on the goods ordered and received through HBC Fort Vancouver and sent to Sitka will have to be conducted on surviving HBC records to document the range of goods traded, including beads.

Based upon the occurrence of Spodeware at RAC sites and published accounts of the supplies shipped from the HBC (Gibson 1967:203, table 11), manufactured goods could have been acquired by the RAC from the HBC during the ten-year period of 1840-1849. If these goods were received by the RAC from the HBC in 1840 (provisions were known to have been received, but the receipt of manufactured materials is in question until 1841), then they probably would have been shipped to Sitka in the late spring or summer, possibly with a portion repackaged and shipped from Sitka to Fort Ross. Because Fort Ross was closed in 1841, probably none of the manufactured items shipped from the HBC to Sitka in 1841 were repackaged and shipped to Fort Ross. Until historical evidence can be found to substantiate the shipment of beads between the two companies, it should be assumed that even if HBC goods did reach Fort Ross during its final two years of operation, the quantity of trade beads acquired from the HBC would have been minor.

BEAD SIZES IN THE RUSSIAN-AMERICAN COMPANY TRADE

Another topic for future archaeological and historical research at Fort Ross, and for other Russian-American Company sites, is the quantities and sizes of beads that appear on historical inventories and orders. It is known

that the Russian-American Company shipped beads by the *pud* (Fedorovoi and Aleksandrov 1985:205). The *pud*, a unit of weight for St. Petersburg or the Russian empire, officially equalled 16.38 kg (36.11 lbs Avoirdupois); but varied by city, weighing upwards of 16.75 kg (36.89 lbs Avoirdupois) in Riga to 18.72 kg (41.28 lbs Avoirdupois) in Narva (Doursther 1840:442-43). The *pud* is divided by weight into 40 *funts* (Doursther 1840:154, 230; Oswalt 1980:96), with each *funt* weighing 409.5 g (14.4 ozs Avoirdupois).

Another measurement used by the Russian-American Company in selling or trading beads was the *sazhen*. In their translation of Khlebnikov's 1817-1832 reports (Khlebnikov 1976:vii-viii), Basil Dmytryshyn and E. A. P. Crownhart-Vaughn indicate that a *sazhen* is a Russian linear measure of 2.13 m (7 ft). When Russian Navy Lieutenant Lavrentii Zagoskin visited the Russian-American Company trading post of Nulato on the Yukon River in 1843, he noted that:

... beads are handled in strings a sazhan long. One pound [funt?] usually produces 12 sazhans. The yearly quantity of beads issued during 1843 was about 7 puds (Zagoskin 1967:185).

Using these equivalences for beads, one 2.13-m (7-ft) bead string (*sazhan*) would weigh 34.1 g (1.2 ozs Avoirdupois). The numbers of beads would vary according to their size, with approximate numbers equalling:

- 600-1400 beads/string for 1.5-3.5 mm embroidery beads,
- 425-600 beads/string for 3.5-5.0 mm small necklace beads,
- 200-425 beads/string for 5-10 mm medium necklace beads, and
- 140-200 beads/string for 10-15 mm large necklace beads.

Depending upon the size of the beads, one *pud* of beads could include 67,200-627,000 beads. Given Zagoskin's figure of 7 *puds* of beads as the yearly total for the Russian-American Company in 1843, the total count could have included 0.47-4.7 million beads.

CONCLUSIONS

Analysis of the beads from NAVS and FRBS indicates the two sites are probably related. Beads from the Village were probably eroded and redeposited downslope in the Beach site. The Village site appears to date to the Russian period of occupation at Fort Ross, 1812-1841, and the only anomaly at the Beach site is a fragment of a Prosser-molded bead (Variety 7), post-dating 1840.

The Village glass and ceramic bead assemblage consists of 548 beads of 78 varieties and 3 manufacturing types: drawn, wound, and blown beads. This represents a highly varied assemblage, with the majority of beads

confined to a few varieties. Such variability suggests that more varieties than presently recorded are likely to be recovered from the Village, and that the present assemblage should be regarded as a tentative and preliminary record of beads used by inhabitants and/or possibly deposited at a later date by American settlers and visitors to the site. The assemblage is dominated by relatively inexpensive undecorated, monochrome and polychrome, hot-tumbled, drawn embroidery beads (Type D/MCHU and D/PCHU beads). Decorated beads comprise only 3.1% of the collection, with the most common form of decoration consisting of faceting. Relatively expensive, decorated necklace beads (Types W/MSDcl, W/MEDs, Ws/MBpDf, and Ws/MSDf, and Subtypes D/MM2CDf, D/MM4CDf, and D/PM2CDf) are rare. This lack of expensive beads is indicative of a site dominated by daily activities, where casual loss predominates. Large numbers of expensive beads at a site generally indicate wealth display or ceremonial activities, where intentional discard or deposition occurs.

NAVS exhibits a relatively unique distribution of colors for western Native American sites. Most western sites contain a majority of white and blue beads, especially early-contact sites. The Village assemblage consists predominantly of white/clear/gray, red, green, and black beads with lower frequencies of blue, purple, and yellow/amber beads. This color patterning is supported by an order placed for red, white, and black beads to be sent to Fort Ross sometime between 1812 and 1841 (Fedorovoi and Aleksandrov 1985:205) and by the 1839 account of Cyrille LaPlace (captain of the French frigate *Artémise*) (Farris 1988:23 citing LaPlace 1854[1841]:144-62). Native American sites in the Fort Ross region may exhibit similar unique color preferences. For example, the bead assemblage from at least one Coast Miwok village, Echa-Tamal, is dominated by white, red, and purple beads (Dietz 1976).

The Native Alaskan Neighborhood collection appears to contain only European beads, no Chinese beads. Chinese beads were available to Native Alaskans as early as 1741 and, by the late 18th century, became common in Alaska and along the northwestern Pacific coastline of North America during the early 19th century. Their absence from the Village, and from a bead assemblage recovered earlier from Fort Ross (Smith 1974), cannot be explained. Chinese beads may have had a relatively high value, suggesting that casual loss or discard would have been minimal, while ceremonial or sacred discard may have been high, especially for burials.

With an apparent European source of manufacture for the beads within the Village assemblage, it is inferred that they were imported via the Russian-American Company trade route from St. Petersburg to Sitka, from Boston (and possibly French) trading vessels to Sitka and Fort Ross, and possibly from Spanish merchants in Alta California. During the period that Fort Ross was

occupied by the Russians, the Russian-American Company may have obtained manufactured goods from the Hudson's Bay Company only in 1840 and definitely in 1841. Although there are many similarities in bead varieties between the archaeological collections at Fort Ross and Fort Vancouver, it is premature to assume that the beads from Fort Ross were acquired through the Hudson's Bay Company. Future archival research will be required to document the types of manufactured goods, including beads, that were supplied by the Hudson's Bay Company in 1840 or 1841; and then to ascertain if beads were reshipped from Sitka during last two years of Russian-American Company occupation of Fort Ross.

ACKNOWLEDGEMENTS

My sincere appreciation to Glenn Farris (California Department of Parks and Recreation) for his assistance in obtaining information on historical accounts of the RAC bead order for Fort Ross and for the translation of the 1839 French account of Captain Cyrille LaPlace; to Karlis Karklins (Parks Canada) for obtaining a translation of the RAC bead order; to Glenn Farris, Louise Jackson, James Gibson (York University Department of Geography), and Ann Morton (HBC Archives) for their assistance in locating evidence for the exchange of manufactured goods between the HBC and RAC; and to Paul and Marietta Schumacher for their gracious hospitality while I conducted archival research at the Bancroft Library.

REFERENCES

- Ahler, Stanley A., and Amy Drybred
1993 Analysis of Euroamerican Trade Artifacts. In *The Phase I Archeological Research Program for the Knife River Indian Villages National Historic Site: Part III: Analysis of the Physical Remains*, edited by Thomas D. Thiessen, chapter 21, pp. 289-340. National Park Service Midwest Archeological Center, Lincoln, Nebraska.
- Allen, Jamey D.
1983 The Manufacture of Intricate Glass Canes, and a New Perspective on the Relationship Between Chevron-Star Beads and Mosaic-Millefiori Beads. In "Proceedings of the 1982 Glass Trade Bead Conference," edited by Charles F. Hayes III, *Rochester Museum and Science Center, Research Records* 16:173-91. Rochester, NY.
- Anonymous
1835 Miscellaneous Communications from an American Naval Officer, Travelling in Europe; Forwarded from the Mediterranean, May 1834. *American Journal of Science and Arts* 27(1):74-84.
- 1978 *Ethnograficheskie materialy Severo-Vostochnoi ekspeditsii, 1785-1793 (Ethnographical material from the North-Eastern Expedition, 1785-1793)*. Magadan.
- Arutiunov, S. A., E. A. Glinskii, and D. A. Sergeev
1977 K probleme proniknoveniia zheleza v Arktikuk Eskimosam. *Sovetskaia Etnografiia* 1:101-6.
- Bailey, Alfred G.
1969 *The Conflict of European and Eastern Algonkian Cultures, 1504-1700*. University of Toronto Press, Toronto. Originally published in 1937 as the *New Brunswick Museum Monograph Series 2*.
- Beaglehole, John Cawte (editor)
1967 *The Journals of Captain James Cook on his Voyages of Discovery, Volume III: The Voyage of the Resolution and Discovery, 1776-80, 2 parts*. Hakluyt Society, Cambridge, England.
- Beck, Horace C.
1928 Classification and Nomenclature of Beads and Pendants. *Archaeologia* 77:1-76. Oxford.
- Bennyhoff, James A., and Richard E. Hughes
1987 Shell Bead and Ornament Exchange Networks Between California and the Western Great Basin. *Anthropological Papers of the American Museum of Natural History* 64(2). New York.
- Berkh, Vasilii Nikolaevich
1974 A Chronological History of the Discovery of the Aleutian Islands of the Exploits of Russian Merchants with a Supplement of Historical Data on the Fur Trade. Translated from the 1823 Russian version by Dmitri Krenov and edited by Richard A. Pierce. *Materials for the Study of Alaska History* 5. Limestone Press, Kingston, Ontario.
- Billings, Joseph
1791 Description of the Aleutian Islands and the Native Inhabitants, from the Journal of Captain Joseph Billings, Aboard the *Slava Rossii*, in the Second Phase (1789-91) of the Billings-Sarychev Expedition. In "Russian Penetration of the North Pacific Ocean, 1700-1797", edited and translated by Basil Dmytryshyn, E. A. P. Crownhart-Vaughan, and Thomas Vaughan. *To Siberia and Russian America: Three Centuries of Russian Eastward Expansion* 2:393-400. Oregon Historical Society Press, Portland.
- 1980 Voyage of Mr. Billings from Akhotsk to Kamchatka; His Arrival There; Setting out for the American Islands; Return to Kamchatka: Second Sea Voyage to those Islands from the North, Thence to Bering Strait and to Chukotskii Nos, 1789-91. Translated by an unnamed translator from the Russian translation of the English original by Z. D. Titova and edited by Richard A. Pierce. *Materials for the Study of Alaska History* 17:Appendix. Limestone Press, Kingston, Ontario.
- Black, Lydia T.
1977 The Konyag (Inhabitants of the Island of Kodiak) by Iosaf [Bolotov] (1794-99) and by Gideon (1804-07). *Arctic Anthropology* 14(2):79-108.
- 1984 Atka: An Ethnohistory of the Western Aleutians. *Alaska History* 24. Limestone Press, Kingston, Ontario.
- 1988 The Story of Russian America. In *Crossroads of Continents: Cultures of Siberia and Alaska*, by William W. Fitzhugh and Aron Crowell, pp. 70-82. Smithsonian Institution Press, Washington D.C.

- 1991 *Glory Remembered: Wooden Headgear of Alaska Sea Hunters; with a reprint of "Aleut Hunting Headgear and Its Ornamentation," by Sergei Vasilevich Ivanov, 1930.* Friends of the Alaska State Museum, Juneau.
- Bone, Kenneth Jone
1975 A Preliminary Analysis of Beads from Mission Santa Clara de Assis, Santa Clara County, California; SCI-30, the "Third Mission Site," Corner of Franklin and Campbell Streets, and the "Fifth Mission Site" - Present Site of the Mission Church. Unpublished manuscript.
- Bussolin, Dominique
1847 *Les célèbres verreries de Venise et de Murano.* H. F. Münster, Venice. Portions translated into English in 1990 by Karlis Karklins with Carol F. Adams.
- Bychkov, Oleg V.
1994 The Origin of Colonial Glass Production in Irkutsk: Research Perspectives. English translation by Mina A. Jacobs. Paper presented at the Society for Historical Archaeology Conference on Historical and Underwater Archaeology, Vancouver, British Columbia.
- Campbell, Archibald
1816 *A Voyage Round the World, from 1806 to 1812; in which Japan, Kamschatka, the Aleutian Islands, and the Sandwich Islands, were visited.* . . A. Constable & Co., Edinburgh.
- Carroll, Jr., B. Harvey
1917 Bead Making at Murano and Venice. Manuscript, General Records of the Department of State (RG-59), State Decimal File 1910-29, File No. 165.184/3, National Archives, Washington D.C.
- Chevigny, Hector
1965 *Russian America: The Great Alaskan Venture, 1741-1867.* Viking Press, New York.
- Choris, Ludovik
1822 *Voyage pittoresque autour du monde.* Paris.
- Collins, Henry B.
1937 Culture Migrations and Contacts in the Bering Sea Region. *American Anthropologist* 39(3):375-84.
- Combes, John D.
1964 Excavations at Spokane House—Fort Spokane Historic Site, 1962-63. *Washington State University Laboratory of Anthropology, Reports of Investigation* 29. Pullman.
- Corney, Peter
1896[1821] *Voyage in the Northern Pacific: Narrative of Several Trading Voyages from 1813 to 1818 Between the Northwest Coast of America, the Hawaiian Islands and China, with a Description of the Russian Establishments on the Northwest Coast.* Thomas G. Thrum, Honolulu.
- Coxe, William
1780 *Account of the Russian Discoveries between Asia and America; to which are added the Conquest of Siberia, and the History of the Transaction and Commerce between Russia and China.* 2nd edition. T. Cadell, London.
- Crowell, Aron Lincoln
1994 *World System Archaeology at Three Saints Harbor, An 18th Century Russian Fur Trade Site on Kodiak Island, Alaska.* Ph.D. dissertation in Anthropology, University of California, Berkeley.
- Davidson, Gladys R.
1952 *Corinth: Volume 12, The Minor Objects.* American School of Classical Studies at Athens, Princeton, New Jersey.
- Davis, Wayne London
1972 Glass Trade Beads of the Northern Plains—Upper Missouri Region. M.A. thesis in Archaeology, University of Calgary, Alberta.
- Davydov, Gavriil Ivanovich
1977 Two Voyages to Russian America, 1802-07. Translated from the 1810-12 Russian version by Colin Bearne, and edited by Richard A. Pierce. *Materials for the Study of Alaskan History* 10. Limestone Press, Kingston, Ontario.
- DeVore, Steven Leroy
1992 Beads of the Bison Robe Trade: The Fort Union Trading Post Collection. *Fort Union Monograph Series, Publication* 1. Friends of Fort Union Trading Post, Williston, North Dakota.
- Dietz, Stephen Alan
1976 Echa-Tamal: A Study of Coast Miwok Acculturation. M.A. thesis in Anthropology, San Francisco State University, San Francisco.
- Dietz, Stephen Alan (editor)
1983 Final Report of Archaeological Investigations at Mission San Jose (CA-Ala-1). Unpublished manuscript, Archaeological Consulting and Research Services, Santa Cruz, California.
- Dixon, George
1789 *A Voyage Round the World; but more particularly to the North-West Coast of America: performed in 1785, 1786, 1787, and 1788, in the King George and Queen Charlotte, Captains Portlock and Dixon* (letters forming a journal written by "W. B." [William Beresford], supercargo aboard the *Queen Charlotte*). 2nd edition. George Goulding, London.
- Doursther, Horace
1840 *Dictionnaire universel des poids et mesures anciens et modernes: contenant des tables des monnaies tous les pays.* 8 vols. Brussels. Reprinted in 1965 by Meridian Publishing Company, Amsterdam.
- Dzeniskevich, Galina I.
1994 American-Asian Ties as Reflected in Athapaskan Material Culture. In *Anthropology of the North Pacific Rim*, edited by William W. Fitzhugh and Valérie Chaussonnet, pp. 79-86. Smithsonian Institution Press, Washington D.C.

- Farris, Glenn J.
1987 *Archaeology of the Old "Magasin" at Ross Counter, California*. Second International Conference on Russian America, Sitka, Alaska.
- 1988 A French Visitor's Description of the Fort Ross Rancheria in 1839. *News from Native California* 2(3):22-23.
- 1992 Russian Trade Beads Made in Irkutsk, Siberia. *The Bead Journal* 21:2-3. Society of Bead Researchers.
- Fedorovoi, S. G. (author), and V. A. Aleksandrov (editor)
1985 (New Archangel [Sitka, Alaska]). USSR Academy of Science, NAUKA, Moscow, p. 205, section 26. Glass Beads, translated for the author from the Russian by G. V. Milda and Karlis Karklins.
- Fisher, Raymond H.
1990 Finding America. In *Russian America: The Forgotten Frontier*, edited by Barbara Sweetland Smith and Redmond J. Barnett, pp. 17-31. Washington State Historical Society, Tacoma.
- Fitzhugh, William W.
1994 Crossroads of Continents: Review and Prospect. In *Anthropology of the North Pacific Rim*, edited by William W. Fitzhugh and Valérie Chaussonnet, pp. 27-51. Smithsonian Institution Press, Washington D.C.
- Fitzhugh, William W., and Aron Crowell
1988 *Crossroads of Continents: Cultures of Siberia and Alaska*. Smithsonian Institution Press, Washington D.C.
- Francis, Peter, Jr.
1979 The Story of Venetian Beads. *World of Beads Monograph Series* 1. Center for Bead Research, Lake Placid, New York.
- 1986 Chinese Glass Beads: A Review of the Evidence. *Occasional Papers of the Center for Bead Research* 2. Center for Bead Research, Lake Placid, New York.
- 1988a Beads and Bead Trade in the North Pacific Region. In *Crossroads of Continents: Cultures of Siberia and Alaska*, by William W. Fitzhugh and Aron Crowell, p. 341. Smithsonian Institution Press, Washington D.C.
- 1988b The Glass Trade Beads of Europe: Their Manufacture, Their History, and Their Identification. *World of Beads Monograph Series* 8. Center for Bead Research, Lake Placid, New York.
- 1994 Beads at the Crossroads of Continents. In *Anthropology of the North Pacific Rim*, edited by William W. Fitzhugh and Valérie Chaussonnet, pp. 281-305. Smithsonian Institution Press, Washington D.C.
- Gasparetto, Astone
1958 Il vetro di Muano: dalle origini ad oggi. Neri Pozza, Venice.
- Gibson, James R.
1969 Russia in California, 1833: Report of Governor Wrangel. *Pacific Northwest Quarterly* 60(4):205-15.
- 1976 *Imperial Russia in Frontier America: The Changing Geography of Supply of Russian America, 1784-1867*. Oxford University Press, New York.
- 1990a "The Russian Contract": The Agreement of 1838 Between the Hudson's Bay and Russian-American Companies. In "Russia in North America: Proceedings of the 2nd International Conference on Russian America, Sitka, Alaska, August 19-22, 1987", edited by Richard A. Pierce. *Alaska History*: 35:157-80. Limestone Press, Fairbanks, Alaska.
- 1990b Furs and Food: Russian America and the Hudson's Bay Company. In *Russian America: The Forgotten Frontier*, edited by Barbara Sweetland Smith and Redmond J. Barnett, pp. 41-53. Washington State Historical Society, Tacoma.
- Gibson, R. O.
1975 A Preliminary Analysis of Beads from San Buenaventura Mission (VEN-87). Chapter in "3500 Years on One City Block," edited by Roberta S. Greenwood, pp. 43-81. Unpublished manuscript.
- 1976 A Study of Beads and Ornaments from the San Buenaventura Mission Site (VEN-87). Chapter in "The Changing Faces of Main Street," edited by Roberta S. Greenwood, pp. 77-166. Unpublished manuscript.
- Gideon, Hieromonk
1989 The Round the World Voyage of Hieromonk Gideon, 1803-09. Translated from the Russian by Lydia T. Black and edited by Richard A. Pierce. *Alaska History* 32. Limestone Press, Kingston, Ontario.
- Gifford, Edward W.
1967 Ethnographic Notes on the Southwestern Pomo. *University of California Anthropological Records* 25:1-47. Berkeley.
- Golder, Frank A.
1914 *Russian Expansion on the Pacific, 1641-1850: An Account of the Earliest and Later Expeditions Made by the Russians Along the Pacific Coast of Asia and North America, including Some Related Expeditions to the Arctic Regions*. Arthur H. Clark Company, Cleveland.
- Golder, Frank A. (editor)
1922 Bering's Voyages: An Account of the Efforts of the Russians to Determine the Relation of Asia and America: Volume I: The Log Books and Official Reports of the First and Second Expeditions, 1725-30 and 1733-42. *American Geographical Society Research Series* 1. New York.
- 1925 Bering's Voyages: An Account of the Efforts of the Russians to Determine the Relation of Asia and America: Volume II: Stellar's Journal of the Sea Voyages from Kamchatka to America and Return on the Second Expedition, 1741-42. *American Geographical Society Research Series* 2. New York.

- Goldstein, Lynne
1992 Spatial Organization and Frontier Cemeteries: An Example from a Russian Colonial Settlement. Paper presented at the Society for Historical Archaeology Conference on Historical and Underwater Archaeology, Kingston, Jamaica.
- Hanson, James A.
1994 *Spirits in the Art from the Plains and Southwest Indian Cultures*. Lowell Press, Kansas City, Kansas.
- Hezeta, Bruno de
1985 For Honor & Country: The Diary of Bruno de Hezeta. Translated from the 1775 Spanish and annotated by Herbert K. Beals. *North Pacific Studies* 7. Oregon Historical Society, Portland.
- Hoppe, David H., and Friedrich Hornschuch
1818 *Tagebuch einer Reise nach den Küsten des adriatischen Meers*. Johan Baptist Rotermundt, Regensburg. English translation by Karlis Karklins and Derek Jordan in *The Bead Forum* 17:5-8. Society of Bead Researchers.
- Hudson, John W.
1897 Pomo Wampum Makers: An Aboriginal Double Standard. *Overland Monthly* 30(2d series, no. 176):101-8.
- Hussey, John A.
1957 *The History of Fort Vancouver and its Physical Structure*. Washington State Historical Society, Seattle.
- Jackson, Louise Melanie
1991 *Nineteenth Century British Ceramics: A Key to Cultural Dynamics in Southwestern Alaska*. Ph.D. dissertation in Anthropology, University of California, Los Angeles.
- Jenkins, Michael R.
1972 Trade Beads in Alaska. *The Alaska Journal* 2(3):31-9. Juneau.
1975 Glass Trade Beads in Alaska. *The Bead Journal* 2(1):23-6. Los Angeles.
- J. L. S.
1776 Account of the New Discoveries made by the Russians in the Eastern Ocean, between Kamtchatka and America. Translation of the German version in *Account of the Russian Discoveries between Asia and America; to which Are Added the Conquest of Siberia, and the History of the Transaction and Commerce between Russia and China*, 2nd edition, by William Coxe, pp. 17-174. T. Cadell, London.
- Karklins, Karlis
1982 Guide to the Description and Classification of Glass Beads. *Parks Canada, History and Archaeology* 59:83-117. Ottawa.
1985 Guide to the Description and Classification of Glass Beads. In "Glass Beads," 2d edition, pp. 85-118. *Parks Canada, Studies in Archaeology, Architecture and History*. Ottawa.
- 1993 The *a speo* Method of Heat Rounding Drawn Glass Beads and Its Archaeological Manifestations. *Beads* 5:27-36. Society of Bead Researchers.
1994 A Classification System for Drawn Glass Beads. Paper presented at the Society for Historical Archaeology Conference on Historical and Underwater Archaeology, Vancouver, British Columbia.
- Karklins, Karlis, with Carol F. Adams
1990 Dominique Bussolin on the Glass-Bead Industry of Murano and Venice (1847). *Beads* 2:69-84. Society of Bead Researchers.
- Karklins, Karlis, and Derek Jordan
1990 An Early 19th-Century Account of Beadmaking in Murano and Venice. *Bead Forum* 17:5-8. Society of Bead Researchers.
- Karklins, Karlis, and Roderick Sprague
1980 *A Bibliography of Glass Trade Beads in North America*. South Fork Press, Moscow, Idaho.
1987 *A Bibliography of Glass Trade Beads in North America: First Supplement*. Promontory Press, Ottawa.
- Keating, William H.
1959[1825] *Narrative of an Expedition to the Source of the St. Peters River, Lake of the Woods, &c., Performed in Year 1823*. Ross and Haines, Minneapolis.
- Khlebnikov, Kirill T.
1976 Colonial Russian America: Kyrill T. Khlebnikov's Reports, 1817-32. Translated from the 1861 Russian version by Basil Dmytryshyn and E. A. P. Crownhart-Vaughan. *North Pacific Studies Series* 2. Oregon Historical Society, Portland.
1990 The Khlebnikov archive: unpublished journal (1800-37) and travel notes (1820, 1822, and 1824). *Rasmuson Library Historical Translation Series* 5. University of Alaska Press, Fairbanks.
- Kidd, Kenneth E.
1979 Glass Bead-Making from the Middle Ages to the Early 19th Century. *History and Archaeology* 30. Parks Canada, Ottawa.
- Kidd, Kenneth E., and Martha A. Kidd
1970 A Classification System for Glass Beads for the Use of Field Archaeologists. *Canadian Historic Sites, Occasional Papers in Archaeology and History* 1:45-89. Ottawa.
- Kidd, Robert S.
1970 Fort George and the Early Fur Trade in Alberta. *Provincial Museum and Archives of Alberta Publication* 2. Edmonton.
- Klichka, Franz Nikolaevich
1790 September 22, 1772 - September 6, 1779: A Report on the Voyage of Potap K. Zaikov to Islands in the North Pacific Ocean Between Asia and America, Aboard the Merchant Vessel *Sv. Vladimír*, as Described for the

- Academy of Sciences by Fränz Nikolaevich Klichka, Governor of Irkutsk. In "Russian Penetration of the North Pacific Ocean, 1700-1797", edited and translated by Basil Dmytryshyn, E. A. P. Crownhart-Vaughan, and Thomas Vaughan. *To Siberia and Russian America: Three Centuries of Russian Eastward Expansion* 2:259-67. Oregon Historical Society Press, Portland.
- Klindt-Jensen, Ole
1970 *The World of the Vikings*. Allen and Unwin, London.
- Kotzebue, Otto von
1821 *A Voyage of Discovery into the South Sea and Bering's Straits, for the purpose of exploring a north-east passage, undertaken in the years 1815-1818* . . . 3 vols. Longman, Hurst, Rees, Orme, and Brown, London.
- Krenitsyn, Petr Kuzmich, and Mikhail Dmitrievich Levashev
1771 An Extract from the Journals of Captain Petr Kuzmich Krenitsyn and Captain Lieutenant Mikhail Dmitrievich Levashev Describing Russian Hunting Techniques and Natives Encountered in the Aleutian Islands During the Voyages Commencing in 1764. In "Russian Penetration of the North Pacific Ocean, 1700-1797", edited and translated by Basil Dmytryshyn, E. A. P. Crownhart-Vaughan, and Thomas Vaughan. *To Siberia and Russian America: Three Centuries of Russian Eastward Expansion* 2:245-52. Oregon Historical Society Press, Portland.
- Kroeber, Alfred L.
1925 Handbook of the Indians of California. *Bureau of American Ethnology Bulletin* 78. Washington D.C.
- Langsdorff, Georg Heinrich von
1813-14 *Voyages and Travels in Various Parts of the World, During the Years 1803, 1804, 1805, 1806, and 1807*, 2 vols. Henry Colburn, London.
- LaPlace, Cyrille
1841 *Campagne de circumnavigation de la frégate l'Artémise, pendant les années 1837, 1838, 1839, et 1840 sous le commandement de M. Laplace, capitaine de vaisseau*, 6 vols. Later edition in 1854. Arthur Bertrand, Paris.

1986 Description of a Visit to an Indian Village Adjacent to Fort Ross by Cyrille LaPlace, 1839. Translated and edited from the French by Glenn Farris. *Cultural Resource Survey at the Fort Ross Campground, Sonoma County, California*, appendix B. Manuscript on file at the Cultural Heritage Section, California Department of Parks and Recreation, Sacramento.
- Larsen, Helge, and Froelich Rainey
1948 Ipiutak and the Arctic Whale Hunting Culture. *Anthropological Papers of the American Museum of Natural History* 42. New York.
- Levin, M. G., and A. D. Sergeev
1960 K voprosu o vremeni proniknoveniia zheleza v Arktiku. *Sovetskaia Etnografiia* 3:116-22.
- Lightfoot, Kent G., Thomas A. Wake, and Ann M. Schiff
1991 *The Archaeology and Ethnohistory of Fort Ross, California: Vol.1, Introduction*. Contributions of the University of California Archaeological Research Facility no. 49, Berkeley.
- Lisiansky, Urey
1814 *A Voyage Round the World, in the years 1803, 4, 5, & 6; performed, by order of His Imperial Majesty Alexander the First, emperor of Russia, in the Ship Neva*. John Booth and Longman, Hurst, Rees, Orme, & Brown, London.
- Lutke, Fedor Petrovich
1987 *A Voyage Around the World: 1826-29*. Translated from the French by Renée Marshall and edited by Richard A. Pierce. *Alaska History* 29. Limestone Press, Kingston, Ontario.
- Loeb, Edwin M.
1926 Pomo Folkways. *University of California Publications in American Anthropology and Ethnology* 19(2):149-405. Berkeley.
- Makarova, Raisa Vsevolodovna
1975 Russians on the Pacific, 1743-1799. Translated from the 1968 Russian by Alton S. Donnelly and edited by Richard A. Pierce. *Materials for the Study of Alaska History* 6. Limestone Press, Kingston, Ontario.
- Masterson, James R., and Helen Brower
1948 *Bering's Successors, 1745-1780: Contributions of Peter Simon Pallas to the History of Russian Exploration toward Alaska*. University of Washington Press, Seattle.
- Meighan, Clement W.
1985 Trade Beads. Chapter in *Excavations at Mission San Antonio, 1976-78*, edited by Robert L. Hoover and Julia G. Costello. *University of California, Los Angeles, Institute of Archaeology, Monograph* 26:56-63. Los Angeles.
- Merck, Carl Heinrich
1980 Siberia and Northwestern America, 1788-92: The Journal of Carl Heinrich Merck, Naturalist with the Russian Scientific Expedition led by Captains Joseph Billings and Gavriil Sarychev. Translated from the 1788-92 German and Russian journal by Fritz Jaensch and edited by Richard A. Pierce. *Materials for the Study of Alaska History* 17. Limestone Press, Kingston, Ontario.
- McCartney, Allen P.
1988 Late Prehistoric Metal Use in the New World Arctic. In *The Late Prehistoric Development of Alaska's Native Peoples*, edited by Robert D. Shaw, Roger K. Harritt, and Don E. Dumond, pp. 57-80. Alaska Anthropological Association, Anchorage.
- Mille, Polly
1975 An Historical Explanation of Alaskan Trade Beads. *The Bead Journal* 2(2):20-4. Los Angeles.
- Miller, Polly G.
1994 *Early Contact Glass Trade Beads in Alaska*. Bead Society of Central Florida, Altamonte Springs, Florida.

- Motz, Lee, and Peter D. Schulz
1980 European "Trade" Beads from Old Sacramento. In "Papers on Old Sacramento Archeology," edited by Peter D. Schulz and Betty J. Rivers. *California Archeological Reports* 19:49-68. California Department of Parks and Recreation, Sacramento.
- Moulton, Gary E. (editor)
1983 *Journals of the Lewis and Clark Expedition*, 8 vols. University of Nebraska Press, Lincoln.
- Munsell Color
1994 *The Munsell Book of Color*. Macbeth Division of Kollmorgen Instruments Corporation, New Windsor, New York.
- Opper, Marie-José, and Howard Opper
1991 French Beadmaking: An Historical Perspective Emphasizing the 19th and 20th Centuries. *Beads* 3(47-59). Society of Bead Researchers.
- Oswalt, Wendell H.
1980 Kolmakovskiy Redoubt: The Ethnoarchaeology of a Russian Fort in Alaska. *Monumenta Archaeologica* 8. Institute of Archaeology, University of California at Los Angeles.
- Pallas, Petr Simon
1781-1796 *Neue nordische Beyträge zur physikalischen und geographischen Erd- und Völkerbeschreibung, Naturegeschichte, und Oekonomie*, 7 vols.

1781 Report of a Four-Year [Five-Year] Voyage Undertaken in 1772 to the Islands Situated between Kamchatka and America, under the Command of the Peredovshik [Foreman] Dmitri Bragin. Translation of the German version of "Neue nordische Beyträge. . ." II:308-24; in *Bering's Successors, 1745-1780: Contributions of Peter Simon Pallas to the History of Russian Exploration toward Alaska* by James R. Masterson and Helen Brower, pp. 67-76. University of Washington Press, Seattle.

1782 Abstract of the Travel Report of the Russian Pilot Zaikov on a Voyage as far as the Mainland of America. Translation of the German version of "Neue nordische Beyträge. . ." III:274-88; in *Bering's Successors, 1745-1780: Contributions of Peter Simon Pallas to the History of Russian Exploration toward Alaska* by James R. Masterson and Helen Brower, pp. 85-92. University of Washington Press, Seattle.
- Penney, David W.
1992 *Art of the American Indian Frontier: The Chandler-Pohrt Collection*. The Detroit Institute of Arts and University of Washington Press, Seattle.
- Pérez, Juan
1989 Juan Pérez on the Northwest Coast: Six Documents of His Expedition in 1774. Translated and annotated by Herbert K. Beals. *North Pacific Studies* 12. Oregon Historical Society, Portland.
- Pfeiffer, Rozanna M.
1983 Glass Trade Beads from Caesarea Maritima, Israel. In "Proceedings of the 1982 Glass Trade Bead Conference," edited by Charles F. Hayes III, *Rochester Museum and Science Center, Research Records* 16:1:205-12. Rochester, New York.
- Pierce, Richard A.
1990 Russian America and China. In *Russian America: The Forgotten Frontier*, edited by Barbara Sweetland Smith and Redmond J. Barnett, pp. 73-9. Washington State Historical Society, Tacoma.
- Porter, Kenneth W.
1931 *John Jacob Astor: Businessman*, 2 vols. Harvard University Press, Cambridge, Massachusetts.
- Portlock, Nathaniel
1789 A Voyage Round the World; but more particularly to the Northwest Coast of America: performed in 1785, 1786, 1787, and 1788, in the *King George and Queen Charlotte*, Captains Portlock and Dixon. John Stockdale and George Goulding, London.
- Pottery and Glassware Reporter
1885 News item, vol. 13(7):24-6 (December 3rd). Reprinted in *The Bead Forum* 14:14 (1989), Society of Bead Researchers.
- Ross, Lester A.
1976 Fort Vancouver, 1829-60: A Historical Archeological Investigation of the Goods Imported and Manufactured by the Hudson's Bay Company. Unpublished manuscript, National Park Service, Fort Vancouver National Historic Site, Vancouver, Washington.

1988 Bohemian Glass Beads: Late 19th-Century Temporal Markers. Paper presented at the Society for Historical Archaeology Conference on Historical and Underwater Archaeology, Reno, Nevada.

1989 Analysis of Glass Beads from Santa Ines Mission. In "Santa Ines Mission Excavations: 1986-88," edited by Julia G. Costello. *California Historical Archaeology* 1:149-61. Coyote Press, Salinas, California.

1990 Trade Beads from Hudson's Bay Company Fort Vancouver (1829-60), Vancouver, Washington. *Beads* 2:29-67.

1993 Glass and Ceramic Beads from the 1846-47 Murphy Cabin Site, California. Unpublished manuscript.

1994a A Proposed Classification System for Mold-Pressed Beads. Paper presented at the Society for Historical Archaeology Conference on Historical and Underwater Archaeology, Vancouver, British Columbia.

1994b 1994 SHA Conference Bead Papers. *The Bead Forum* 24:15-18. Society of Bead Researchers.
- Ross, Lester A., with Barbara Pflanz
1989 Bohemian Glass Beadmaking: Translation and

- Discussion of a 1913 German Technical Article. *Beads* 1:81-94. Society of Bead Researchers.
- Sarytschew, Gawrilla (Gavril Sarychev)
1802 *Puteshestvie flota kapitana Sarycheva po severo-vostochnoi chasti Sibiri, Ledovitomu moriu i Vostochnomu okeanu v prodolzhenii osmi let pri Geograficheskoi i Astronomicheskoi morskoi ekspeditsii. . . kapitana Billingsa s 1785 po 1793 god.* St. Petersburg.
- 1807 *Account of a voyage of discovery to the northeast of Siberia, the frozen ocean, and the northeast sea, Volume II: Translated from the Russian, and embellished with engravings.* Richard Phillips, London.
- Sauer, Martin
1802 *An account of a geographical and astronomical expedition to the northern parts of Russia . . . in the years 1785 to 1794.* T. Cadell, London.
- Shapiro, Elizabeth G.
1988 Trade Beads Excavated from a European/Konyag Contact Site on Kodiak Island, Alaska. *The Bead Forum* 13:7-12. Society of Bead Researchers.
- Shelikhov, Grigorii Ivanovich
1971 After November 18, 1786: The Account of the Voyage of Grigorii I. Shelikhov and His Wife, Natalia Shelikhova, from Okhotsk to the Coast of Northwest America and Return, Including a Description of Islands and Native Peoples Encountered (from a Russian document edited in 1971 by B. P. Polevoi). In "Russian Penetration of the North Pacific Ocean, 1700-97", edited and translated by Basil Dmytryshyn, E. A. P. Crownhart-Vaughan, and Thomas Vaughan. *To Siberia and Russian America: Three Centuries of Russian Eastward Expansion* 2:296-320. Oregon Historical Society Press, Portland.
- 1981 *A Voyage to America, 1783-86.* Translated from the Russian by Marina Ramsay and edited by Richard A. Pierce. *Alaska History* 19. Limestone Press, Kingston, Ontario.
- Shur, L. A., and Richard A. Pierce
1975 Artists in Russian America: Mikhail Tikhonov (1818). *Alaska Journal* 6(1):40-9.
- 1978 Pavel Mikhailov: Artist in Russian America. *Alaska Journal* 8(4):360-63.
- Smith, Janice Christina
1974 *Pomo and Promyshlenniki: Time and Trade Goods at Fort Ross.* M.A. thesis in Archaeology, University of California, Los Angeles.
- Solovjova, Katerina
1995 Analogues of Alaskan Wooden Structures to Russian Northern Architecture. Paper presented at the Society for Historical Archaeology Conference on Historical and Underwater Archaeology, Washington D.C.
- Sprague, Roderick
1983 Tile Bead Manufacturing. In "Proceedings of the 1982 Glass Trade Bead Conference," edited by Charles F. Hayes III, *Rochester Museum and Science Center, Research Records* 161:167-72. Rochester, New York.
- 1985 Glass Trade Beads: A Progress Report. *Historical Archaeology* 19(2):87-105. Society for Historical Archaeology.
- 1994 Prosser Molded Bead Classification. Paper presented at the Society for Historical Archaeology Conference on Historical and Underwater Archaeology, Vancouver, British Columbia.
- Van Bueren, Thad M.
1983 *Archaeological Perspectives on Central Sierra Miwok Culture Change During the Historic Period.* M.A. thesis in Anthropology, San Francisco State University, San Francisco.
- van der Sleen, W. G. N.
1967 *A Handbook on Beads.* Musée du Verre, Liège, Belgium.
- Vancouver, George
1984 *A Voyage of Discovery to the North Pacific Ocean and Round the World in which the Coast of North-West America Has been Carefully Examined and Accurately Surveyed in the Years 1790-1795.* Reprint in 4 volumes of the 3-volume 1798 edition. The Hakluyt Society, London.
- VanStone, James W.
1960 An Early Nineteenth-Century Artist in Alaska: Louis Choris and the First Kotzebue Expedition. *Pacific Northwest Quarterly* 51(4):145-58. University of Washington, Seattle.
- 1984 Exploration and Contact History of Western Alaska. In *Handbook of North American Indians, Vol 5: Arctic*, edited by David Damas, pp. 149-60. Smithsonian Institution, Washington D.C.
- Veniaminov, Ivan
1984 Notes on the Islands of the Unalaska District. Translated from the 1840 Russian by Lydia T. Black and R. H. Geoghegan and edited by Richard A. Pierce. *Alaska History* 27. Elmer E. Rasmuson Library Translation Program and Limestone Press, Kingston, Ontario.
- Woodward, Arthur
1965 Indian Trade Goods. *Oregon Archaeological Society Publication* 2, Portland.
- Wrangel, Ferdinand Petrovich von
n.d. Izvestiia i zamechaniia F. P. Vrangelia o rossiiskikh koloniakh v Amerike, narodakh Severo-Zapadnoi Ameriki i ikh torgovykh snosheniakh s Chukchami i dr./1831-1835/ (News and notes by F. P. Wrangel on the Russian colonies in America and on the peoples of North-Western America and their trade relations with the Chukchi and others, 1831-1835). *State Archives of Estonia*, F.2057, op. 1.
- 1839 *Statistische und ethnographische Nachrichten über die Russischen Besitzungen an der Nordwestküste von*

Amerika. St. Petersburg.

Yarborough, Michael R., and Linda F. Yarborough

1992 Uqciuvit: a Multicomponent Site in Northwestern Prince William Sound, Alaska. USDA Forest Service, Anchorage.

Zagoskin, Lavrentii Aleksieevich

1967 Lieutenant Zagoskin's Travels in Russian America,

1842-44: The First Ethnographic and Geographic Investigations in the Yukon and Kuskokwim Valleys of Alaska. Translated from the 1847 Russian version by Penelope Rainey and edited by Henry N. Michael. *Arctic Institute of North America, Anthropology of the North: Translations from Russian Sources* 7. University of Toronto Press.

APPENDIX 8.1: HISTORICAL TERMS FOR THE RUSSIAN BEAD TRADE

Historical terminology for trade beads is poorly documented, and terms in common usage among investigators of Russian-American beadwork are often modern terms developed by collectors. For example, the terms “Russian” or “Hudson’s Bay” beads are used to describe multi-sided, corner-faceted, cut drawn beads (Mille 1975; Woodward 1965:12). They were neither manufactured in Russia, nor distributed principally by Russian or Hudson’s Bay Company fur traders. Such terms are inappropriate for identifying trade beads recovered from archeological sites. Rather, correlations should be made between archeological types and varieties and the historical terms used by manufacturers, wholesalers, and retailers who supplied beads and the traders who inventoried beads at fur trading sites.

The following is a list of terms encountered in Russian historical accounts and English translations of these accounts.

***Bisera*, sing.; *Bisery*, pl.**

In an inventory of one Russian fur trading expedition, the 1773-79 Russian voyage of the vessel *Evpl* to the Aleutian Islands in the vicinity of Fox Island, under contract to the Company of Moscow merchant Vasilii Serebrennikov, the beads listed were “3,189 metal beads [*korol’kov*]” and “1-1/4 pounds of rosary beads [*bisera*]” (Makarova 1975:187).

English translators have translated *bisera* as beads, small beads, or even small drawn beads (e.g., Francis 1994:289). The identification of *bisera* as “rosary beads” is unique and unexplained by the translator.

Chinese Cache

It is possible that the “Chinese iron beads” noted by Sofron Khitrov at Bird Island, Alaska (Golder 1925:92) were Chinese cache (iron coins with square holes). Carl Heinrich Merck (1980:79-80) at the Aleutian Islands during the Billings-Sarychev Russian voyage of 1791-92 noted the use of *Rechenpfennig* (translated counting penny, but probably Chinese cache) along the hem of garments. Archibald Menzies also mentioned trading iron Chinese cache at Hood Canal, Washington on May 12, 1792 (Vancouver 1984:529n2).

Corals (*korolek*, sing.; *korol’ki*, pl.)

Grigorii Ivanovich Shelikhov, prior to helping establish the Russian-American Company, had a joint fur trading company with Ivan Larionovich Golikov from 1781 to 1797. On one voyage to Alaska between 1783 and 1786, he used the term *korol’ki* to identify beads in use at Kodiak Island, Alaska (Shelikhov 1981:9). Gawrila Sarytschew (Gavril Sarychev), co-captain of the Billings-Sarychev Russian voyage of 1791-92, also used this term for beads observed at Unalaska Island, Aleutian

Islands in 1790 (Sarytschew 1807:9). Carl Heinrich Merck, naturalist for the same voyage used the term to describe red and blue beads in use at Unalaska Island, Kodiak Island, and Cape Rodney, Alaska in 1790-91 (Merck 1980:78, 102, 103, 123, 170, 188). Fedor Petrovich Litke undertook a voyage around the world between 1826 and 1829, and used the term to describe beads in use at Bristol Bay ca. 1827 (Lutke 1987:80).

Some English translators appear to have made a literal translation of *korolek*, presumably derived from *korall*, for coral. Other translators have translated *korolek* to mean a large trade bead (Francis 1994:289-90; Shelikhov 1981). The plural form of the Russian term is *korol’ki*, which according to Lydia Black (1977:104) is: A prestige item. Used by Russians in barter with the Aleuts and Konyag [on Kodiak Island] since the earliest contact. The dictionary definition identifies this word as meaning a small sparrow-like bird with multicolored plumage. However, context indicates that an alternative reading is possible, but the latter meaning I was not able to ascertain with certainty. From the context of other 18th century materials studied, *korol’ki* were a kind of beads, greatly desired by Alaskans and used extensively in trade by the Russians as well as by the natives in the intertribal trade.

“Corals” may have been opaque wound beads, mimicking true red coral beads; but by the 18th century the term appears to have signified glass beads (following van der Sleen 1967:56).

Enamels or Pearl-Enamels (see Pearls below)

From the Russian fur trading voyage that spent July 4, 1776 at Kodiak Island, Alaska, Petr Simon Pallas (1781:72) used the terms “enamels and glass beads.” While at Kodiak Island, ca. 1778, Pallas (1782:91) recounted that: “Men and women wear in their ears and round their necks white enamel beads . . .” Gawrila Sarytschew (Gavril Sarychev), co-captain of the Billings-Sarychev Russian voyage expedition of 1791-1792, used the terms “enamels” and “pearl-enamels” for white and red beads observed at Unalaska Island and Prince William Sound, Alaska (Sarytschew 1807:44, 56). “Enamels” and “pearl-enamels” are probably glass beads, but these terms may be translations of a Russian term which means something else.

Beck (1928:56) identifies an enamelled bead as one with “. . . comparatively deep holes or lines filled in with vitreous enamel”; while Kidd (1979:58) defines enamel as “opaque glass with colouring matter in it. Term usually indicates raw material for making enamelled glasses or beads.” Speaking of the glass-industry in Morano and Venice, Italy during the mid-19th century, as described by Dominico Bussolin (1847), Karklins with Adams (1990:69) notes that “enamel” is a “. . . high-

quality glass, transparent or opaque, that probably had its clarity and brilliance enhanced by the addition of lead oxide. 'Glass' would be less refined and cheaper."

Garnets

The "garnets" noted by Carl Heinrich Merck (1980:78) at the Aleutian Islands during the Billings-Sarychev Russian voyage of 1791-92 are probably glass beads, but this English term may be a translation of a Russian term meaning something else. Merck (1980:78-80, 102-103, 170, 190) appears to use the term interchangeably with "melt-garnet," "melting garnet," "glass-garnet," and "soft-garnet." He also notes they are white, blue, and red; and can be small, sewn around the edges of ears or long, 1-2 *zolls* (approximately 1-2 in.) in length. Other occurrences of the term include:

- brown garnets were listed on 1824-1854 Hudson's Bay Company inventories of trade goods and were sold by the bunch (Ross 1990:31), and
- mock-garnets were inventoried by the pound and bunch at the American Fur Company post Fort Union, North Dakota, at least between 1832 and 1846. Colors were listed as assorted. They were less expensive than necklace, agate, and seed beads, but more expensive than barley corn, garnishing, cut, pound, and snake beads (DeVore 1992:118, 121).

Garnet beads are probably small cut-faceted beads (Kidd's Type IIf beads), possibly manufactured in Italy and cut in Bohemia. They are monochrome "seed" beads with 1 to 11 randomly ground facets. In his description of the glass bead industry of Murano and Venice in the 1840s, Dominique Bussolin (Karklins with Adams 1990:73) commented on the cutting of the facets for these beads:

Just as precious gems take on more shine and a more pleasant appearance when they are cut and polished, it was thought that margaritines or embroidery beads, as well as other qualities of beads, could be cut; in fact, margaritines cut in this way do produce a most beautiful effect when used on fabrics and in embroidery.

Our beads are cut quite easily in Bohemia, and at very reasonable prices. So that is where they have been

shipped for a long time now to undergo this further process. It should be noted that cut colored-crystal beads are also produced in Bohemia [probably Kidd's Type IIf and Type IIIIf drawn, sided, and faceted beads, and Karklins Type MPII faceted mold-pressed beads]. The type of process, however, is very different and the product should not be confused with the beads produced in the Venetian factories.

Pearls or False Pearls (see Enamels above)

The "false pearls" noted in the Krenitzin-Levashff Russian fur trade journal of 1768-69 for trade among the Unangan (Coxe 1780:265) could be plain glass beads ("pearls") or blown beads ("imitation pearls" or "Roman pearls"). One of the more popular methods for manufacturing imitation pearls was invented in the late 17th century in France. Clear glass was blown into a spheroidal bead, coated on the interior with an opalescent material extracted from fish scales, and filled with wax, later gum (Francis 1986:6, 1988b:47-48; Opper and Opper 1991:47; van der Sleen 1967:26).

Seed Beads

Peter Corney (1896[1821]:53), 1st mate on the Robson North West Company Voyage of 1813-18, speaking of natives on Unalaska Island during July 1816, noted the use of seed-beads. The term has been found on some historical inventories. For example, seed beads were inventoried at the American Fur Company post of Fort Union, North Dakota, at least between 1840 and 1851. They were only listed by the pound; and were less expensive than long string, necklace, and agate beads, and more expensive than mock garnet, garnishing, barley corn, pound, cut, and snake beads. Colors included white and blue, but most were sold as assorted colors. No sizes were listed (Devore 1992:119-27).

Stekliarus

The priest Ivan Veniaminov (1984:288), who lived among the Unangan during 1823-1839, used the Russian terms *stekliarus* and *korol'ki* to describe beads of different types. English translators have translated *stekliarus* to mean glass seed beads, but it is not clear how these beads differ from *bisera* or how translators arrived at this translation.

Lithic Assemblage at the Fort Ross Beach and Native Alaskan Village Sites

ANN M. SCHIFF

IN THIS CHAPTER, the lithic assemblages at the Fort Ross Beach Site (FRBS) and the Native Alaskan Village Site (NAVS) are described. The analysis focuses on the Native Alaskan Neighborhood as a whole, as well as specific provenience units within each site. The areas of FRBS include the East Profile, the Middle Profile, the West Profile, the FRBS Pit Feature, the Southwest Bench, and the East Bench. NAVS analysis areas include the South Central Test Unit, the West Central Trench, the East Central Trench, the South Trench, the East Central Bone Bed, and the South Bone Bed. Raw material types, artifact categories, and stratigraphic context are reviewed. Finally, the Native Alaskan Neighborhood assemblage is compared to artifact assemblages collected previously from Fort Ross Region survey sites, as described in Volume 1.

CLASSIFICATION SYSTEM

The classification system used in this analysis consists of two components—a raw material type and an artifact category. Raw materials found at the Native Alaskan Neighborhood include basalt, chert, obsidian, quartzite, sandstone, and schist. This assemblage is typical of the tortured Franciscan geological sequence evident in the North Coast Ranges (Lightfoot, Wake, and Schiff 1991:33-35, 59). A detailed discussion of the geologic history and contemporary geologic complexes of this region can be found in Volume 1 (chapter 3) and will not be repeated here. As outlined in the first volume, black basalts; red, green, and brown cherts; yellow and red sandstone; and “blueschist” are commonly found at Fort Ross. The obsidian present came from four sources in the southern North Coast Ranges: Borax Lake, Annadel, Napa Valley, and Konocti. In addition, slate tools and debris found at Fort Ross are believed to be

nonlocal in origin, perhaps arriving in California by way of Native Alaskans in the employ of the Russian-American Company (Aron Crowell, personal communication; Peter Mills, chapter 10).

The following discussion summarizes the artifact category classification system used in this analysis; a more detailed review of lithic categories can be found in Volume 1 (also see Baumhoff 1982; Bettinger et al. 1984; Hayes 1985; Jackson et al. 1988; Levulett and Hildebrandt 1987; Shott 1994; Whittaker 1994; Yerkes and Kardulias 1993). Artifact categories include flaked, cobble, fire-cracked rock, and ground stone. The flaked category is subdivided into formal tools, including bifaces (symmetrically shaped with flake scars on both sides), unifaces (symmetrically shaped with flake scars on one side), and projectile points. Point types include notched (small triangular point with basal corner or side notch, including Rattlesnake corner-notched and Gunther Barbed), serrated (small point with distinctive serration along the blade), and lanceolate (large leaf-shaped, shouldered or unshouldered point with a triangular blade, including Excelsior). The notched points are thought to be diagnostic of the Upper Emergent and Historic periods; serrated points are believed to be found in Lower Emergent deposits; and lanceolate points appear to date to the Upper Archaic (Lightfoot et al. 1991:67-68). To the extent that the older points have been reworked, this typological analysis is valid only for the final iteration of the point.

Edge-modified flakes, exhibiting secondary modification (use-related damage or intentional alteration) along the lateral edges, are an additional segment of the flaked category. Finally, chipping debris, resulting from lithic reduction, is classified either as unmodified debitage (including primary and secondary cortical

flakes, biface thinning flakes, interior flakes, and cores) or shatter. Primary cortical flakes, initially removed from the core surface, have few or no dorsal flake scars and display more than 90 percent cortex. Secondary cortical flakes are distinguished by two or more scars and about 50 percent cortex on the dorsal surface. Biface thinning flakes exhibit a longitudinal cross section and large platform scars, while interior flakes have many dorsal flake scars and very little or no cortex. Cores are raw material nodules with flakes detached but without evidence of further modification or use. Shatter includes all other lithic debris with no flake characteristics.

The cobble category includes battered cobbles, marked by battering along the body of the artifact, and unmodified whole or fragmentary beach cobbles. Some cobbles exhibit evidence of fire-altered surfaces. Many of these fire-cracked cobbles appear to have been "cooking stones" used in underground ovens and in hearths (Barrett 1952:61; Gifford and Kroeber 1937:137). Often, these hot rocks were added to gruels in watertight baskets, effectively boiling the porridge (Barrett 1952:60; Gifford and Kroeber 1937:137). The fire-cracked rock category is composed of noncobble rocks that exhibit evidence of fire-cracking; these are mostly angular sandstone fragments.

The ground stone category consists of artifacts shaped by grinding, pecking, and polishing. Formal tools include manos (or handstones), pestles, millingstones (slab and basin), hammerstones, nutting stones, and net weights. Manos, or handstones, are convex, hand-sized tools with one or more grinding surfaces. Pestles are cylinder-shaped ground tools with evidence of battering on the distal and/or proximal end. Millingstones are large slabs that exhibit a one-sided or two-sided grinding surface on a flat or a shallow basin-shaped central area. Hammerstones are cobbles with pecking on one or both ends. Nutting stones are small cobbles with an acorn-sized depression on one side and a flattened underside. Net weights are cobbles with a characteristic pecked or ground groove near one end. Complementing these formal ground stone tool categories is a ground stone "other" category, which includes all remaining artifacts with ground, pecked, or polished surfaces. Many of the latter are broken fragments of ground stone tools, such as handstones or millingstones, that have fire-altered surfaces. These ground stone fragments appear to have been largely recycled as cooking stones.

In addition to these individual artifact categories, several functional groupings are analyzed in an attempt to provide insight into activities performed in the Native Alaskan Neighborhood. The flaked artifact group reflects flaked tool manufacture, use, maintenance, curation, and discard activities. A flaked tool to debitage ratio (formal flaked tools and edge-modified flakes vs. all other chipping debris) may indicate the degree to which flaked tools were produced or modified at the site as

opposed to being imported in finished form. This ratio may also reflect tool curation/discard propensities. The proportion of primary and secondary cortical flakes may provide some insight into activity areas and/or debris deposits associated with the initial stages of lithic raw material reduction and flaked tool manufacture. Vegetable and other raw material processing activities (mashing and grinding) may be reflected by the ground stone tool group. The cooking group (cobbles, other ground stone, and fire-cracked rocks) consists of artifacts that are by-products of food cooking activities. Cooking methods using hot stones to boil gruels in water tight baskets can produce many fire altered rocks, in addition to the rocks used in hearths and underground ovens. Our investigations of nearby Native Californian sites suggest ground stone tool fragments may have been recycled for use as cooking stones, along with unmodified rocks and cobbles.

Details of the of Fort Ross Beach and Native Alaskan Village sites lithic assemblage can be found in appendices 9.1 and 9.2. Raw material, artifact, and functional counts are located in tables 9.1, 9.2, 9.4, 9.5, 9.6, and 9.8. Corresponding graphic representation is displayed in figures 9.1, 9.2, 9.8, and 9.9. Finally, tables 9.3 and 9.7 list projectile points in the assemblage.

FRBS LITHIC ASSEMBLAGE - TOTAL SITE

The FRBS assemblage consists of 2,485 artifacts in 27 lithic categories, and 11 raw material types. The majority of the artifacts are obsidian (40.3%), with chert (31.2%) and sandstone (24.4%) artifacts also well represented as raw material types. Basalt, quartzite, and schist each represent about 1% of the total artifacts, with the remaining raw materials comprising about 1% collectively.

Flaked artifacts represent 74.5% of the total assemblage. Within this category, 77.4% are unmodified flakes, 14.5% are shatter, 6.7% are edge-modified, and 1.3% are formal flake tools. Five projectile points, nine projectile point fragments, one biface, eight biface fragments, and one uniface fragment are found in the FRBS assemblage. Diagnostic points and fragments (six are pictured in figure 9.3) include two notched, one serrated, and five lanceolate. A 1:11.4 flaked tool to debitage ratio exists for the site. Primary and secondary cortical flakes make up 4.1% of the total flaked category.

About 7% of the total assemblage is ground stone (figures 9.4, 9.5, and 9.6). Of the total ground stone, about 23% is in formal artifact categories: 9 manos, 15 mano fragments, 5 pestles, 3 millingstones, 7 hammerstones, and 1 net weight. Cobbles comprise 1.1% of the total lithics, and fire-cracked rock accounts for the remaining 16.4%. The ground stone "other," cobble, and fire-cracked rock categories can be viewed together as reflecting cooking activities that took place at FRBS: this cooking component represents 23% of the

Table 9.1 Fort Ross Beach Site Lithic Assemblage: Raw Material Type Counts

	Total	East Bench	Southwest Bench	East Profile	Middle Profile	West Profile
Basalt	30	0	13	4	7	4
Chert	775	26	381	239	75	37
Chalcedony	14	0	14	0	0	0
Graywacke	1	0	1	0	0	0
Jasper	2	0	2	0	0	0
Other	5	0	5	0	0	0
Obsidian	1002	17	704	111	93	63
Pumice	1	0	0	0	0	1
Quartzite	25	0	9	14	1	0
Sandstone	607	30	116	333	63	10
Schist	23	0	22	0	0	0
Total	2,485	73	1267	701	239	115

Note: ninety artifacts with miscellaneous provenience are in the total.

Figure 9.1 Fort Ross Beach Site Lithic Assemblage: Raw Material Types

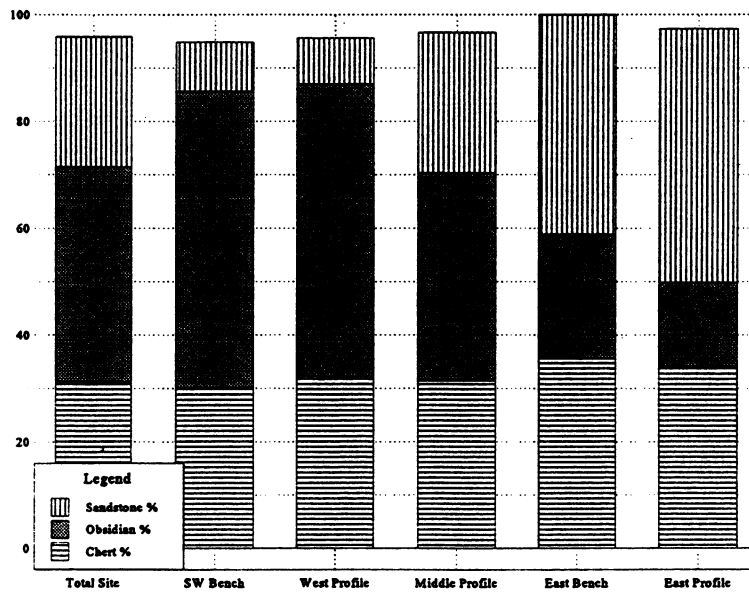


Table 9.2 *Fort Ross Beach Site Lithic Assemblage: Artifact Category Counts*

	Total	East Bench	Southwest Bench	East Profile	Middle Profile	West Profile
Cobble	26	0	4	16	5	1
Cobble Fragment	2	0	0	2	0	0
Slab Millingstone	3	0	0	2	1	0
Hammerstone	7	0	2	4	1	0
Mano	9	0	0	9	0	0
Mano Fragment	15	1	1	9	1	0
Net Weight	1	0	0	0	1	0
Pestle	5	0	1	3	1	0
Fire-Cracked Rock	407	28	101	193	36	8
Gun Flint	2	0	1	0	1	0
Ground Stone Other	136	1	3	98	20	3
Other	20	0	16	0	0	4
Biface Fragment	8	0	3	1	1	1
Biface	1	0	0	0	0	0
Edge-Modified Flake	125	3	74	21	11	14
Projectile Point	5	0	0	5	0	0
Projectile Point Fragment	9	1	4	0	1	3
Uniface	1	0	1	0	0	0
Biface Thinning Flake	701	9	486	101	68	29
Core Fragment	22	0	6	9	4	2
Core	2	0	0	2	0	0
Interior Flake	631	10	446	104	36	27
Linear Flake	3	0	0	0	3	0
Primary Cortical Flake	32	0	7	17	2	3
Secondary Cortical Flake	43	0	14	12	6	8
Shatter	269	20	97	93	40	12
Total	2,485	73	1267	701	239	115

Note: 90 artifacts with miscellaneous provenience are in the total.

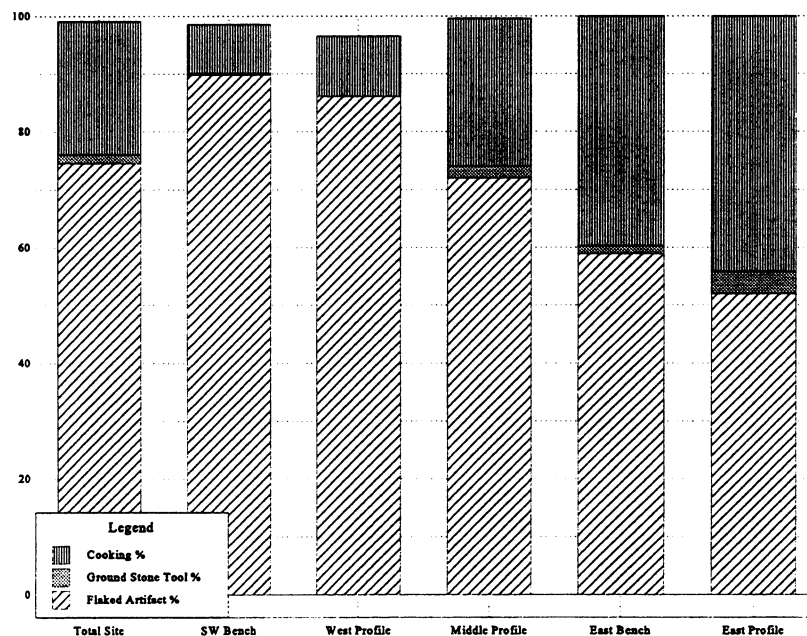
Table 9.3 *Fort Ross Beach Site Diagnostic Projectile Points*

FRBS Catalog #	Unit	Raw Material	Length (mm)	Width (mm)	Thickness (mm)	Type
FRBS-6/17/88-4-L-1	P08	OB	47.50	17.40	9.60	Lanceolate
FRBS-6/17/88-15-L-18	P08	CH	45.60	20.30	7.50	Lanceolate
FRBS-6/17/88-15-L-19	P08	CH	24.60	23.00	10.80	Lanceolate tip
FRBS-6/19/89-17-L-1	P27	OB	16.25	10.00	2.40	Notched tip
FRBS-6/21/89-31-L-1	8S, 18W	OB	21.20	18.80	4.20	Serrated
FRBS-6/21/89-41-L-1	P28	OB	18.75	16.30	4.00	Notched
FRBS-6/23/89-11-L-1	8S, 17W	OB	26.70	27.85	9.30	Lanceolate midsection
FRBS-6/24/88-38-L-2	P13	CH	22.80	20.30	7.60	Lanceolate tip

Table 9.4 Fort Ross Beach Site Lithic Assemblage

	Total Site	East Bench	Southwest Bench	East Profile	Middle Profile	West Profile
Flaked Artifact	74.5 %	58.9 %	89.8 %	52 %	72 %	86.1 %
Ground Stone Tool	1.6 %	1.4 %	.3 %	3.9 %	2 %	0 %
Fire-Cracked Rock	16.4 %	38.4 %	8 %	27.5 %	15.1 %	7 %
Cooking	23 %	39.7 %	8.5 %	44.1 %	25.6 %	10.5 %
Flaked Tool/ Debitage Ratio	1:11.4	1:9.8	1:12.9	1:12.5	1:12.2	1:4.5
Cortical Flake	4.1%	0%	1.9%	8.1%	4.7%	11.5%
Chert	31.2 %	35.6 %	30.1 %	34.1 %	31.4 %	32.2 %
Obsidian	40.3 %	23.3 %	55.6 %	15.8 %	38.9 %	54.8 %
Sandstone	24.4 %	41.1 %	9.2 %	47.5 %	26.4 %	8.7 %
Raw Material Categories	11	3	10	5	5	5
Artifact Categories	27	8	19	19	19	13
Total Count	2485	73	1267	701	239	115
Formal Tools (%)	64 (2.6%)	2 (2.7%)	12 (.9%)	33 (4.7%)	7 (2.9%)	4 (3.5%)

Figure 9.2 Fort Ross Beach Site Lithic Assemblage: Functional Groups



total lithic assemblage.

Of the entire 2,485 lithic artifacts found at FRBS, 64 can be classed as formal tools, either flaked or ground stone. This represents 2.6% of the total assemblage. Two gun flints are also found in the FRBS materials (figure 9.7).

Since considerable diversity in sediment strata is found across the site, a complete analysis of stratigraphic patterns can be conducted only within specific locations of the site. However, an aggregate site-wide analysis of midden and clay levels (the only two soil levels common across the site), provides several interesting observations. Midden areas typically exhibit greater proportions of sandstone (55.3%), larger cooking components (53.2%), and higher tool to debitage ratios (1:13.3). Clay levels exhibit more chert and obsidian (41.4% and 32.9%), greater proportions of flaked artifacts (74.6%), and lower tool to debitage ratios (1:20.6).

LITHIC ASSEMBLAGE - EAST BENCH

Excavations at unit 0N, 12W on the eastern side of the bench produced 73 lithics in eight categories. Three raw material types are in evidence. The majority of the artifacts are sandstone (41.1%), with chert (35.6%) and obsidian (23.3%) representing the remaining raw material types. These proportions of sandstone and obsidian are the opposite of that found in the site as a whole. Addi-

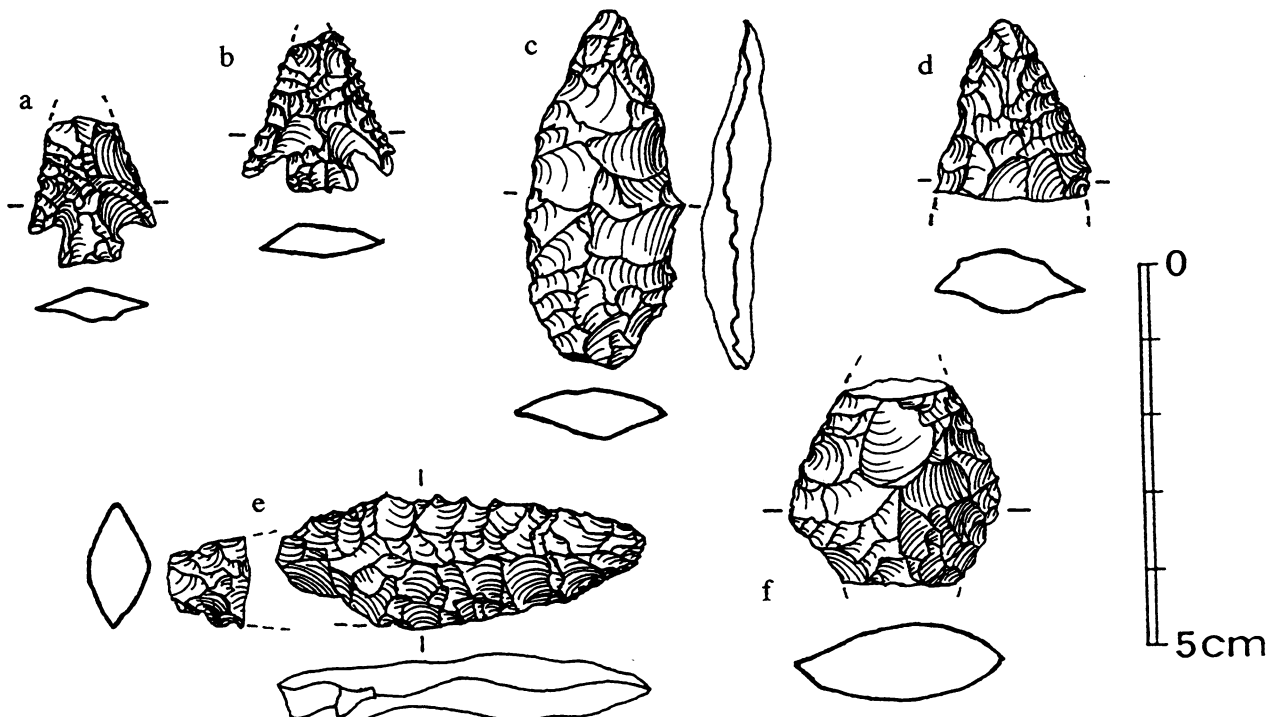
tionally, there is much less diversity in raw material types (3 vs. 11) and lithic categories (8 vs. 27) on the eastern side of the bench than for the entire site. In fact, this area evidences the lowest diversity at FRBS, but this may only be a reflection of the small sample size.

Flaked artifacts represent only about 59% of this assemblage, significantly less than the 75% proportion for the entire site. Within the flaked category, 44% are unmodified flakes, 46.5% are shatter, 7% are edge-modified, and about 2% are formal flaked tools. Only one projectile point fragment is found in the 0N, 12W assemblage. Although the tool to debitage ratio for this area is higher than for the entire site (1:9.8 vs. 1:11.4), there is a much larger representation of shatter (46.5% vs. 14.5%). There are no cortical flakes found in this area.

Only 2.8% of this unit's assemblage is ground stone, compared to 7% for the site as a whole. Formal ground stone tools are represented by a single mano fragment. There are no cobbles, but a much larger percentage of fire-cracked rock (38.4%) is present than for the total site (16.4%). Actually, this is the highest occurrence of fire-cracked rock at FRBS. Although cobbles and ground stone are underrepresented, the higher occurrence of fire-cracked rock results in a food cooking component of almost 40%, compared to 23% for the total site.

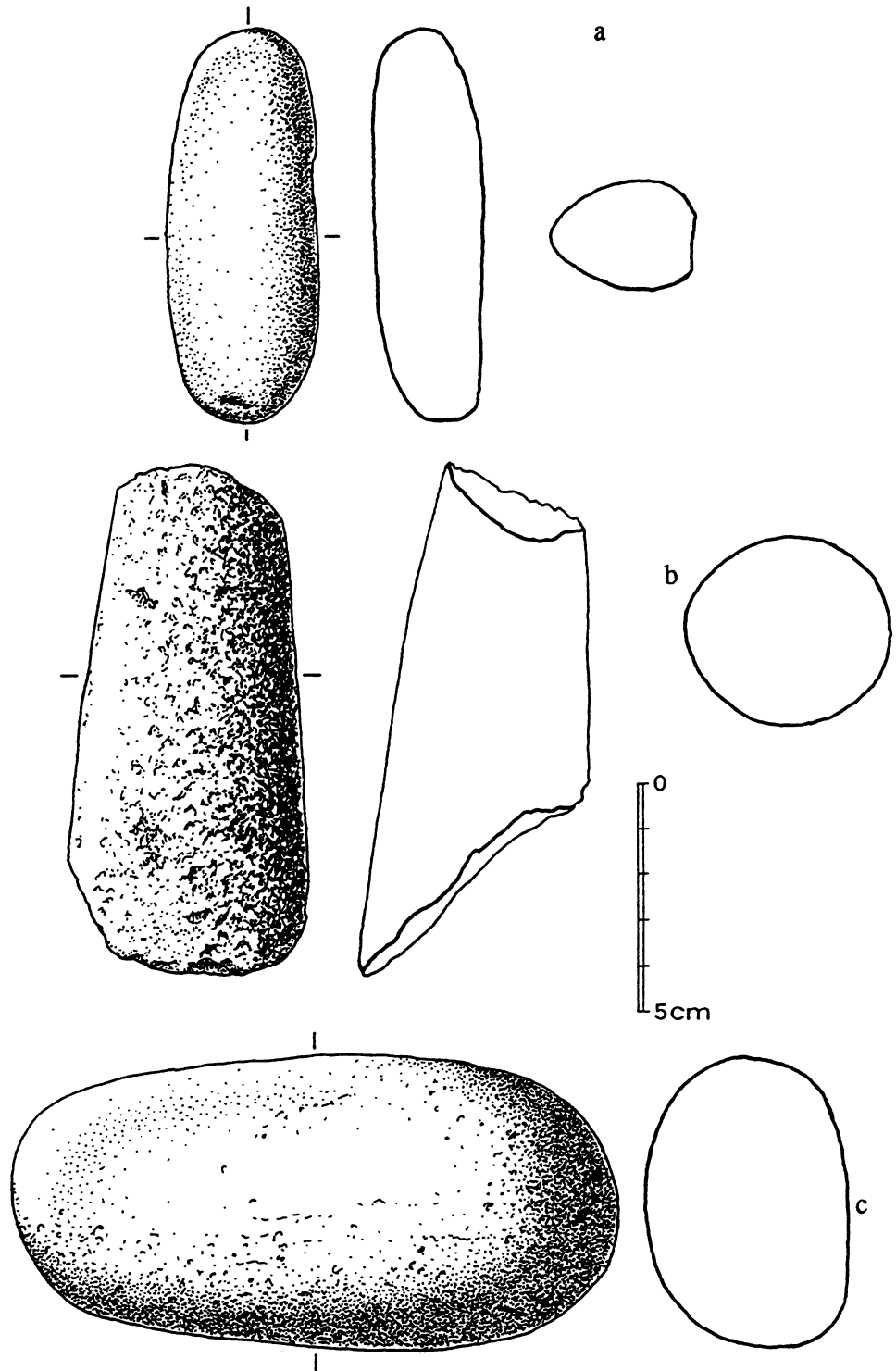
The two formal tools recovered in 0N, 12W, a projectile point fragment and a mano fragment, account

Figure 9.3 Fort Ross Beach Site Projectile Points

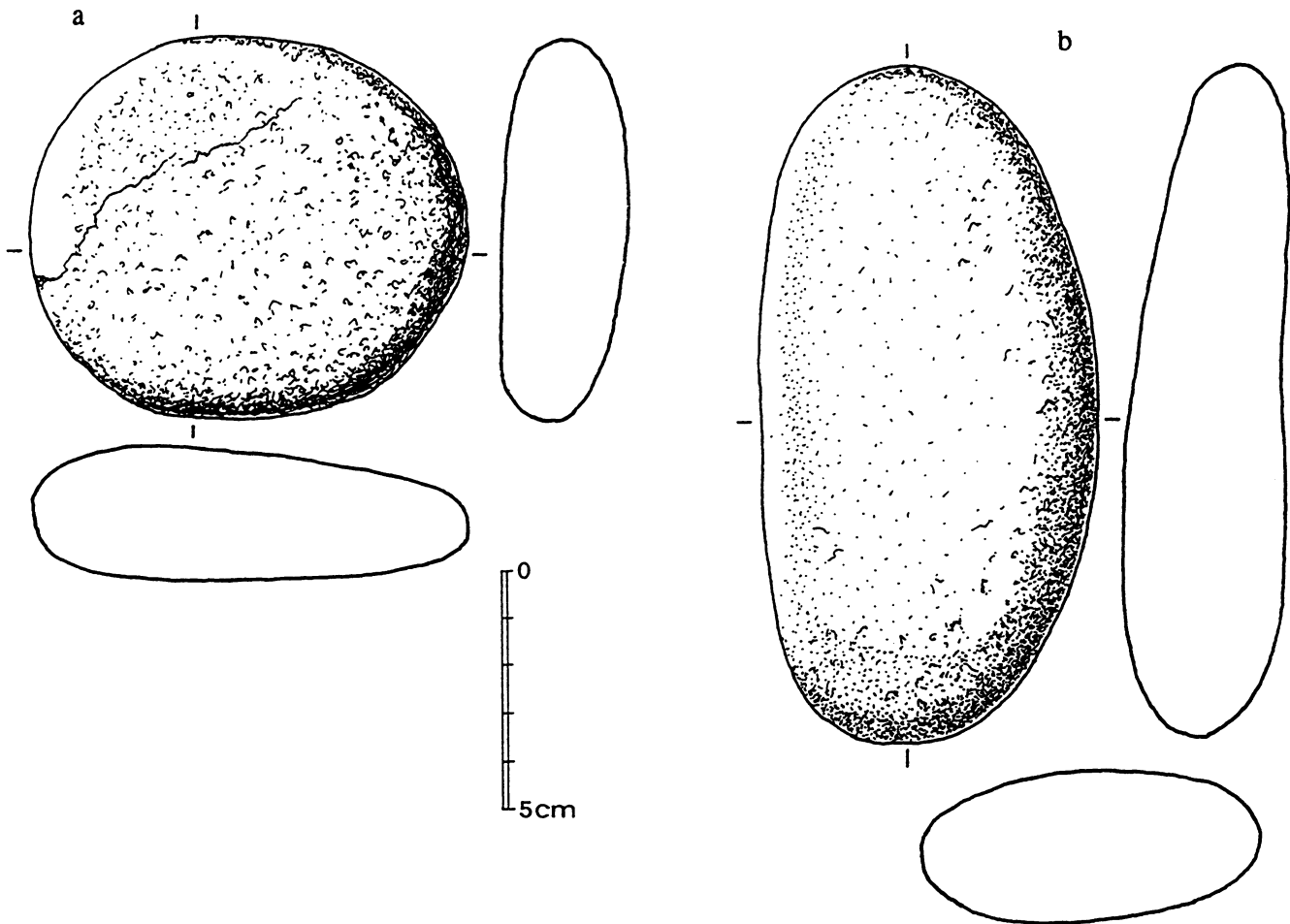


a. FRBS 6/21/89-41-L-1 Notched, obsidian. b. FRBS 6/21/89-31-L-1 Serrated, obsidian. c. FRBS 6/17/88-15-L-18 Lanceolate, chert. d. FRBS 6/24/88-38-L-2 Lanceolate, chert. e. FRBS 6/17/88-4-L-1 Lanceolate, obsidian. f. FRBS 6/23/89-11-L-1 Lanceolate, obsidian. (Illustrations by Judith Ogden)

Figure 9.4 *Fort Ross Beach Site Ground Stone*



a. FRBS 6/17/88-9-L-1 Pestle. *b.* FRBS 6/28/88-42-L-1 Pestle. *c.* FRBS 6/24/88-23-L-1 Mano. (Illustrations by Judith Ogden)

Figure 9.5 *Fort Ross Beach Site Ground Stone**a. & b.* FRBS 6/24/88-7-L-6 Manos. (Illustrations by Judith Ogden)

for 2.7% of the area total assemblage, a proportion comparable to the entire site percentage of formal tools (2.6%).

A review of the raw material types by soil stratigraphic levels suggests that, although the percentage of obsidian remains constant, the proportions of chert and sandstone change by level. In the topsoil level, chert dominates (71.4%); in the midden level, sandstone is more pervasive (55%). This correlates with a review of artifact categories by level. The topsoil contains mostly flaked artifacts (93%), with little ground stone or fire-cracked rock; the midden has a cooking component of almost 55%. Of interest, the midden contains both of the formal tools recovered in the unit.

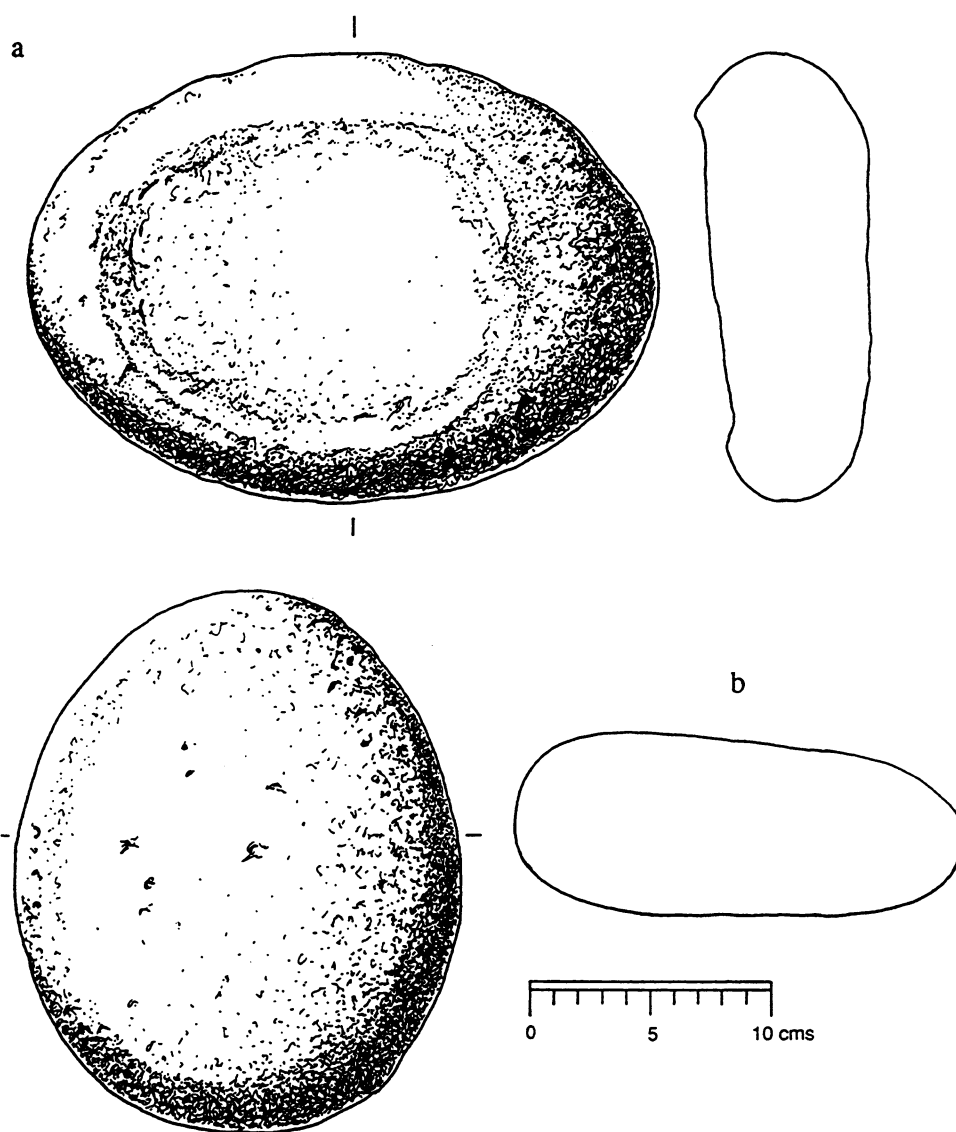
LITHIC ASSEMBLAGE - SOUTHWEST BENCH

Excavations at the Southwest Bench occurred in six units: 7S, 17W; 7S, 18W; 7S, 19W; 8S, 17W; 8S, 18W; and 8S, 19W. The assemblage consists of 1,267 lithics in 19 categories. Ten raw material types are represented.

Over 55% of the artifacts are obsidian, with chert (30%), sandstone (9.2%), and schist (1.7%) comprising the majority of the remaining raw material types. This represents a greater proportion of obsidian (the highest on the site) and a lesser proportion of sandstone than is found for the site as a whole. The Southwest Bench has greater raw material diversity than any other area and is similar to the site total (10 vs. 11 types). Moderate diversity in lithic category types (19 vs. 27) is in evidence.

Almost 90% of the entire assemblage is flaked, which is a much higher percentage than the 75% found for the site as a whole; the Southwest Bench exhibits the highest proportion of flaked artifacts at FRBS. For the total flaked category, about 84% are unmodified flakes, 8.5% are shatter, 6.5% are edge-modified, and .7% are formal tools. The formal flaked tools include four projectile point fragments, one uniface fragment, and three biface fragments. Diagnostic points include the only FRBS serrated point (FRBS 6/21/89-31-L-1) and

Figure 9.6 Fort Ross Beach Site Ground Stone



a. FRBS 6/24/88-3-L-1 Slab millstone. b. FRBS 6/23/88-28-L-1 Ground stone other. (Illustrations by Judith Ogden)

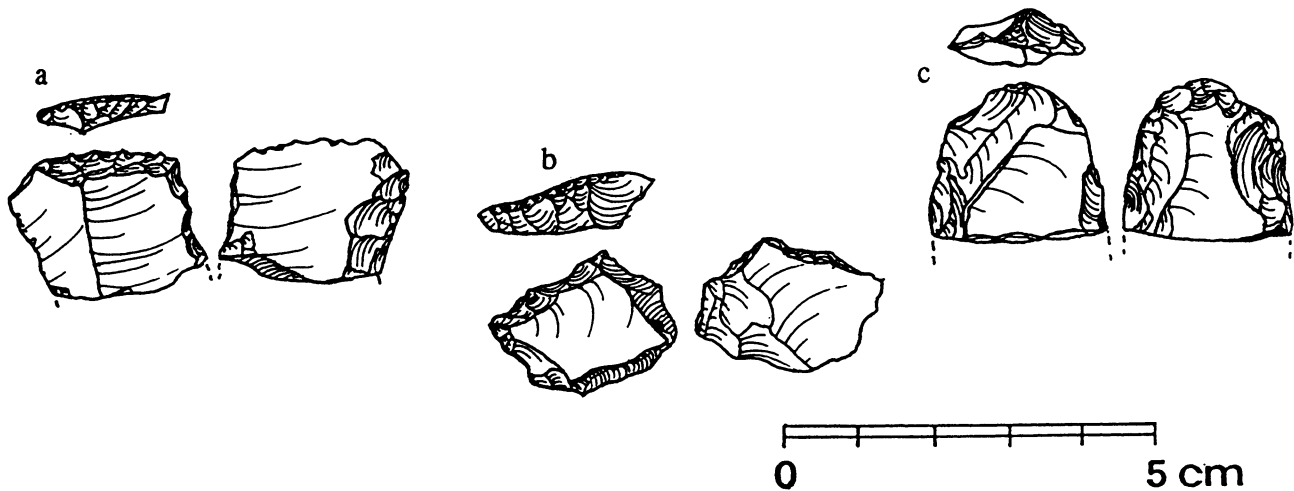
one lanceolate point (FRBS 6/23/89-11-L-1). Although shatter represents a lesser proportion of the flaked category than in the total site (8.5% vs. 14.5%), unmodified flakes are more frequent (84% vs. 77%). This mix results in a lower tool to debitage ratio for this area (1:12.9 vs. 1:11.4). The primary and secondary cortical flake proportion (1.9%) is less than half that found in the overall site.

The Southwest Bench reveals a much lower proportion of ground stone than the total site (.5% compared with about 7%); actually, this area has the lowest percentage of ground stone of any at FRBS. Fire-cracked rock

occurs with about half the frequency (8% vs. 16%). The resulting food cooking component is only 8.5% compared to a 23% site component; this bench has the smallest cooking component at the site. Formal ground stone tools include one pestle, one mano fragment, and two hammerstones.

Twelve artifacts from the Southwest Bench can be classed as formal tools; these represent about 1% of the Southwest Bench assemblage, compared to a 2.6% FRBS formal tool component. One of the two gun flints at the site is found in this area.

A stratigraphic analysis of the assemblage indicates

Figure 9.7 *Native Alaskan Neighborhood Gun Flints*

a. NAVS 7/31/91-21-L-1. b. NAVS 8/13/91-4-L-5. c. FRBS 6/15/89-25-L-3. (Illustrations by Judith Ogden)

little difference in raw material types in the mottled clay levels, but obsidian is less prevalent and sandstone more frequent in the topsoil levels. The lithic category distribution in the topsoil level results in a greater food cooking component (42%). The type and distribution of artifacts between the mottled and highly mottled clay levels exhibit minimal differentiation. All of the formal tools, except the pestle, were found in the mottled clay levels.

LITHIC ASSEMBLAGE - EAST PROFILE

Excavations on the East Profile included nine units: P1 through P9. A total of 701 lithics in 19 categories comprises the assemblage from this area. Five raw material types are present. The largest proportion of sandstone for any area in the entire site (47.5%) occurs in the East Profile, almost double the 24.4% for the site as a whole. This is in contrast to the lowest occurrence of obsidian (15.8% vs. 40.3%) in the site. While diversity of raw material types is moderate (5), the 19 lithic category types represent moderate to high diversity for the sample size.

Flaked artifacts represent 52% of the East Profile assemblage, the lowest proportion on the entire site and significantly lower than the 74.5% site average. Within the flaked category, the proportions of modified flakes (5.8%) and formal tools (1.7%) approximate the site distribution, while unmodified flakes (67%) occur with less frequency and shatter (25.5%) occurs with greater frequency. This results in a lower tool to debitage ratio (1:12.5 vs. 1:11.4) in the East Profile. Notably, the proportion of cortical flakes (8.1%) is twice the site average. Five projectile points and one biface fragment are found in the assemblage, including three diagnostic lanceolate points (FRBS 6/17/88-4-L-1, FRBS 6/17/88-15-L-18, and FRBS 6/17/88-15-L-19).

The highest proportion of ground stone for any area in the site (17.9%) is found in the East Profile, as well as higher proportions than the site averages of fire-cracked rock (27.5% vs. 16.4%) and of cobbles (2.6% vs. 1.1%). Twenty-seven formal ground stone tools are found in the assemblage: 9 manos, 3 pestles, 2 slab millings, 9 mano fragments, and 4 hammerstones. The food cooking component for this area is the highest in the entire site (44.1%) and is almost double the component percentage for the site as a whole (23%).

A total of 33 formal tools in the East Profile excavation materials represents 4.7% of the entire area assemblage, which is almost twice the proportion found for the entire site (2.6%). Of interest, these 33 artifacts represent more than half of all the formal tools found at FRBS.

Raw material types and lithic categories each evidence different degrees of diversity by stratigraphic level. The diversity is greater in the midden levels, with a smaller assemblage size, than in the clay strata. In addition, the clay levels contain three times the fire-cracked rock that appears in the midden levels (30.7% vs. 10.7%), whereas the midden levels exhibit a greater proportion of ground stone than the clay levels. A higher percentage of obsidian occurs in the midden, with a corresponding lower occurrence of sandstone and chert. The midden contains the second highest tool to debitage ratio in the entire assemblage (1:5.4), whereas the clay strata was the lowest (1:31.7). All of the flaked formal tools were found in the midden; ground stone formal tools were equally present in both strata.

LITHIC ASSEMBLAGE - MIDDLE PROFILE

Excavations on the Middle Profile included eight units (P11 through P18) and produced 239 artifacts in 19 lithic categories. This lithic class diversity is high, considering the relative assemblage size. Raw material

diversity is moderate to high. The proportions of chert (31.4%), obsidian (38.9%), and sandstone (26.4%) mirrored the overall site distribution more closely than any other area excavated. In addition, this site-total parallel distribution is also found in the proportions of flaked artifacts, ground stone, fire-cracked rocks, and processing tools.

Flaked artifacts represent 72% of the entire assemblage, compared to 74.5% for the total site. Within the flaked category, 69% are unmodified flakes, 23.3% are shatter, 6.4% are edge-modified, and 1.2% are formal tools. One diagnostic lanceolate projectile point fragment (FRBS 6/24/88-38-L-2) and one biface fragment are found in the artifacts. Curiously, although these distribution similarities exist, the Middle Profile contains a lower tool to debitage ratio than for the entire site (1:12.2 vs. 1:11.4). This area's proportion of cortical flakes (4.7%) approximates the site average.

Ground stone represents 10.4% of the total assemblage. Five formal ground stone tools are present: a net weight, a pestle, a slab millstone, a mano fragment, and a hammerstone. Cobbles comprise about 2% of the total artifacts, a little higher than the proportion for the site as a whole (1.1%), and fire-cracked rock makes up 15.1%. All in all, this combination results in a cooking component of 25.6%, approximating the site cooking component of 23%.

The seven formal tools in the Middle Profile represent 2.9% of the total area assemblage, which is higher than the 2.6% site proportion. One of the two gun flints found at FRBS is from this profile area.

An examination of raw material types and lithic categories by stratigraphic level suggests some interesting differences. The midden contains a greater proportion of sandstone than the lower clay levels; inversely, the clay strata contain a higher percentage of obsidian than the midden. As is consistent with the patterning of raw materials, there is a differential distribution of flake and ground stone artifacts by stratum: the topsoil and midden levels contain all of the ground stone whereas the clay levels contain twice the proportion of flake artifacts that the midden contains, as well as both of the formal flake tools. Cooking component percentages range between 33% and 49% for the topsoil and midden, but only between 9% and 10% for the lower clay levels. The lower clay levels also contain a significantly smaller proportion of fire-cracked rock than the midden level.

LITHIC ASSEMBLAGE - WEST PROFILE

Excavations on the West Profile included 11 units: P20 through P30. A total of 115 lithic artifacts in 13 categories constitutes the assemblage from this area. Five raw material types are present and represent a high diversity for the collection size. The 13 lithic categories in evidence, however, suggest lower diversity in this section of the profile than in the other two sections, even

considering the size of the assemblages. The lowest proportion of sandstone for any area at FRBS occurs in the West Profile (8.7%), as does the second highest percentage of obsidian (54.8%). This distribution is similar to the sandstone/obsidian occurrence in the Southwest Bench.

A higher proportion of flaked artifacts is present in this area than in the site as a whole (86% vs. 74.5%). Additionally, the West Profile exhibits a greater occurrence of edge-modified (14% vs. 6.7%) and formal tools (4% vs. 1.3%) in the total flaked category than does the site in its entirety. This distribution results in the highest tool to debitage ratio (1:4.5) at the site. The West Profile also evidences the highest cortical flake proportion at FRBS (11.5%), almost three times the site average. Three projectile point fragments, including the only two diagnostic notched points at FRBS (FRBS 6/21/89-41-L-1 and FRBS 6/19/89-17-L-1), and one biface fragment are found in the assemblage.

Also, in concordance with the artifact distributions at the Southwest Bench, the West Profile compared to the site as a whole contains low proportions of ground stone (2.6% vs. 7.1%) and fire-cracked rock (7% vs. 16.4%). The occurrence of fire-cracked rock in the West Profile is the lowest in the entire site. There are no formal tools in the ground stone assemblage and only one cobble. The cooking component, as can be predicted from the above, is a low 10.5%, less than half the FRBS cooking component.

The four formal flaked tools represent a greater proportion of the area assemblage (3.5%) than is found in the total site (2.6%). This is the only area at FRBS without any formal ground stone tools.

A stratigraphic review of this area reveals small sample sizes in each level, and much mixing across levels. Raw materials vary by level, with the mottled clay levels exhibiting a larger proportion of obsidian to sandstone, whereas the lower beach gravel contains the reverse distribution. All levels appear to have high tool to debitage ratios. Lithic category and raw material diversity are similar across levels; the higher lithic category diversity in the mottled clay level is perhaps a function of assemblage size. In addition, flaked artifacts were more prevalent in the mottled clay levels than the beach gravel levels.

LITHIC ASSEMBLAGE - FRBS PIT FEATURE

Excavations in the FRBS Pit Feature produced 42 lithic artifacts, 38 from the fill and 4 from the pit floor. The fill contains 7 artifact categories and 4 raw material types; the pit floor artifacts represented 3 categories and 2 raw material types. The small sample makes comparisons between areas difficult, but a cursory review results in no glaring differences.

Within the fill, 55.3% of the artifacts are flaked, 34.2% are fire-cracked rock, and 10.5% are ground stone.

About 42% of the assemblage in the fill is sandstone, with most of the remaining artifacts split between obsidian (29%) and chert (26%). Of the four artifacts found on the floor, three are obsidian flakes and one is a sandstone mano fragment. This mano fragment is the only formal tool found in the pit feature assemblage. Ground stone and fire-cracked rock occur in the fill with greater frequency than in the site as a whole, and correspondingly, the food cooking component of about 45% is the highest found on the site.

Overall, this assemblage exhibits more similarity to the artifacts in the East Bench and the East Profile than to the assemblage in the Middle Profile, of which it is part. The lower frequency of flaked artifacts, the higher occurrence of sandstone, and the greater cooking component in the pit feature are all mirrored in both the East Bench and East Profile.

FRBS LITHIC ASSEMBLAGE - SUMMARY

A review of the various artifact distributions in different areas of the site reveals several patterns. The West Profile and the Southwest Bench both exhibit the highest concentrations of flaked artifacts and artifacts made from obsidian. Also, the West Profile contains the highest tool to debitage ratio, the highest cortical flake proportion, and the only two late period corner-notched points at FRBS. All three profile areas display significantly greater proportions of cortical flakes than do the bench areas. The lowest sandstone and fire-cracked rock proportions in the site are found in the West Profile, followed closely by the Southwest Bench. The Southwest Bench manifests the smallest percentage of ground stone in the site. In addition, both areas reveal the lowest food cooking components found in FRBS.

In contrast, the East Bench and East Profile exhibit great amounts of fire-cracked rock, high proportions of sandstone artifacts, and large food cooking components. The East Profile has the largest ground stone component, and the East Bench contains the greatest amounts of fire-cracked rock of any area in the site. Both locations have smaller proportions of flaked artifacts and fewer obsidian artifacts than other site areas. The East Profile contained half of all the formal tools found at FRBS.

The Middle Profile assemblage reflects most closely the total site distributions for both raw material types and lithic categories, but the FRBS Pit Feature located in it seems to more closely resemble the East Bench and East Profile areas.

Also of interest is the relatively constant distribution of chert across the site (30.1% to 35.6%), compared to large deviations in obsidian (15.8% to 55.6%) and sandstone (8.7% to 47.5%). The assemblage exhibits large percentage variations in flaked artifacts (52% to 89.8%), fire-cracked rock (7% to 38.4%), and cooking components (8.5% to 44.1%) across site areas. With the exception of the West Profile, the tool to debitage ratio

varies between 1:9.8 and 1:12.9. Formal tool proportions range from 1% of the area assemblage to almost 5%.

Given the depositional history and geological context of FRBS, it is difficult to reach firm conclusions about the spatial and temporal associations of materials in this site. Even so, the site artifact distributions reveal areas possibly associated with food cooking (East Bench and East Profile), as distinct from areas associated with flaked tool activities (Southwest Bench and West Profile). Artifact distributions in the boundary area (Middle Profile) reflect a mix of the two and the site as a whole. The assemblage distributions also suggest a greater incidence of initial lithic raw material reduction activities/debris deposition in the profile areas than in the bench areas. A close association between the West Profile area and the historic Native Alaskan Village on the bluff above FRBS may be indicated by the occurrence of the only two later period projectile points in the West Profile deposit.

In addition to the horizontal spatial and temporal patterns, a tentative vertical distinction is in evidence between the midden and clay levels at the Fort Ross Beach Site. Midden levels appear to be associated with the Native Alaskan Village on the bluff above, as reflected by artifact constituents indicative of food cooking and lithic manufacture/use activities. As with the NAVS assemblage, the large proportion of cobbles, ground stone, and fire-cracked rock associated with cooking represents various daily activities of the Village residents. In addition, a higher tool to debitage ratio may reflect a more comprehensive spectrum of flaked tool activities of Village inhabitants, including tool discard. The activities of the residents of the habitation site located on the bluff above can be indirectly perceived through the character of the FRBS lithic assemblage.

On the other hand, the clay levels suggest a prehistoric component unrelated to the Village, with lower food cooking components, lower tool to debitage ratios, and higher flaked artifact proportions. The character of this assemblage suggests an archaeological place used for sporadic, special purpose visits, over long periods, by Native Californians from residential bases located in the hinterlands. We argued in Volume 1 (pp. 110-12) that this may have been a common use of the coastal terraces in prehistoric times. Intermittent sojourns to the beach would result in few tools deposited, but many perhaps used and retouched or otherwise maintained, depositing more flaked debris relative to flaked tools. These short stays would not be conducive to prolonged plant product or other raw material processing, and most intensive food cooking activities would be conducted at the residential location. Hence, these clay deposits are characterized by the relative infrequency of ground stone vis à vis flaked artifacts, and a low proportion of cobbles, ground stone fragments, and fire-cracked rock. In addition, the clay deposits contain over 80% of the FRBS primary and

secondary cortical flakes, suggesting a prehistoric time frame for the initial lithic raw material reduction and manufacture activities at the site.

A temporal analysis of the diagnostic projectile points found in the FRBS assemblage reveals that the majority of the points are lanceolate, dating to the Upper Archaic, and that one serrated point may date to the Lower Emergent (table 9.3). The two corner-notched points found at FRBS are thought to be diagnostic of the Upper Emergent and Historic periods. This range of point types and associated temporal indications are consistent with both the NAVS related historical midden and the prehistoric clay deposit components of FRBS, as discussed earlier. Of note, all lanceolate and serrated points are found in the clay and clay/midden interface levels, providing another line of evidence supporting the prehistoric component at FRBS.

NAVS LITHIC ASSEMBLAGE - TOTAL SITE

For this analysis, the NAVS total site assemblage is defined as artifacts from the South Central Test Unit (110S, 11W), the West Central Trench (75S, 16W; 75S, 18W; and 75S, 20W), the East Central Trench (75S, 0-4E), and the South Trench (125S, 18-24W). This assemblage contains 1,838 artifacts in 25 lithic categories, and reveals 9 raw material types. Almost half of the artifacts are made from obsidian, with the bulk of the remainder split between chert (25.3%) and sandstone (23.2%). Basalt represents 1.4%, while schist, graywacke, quartzite, and slate together comprise about 1% of the total artifacts at NAVS.

Flaked tools represent 74.6% of the total lithic artifacts. Within this category, 1.7% are formal flaked tools, 3.7% are edge-modified, 73.2% are unmodified flakes, and 21.4% are shatter. Formal tools include six biface fragments, one biface, eight projectile point fragments, eight projectile points, and one uniface fragment. Thirteen diagnostic points and fragments are all of the notched type (six are shown in figure 9.10). A 1:17.3 flaked tool todebitage ratio can be calculated for the site. Primary and secondary cortical flakes represent 2.3% of the total flaked category.

Almost 3% of the total lithic assemblage is ground stone. More than half of the ground stone occurs as formal tools: three basin millingstone fragments, six slab millingstone fragments, nine pestle fragments, one pestle, three mano fragments, two hammerstones, and two nutting stones. Several are illustrated in figures 9.11, 9.12, and 9.13. Cobbles account for 14.8% of the total lithics and fire-cracked rock makes up the remaining 6.7%. NAVS exhibits a total food cooking component (cobbles, fire-cracked rock, and ground stone other) of 22.9%.

The NAVS assemblage contains 50 formal tools, which are split almost equally between flaked tools and

ground stone tools. These formal tools represent 2.7% of all lithic artifacts. Ten gun flints (two are pictured in figure 9.7), one quartz crystal, three slate artifacts, and two whetstones/hones are also found in the NAVS assemblage under consideration.

LITHIC ASSEMBLAGE - SOUTH CENTRAL TEST UNIT

Excavations at 110S, 11W produced 138 lithics, representing 8 lithic categories and 5 raw material types. Half of the artifacts are obsidian, 44.2% are chert, and 3.6% are sandstone; basalt and schist comprise the remaining 2%. Although the area contains about the same proportion of obsidian as does the site, this test unit has almost twice the chert and only about a sixth of the sandstone. The South Central Test Unit has the lowest proportion of sandstone of any area in the site. The lithic categories demonstrate much less diversity than the total site, but this is partly a function of the small assemblage size. On the other hand, even considering the sample size, raw material diversity is moderate.

Flaked artifacts represent almost 95% of the entire assemblage, which is significantly more than the 74.6% value for the overall site. This is the highest percentage of flaked artifacts of any area in the entire site. Within the flaked artifact category, .8% are formal tools, 4.5% are edge-modified flakes, 64.1% are unmodified flakes, and 30.5% are shatter. One nondiagnostic projectile point fragment is the only formal tool, flaked or ground stone, found in this unit, resulting in the lowest total formal tool proportion at the site (.7% vs. 2.7%). However, the flaked tool todebitage ratio (1:17.7) is still comparable to the site total (1:17.3). Cortical flakes represent 4.6% of the total test unit flake assemblage.

The South Central Test Unit is the only area that contains no ground stone and no cobbles, a significant deviation from artifact distributions across the rest of the site. In addition, it exhibits only half of the site proportion of fire-cracked rock (2.9% vs. 6.7%) and a significantly lower food cooking component (2.9% vs. 22.9%). Both the fire-cracked rock and cooking proportions represent site lows. Of interest, this assemblage contains three of the ten gun flints found at NAVS, a far greater proportion than one would expect based on relative sample size.

A stratigraphic analysis of the assemblage reveals little deviation in raw material types by soil types; all levels have high proportions of chert and obsidian and low amounts of sandstone. The lower rock rubble/clay levels contained no sandstone artifacts at all. Lithic category distributions, however, do vary among soil types. The topsoil levels contained the one formal tool, all edge-modified flakes, all three gun flints, and all fire-cracked rocks in the unit. In contrast to this, unmodified flaked and shatter are the only artifacts found in the lower rock rubble/clay levels.

Table 9.5 *Native Alaskan Village Site Lithic Assemblage: Raw Material Type Counts*

	Total	South Central Test Unit	West Central Trench	East Central Trench	East Central Bone Bed	South Trench	South Bone Bed
Basalt	25	2	1	6	4	16	3
Chert	465	61	30	80	7	294	34
Graywacke	5	0	0	0	0	5	4
Other	2	0	1	0	0	1	0
Obsidian	903	69	25	70	9	739	68
Quartzite	2	0	0	0	0	2	0
Sandstone	427	5	8	150	100	264	158
Schist	6	1	0	0	0	5	1
Slate	3	0	2	1	1	0	0
Total	1,838	138	67	307	121	1,326	268

Figure 9.8 *Native Alaskan Village Site Lithic Assemblage: Raw Material Types*

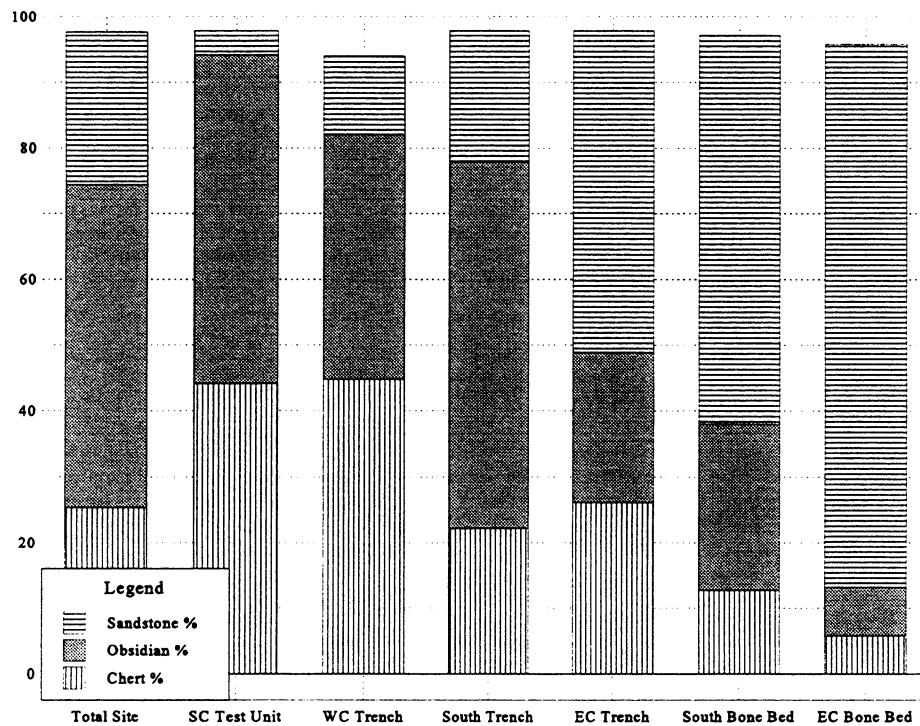


Table 9.6 *Native Alaskan Village Site Lithic Assemblage: Artifact Category Counts*

	Total	South Central Test Unit	West Central Trench	East Central Trench	East Central Bone Bed	South Trench	South Bone Bed
Cobble	48	0	0	12	7	36	25
Cobble Fragment	224	0	2	70	53	152	76
Basin Millingstone Fragment	3	0	0	1	1	2	2
Hammerstone	2	0	0	0	0	2	0
Mano Fragment	3	0	1	0	0	2	1
Nutting Stone	2	0	0	2	1	0	0
Pestle	1	0	0	0	0	1	0
Pestle Fragment	9	0	0	6	3	3	1
Slab Millingstone Fragment	6	0	0	6	6	0	0
Ground Stone Other	25	0	1	8	8	16	8
Fire-Cracked Rock	123	4	3	48	26	68	56
Gun Flint	10	3	2	3	0	2	0
Other	10	0	3	3	0	4	1
Biface Fragment	6	0	0	0	0	6	1
Biface	1	0	0	0	0	1	0
Edge-Modified Flake	51	6	5	12	0	28	1
Projectile Point	8	0	2	4	1	2	0
Projectile Point Fragment	8	1	0	1	0	6	1
Uniface	1	0	0	0	0	1	0
Core Fragment	4	0	0	1	0	3	1
Core	3	0	0	3	0	0	0
Interior Flake	966	78	22	74	10	792	79
Primary Cortical Flake	12	2	4	4	0	2	0
Secondary Cortical Flake	19	4	0	9	2	6	0
Shatter	293	40	22	40	3	191	15
Total	1,838	138	67	307	121	1,326	268

Table 9.7 *Native Alaskan Village Site Diagnostic Projectile Points*

NAVS Catalog #	Unit	Raw Material	Length (mm)	Width (mm)	Thicknes (mm)	Type
NAVS 7/31/91-22-L-1	75S, 20W	CH	25.00	15.50	4.10	Notched
NAVS 8/2/91-10-L-1	75S, 1E	OB	26.60	17.80	4.35	Notched
NAVS 8/3/91-4-L-1	75S, 2E	OB	19.35	13.00	3.80	Notched fragment
NAVS 8/5/91-3-L-1	125S, 18W	OB	8.40	6.20	2.00	Notched tip
NAVS 8/5/91-17-L-1	125S, 22W	OB	8.35	4.75	2.00	Notched tip
NAVS 8/6/91-10-L-1	125S, 22W	OB	14.50	11.25	4.00	Notched fragment
NAVS 8/6/91-37-L-1	125S, 24W	OB	8.20	4.40	1.70	Notched tip
NAVS 8/7/91-42-L-1	125S, 22W	CH	25.20	14.40	4.20	Notched
NAVS 8/8/91-22-L-1	125S, 24W	OB	11.00	9.10	4.00	Notched fragment
NAVS 8/9/91-17-L-3	125S, 18W	OB	21.50	13.40	3.60	Notched
NAVS 8/9/91-38-L-1	75S, 3E	OB	22.20	13.65	4.60	Notched
NAVS 8/15/91-10-L-1	125S, 23W	OB	23.60	17.35	4.20	Notched
NAVS 8/16/91-1-L-1	75S, 2E	OB	18.75	12.65	4.20	Notched

Table 9.8 *Native Alaskan Village Site Lithic Assemblage*

	Total Site	Sout Central Test Unit	West Central Trench	East Central Trench	East Central Bone Bed	South Trench	South Bone Bed
Flaked Artifact	74.6%	94.8%	82.1%	48.1%	13.3%	78.5%	36.7%
Ground Stone Tool	1.4%	0%	1.5%	5%	9.1%	.9%	1.5%
Fire-Cracked Rock	6.7%	2.9%	4.5%	15.6%	21.5%	5.1%	20.9%
Cooking	22.9%	2.9%	9%	44.9%	77.7%	20.5%	61.6%
Flaked Tool/ Debitage Ratio	1:17.3	1:17.7	1:6.9	1:7.7	1:15	1:22.6	1:31.7
Cortical Flake	2.3%	4.6%	7.5%	9.1%	13.3%	.8%	0%
Chert	25.3%	44.2%	44.8%	26.1%	5.8%	22.2%	12.7%
Obsidian	49.1%	50%	37.3%	22.8%	7.4%	55.7%	25.4%
Sandstone	23.2%	3.6%	11.9%	48.9%	82.6%	19.9%	59%
Raw Material Categories	9	5	6	5	5	8	6
Artifact Categories	25	8	11	19	12	22	14
Total Count	1838	138	67	307	121	1326	268
Formal Tools (%)	50 (2.7%)	1 (.7%)	3 (4.5%)	20 (6.5%)	12 (9.9%)	26 (1.9%)	6 (2.2%)

Figure 9.9 *Native Alaskan Village Site Lithic Assemblage: Functional Groups*

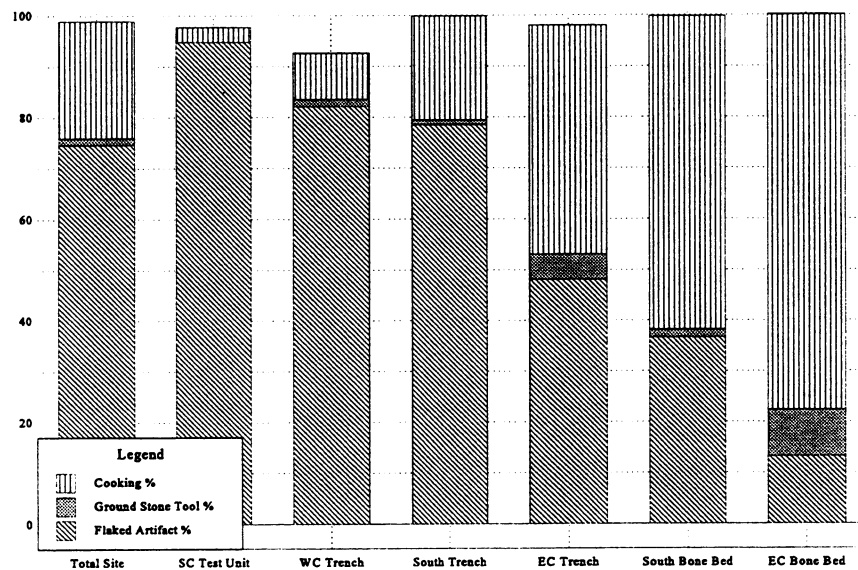
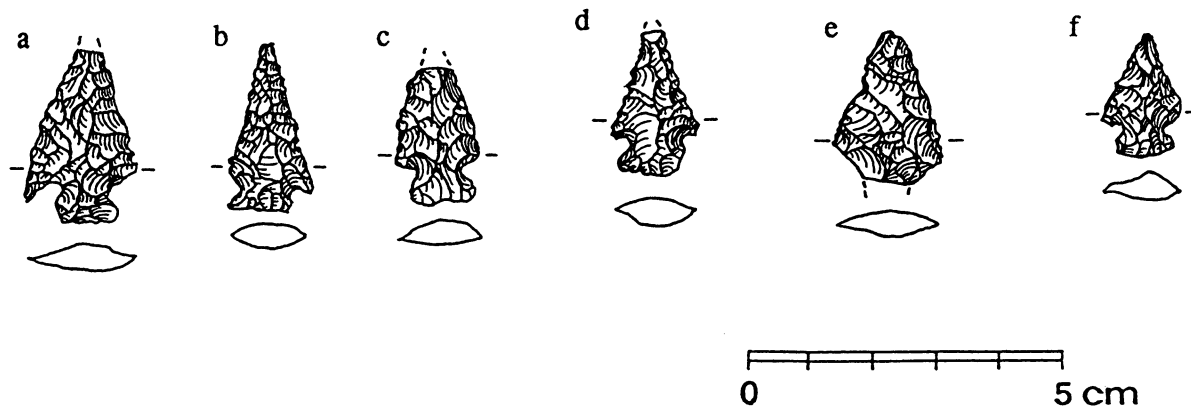


Figure 9.10 Native Alaskan Village Site Projectile Points



a. NAVS 8/2/91-10-L-1 Notched obsidian. b. NAVS 8/7/91-42-L-1 Notched chert. c. NAVS 8/9/91-17-L-3 Notched obsidian. d. NAVS 8/9/91-38-L-1 Notched obsidian. e. NAVS 8/15/91-10-L-1 Notched obsidian. f. NAVS 8/16/91-1-L-1 Notched obsidian. (Illustrations by Judith Ogden)

LITHIC ASSEMBLAGE - WEST CENTRAL TRENCH

Excavations in the West Central Trench occurred in three units: 75S, 16W; 75S, 18W; and 75S, 20W. Artifacts recovered include 67 lithics in 11 lithic categories and 6 raw material types. Almost 45% of the lithic artifacts are chert, representing a proportion much higher than the total site (25.3%) and, indeed, the highest of any individual area. Both obsidian (37.3%) and sandstone (11.9%) artifact proportions are lower than for the entire site. Basalt accounts for 1.5% of the artifacts. Two of the three slate artifacts found in the NAVS assemblage under consideration are from this area (NAVS 7/31/91-2-L-1 and NAVS 7/31/91-19-L-4). This is especially noteworthy considering that the West Central Trench is the smallest collection at NAVS. The diversity of raw materials is moderately high considering the small sample size, and the lithic categories are also well represented.

Over 82% of the entire assemblage is flaked, which is higher than the 74.6% site proportion. In the flaked category, 40% are shatter, 47.3% are unmodified flakes, 9.1% are edge-modified flakes, and 3.6% are formal tools. Two projectile points, including one diagnostic corner-notched point (NAVS 7/31/91-22-L-1), are the only formal flaked tools recovered. These two, representing a quarter of all the points recovered at NAVS, are of note considering the relatively small sample size for the area. Although shatter represents a larger proportion of the flaked category (40% vs. 21.4%), unmodified flakes are less frequent (47.3% vs. 73.2%). This mix, in combination with greater proportions of tools and edge-modified flakes, results in a higher tool to debitage ratio for this area (1:6.9), compared to the site as a whole (1:17.3). The primary and secondary cortical flake proportion (7.5%) is over three times the site average.

Although ground stone proportions in this area are

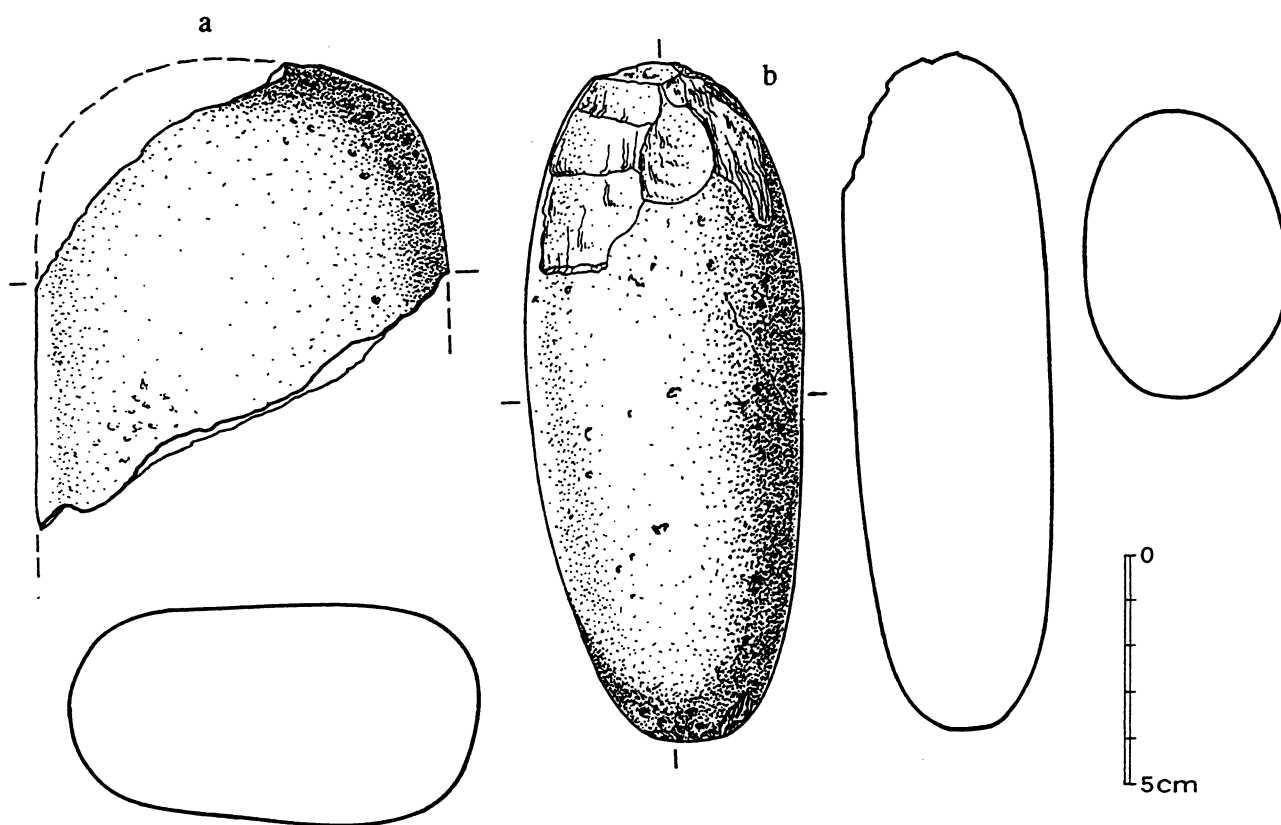
similar to site totals (3.0% vs. 2.8%), the West Central Trench evidences less fire-cracked rock (4.5% vs. 6.7%) and fewer cobbles (3% vs. 14.8%). The resulting food cooking component is only 9% compared to a 22.9% site component. One mano fragment was found in the assemblage.

Three artifacts from the West Central Trench can be classed as formal tools; these represent 4.5% of the total area assemblage, compared to a 2.7% entire site formal tool component. Two of the ten NAVS gun flints are found in this area, which is another high proportion in light of the small sample size.

Stratigraphic analysis of the assemblage provides two additional insights. First, all four of the artifacts in the topsoil level are chert shatter. Second, two of the three slate artifacts from the NAVS assemblage considered in this chapter and two of the eight projectile points are found in the dark sandy loam levels of two units: 75S, 16W and 75S, 20W.

LITHIC ASSEMBLAGE - EAST CENTRAL TRENCH

Excavations in the East Central Trench included five units: 75S, 0E; 75S, 1E; 75S, 2E; 75S, 3E; and 75S, 4E. A total of 307 lithic artifacts composed of 5 raw material types comprises the assemblage, demonstrating moderate to low raw material diversity. Given the relative size of the assemblage, the lithic category diversity of 19 is moderate to high. While the proportion of chert in this area is comparable to the total site (26.1% vs. 25.3%), the proportions of obsidian and sandstone are reversed. The East Central Trench has more than twice the sandstone (48.9% vs. 23.2%) and less than half the obsidian (22.8% vs. 49.1%). This proportion of sandstone is the highest for any area in NAVS. Basalt accounts for 1.9% of the assemblage. One slate artifact occurs in this trench.

Figure 9.11 *Native Alaskan Village Site Ground Stone*

a. NAVS 8/12/91-35-L-1 Mano. b. NAVS 7/13/92-26-L-1 Pestle. (Illustrations by Judith Ogden)

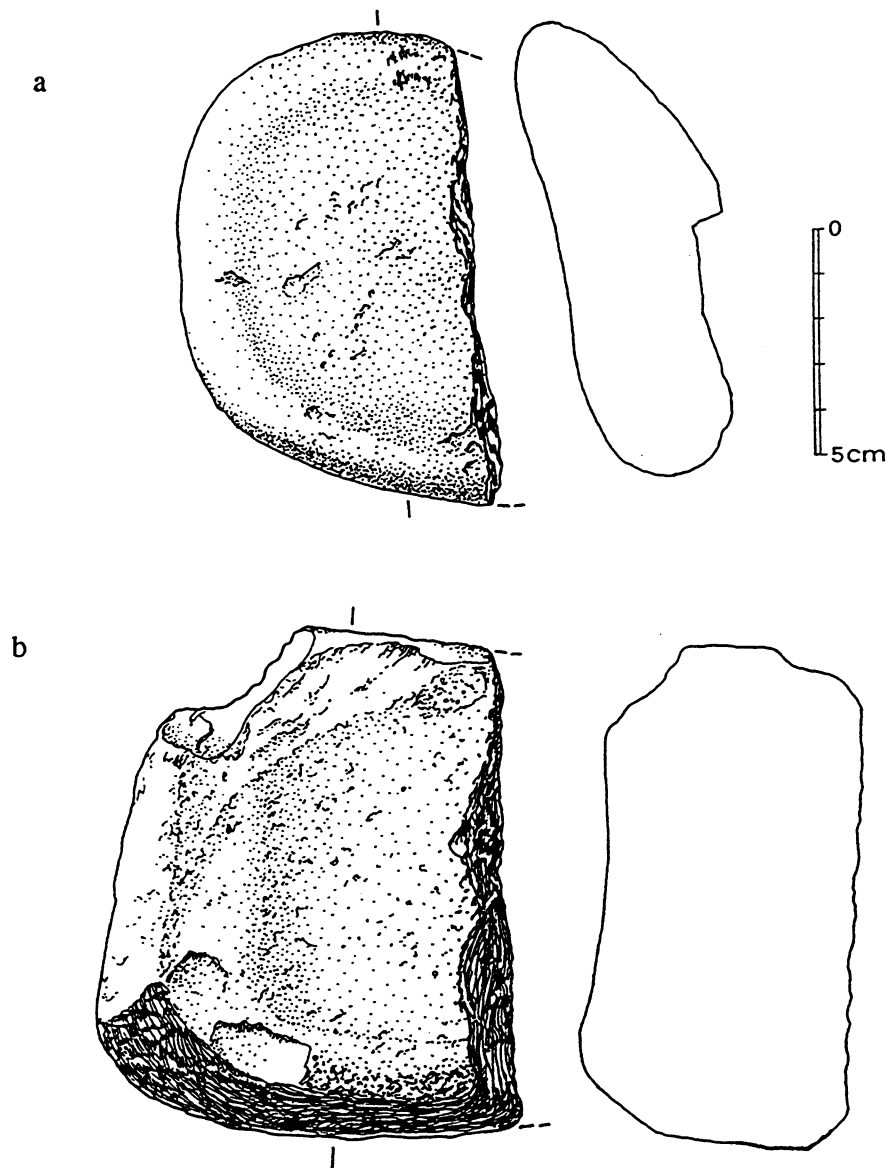
Flaked artifacts represent only 48.1% of the assemblage, the lowest proportion at the site and significantly lower than the 74.6% site percentage. Within the flaked category, the proportion of unmodified flakes (61.5%) is less than for the site as a whole, while shatter (27%) is a larger proportion. Both formal tools (3.4%) and edge-modified flakes (8.1%) occur with two or more times the frequency in the East Central Trench assemblage. This results in a higher tool to debitage ratio of 1:7.7, compared to 1:17.3 site ratio. Interestingly, the East Central Trench exhibits the highest cortical flake proportion (9.1%) of any area in the site. One projectile point fragment and half of all projectile points are found in this area, including four diagnostic notched points: NAVS 8/2/91-10-L-1, NAVS 8/3/91-4-L-1, NAVS 8/9/91-38-L-1, and NAVS 8/16/91-1-L-1.

The highest proportion of ground stone at the site (7.6%) is found in the East Central Trench, along with the highest site percentages of cobbles (26.7%) and fire-cracked rock (15.6%). The cooking component for this area (44.9%) is the highest at NAVS, almost twice the proportion as is found in the total assemblage. Fifteen formal ground stone tools are in evidence in the assemblage: one basin millingstone fragment, six slab

millingstone fragments (the total for the entire site), six pestle fragments (two-thirds of the entire site total), and both of the nutting stones in the site assemblage.

A total of 20 formal tools in this trench represents 6.5% of the area assemblage, which is almost 2 1/2 times the proportion found for the entire site (2.7%). Forty percent of all NAVS formal tools occur here, including almost 60% of the total formal ground stone tools, two-thirds of the pestle fragments, all of the slab millingstone fragments, both nutting stones, and half of the projectile points. This distribution is even more interesting considering that the East Central Trench assemblage is only 16.7% of the total lithic artifacts in the NAVS collection. In addition, the two sandstone hones or whetstones (NAVS 7/31/91-13-L-1 and NAVS 8/6/91-46-L-1) found at NAVS occur in this trench, as do 3 of the 10 gun flints.

Raw materials display variation across soil stratigraphic levels. Higher proportions of obsidian and chert occur in the topsoil and then again in the pit/mottled fill levels; the dark sandy loam, on the other hand, exhibits a greater proportion of sandstone and the one slate artifact. Lithic categories likewise vary by level: the dark sandy loam contains all but one ground stone artifact, a greater

Figure 9.12 *Native Alaskan Village Site Ground Stone*

a. NAVS 8/114/91-23-L-1 Slab millingstone. b. NAVS 8/14/91-109-L-1 Basin millingstone. (Illustrations by Judith Ogden)

proportion of cobbles and fire-cracked rock, and a 76.6% cooking component. The topsoil and fill levels, bracketing the loam, display no ground stone, few cobbles, little fire-cracked rock, and cooking components between 16% and 25%. In addition, these levels reveal flaked artifact proportions of 70% to 75%, whereas the dark sandy loam contains only 31.9% flaked artifacts. All of the formal flaked tools occur in the dark sandy loam and fill levels. In the lower levels, the sandy loam evidences high lithic category diversity, considering the small sample size, whereas the clay level contains only one obsidian flake.

No fire-cracked rock is found in either level, and only one ground stone and two cobbles were recovered from the lower strata.

LITHIC ASSEMBLAGE -EAST CENTRAL BONE BED

Excavations in the East Central Bone Bed occurred in three units at the western end of the East Central Trench (75S, 0E; 75S, 1E; and 75S, 2E) and extended across two 10 cm levels (20-30 cm and 30-40 cm). The assemblage consists of 121 artifacts in 12 lithic categories and 5 raw material types. This represents moderate

diversity, considering the small sample size. An overwhelming percentage of artifacts are sandstone (82.6%), compared to the trench (48.9%) and site total (23.2%) proportions. Conversely, the East Central Bone Bed exhibits low proportions of chert (7.4%) and obsidian (5.8%). Basalt accounts for 3.3% of the assemblage. The one slate artifact (NAVS 8/14/91-73-L-3) from the East Central Trench assemblage is found in this bone bed.

Flaked artifacts represent only 13.3% of the entire assemblage, a very low proportion relative to the East Central Trench (48.1%) and overall site (74.6%). Within the flaked category, 75% are unmodified flakes, 6.3% are formal tools, and 18.8% are shatter. There are no edge-modified flakes in the deposit. This flaked artifact distribution, although reflecting a lower proportion of the bone bed assemblage, approximates the site flaked artifact mix more closely than the trench mix. In addition, the tool to debitage ratio for the East Central Bone Bed (1:15) is closer to the site ratio (1:17.3) than to the trench ratio (1:7.7). As in the parent trench deposit, a higher proportion (13.3%) of primary and secondary cortical flakes occurs here than in the total site. One notched projectile point (NAVS 8/3/91-4-L-1) is found in the East Central Bone Bed collection.

Ground stone represents 15.7% of the total assemblage, more than twice the trench proportion (7.6%) and a significantly greater proportion than in the site (2.8%). Eleven of the 15 East Central Trench ground stone formal tools are found in this bone bed, including 1 basin millingstone fragment, 6 slab millingstone fragments, 3 pestle fragments, and 1 nutting stone. This represents all of the millingstone fragments and half of the pestle fragments recovered in the East Central Trench. In addition, the East Central Bone Bed reveals almost twice the cobbles (49.6%) and a higher proportion of fire-cracked rock (21.5%) than the trench. This mix results in a cooking component of 77.7% for the East Central Bone Bed, the highest for any collection at NAVS.

The 12 formal tools in this bone bed constitute 9.9% of the assemblage, by far the highest proportion at NAVS. Although the artifacts from this area are only 6.6% of the NAVS collection (121/1838) and 39% of the East Central Trench collection (121/307), they represent 24% of the NAVS tools (12/50) and 60% of the East Central Trench tools (12/20). This distribution is skewed in favor of ground stone tools: the total East Central Bone Bed/NAVS tool component breaks down into 42% ground stone (11 of 26 NAVS ground stone tools) and 4% flaked (1 of 24 NAVS flaked tools).

When compared to NAVS totals, the East Central Bone Bed reflects with greater intensity several East Central Trench patterns. The proportion of flaked artifacts is lower in this bone bed than in the East Central Trench, and lower in the East Central Trench than in the NAVS assemblage. Similarly, the proportions of formal tools, ground stone, cobbles, and food cooking artifacts

are all higher in the East Central Bone Bed than in the East Central Trench, and higher in the trench than in the NAVS assemblage. One curious exception to this pattern, however, can be seen in the tool to debitage ratio. Although the East Central Trench ratio is higher than the NAVS ratio (1:7.7 vs. 1:17.3), the East Central Bone Bed ratio (1:15) is lower than that of the trench, approximating the NAVS ratio. This is a function of the presence of only one flaked tool and the absence of any edge-modified flakes in the bone bed assemblage.

LITHIC ASSEMBLAGE - SOUTH TRENCH

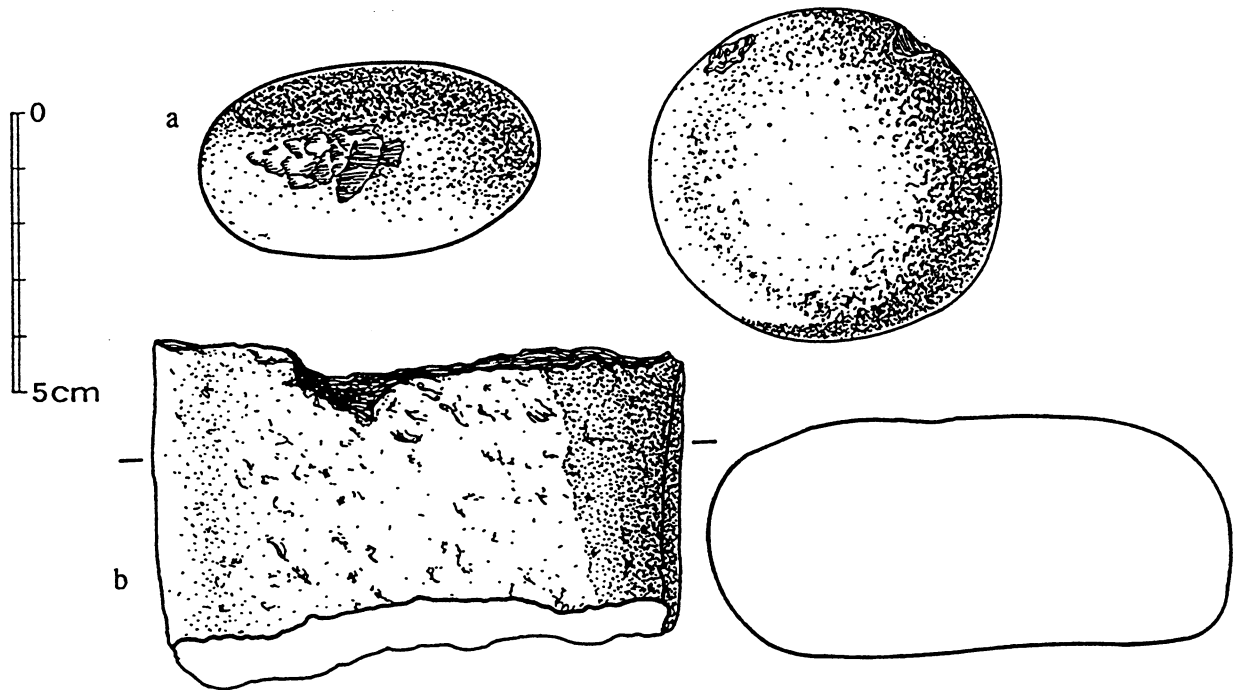
Excavations in the South Trench included seven units: 125S, 24W; 125S, 23W; 125S, 22W; 125S, 21W; 125S, 20W; 125S, 19W; and 125S, 18W. A total of 1,326 lithic artifacts in 22 categories constitutes the assemblage from this area. Eight raw material types are present, and, with the lithic categories in evidence, represent diversity comparable to the total NAVS collection. The highest proportion of obsidian for any area at NAVS occurs in the South Trench (55.7%); conversely, the lowest percentage of chert is exhibited in this area (22.2%). The incidence of sandstone (19.9%) is also lower than in the site as a whole. No slate artifacts are found in the South Trench, but one quartz crystal appears in the assemblage (NAVS 8/5/91-25-L-3).

Flaked artifacts occur in similar proportions to the total site (78.5%). Unmodified flakes (77.3%) constitute a larger proportion of the flaked category than in the total assemblage, whereas shatter (18.4%), flaked tools (1.5%), and edge-modified flakes (2.7%) represent smaller constituencies. The resulting tool to debitage ratio (1:22.6) is the lowest at NAVS. This area's proportion of cortical flakes is less than 1%. Sixteen formal flaked tools are found in the assemblage: 6 biface fragments, 1 biface, 6 projectile point fragments, 2 projectile points, and 1 uniface fragment. Eight diagnostic notched points or fragments are evident in the deposit: NAVS 8/5/91-3-L-1, NAVS 8/5/91-17-L-1, NAVS 8/6/91-10-L-1, NAVS 8/6/91-37-L-1, NAVS 8/7/91-42-L-1, NAVS 8/8/91-22-L-1, NAVS 8/9/91-17-L-3, and NAVS 8/15/91-10-L-1.

Proportions of cobbles (14.2%), ground stone (2.1%), and fire-cracked rock (5.1%) exhibited by the South Trench are similar to total site percentages. The cooking component (20.5%) is only slightly lower than the NAVS component (22.9%). The assemblage contains 10 formal ground stone tools: 2 basin millingstone fragments, 2 hammerstones, 2 mano fragments, 3 pestle fragments, and the only complete pestle in the NAVS collection.

The 26 formal tools represent 1.9% of the South Trench artifact universe, less than the 2.7% found for the total site. Although this area accounts for 72% of the total NAVS artifacts, it contains only 52% of the formal tools. In addition, this reduced occurrence of tools

Figure 9.13 Native Alaskan Village Site Ground Stone



a. NAVS 8/13/91-75-L-1 Nutting stone. b. NAVS 8/14/91-303-L-1 Slab millingstone. (Illustrations by Judith Ogden)

reveals a reversed share of ground stone and flaked tools: 62% flaked and 38% ground stone in the South Trench in comparison to 48% flaked and 52% ground stone in NAVS.

A stratigraphic review of this area reveals a topsoil level with high proportions of flaked artifacts (97%) and obsidian (70.5%), and low proportions of sandstone (2.5%), ground stone (.5%), fire-cracked rock (1%), cobbles (1.5%), and cooking artifacts (2.5%). The dark sandy loam stratum provides the opposite distribution: lower proportions of flaked artifacts (70.8%) and obsidian (50.5%), and higher percentages of sandstone (26.7%), fire-cracked rock (7.4%), cobbles (18.6%), ground stone (2.7%), and cooking artifacts (27.8%). Seventy-one percent of the formal tools in the South Trench are found in the dark sandy loam level, as well as 68% of the total trench artifacts. The pit fill level exhibits a high tool to debitage ratio compared to the upper levels (1:13.7 vs. 1:26.7 and 1:30.7). In addition, the pit fill reveals artifacts in almost twice the number of lithic categories as in the topsoil level (14 vs. 8), which would suggest a significantly greater diversity for comparable sample sizes.

LITHIC ASSEMBLAGE - SOUTH BONE BED

Excavations at the South Bone Bed occurred in three units near the west end of the South Trench (125S, 23W; 125S, 22W; and 125S, 21W) and extended across two 10 cm levels (20-30 cm and 30-40 cm). The assemblage

consists of 268 lithics in 14 categories. Six raw material types are in evidence. Almost 59% of the artifacts are made from sandstone, with obsidian (25.4%), chert (12.7%), and basalt (1.1%) comprising most of the remaining raw material types. This mix reflects a significant difference from the South Trench assemblage as a whole: more than three times the sandstone, but only about half the chert and less than half the obsidian.

Far fewer flaked artifacts (36.7% vs. 78.5%) occur in the South Bone Bed than in the South Trench as a whole. In the flaked category, about 82% are unmodified flakes, 15.6% are shatter, 1% are edge-modified, and 2% are formal tools. Compared with the entire South Trench assemblage, the higher South Bone Bed proportions of unmodified flakes and formal tools are offset by lower shatter and edge-modified percentages. This mix ultimately results in a low tool to debitage ratio (1:31.7). In fact, the South Bone Bed exhibits the lowest ratio at NAVS. This is the only area at NAVS, however, without any primary or secondary cortical flakes in the deposit. One biface fragment and one notched projectile point fragment (NAVS 8/15/ 91-10-L-1) are found in the collection.

In comparison with the South Trench as a whole, the South Bone Bed reveals twice the ground stone (4.5% vs. 2.1%), more than twice the cobble (37.7% vs. 14.2%), and four times the fire-cracked rock (20.9% vs. 5.1%). These latter two proportions contribute to a 61.6% food cooking component, which is the second highest at

NAVS after the East Central Bone Bed. Four formal ground stone tools include two basin millstone fragments, one mano fragment, and one pestle fragment.

The six formal tools represent 2.2% of the South Bone Bed assemblage, which is greater than the South Trench proportion of 1.9%. Of note, this bone bed demonstrates a reverse proportion of flaked and ground stone formal tools relative to the South Trench: the trench contains 62% flaked tools and 38% ground stone tools, whereas the bone bed exhibits 33% flaked and 66% ground stone. Additionally, only 12% of the South Trench flaked tools are found in its bone bed, while 40% of the former's ground stone tools occur in the latter.

NAVS LITHIC ASSEMBLAGE - SUMMARY

A review of the assemblages from various areas of the site provides several observations. Areas with the highest proportions of flaked artifacts are those spatially distinct from the bone beds: the South Central Test Unit and the West Central Trench. The South Trench percentage of flaked artifacts is smaller, and the East Central Trench has an even lower proportion of flaked artifacts. The bone beds reveal even further reductions in the percentages of flaked artifacts, with the East Central Bone Bed evidencing the lowest flaked artifact component at NAVS. This inverse relationship between flaked artifact proportions and proximity to the bone beds suggests flaked tool activities or deposition of flaked artifacts at NAVS occurred at locations spatially removed from the bone beds. It is also possible that this greater incidence of flaked artifacts is a product of prehistoric use of the area.

The opposite relationship can be observed in the patterning of the food cooking component, which consists of artifacts that may be by-products of various cooking activities. Cooking components are greatest in the bone beds, with the East Central Bone Bed component higher than the South Bone Bed. Both areas associated with the bone beds (the South Trench and the East Central Trench) have higher cooking constituencies than the locations physically removed from the bone beds (the South Central Test Unit and the West Central Trench). These distributions reflect tendencies for the residues of cooking activities to be deposited in the bone beds.

In addition to these patterns of cooking activities associated with the bone beds and flaking activities occurring elsewhere, a more fine-grained observation is provided by the flaked tool to debitage ratios. The areas to the south of NAVS (the South Central Test Unit and the South Trench) have flaked tool to debitage ratios significantly lower than areas central to NAVS (the West Central and East Central trenches). Within the trench areas, the bone bed ratios are likewise lower, with the South Bone Bed exhibiting a site low. These ratios reflect two different, but not mutually exclusive, activi-

ties. First, more manufacture and maintenance activities may have occurred in the southern areas than in the central, and within the bone beds as compared to non-bone bed areas, resulting in a greater portion of debris to tools in the southern and bone bed assemblages. In addition, it is a possibility that more tools were curated and fewer discarded in the southern areas than in the central, which would also result in a larger proportion of debris to tools in the southern assemblage. Conversely, the higher ratios in non-bone bed and central NAVS areas suggest less manufacture (importation?) and maintenance, perhaps coupled with less curation and/or greater discard propensities.

The patterns of low bone bed flaked artifact proportions and low bone bed flaked tool to debitage ratios could also indicate another scenario. Perhaps tool manufacture and maintenance activities never actually occurred at the historic bone bed locations, resulting in deposits that originally contained neither flaked tools nor debitage. Over time, depositional factors mixed some debitage from prehistoric flaking activities into the bone bed deposit. This would result in the low flaked artifact proportions and low tool to debitage ratios observed in the bone beds.

As with the tool to debitage ratios, the proportion of primary and secondary cortical flakes is significantly lower in the southern areas of NAVS (South Central Test Unit and South Trench). In fact, the South Bone Bed deposit does not contain any cortical flakes. This suggests that NAVS residents were not involved in initial lithic reduction activities in the southern areas of the site. By way of contrast, the East Central Bone Bed reveals the highest percentage of cortical flakes at NAVS. While the tool to debitage ratios suggest higher overall lithic manufacture and maintenance activities in the south, the cortical flake proportions indicate that specific initial lithic raw material reduction and manufacture activities were occurring with greater frequency in the central NAVS areas, especially the East Central Bone Bed.

Artifact densities reveal varying rates of lithic deposition across the NAVS landscape. The southern area has higher densities than the central area and both bone beds have higher densities than the surrounding trenches. In the central area of NAVS, lithic artifacts occur at the rate of 61 and 88 per cubic meter in the West Central Trench and the East Central Trench, respectively. By contrast, the density rate for the South Trench is 402 artifacts per cubic meter. This central/south density pattern holds true also within the bone beds: 242 artifacts per cubic meter in the East Central Bone Bed and 536 artifacts per cubic meter in the South Bone Bed.

Formal tool distributions vary greatly by area. The largest proportions of formal tools to total artifacts occur in the central area, with almost a quarter of all NAVS tools found in the East Central Bone Bed assemblage. A density of 24 formal tools per cubic meter in the East

Central Bone Bed is twice the South Bone Bed formal tool density. This contrasts markedly with the overall higher artifact densities in the South Bone Bed vs. the East Central Bone Bed, as noted above. Additionally, this pattern holds true to an even greater degree for ground stone formal tools; over forty percent of all NAVS ground stone tools are located in the East Central Bone Bed. Of interest, no gun flints are found in the bone beds.

Raw materials exhibit differing distributions in separate areas of the Village. All of the slate and both of the sandstone whetstones are found in the central area, perhaps reflecting places where the Native Alaskans worked and/or deposited slate tools. Sandstone proportions are highest in the bone beds and in the East Central Trench, which correspond with the distribution of cooking artifacts at NAVS. Obsidian is in evidence with greater frequency in the southern areas, accounting for over half the artifacts in the South Trench and the South Central Test Unit. Chert occurs less frequently in the bone bed areas, while basalt proportions remain fairly constant across the site.

Some similarities and differences in the stratigraphy of NAVS follow. Artifact distributions in the dark sandy loam levels in the East Central Trench and the South Trench are equivalent. The dark sandy loam level reveals higher proportions of cobble, ground stone, fire-cracked rock, sandstone, and cooking artifacts, and lower proportions of flaked artifacts, than in the remainder of the trench. The two bone beds exhibit many dissimilarities: the proportions and types of formal tools, the tool to debitage ratios, the raw material types, the proportions of flaked to ground stone artifacts, and overall artifact densities. Of note, all diagnostic projectile points and fragments are found in the upper stratigraphic levels, and these notched points appear to date to the Upper Emergent and Historic periods (table 9.7).

COMPARATIVE ANALYSIS - FRBS AND NAVS

A comparison of the artifact and raw material distributions from the two Native Alaskan Neighborhood sites reveals several patterns. Although raw material distributions are similar, FRBS exhibits higher proportions of ground stone and fire-cracked rock, while NAVS displays a greater portion of cobbles. These distributions may reflect a greater occurrence of dumping activities at FRBS, with spent ground stone and fire-cracked rock making their way over the cliff and into the beach deposit. Cooking tasks involving underground ovens, hearths, and the stone boiling method would traditionally take place in the residential areas at NAVS, resulting in greater proportions of reusable cobbles in the Village deposit. Both sites have comparable overall proportions of flaked artifacts, formal tools, and cooking components, suggesting that, eventually, all categories of artifacts evident at NAVS had an equal chance of finding a final

resting place at FRBS.

The tool/debitage ratio is higher at FRBS, reflecting either a greater occurrence of tool discard and/or a reduced instance of tool manufacture/maintenance activities. The resulting deposit is consistent with both a historic refuse disposal site associated with the Village and an earlier, sporadic-use special purpose site. At NAVS, the situation is reversed, with a lower tool/debitage ratio suggesting pronounced curation propensities, more intense tool production/repair, and/or a smaller prehistoric flaked artifact component. Residents of NAVS perhaps engaged more frequently in tool manufacture or maintenance while "at home" rather than "on the road." Additionally, raw material shortages and/or traditional cultural practices may have encouraged retention of previously manufactured tools, for either sentimental or utilitarian reasons.

Overall cortical flake proportions at FRBS are almost twice those found at NAVS, suggesting significant differences in initial lithic raw material reduction and manufacture activities and/or deposition between the two sites. This discrepancy appears to be temporal, and, as discussed earlier, may be explained by the prehistoric component at FRBS, where over 80% of the cortical flakes are deposited.

Although three slate artifacts (no tools) and two whetstones were recovered from the deposits at NAVS, none are evident in the FRBS collection. If slate arrived at Fort Ross with the Native Alaskans, and there were no alternative local sources, the slate in the Villagers' possession would be the sum of a limited supply. Assuming the slate tools would still be of value in traditional cultural venues, Native Alaskan residents would be less likely to discard them and maintenance debris would be scarce. A sentimental value might also accrue to the slate—a reminder of a far away home. Alternatively, Native Californians may have considered the new raw material and tools curious; any discarded tools or debris perhaps were recovered and saved by the locals. Either or both of the above scenarios would account for the dearth of slate in the Neighborhood deposits.

A separate review of the bone beds at NAVS suggests several distinct differences between them and the overall FRBS and NAVS deposits. The cooking component in the bone beds is, on average, more than three times the proportion found in the aggregate collection. It is not surprising that cooking activities would be concentrated in distinct locations within the residential base, coincident with numerous faunal and shellfish remains. In addition, the East Central Bone Bed exhibits over six times the proportion of formal ground stone tools than is found in the general accumulation. This indicates that, as with cooking, the processing of food and other raw materials took place with greater frequency in this bone bed location. Corresponding to these greater processing and cooking constituents, the bone beds reveal

over three times the proportion of sandstone than found in the total deposits at NAVS and FRBS. This is to be expected, considering that sandstone is the major raw material found in each of the processing and cooking artifact groups: ground stone tools, cobbles, ground stone other, and fire-cracked rock.

The proportion of flaked artifacts in the bone beds is only one third that of the complete Neighborhood collection, suggesting that tool maintenance, production, and discard took place in locations discrete from the food cooking areas. Indications of flaked tool discard activities are especially lacking in the bone beds, as evidenced by low tool/debitage ratios: the South Bone Bed has the lowest ratio in the Neighborhood. However, this pattern may simply reflect a temporal distinction: debris from prehistoric flaking activities is more common in all Neighborhood locations outside the historic bone bed deposits.

A comparison of diagnostic projectile points and fragments reveals that, while the NAVS assemblage has only the more recent notched points, the FRBS deposits contain earlier serrated and lanceolate points, as well as corner-notched points (tables 9.3 and 9.7). The greater temporal span of FRBS is not only indicated by diagnostic projectile point types but also confirmed by stratigraphic deposits from prehistoric (Lower Emergent and Upper Archaic), protohistoric (Upper Emergent), and NAVS associated (Historic) activities. As discussed earlier, all diagnostically early points at FRBS are found in the lower clay levels. NAVS deposits excavated to date, however, appear to originate in protohistoric and historic periods only.

COMPARATIVE ANALYSIS - FRBS, NAVS, AND SURVEY SITES

Two related trends are apparent from a review of the Ross Region sites. First, many sites on the coastal terrace appear to be part of broad, low density lithic scatters. These prehistoric deposits exhibit long use durations and are part of an extensive nonsite manifestation. Hunting and gathering endeavors, taking place across an extended plant and animal resource area, result in occasional loss, discard, and/or limited maintenance of various tools. Evidence in the deposits for plant and raw material processing is slight, as are indications of cooking activities. Site deposits reveal large flaked artifact components and corresponding small ground stone constituents, as well as low proportions of sandstone raw materials. In addition, these prehistoric nonsite manifestations evidence almost twice the proportion of cortical flakes than habitation sites. Several survey sites discussed in Volume 1 have deposits consistent with prehistoric nonsite collections: CA-SON-1453, CA-SON-228, CA-SON-1454/H, and CA-SON-1880. Each displays a major flaked artifact component with little ground stone.

Excavations at FRBS and NAVS expose deposits comparable with this prehistoric pattern. Each site contains an overall 75% flaked artifact component. At FRBS, the clay levels demonstrate the highest flaked artifact proportions coupled with low ground stone, processing, and cooking components. Non-bone bed areas at NAVS display these same higher flaked artifact distributions. The overall cortical flake proportions at FRBS are almost twice those at NAVS, with the great majority of the FRBS cortical flakes being found in the lower clay levels. Sporadic prehistoric activities on the coastal terrace may be responsible for these high flaked artifact proportions in the Neighborhood sites. While the location of the deposits in the low clay levels at FRBS could be predicted, the NAVS deposits, both separate from and in some cases above the discrete bone bed, suggest some mixing of deposits outside the "sealed" bone bed.

The second trend in evidence is a corollary to the prehistoric, nonsite lithic scatters. Native Californian residential areas in the Ross Region exhibit large ground stone components, reflecting processing and cooking activities. In Volume 1, three sites were discussed that appear to be habitation areas, one close to the Fort and two on the ridge top: CA-SON-1886/H, CA-SON-1883, and CA-SON-1884. Each displays high proportions of ground stone (about 60%). This is a direct reversal of the nonsite patterns. The bone beds at NAVS reveal similar high processing and cooking components, at the expense of the flaked artifacts. While both NAVS and FRBS as a whole are suggestive of the coastal terrace patterns, it is clear that the discrete bone bed areas at NAVS are more reflective of residential activities, including processing and cooking. Excavations are currently underway on Native Californian habitation areas; the deposits revealed will produce a comparative base and provide further insight into these trends.

ACKNOWLEDGEMENTS

I thank Roberta Jewett, Kent Lightfoot, and Antoinette Martinez for their constructive comments on earlier drafts of this chapter. In addition, I thank Allan Bramlette for his insightful suggestions on projectile point typology. I thank the many people who have supported or participated in the Fort Ross Archaeology Project since its inception in 1988, including UCB field school participants, laboratory analysts, and Archaeological Research Facility personnel. I am especially indebted to the many people at the Fort Ross State Historic Park and the archaeological staff of the California Department of Parks. I am most grateful for the continuing encouragement and patronage of Kent Lightfoot. Finally, I thank Robert Schiff for his steadfast support and unwavering optimism.

REFERENCES

- Barrett, S. A.
1952 Material Aspects of Pomo Culture. *Bulletin of the Public Museum of the City of Milwaukee* vol. 20, part 1.
- Baumhoff, Martin A.
1982 *North Coast Point Types in Cultural Resource Overview for the Mendocino National Forest and East Lake Planning Unit, BLM, California*, edited by H. McCarthy, W. Hildebrandt, and L. Swenson, pp. 1-43, Appendix A, California Archaeological Consultants, Inc.,
- Bettinger, R., Delacorte, M., and McGuire, K.
1984 *Archaeological Investigations at the Partridge Ranch Site, Inyo County, (CA-INY-2146)*. Far Western Anthropological Research Group, Inc.
- Gifford, E. W., and Kroeber, A. L.
1937 Cultural Element Distributions: IV, Pomo. *University of California Publications in American Archaeology and Ethnology* 37:117-254.
- Hayes, John F.
1985 *An Analysis of Redwood National Park Artifacts*. Redwood National Park, Crescent City, CA.
- Jackson, R., Boynton, M., Olsen, W., and Weaver, R.
1988 *California Archaeological Resource Identification and Data Acquisition Program: Sparse Lithic Scatters*. Manual prepared by the Office of Historic Preservation, Sacramento, CA.
- Levulett, V., and Hildebrandt, W.
1987 *The King Range Archaeological Project: Results of the 1984 Field Season*. Anthropological Studies Center, Sonoma State University, Rohnert Park, CA.
- Lightfoot, K., Wake, T., and Schiff, A.
1991 *The Archaeology and Ethnohistory of Fort Ross, California: Voll, Introduction*. Contributions of the University of California Archaeological Research Facility no. 49, Berkeley.
- Shott, Michael J.
1994 Size and Form in the Analysis of Flake Debris: Review and Recent Approaches. *Journal of Archaeological Method and Theory*, vol. 1, no. 1, pp. 69-110.
- Whittaker, John C.
1994 *Flintknapping: Making and Understanding Stone Tools*. University of Texas Press, Austin.
- Yerkes, R. W., and Kardulias, N. P.
1993 Recent Developments in the Analysis of Lithic Artifacts. *Journal of Archaeological Research*, vol. 1, no. 2, pp. 89-119.

Slate Artifacts and Ethnicity at Fort Ross

PETER R. MILLS

SLATE WAS USED EXTENSIVELY by Native Alaskans and to a lesser extent by Europeans and Native Californians. Thus, the presence or absence of particular ground slate tools at Fort Ross may indicate continuity and change within the 19th century multiethnic community. In Alaska for example, Knecht and Jordan attempt to address why slate was still in use in the 1840s when iron “was no longer difficult for a Koniag household to acquire in quantity (1985:27).” They suggest that slate use may relate to cultural conservatism among the Alutiit who did not want iron coming into contact with their food. In support of this, they cite an account by Lt. Zagoskin in the 1840s:

In spite of the fact that the coastal natives have dropped a great many of their superstitions and have become Russianized in many respects, they cannot bring themselves to cut the beluga with iron (knives). This metal is considered unclean because it comes from the Russians (Michael 1967:113).

Another example comes from the first Russian-American Company (RAC) post (est. 1784) at Three Saints Harbor, Kodiak Island. Although Crowell (1994a) identified traditional Alaskan ground slate artifacts in Structure 3 at the site, he argues that Russian hunters occupied the structure due to the presence of metal knives and firearms that were contraband for Native Alaskans. He suggests that the Native Alaskan artifacts may indicate the presence of Alaskan co-inhabitants or that Russians were using Alaskan tools in the absence of an abundant supply of Russian tools.

In order to address the significance of slate artifacts from Fort Ross, this chapter provides a review of traditional uses of ground slate in southern coastal Alaska (focusing on Kodiak Island), northern and central

California, and Europe. This is followed by a description of the slate artifacts from Fort Ross and a discussion of their significance for interpreting the 19th century multiethnic community.

SLATE ARTIFACTS IN SOUTHERN COASTAL ALASKA

Little research in southern coastal Alaska focuses specifically on slate tools in the late prehistoric period and the Contact Period, although site reports and artifact collections document the heavy reliance on this material (Clark 1974a, 1974b; Shaw et. al 1988). Slate is the predominant lithic raw material on many Alaskan beaches including Kodiak Island, Cook Inlet, Prince William Sound, and the Alaska panhandle. It is rare, however, in the Aleutian chain (Crowell 1988:137). Where slate occurs, it can be gathered from shorelines in tabular sections that can be easily shaped into a variety of tools. Traditional slate tool manufacture often employed the “saw-and-snap” method in combination with rough flaking of the edges (Clark 1974a:79; Knecht and Jordan 1985:30). Final shaping and edge preparation commonly involved grinding against an abrasive surface. The types of artifacts produced during this process are numerous. I have attempted to characterize them within five very general categories: long blades, short blades, pencils/splinters/awls, ulus/transverse knives, and incised tablets.

LONG BLADES

In keeping with Clark (1974a:106), long slate blades are defined as double-edged blades over 11 cm in length. This division is arbitrary. Most double-edged blades appear to be shorter than 11 cm. Clark (1974a:106) describes numerous late prehistoric long blades on Kodiak Island and suggests that they may have served as knives, lances, spear heads, and daggers. Heizer

(1956:49-51) describes other examples from the Uyak site, Kodiak Island. This general form was common as early as the Ocean Bay II phase (ca. 4500 B.P.) on Kodiak Island (Clark 1984:138). Long slate blades also occur over several thousand years of prehistory for the Bering Sea region, the northern Alaska Peninsula (Dumond 1984:9, 103), and Cook Inlet (de Laguna 1934:71, Pl. 31, Pl. 32).

One type of long blade that is found in late prehistoric sites and Contact Period sites is associated with a whaling method unique to Kodiak Island (Birket-Smith 1941; Clark 1974b; Heizer 1956:48). These blades are finely made with well-formed barbs and elongated triangular outlines. Cross sections generally appear diamond-shaped (Heizer 1956:Pl. 62). The Alutiit hunted whales from *baidarkas* by throwing slate lances into the whale, preferably near a side fin (Gideon 1989:142). The slate heads would detach from a shaft after the whale was struck (Birket-Smith 1941:138; Clark 1974a:72). Accounts suggest that whaling was practiced by a select number of men who acquired whaling rights through descent and who remained isolated from the rest of the community (Birket-Smith 1941:138; Crowell 1994b; Heizer 1943; Lantis 1938, 1940). A poison made from the root of monkshood (*Aconitum maximum*), applied to the blade, would partially paralyze the whale so that it would drown over a period of days and eventually wash ashore (Black 1987; Crowell 1994b; Gideon 1989:142; Heizer 1943; Lantis 1938, 1940). Due to the long period between the initial strike and the death of the whale, whaling was usually attempted in deep embayments where there was less chance of the whale being lost in ocean currents.

Whaling lances often bear the distinguishing mark of a particular hunter (Crowell 1994b; Dyson 1986:46; Rousellot et al. 1988:172) or hunter's village (Kittlitz 1987:169-70) so that no matter where a whale washed ashore, the kill could be claimed. Knecht and Jordan (1985:27-29) recovered two slate whaling lances in a Alutiit structure dating to the 1840s. Based upon striations on the blades, they suggest that the lances were shaped with metal tools. Another archaeological specimen was described by Clark (1974b:109-110) from a Russian artel at Igatsk, Ugak Bay. Ethnographic examples are in the Holmberg collection (Birket-Smith 1941: Pl. 16; Heizer 1956: Pl. 62).

SHORT BLADES

Double-edged slate blades less than 11 cm long are common in coastal Alaska and occur in late prehistoric sites on the Northwest Coast as well (e.g. Hobler 1990:302). The majority of slate points depicted by Jordan and Knecht (1988:277-97) from prehistoric and historical deposits at Karluk, Kodiak Island fit this category. Heizer (1956:49) suggests uses on Kodiak Island including dart points, arrow points, and harpoon

heads. Birket-Smith (1941) suggests that slate points were used to hunt bear on Kodiak Island. While smaller marine animals such as the sea otter were often hunted with bone points, larger sea mammals such as walrus and sea lion were hunted with slate blades as well as toggling bone and ivory harpoons. Clark (1974b) clearly documents the continued significance of these slate tools into the Contact Period. Crowell (1994a:226-27) recovered an end-blade preform that would fit this general category at Structure 3, Three Saints Harbor. Oswalt (1980:48,195) found two short blades and one blade fragment at Kolmakovskiy Redoubt (1841-1917) in the Yukon-Kuskokwim Delta. While the form of short blades has changed through time and from region to region, similar forms occur over broad regions of the North Pacific. Blade forms generally vary from lanceolate to triangular, and cross sections are frequently both bi-planar and diamond-shaped. Thus, establishing a specific ethnic association for many of these tools without any regional context would be difficult.

PENCILS/SPLINTERS/AWLS

Clark (1974a:97, 98, Pl. 17) depicts fourteen ground slate "splinters and bars" from Rolling Bay site 420 and ten similar artifacts from Kiavak site 418 on Kodiak Island. These artifacts vary from 5.7 cm and 15.5 cm in length and are modified from naturally bar-shaped slate gravel. Some are bluntly pointed while others are sharply pointed. Cross sections vary from irregularly round to rectangular. Similar artifacts were recovered on Kodiak Island from the Uyak site (Heizer 1956:49). Crowell (1994a:226-27) recovered a 4.5 x .8 cm "ground slate rod" from structure 3 at Three Saints Harbor. He suggests that the rod may have been used for honing tool edges. In terms of their function, Clark (1974a:98) states:

The few sharply pointed specimens are probably piercers, while the dull implements could be creasing tools, embossing tools, etc. Specimens with sharp chisel edges are known from other sites on Kodiak. The asymmetry of some Kiavak specimens is noteworthy and may relate to their use.

Similar artifacts are known from southern coastal Alaska including Cook Inlet (de Laguna 1934:79, Pl. 36) and Prince William Sound (de Laguna 1956:a: Pl. 30, 31).

ULUS/TRANSVERSE KNIVES

This class includes all single-edged slate tools. Ulus have a single semi-lunar cutting edge and are often back-hafted. Metal-bladed ulus continue to be used in the Arctic for a variety of purposes such as the cutting and processing of meat and blubber. Jochelson (1925) identifies these tools as "women's knives." This distinction has continued in the literature for southern Coastal Alaska (e.g. Clark 1974a:100), although some have

argued that distinguishing between straight-edged transverse knives ("men's knives") and ulus is problematic with archaeological specimens (de Laguna 1934:74; Heizer 1956:48). Knecht and Jordan (1985) identify five complete ground slate ulus at Structure 1 in Karluk dating to the 1840s. Several of these ulus display iron stains suggesting that the blades were attached to the handle by iron pins. Crowell also recovered two ulus and a transverse-edged scraper or knife from Structure 3 at Three Saints Harbor (1994a:226). Other ulus and transverse-edged knives have been identified in late prehistoric sites on the Alaska peninsula as well (Harritt 1988).

INCISED TABLETS

On Kodiak Island, incised slate tablets with distinctive anthropomorphic designs have been recovered from several Koniag Phase sites (Clark 1964, 1974b; Crowell 1988:135; Heizer 1952) including 88 specimens from the Kizhuyak site, Marmot Bay (Clark 1974b:20-21). Clark interprets these as purposefully discarded ritual objects. It seems that these items were manufactured from approximately 1350-1500 A.D. but they were no longer being manufactured by the time of Russian contact (Crowell 1988:135; Jordan and Knecht 1988:271). Knecht and Jordan (1985:30-32) did identify a slate fragment incised with a series of markings in the bottom of a leather quiver at a historical house structure in Karluk; they suggest it may be a hunting tally or may have served an ideological purpose.

SLATE ARTIFACTS OF THE FORT ROSS REGION

In the North Coast Ranges surrounding Fort Ross, slate is not an abundant raw material. Most of the regional geology consists of uplifted marine terraces and intrusive igneous formations (Lightfoot, Wake, and Schiff 1991:32-35). The marine sediments contain occasional shales with some metamorphism of these materials along tectonic plate boundaries. The majority of the metamorphic rocks, however, are schists and graywackes (Page 1966:266, 258). Layton (1990) reports on the excavation of several sites directly north of Fort Ross in Mendocino County dating from 2000 B.P. to the Contact Period. Hundreds of chipped stone tools were recovered, but no ground slate was identified. Two fragments of schist, however, were reported to have been polished and worn along an edge (Layton 1990:23). Baumhoff (1976) conducted an extensive locational survey of archaeological sites in the Warm Springs Dam/ Lake Sonoma Region, but millstones and handstones are the only ground tools that he noted. In general, the use of slate by Native Californians in the North Coast Ranges appears to have been non-existent or extremely rare (David Fredrickson, personal communication 1995).

Ground slate tools were manufactured sporadically

through prehistory by Native Californians in areas surrounding the North Coast Ranges. To the south and east, Heizer (1949:23-24) describes several classes of slate artifacts from Early Horizon (4,000-3,000 B.P.) Windmill burials in Central California. These include 19 small cylindrical "pencils" that measure about 5 mm in diameter and from 9 to 11.8 cm in length. He speculates that these were used as projectile points, awls, or perforators. Larger ground slate rods and "charmstones" also were recovered. Charmstones are cylindrical objects usually with a perforation in one end. Similar charmstones and flat perforated slate pendants occur in Middle Horizon (3,000-1,500 B.P.) sites in central California (Elsasser 1978:37-40). Barrett and Gifford (1933:213) showed charmstones to some Central Miwok informants who suggested that they had been "made by the supernatural being, Coyote." While the informants suggested that the stones may have been used as spinning tools and fire-drills, it was Gifford and Barrett's opinion that the informants were simply guessing at possible functions.

EUROPEAN WRITING SLATES AND PENCILS

Petroski (1990:29) notes that slate was commonly used for writing tablets in the 19th century and that it continues to be used today "in primitive schools and third world countries." Some writing slates were marketed to be used with lead pencils and others with slate pencils (Israel 1968:356). Slate pencils continued to be used up to the end of the 19th century (Petroski 1990:29). In 1897, the Sears Roebuck catalogue carried a pack of twelve "German Slate Pencils" for 28 cents, and two varieties of "American soapstone slate pencils" for 80 cents and \$1.05 per box of 1000, depending on the variety (Israel 1968:353). As early as the 1770s, however, graphite pencils encased in wood were being competitively marketed in Germany and England (Petroski 1990).

Slate writing tablets and pencils clearly became a part of the European material culture in the Pacific Rim in the 19th century. Ann Garland has documented the presence of slate pencils at excavations of mid 19th century Protestant Mission houses in downtown Honolulu (Garland, personal communication 1995). An artifact of probable European origin at Structure 1 in Karluk is a slate tablet with Russian letters and various linear marks incised on the surface (Knecht and Jordan 1985:30, 31). They note that "incised characters and a burnished surface attest that the slate was used extensively prior to breakage. After breakage, the slate apparently was used to keep a tally or perhaps, as some local residents have suggested, to serve as a Russian-style calendar."

SUMMARY

In sum, what we know about the traditional tool kits

of the ethnic groups at Fort Ross suggests that slate would be introduced to the site primarily from Native Alaskan and European sources. Given the documented use of slate by Native Californians in regions surrounding Fort Ross, however, the introduction of slate to the site by local peoples should not be ruled out. The Native Alaskan uses would be distinguishable in the manufacture of edged hunting tools, processing tools, and stylized art work. European slate use would be distinguishable in terms of writing tablets, but rod-shaped slate tools of similar sizes were produced by Alaskans, Europeans, and Californians. Therefore, these items at Fort Ross are simply called "slate rods", and no attempt is made to assign them to particular ethnic groups. More research on the slate rods including production techniques, use-wear, petrographic and geochemical analyses, and refined stylistic typologies is necessary before any reliable distinctions can be made.

GROUND SLATE AND THE ROSS COLONY

FARALLON ISLANDS

Four slate artifacts were recovered during Riddell's (1955) excavations of the Ross Colony's sea-mammal hunting outpost on the Farallon Islands (SFr-1), and are housed in the collections of the Phoebe Hearst Museum. A re-examination of the pieces reveals that the slate fragments vary from 1.7 cm to 4.8 cm in length and between 3 mm and 4 mm in thickness. All fragments display two smoothed faces, but no grinding striations are visible with the naked eye and no purposeful marking beyond saw-and-snap lines are apparent. Riddell (1955:7) reported that one artifact (1-103494) had been sawed, and may be commercially produced slate. This piece displays saw cuts on one side margin and is ground flat on a perpendicular margin. No obvious saw-and-snap lines are present. Riddell also notes that "an attempt had evidently been made to break the other three pieces along previously incised lines and it can be suggested that the 'Aleut' hunters may have used this material for the manufacture of slate harpoon head blades. However, no such blades, or fragments of them, were found" (Riddell 1955:7).

In re-examining the fragments, saw-and-snap lines appear on only two fragments (1-103450 and 1-103487). A third fragment (1-103385) appears roughly broken on all margins. There are two saw-and-snap lines on specimen 1-103450 that are nearly parallel and spaced approximately 2.4 cm apart. No lines are on the opposite face. Specimen 1-103487 displays three saw-and-snap lines on one face. These form the margins of an irregular triangle measuring 3.4 cm in length and 2.5 cm in width.

In addition, it should be noted that Riddell recovered four fragments of a decorated stone tablet (1955:9, Plate I, specimen 1-103520). The stone was identified by Riddell as steatite. The decorations are made by a series of connected straight lines that form squares and tri-

angles. These lines enclose a symmetrical curvilinear motif. Adjacent to the curvilinear motif is what appears to be a figure "8" or "∞" depending on which direction is considered to be vertical. The overall design bears no resemblance to the incised slate tablet designs from Kodiak Island. Farris (chapter 6) suggests this symbol may be the Fort Ross "Counter mark" used on lead bale seals for skins. No function is suggested for this artifact, although it is listed under Riddell's category of "non-aboriginal artifacts." In one orientation, it appears that the design may be a depiction of a house with a peaked roof. An examination of the artifact in the Phoebe Hearst Museum of Anthropology collections reveals that it is ground flat on both faces and is 6 mm thick. The refit pieces measure 5.2 cm by 6.8 cm along their longest dimensions. The rock is non-platy and light green in color, consistent with steatite rather than slate. The design has been incised, and it appears that the striations have been filled with white ink, possibly to assist in photographing the artifact in 1955.

FORT ROSS STOCKADE

No geochemical or petrographic analyses of slate from the Fort Ross excavations have been completed. As such, the identification of "slate" is based upon macroscopic characteristics of a dark, indurated, fine-grained metamorphic rock with platy cleavage. A review of the archaeological collections from Fort Ross Stockade reveals nine slate objects recovered by the north Stockade wall and from the Kuskov House.

Slate from the north Stockade wall came from "Trench A," excavated by A. Treganza (1954). While these objects were not mentioned in the report, they were found in the collections from the excavations at the State Parks Archaeology Laboratory in Sacramento. These include seven slate objects: a fragment of a slate tablet; three small pointed slate tools; two possible slate rod preforms; and an unworked slate fragment. The flat slate tablet fragment measures 4.5 cm x 4 cm and averages 4 mm in thickness. The fragment displays two perpendicular saw-and-snap lines on two of the four margins. The other margins display rough breaks. The break along one saw-and-snap line was subsequently ground smooth. The two opposing flat surfaces of the fragment exhibit grinding striations, but no letters or geometric designs are apparent.

Three slate objects are less than 4 cm in length and have been ground to points. One tipped tool is ground to a beveled tip parallel to the main faces, and has a triangular outline with beveled side margins. The base is ground flat. The second pointed tool appears very similar in form to a modern carpenter's pencil. It has parallel sides, a flat base, and tapers to a tip that forms a beveled edge parallel to the main faces of the tool. The only sharp edge is the beveled tip; all other margins are ground flat. The third pointed tool is irregularly ovoid in

outline. The slightly rounded margins are ground to a tip, but this tip is not beveled parallel to the main faces. Several incised lines are present on both faces that may be remnants of saw-and-snap lines from a larger slate blank.

Also from Trench A came a fragment of slate measuring 1 cm by 4 cm and 4 mm thick that is broken across the long axis. It displays carefully beveled and parallel saw-and-snap lines along the sides and may have been a preform for a slate rod. An additional slate fragment from Trench A is very similar to the possible rod preform except that the sides taper slightly. It measures 3.8 cm x 1.3 cm and is 3.5 mm thick. One unworked fragment of slate, also recovered from Trench A, is approximately 4.5 cm x 2 cm in outline and 2 mm thick.

In collections at the State Parks Archaeology Laboratory in Sacramento, there are two other slate tools from Karl Gurke's 1975 excavations of the Kuskov House (see Gurke, n.d.). Provenience data suggest that both of these objects were located within approximately 5 m of the north Stockade wall. One of these items closely resembles one of the pointed tools from Trench A. It is ground to a fine point but has rounded side margins and an irregular ovoid outline. The second item from the Kuskov House is a slate rod that is faceted with seven asymmetrical faces in cross section. It is approximately 4 mm in diameter and 2 cm in length. Both ends appear broken.

NATIVE ALASKAN VILLAGE SITE

Eleven slate artifacts have been recovered in the vicinity of NAVS (figure 10.1). These items include three small, unmodified fragments of slate (figure 10.1a, b, c), two broken slate rods (figure 10.1d, e), three fragments of ground slate projectiles or knives (figure 10.1f, g, k), two roughly rectangular slate tablets (figure 10.1h, i), and a small tabular fragment that has been ground and polished on one surface (figure 10.1j).

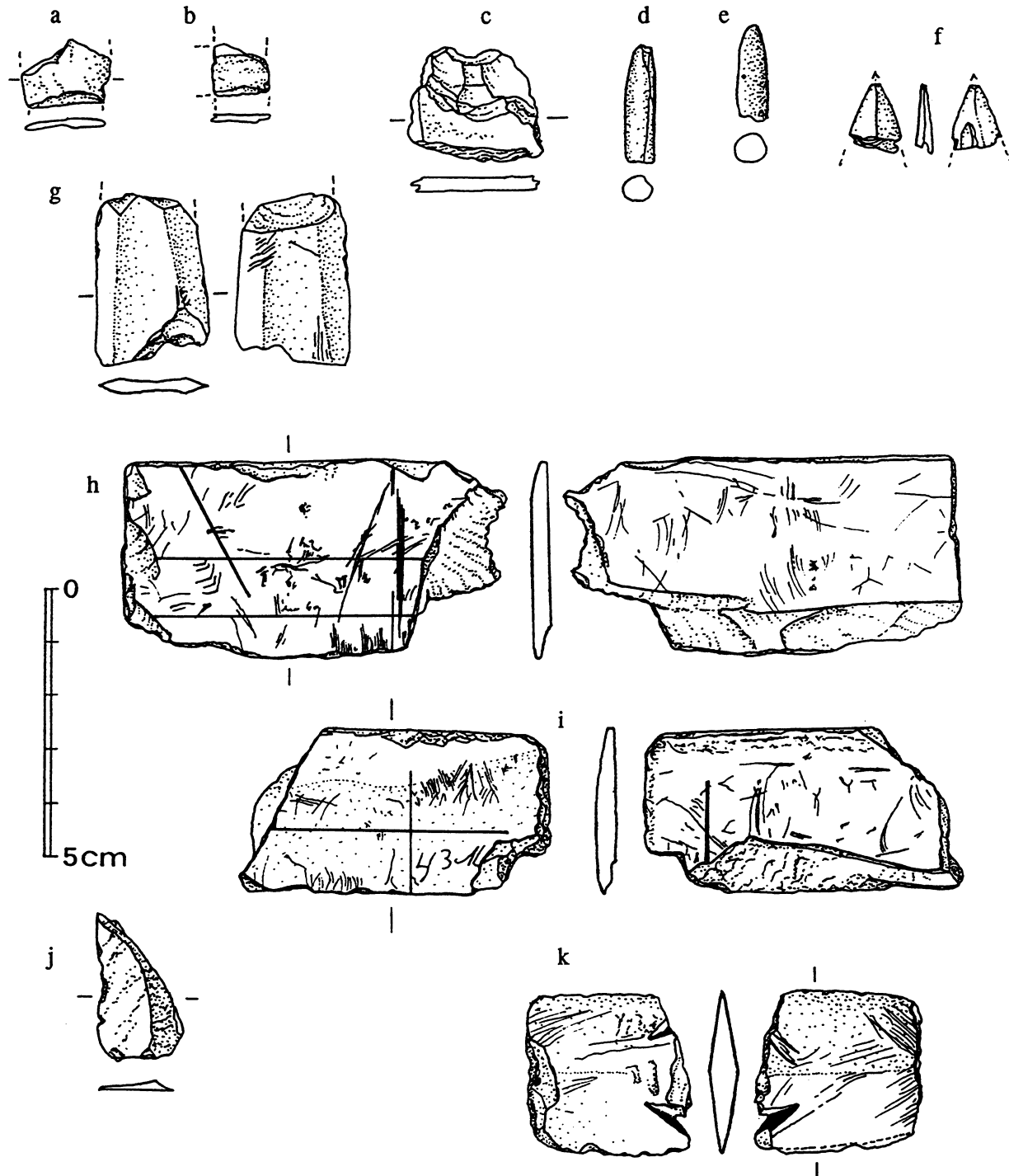
The two slate rods are both ground to a tip and are broken on the opposite end. One slate rod (figure 10.1d) was located in the East Central Area Excavation (74S, 3E). It is 3.1 cm in length and 4 mm in diameter. Ground to a nearly cylindrical cross section, it is slightly flattened on one side. On the main body, grinding striations run parallel with the length of the tool. Where it tapers to a tip, it is faceted to seven surfaces and grinding striations are visible at low magnification running in several directions. The tip itself is formed by four smaller facets ground at a slightly steeper angle than the tapering surface. The edges of the facets at the tip appear slightly rounded at low magnification suggesting that this was used as a stylus and/or an awl. The second slate rod (figure 10.1e) was located in the South Area Excavation (124S, 22W). It is 2.2 cm from the tip to the break and is 5 mm in diameter at its widest point. The

diameter of the rod gradually decreases as it approaches the point. No faceting is visible but the point is slightly rounded. The overall surface is slightly rough and pitted. No grinding striations or use-wear are visible.

Three fragments of slate double-edged tools were recovered that appear to be portions of end-blades, lances, or knives. A tip fragment (figure 10.1f) and a midsection (figure 10.1g) were found during excavations of the East Central Area Excavation (74S, 2E; 73S, 1E), and a base fragment (figure 10.1k) was located by a local resident, Nancy Walton, near the center of the terrace directly to the east of the access road (Nancy Walton, personal communication 1995). Since all three artifacts are fragmentary, it is difficult to assign them to classes of short blades vs. long blades. The tip fragment (figure 10.1f) is diamond-shaped in cross section with a well defined central ridge on each face. Since the tip fragment is so small, it is impossible to suggest if this cross section was maintained for the entirety of the blade or if it is a function of the two ground edges coming to a point. The midsection (figure 10.1g) is a double-edged end-blade with a slightly lanceolate outline. While this fragment is being called a "midsection," part of the base may remain intact since a portion of it has been ground flat on one corner. This may be the original base or an attempt to rework the broken midsection. The fragment measures 3 cm in length between the "base" and a lateral snap near the tip. The blade is 2.1 cm wide at its widest point. The center of each face has been ground extensively to a slightly biconcave surface, much like a fluted point. The center of the blade is only 2 mm thick and the thickness expands to 3 mm near the beveled edges of the blade. Grinding striations in the center of each face run longitudinally. The side margins are formed by evenly beveled edges with grinding striations running in several directions. No incised designs or maker's marks are apparent.

The barbed basal fragment (figure 10.1k) is not a complete base, since the stem has been broken off at the point where the haft was apparently secured. The extent of the haft is evident from a purposeful flattening of the diamond-shaped cross section on the small portion of the stem that is intact. The blade is 3 cm wide at its widest point and 5 mm thick along the central ridge. Corner-notched barbs were formed at an angle of approximately 40 degrees to the longitudinal axis by grinding from both faces. The grinding for the barbs forms uniform notches with straight edges, possibly indicating the use of a metal file. No incised designs such as maker's marks are apparent. The blade edges are sharp and show little beveling in relation to the main faces, suggesting that the edges had not been reworked to any great degree prior to breakage. The breakage is consistent with a bending fracture from impact, resulting in snaps at the end of the haft and through the midsection. While the blade width and form fall within the general range of Alutiiq whaling lances, several factors preclude a definite interpretation

Figure 10.1 Slate Artifacts from the Native Alaskan Neighborhood



a. Unmodified fragment (NAVS-7/31/91-2-L-1: 75S, 20W; 10-20 cm bd). *b.* Unmodified fragment (NAVS-7/31/91-19-L-4: 75S, 16W; 10-20 cm bd). *c.* Unmodified fragment (NAVS-7/6/92-34-L-3: 73S, 1E; SE quad; Level A). *d.* Slate rod (NAVS-6/30/92-12-L-1: 74S, 3E; SE quad; Level A). *e.* Slate rod (NAVS-6/30/92-15-L-1: 124S, 22W; SE quad; Level A). *f.* Blade tip (NAVS-7/1/92-36-L-5: 74S, 2E; SW quad; Level A). *g.* Blade midsection (NAVS-7/8/92-7-L-1: 73S, 1E; 100 cm N, 62 cm E, 42 cm bd). *h.* Slate tablet (NAVS-7/7/92-59-L-1: 72S, 2E; 55 cm N, 36 cm E, 28 cm bd; Level A). *i.* Slate tablet (NAVS-7/3/92-38-L-1: 73S, 3E; 53 cm N, 0 cm E, 31 cm bd; Level A). *j.* Polished tabular fragment (NAVS-8/14/91-73-L-3: 75S, 0E; 30-40 cm bd). *k.* Blade base fragment: surface find by Nancy Walton directly east of the access road and near the center of the NAVS coastal terrace.

(Illustrations by Judith Ogden)

as such. These factors are the unknown length of the tool, the lack of maker's marks, and the slightly more acute angle of the barbs (40 degrees) in comparison to other known specimens. Of the six Alutiiq whaling lances depicted between Clark (1974b) and Heizer (1956:176), the average barb angle is approximately 60 degrees and varies from a right angle to approximately 46 degrees in relation to the longitudinal axis.

Finally, two small rectangular slate tablets and a polished tabular fragment were recovered in the East Central Trench and East Central Area Excavation (72S, 2E; 73S, 3E; 75S, 0E). One slate tablet (figure 10.1i) measures 6 cm x 3 cm and is 3.5 mm thick. Two adjacent side margins are ground smooth and meet at a right angle. A rough break parallel with the longitudinal axis forms a third margin. This break appears to be the result of an intentional saw-and-snap reduction technique, but the saw line is only visible on one face. The fourth margin is broken roughly through the cross section. Both faces of this tablet have been ground smooth. On one face, a slight beveling of one margin suggests that someone may have been attempting to create an edged tool. On the same face, two perpendicular lines have been incised creating four quadrants. One quadrant appears to have been inscribed with a stylus, but the inscription was subsequently scratched out. Another quadrant displays numbers and Russian lettering, but the end of the word is missing due to damage. Alexei Istomin, an anthropological historian from the Russian National Academy of Sciences, examined the tablet and suggests that the inscriptions are the number "43" followed by a "JI" (which transliterates to an English *L*) in Russian script, and portions of another letter or symbol. When the letter *L* is written rather than printed in Cyrillic, it usually comes to a sharp peak. Alexei Istomin's tentative suggestion for the partially broken letter is a "b" or "bl". The remaining two quadrants display a few irregular striations over the polished surface, but nothing is discernible as a particular letter or design. The reverse face of this artifact has two incised lines running perpendicular to the longitudinal axis, but no further markings are apparent.

The second slate tablet (figure 10.1h) is slightly larger, measuring 7 cm x 3.6 cm and is 3 mm thick. It also has a rectangular outline with two margins ground smooth and meeting at a right angle. The other two margins are roughly broken. Both faces have been ground smooth. One face has two parallel lines running with the longitudinal axis. One of these lines is crossed by a short, perpendicular hatch-mark close to a broken margin. Another deeply incised line crosses both of the parallel lines near a right angle, and two other incised lines run across the face at angles of 65/125 degrees and 115/75 degrees to the longitudinal axis, forming an isosceles triangle. The other face of this artifact is relatively smooth with some random deep striations over

the smoothed surface.

The final tabular slate fragment measures 2.6 cm x 1.5 cm and is 1 mm thick. It is broken on all margins and one face displays an unground surface. The opposite face is polished smooth. This appears to be a fragment broken off of a larger polished slate tablet.

DISCUSSION

Worked slate artifacts recovered in the vicinity of the Fort Ross Stockade are limited to tablets, rods, and small fragments ground to a point on one end. No double-edged Alaskan hunting tools were identified here. It is difficult to interpret the slate tools from the Stockade due to their lack of similarity to any known ethnic tool kit. Four of the nine artifacts in question are shaped to points, are less than 4 cm in length, and show no evidence of hafting, with one possible exception. From their design, it seems unlikely that they were intended to be used as projectile points or cutting tools. A possible interpretation is that these were improvised tools for carpentry. This is supported by the close similarity of one of these artifacts to a carpenter's marking pencil (Israel 1968:352). The three other points recovered in this area are similar in size and general form, but are more crudely shaped.

The remaining five slate artifacts from the Stockade appear to be a fragment of a writing tablet, two possible slate rod preforms, a slate rod fragment, and an unworked fragment. The preform and the unworked slate fragment suggest that some slate tools such as rods were being manufactured at the Stockade. In this context, it seems most likely that the rods were writing tools, but this should not be considered definite without corroborating data.

Of the eleven slate objects recovered from NAVS, seven were recovered from the East Central Area Excavation, two others (both unmodified) from the West Central Trench excavation, one slate rod from the South Area Excavation, and the remaining artifact from an isolated surface collection between the West Central Trench and the South Area Excavation. While these differences are not overwhelming, it appears that slate tool and tablet manufacture/deposition was most common in the vicinity of the East Central Area Excavation and least common in the vicinity of the South Area Excavation.

The recovery of ground slate Native Alaskan tools at NAVS and the Farallon Islands is notably sparse in relation to Native Alaskan Contact Period sites in the North Pacific. The lack of slate source material may have much to do with this, but numerous other factors may be influencing the paucity of ground slate at NAVS as well. The infrequency of slate ulus may be due to the limited number of Alutiiq women at Fort Ross, if indeed women primarily used ulus. It would also seem to suggest that the Native Californian women who were

cohabiting with Native Alaskan men were not adopting Alaskan methods of processing food, a point that is elaborated on in chapter 17.

Furthermore, since a large portion of the ground slate hunting tools in Alaska were used for hunting whale, walrus, and sea lion, the paucity of slate end-blades and lances may reflect changes in the methods used to hunt large sea mammals in the Fort Ross Region. A particularly strong argument can be made for the need to devise changes in Alutiiq style whaling at Fort Ross due to the cultural and geographic isolation of the Native Alaskan community there. As Crowell (1994b) has recently surmised for Kodiak Island, Alutiiq whaling was a highly specialized task that was embedded within and reliant upon a complex social system and particular environment. As I have argued elsewhere in detail (Mills 1994), this whaling technology at Fort Ross would have been complicated by the lack of opportunity to retrieve kills from nearby villages, the presence of few deep embayments, the lack of locally available *Aconitum maximum* and slate, the traditional selection of whalers through descent, and the isolation of whalers from the rest of the community.

The one basal fragment that is somewhat similar to a Alutiiq style whaling lance (figure 10.1k) lacks any maker's marks. If this was a lance used for whaling, the lack of maker's marks could be due to the lack of any need to claim the kill, since so few individuals and only one village (NAVS) were involved in whaling. It may also reflect more direct methods of retrieval of the kill. At the very least, the three fragments of double-edged slate blades attest to the continuity of a vestige of traditional Alaskan slate blade technologies in the Fort Ross region in addition to the well-documented continuation of bone dart sea-mammal hunting (see Wake, chapter 11).

One particularly interesting aspect of the slate assemblage at NAVS is the presence of what appear to be writing tablet fragments, one with Russian lettering (figure 10.1i). While the specific purpose of these tablets is unclear, the segmentation of the surface with different entries in each segment may suggest use by *promeshlenniki* or Native Alaskan hunters who were keeping records of hunters' catches or accrued debts. Keeping records on slate while in *baidarkas* would have been much more feasible than attempting to keep records with paper and pen. While it is tempting to infer that slate writing implements at NAVS in combination with slate rods suggest that at least some of the occupants of NAVS were literate, their condition suggests that these tablets were being scavenged from other contexts and reworked into different tools. This observation has also been made for glass and ceramic artifacts at NAVS (Farris, chapter 6; Silliman, chapter 7). Thus, the writing on the tablets may not be indicative of activities carried out by Native Alaskans in the context of their community.

REFERENCES

- Barrett, Samuel A., and E. W. Gifford
1933 *Miwok Material Culture*. Bulletin of the Public Museum of the City of Milwaukee 2(4).
- Baumhoff, M. A.
1976 An Archaeological Study of the Prehistoric Cultural Resources in the Warm Springs Dam and Lake Sonoma Project, Sonoma County, CA. Ms. on file with the National Park Service. Contract #CX8000 S0008.
- Birket-Smith, Kaj
1941 Early Collections from the Pacific Eskimo: Ethnographical Studies. *Nationalmuseets Skrifter Ethnografisk Raekke* 1:121-63. Copenhagen.
- Black, Lydia
1987 Whaling in the Aleutians. *Etudes Inuit* 11(2):7-50.
- Clark, Donald W.
1964 Incised Figurine Tablets from Kodiak, Alaska. *Arctic Anthropology* vol. 2(1):118-34.

1974a *Koniag Prehistory: Archaeological Investigations at Late Prehistoric Sites on Kodiak Island, Alaska*. Tubinger Monographien zur Urgeschichte, vol. 1. Verlagsort: Stuttgart, Germany.

1974b *Contributions to the Later Prehistory of Kodiak Island, Alaska*. National Museum of Man Series, Archaeological Survey of Canada, Paper no. 20. Ottawa.

1984 Prehistory of the Pacific Eskimo Region. In *Arctic*, edited by David Damas, *Handbook of North American Indians*, 5:136-48. Smithsonian Institution Press, Washington DC.
- Crowell, Aron
1988 Prehistory of Alaska's Pacific Coast. In *Crossroads of Continents*, pp. 130-40, edited by W. Fitzhugh and A. Crowell, Smithsonian Institution Press, Washington DC.

1994a World System Archaeology at Three Saints Harbor, An 18th Century Russian Fur Trade Site on Kodiak Island, Alaska. Ph.D. dissertation, Department of Anthropology, University of California, Berkeley.

1994b Koniag Eskimo Poisoned-Dart Whaling. In *Anthropology of the North Pacific Rim*, edited by W. Fitzhugh and Valerie Chaussonet, pp. 217-42. Smithsonian Institution Press, Washington DC.
- de Laguna, Frederica
1934 *The Archaeology of Cook Inlet, Alaska*. Reprinted in 1975, Alaska Historical Society, Anchorage. 1956 Chugach Prehistory: The Archaeology of Prince William Sound, Alaska. *University of Washington Publications in Anthropology* 13, Seattle.
- Dumond, Don E.
1984 Prehistory of the Bering Sea Region. In *Arctic*, edited by David Damas, *Handbook of North American Indians*, 5:94-105. Smithsonian Institution, Washington DC.

- Dyson, George
1986 *Baidarka*. Alaska Northwest Books, Anchorage.
- Elsasser, Albert B.
1978 Development of Regional Prehistoric Cultures. In *California*, edited by R. Heizer. *Handbook of North American Indians*, vol. 8. Smithsonian Institution Press, Washington DC.
- Gideon, Hiermonk
1989 *Hiermonk Gideon: An Orthodox Missionary in Alaska, 1803-1807*, translated and edited by L. Black. Limestone Press, Kingston, Ontario.
- Gurke, Karl
n. d. Excavations at Fort Ross. Manuscript on file, Fort Ross State Historic Park, Fort Ross, CA.
- Harritt, Roger K.
1988 *The Late Prehistory of the Brooks River, Alaska*. University of Oregon Anthropological Papers, no. 38, Eugene, Oregon.
- Heizer, Robert F.
1943 Aconite Poison Whaling in Asia and America: an Aleutian Transfer to the New World. *Anthropological Papers 24, Bureau of American Ethnology Bulletin* 133:415-68, Washington DC.
1949 The Archaeology of Central California I: the Early Horizon. *University of California Anthropological Records* 12(1):1-84.
1952 Incised Slate Figurines from Kodiak Island, Alaska. *American Antiquity* 17(3):266.
1956 *Archaeology of the Uyak Site, Kodiak Island, Alaska*. University of California Anthropological Records:17(1).
- Hobler, Philip M.
1990 Prehistory of the Central Coast of British Columbia. In *Northwest Coast*, edited by Wayne Suttles, *Handbook of North American Indians*, 7:298-305.
- Israel, Fred L. (editor)
1968 *1897 Sears Roebuck Catalogue*. Chelsea House Publishers, New York.
- Jochelson, Waldemar
1925 *Archaeological Investigations in the Aleutian Islands*. Carnegie Institution, Washington DC.
- Jordan, Richard H., and Richard A. Knecht
1988 Archaeological Research on Western Kodiak Island, Alaska: the Development of Koniag Culture. In *Aurora: The Late Prehistoric Development of Alaska's Native People*, edited by Robert Shaw, Roger Harritt, Don Dumond. Alaska Anthropological Association Monograph Series No. 4.
- Kittlitz, Friedrich Heinrich Baron Von
1987 *Denkwürdigkeiten einer Reis nach dem russischen America*, translated by J. Moessner. In *A Voyage Around the World 1826-1829 by F. P. Lutke*. Alaska History no. 29. Limestone Press, Kingston, Ontario.
- Knecht, R. A., and R. H. Jordan
1985 Nunakakhnak: an Historic Period Koniag Village in Karluk, Kodiak Island, Alaska. *Arctic Anthropology* 22(2):17-35.
- Lantis, Margaret
1938 The Alaskan Whale Cult and its Affinities. *American Anthropologist* 40:438-64.
1940 Note on Alaskan Whale Cult and its Affinities. *American Anthropologist* 42:366-68.
- Layton, Thomas N.
1990 *Western Pomo Prehistory*. Monograph 32, Institute of Archaeology, University of California, Los Angeles.
- Lightfoot, K., Wake, T., and Schiff, A.
1991 *The Archaeology and Ethnohistory of Fort Ross, California: Volume 1, Introduction*. Contributions of the University of California Archaeological Research Facility, no. 49. Berkeley.
- Michael, Henry (editor)
1967 Lieutenant Zagoskin's Travels in Russian America, 1842-1844. *Arctic Institute of North America Anthropology of the North: Translations from Russian Sources no. 7*, Toronto.
- Mills, Peter R.
1994 Alaskan Hunting Technologies and Cultural Accommodation at Fort Ross (1812-1841), California. *Proceedings of the Society for California Archaeology* 7:33-40.
- Oswalt, Wendell H.
1980 *Kolmakovskiy Redoubt: The Ethnoarchaeology of a Russian Fort in Alaska*. Institute of Archaeology, vol. 8. Los Angeles.
- Page, B. M.
1966 Geology of the Coast Ranges of California. In *Geology of Northern California*, edited by E. H. Bailey, pp. 255-76. *California Division of Mines and Geology Bulletin* 190.
- Petroski, Henry
1990 *The Pencil: a History of Design and Circumstance*. Alfred Knopf, New York.
- Riddell, Francis A.
1955 *Archaeological Investigations on the Farallon Islands, California*. Reports of the University of California Archaeological Survey, no. 34. Berkeley.
- Rousselot, Jean Loup, William Fitzhugh, and Aron Crowell
1988 Maritime Economies in the North Pacific Rim. In *Crossroads of Continents*, edited by W. Fitzhugh, and Aron Crowell, pp. 151-72. Smithsonian Institution Press, Washington DC.

Shaw, Robert, Roger K. Harritt, and Don E. Dumond (editors)
1988 *Aurora: The Late Prehistoric Development of
Alaska's Native People*. Alaska Anthropological Association
Monograph Series no. 4.

Treganza, Adan E.
1954 Fort Ross: A Study in Historical Archaeology.
*Reports of the University of California Archaeological
Survey* 23:1-26.

Bone Artifacts and Tool Production in the Native Alaskan Neighborhood

THOMAS A. WAKE

BONE TOOLS AND WORKED BONE ARTIFACTS are one of the more intriguing artifact classes recovered in the Native Alaskan Neighborhood. Bone tools and artifacts represent, from one perspective, the ultimate stage in the exploitation of vertebrates as resources, since these tools were often used to capture more of the species from which they were made. This chapter describes and analyzes the bone artifacts recovered from both the Native Alaskan Village Site (NAVS) and the Fort Ross Beach Site (FRBS).

Tools and ornaments made of bone were important aspects of the material culture of both Native Alaskans and Native Californians. The wide variety of artifacts made from bone in both Alaska and California includes fishing and hunting implements, utilitarian items, manufacturing implements, and ornaments. Several examples of these kinds of implements have been found in the Native Alaskan Neighborhood.

Many of the bone artifact types made by these two Native American groups, such as the hunting and fishing implements and bone ornaments, have stylistic attributes that allow them to be assigned to a particular ethnic group or time period (Bennyhoff 1950, 1994; Birket-Smith 1953; Clark 1974a, 1974b; Gifford 1940; Heizer 1956; Jochelson 1925). The utilitarian and manufacturing implements such as awls, containers, wedges, and flakers are usually more functional and generalized, and therefore more difficult to assign to a given ethnic group or time period (Bennyhoff 1950; Gifford 1940).

Assignment of the bone artifacts from the Neighborhood to a specific time period is a relatively moot point, however. It is almost certain that these bone artifacts were deposited in the sites discussed here during the Russian occupation of Ross, somewhere between 1812 and 1841. It will be seen that the stylistic attributes of

these artifacts do indeed correspond to contact period and early postcontact period examples from California, Alaska, and the Kurile Islands (Bennyhoff 1950, 1994; Clark 1974a, 1974b; Gifford 1940; Heizer 1956; Hrdlicka 1944; Riddell 1955; Shubin 1990).

The determination of the cultural affiliation of bone artifacts from the Neighborhood is a much more interesting problem. It is well known that local Kashaya Pomo, Southern Pomo, Central Pomo, and Coast Miwok women lived with Native Alaskan men in interethnic households in the Neighborhood (Istomen 1992; Khlebnikov 1976, 1990; Lightfoot et al. 1991, 1993, chapter 1). Bone artifacts were integral parts of the material culture of both broad ethnic groups, the Native Californians and the Native Alaskans. Therefore, it should not be unusual to find bone artifacts belonging to both cultural traditions in the assemblage from the Neighborhood.

In fact, a number of bone artifacts recovered bear stylistic attributes that allow relatively clear identification of their respective cultural origins or identities (Bennyhoff 1950, 1994; Birket-Smith 1953; Clark 1974a, 1974b; Gifford 1940; Heizer 1956; Hrdlicka 1944; Jochelson 1925; Liapunova 1975; Riddell 1955; Shubin 1990). Other bone artifacts recovered at Ross have less well-defined cultural affiliations. When analyzed as a complete assemblage, however, most of these individual artifacts can be classified as belonging to one cultural tradition or the other. Nonetheless, some of the bone artifacts in this assemblage may be found in either cultural tradition. Evidence of modification of cultural traditions in the bone artifact assemblage is represented by the use of metal manufacturing tools. Cultural affiliation of these bone artifacts is assigned, wherever possible, and discussed below.

Many of the bone artifacts in this assemblage appear

to be the result of continuing on-site production of bone tools. Little has been written on the subject of Native American bone tool production techniques or technology (Johnson 1983, 1985, 1989; Miller 1989). Even less is known about bone tool production and technology in interethnic contact-period coastal archaeological sites. Artifacts are assigned to categories representing different stages in the bone tool production sequence.

A total of 836 worked bone artifacts have been recovered from the Fort Ross Beach Site and the Native Alaskan Village Site. A wide variety of tool types, forms, and stages of production can be seen in this assemblage. The complete and broken finished tools and ornaments (n=85) are described below, as are worked bone objects indicative of various stages of implement production. The vast majority (n=751) of worked bone artifacts recovered from these excavations are clearly culturally modified but are relatively amorphous bits and flakes of bone that defy classification as formal tool types. This does not mean that they cannot be classified as artifacts, however. They are classed as waste flakes, worked splinters, and worked chunks of bone and are described below. Appendix 11.1 provides additional detail on the bone artifacts from the Native Alaskan Neighborhood.

DIAGNOSTIC BONE IMPLEMENTS

A total of 85 identifiable worked bone artifacts have been recovered from FRBS and NAVS. The majority of diagnostic bone implements from these sites relate in some way to marine mammal hunting (n=28) or fishing (n=15). There are also a number (n=15) of utilitarian objects such as buttons, awls, and fasteners. Many of the diagnostic bone artifacts (n=30) from these sites are associated with personal adornment, such as plain and incised bird bone tubes and bone buttons.

MARINE MAMMAL HUNTING IMPLEMENTS

Marine mammal hunting was of paramount importance at Ross. Fully 36% of the diagnostic bone artifacts recovered from FRBS and NAVS are designed for this practice. The marine mammal hunting implement assemblage consists of 18 varied projectile points and point fragments, 6 dart socket pieces and socket piece fragments, 3 finger rests, and 1 possible dart hindshaft.

Thirteen of the eighteen recovered carved bone projectile points, point bases, and point fragments are specifically associated with sea otter hunting. Three projectile point fragments are associated with seal hunting. One long slender point may be associated with sea urchin gathering.

Projectile Points: Large Dart Points

Three small fragments of large dart points have been recovered from NAVS. None were encountered at FRBS. These artifact fragments are too small to be diagnostic,

but, even as fragments, they are too large for sea otter darts or harpoon arrows. All of these artifacts are suggestive of parts of harpoon heads used in seal hunting (Birket-Smith 1953; Clark 1974a, 1974b; Heizer 1956; Jochelson 1925; Shubin 1990).

One dart point fragment is a burned, calcined distal barb from a good sized point (NAVS-7/13/92-53-WB-1) (Wake 1995, figure 5.1a). This fragment is really too small to be truly diagnostic. It is unilaterally barbed. The height of the barb from the body of the point indicates that the space between the distal barb and the next, more proximal barb, and probably any other barbs was considerable. Large spaces between barb bases indicate a point of relatively large size, probably a sealing point (Jochelson 1925:53-54).

Another large dart point fragment appears to be a harpoon point base with part of a line hole (NAVS-7/13/92-85-WB-1) (Wake 1995, figure 5.1b). The base has broken off at the level of the line hole. No barbs or other portions of the point were found. The base is finely carved with metal tools and tapers to a narrow, round tip with a flat end. The line hole is bi-conical and relatively wide. This base is reminiscent of harpoon bases illustrated by Clark (1974a:plate 18c) and Heizer (1956:plate 57a-e). This base probably was designed to fit into the socketed bone foreshaft of a sealing spear. It is not likely that a point of this one's probable size was used with throwing boards. It is more likely that it was propelled by hand or possibly by a finger rest (Heizer 1956:194, plate 80p-s).

The last large dart point specimen is a base fragment (NAVS-7/15/92-35-WB-1) (Wake 1995, figure 5.1c). This fragment is a portion of the lateral shoulder of the basal, male end of a point that would fit into the socketed end of a bone foreshaft. This artifact is finely finished and compares favorably to points from Uyak Bay illustrated in Heizer (1956:169, plate 55k, l, p-s).

Projectile Points: Small Dart Points

Ten small dart points and point fragments have been recovered from NAVS and FRBS. These points are specifically associated with sea otter hunting, usually from skin boats (*baidarkas*) (Jochelson 1925:53; Ogden 1941:12; Scammon 1874). All of these dart points were typically fitted snugly into bone socket pieces, which were in turn attached to wood mainshafts and propelled from throwing boards. The points were designed to detach from the socket piece once they had penetrated a mammal's skin. The point, the mainshaft, and the hunter were all linked together by a series of lines to facilitate retrieval of the otter. Once the animal was hauled back to the boat, it was typically killed with a club.

The most common carved bone projectile point type encountered in the Native Alaskan Neighborhood is symmetrical and bilaterally barbed. The pointed barbs

project backwards. The tip and barb region is connected by a short, undecorated shaft to a finished, expanded, tapering base (figure 11.1a-c). The base is designed to be inserted into a socket at the distal end of a carved bone foreshaft (see Jochelson 1925:55, text-figure 7; Liapunova 1975:80, plate 6: # 3, plate 7: #'s 1, 2). I call projectile points having the attributes outlined above the type one (type 1) series.

The tips of all three relatively complete points are missing. It is probable that a single, smaller, unilateral barb may have been close to the tips of these points, and have been broken off during use. All three points have attributes indicative of a single unilateral distal barb as a part of the missing tips. Each point has one finely finished sharp-edged side moving from the proximal barb to the missing tip. The other side of each point has a sharp edge near the proximal barb, however, this edge is carved down, dulled, widened, and slightly indented closer to the other side of the missing tip area. This attribute is characteristic of indentations forming the second, smaller, unilateral barb on points illustrated by Heizer (1956:57-58, table 24, figure 35f, plate 55e, f), Jochelson (1925:55, text-figure 7, plate 24: #'s 13-15, 23, 24, 26), Liapunova (1975:80, plate 6: # 3, plate 7: #'s 1, 2), Riddell (1955:18, figures b, c), and Shubin (1990:447, figure 8: #'s 11-16).

One clear example of a small dart point of this type (type 1 series) came from NAVS (NAVS-7/8/92-40-WB-1). It is a midsection of a relatively small asymmetrical bilaterally barbed point, missing the base and the very tip. The two basal barbs are equally sized, and a smaller barb lies on one side of the point, closer to the tip.

There are three varieties of bases associated with the type 1 small dart points at FRBS and NAVS. The most common base type (type 1a; figure 11.1a) of which there are four examples (NAVS-7/7/92-19-WB-1, NAVS-7/13/92-41-WB-1, NAVS-7/14/92-67-WB-1, NAVS-8/6/91-45-W-1) (Wake 1995, figure 5.1e-h), is a simple, undecorated, expanded base, which tapers gradually in a distal to proximal direction, and has a finished, flat surface at the very proximal end. One example has a base similar to 1a, (FRBS-6/22/88-14-WB-1, figure 11.1b), but has a curved distal to proximal taper, and an expanded ring running around the widest, distal-most portion of the base. I refer to this point as type 1b. There is also one example of a very simple, contracting base which is essentially a short, conical taper at the proximal end of the point's shaft (NAVS-7/14/92-63-WB-1, figure 11.1c). I call this point, type 1c.

The lone example of type 1c is an interesting specimen. Crudely carved, it has a very simple base yet seems entirely functional. On one side of this point the actual cortex of the bone is still visible. The medullary cavity and portions of buttressing cancellous tissue are still visible on the other side of this point. The very tip of the point and almost certainly the smaller unilateral distal

barb, has been broken off. It appears that a minimum of artistic effort was spent in the manufacture of this point, especially when compared to types 1a and 1b from Ross.

Points of this general type 1 series are described and illustrated in Heizer (1956:57-58, table 24, figure 35d, e, f, plate: 55d, e, f, l). Heizer calls these kinds of points type 1b small (1956:57-58, table 24). According to him, this type of point has a "... simple expanded base, no line hole, bilateral barbs, simple tip, ... [and a] length under 10 cm."

Waldemar Jochelson (1925:55, text-figure 7, plate 24: #'s 13-26, 28, 31, 43, 50, plate 25: #'s 2, 26) provides a description of a generalized Unangas sea otter harpoon, or dart, propelled by a throwing board and the carved bone accouterments associated with it, including projectile points remarkably similar to type 1 series found at NAVS and FRBS. He first describes the basic types of Unangas harpoons.

Harpoons are called throwing-arrows or spears when the pointed head fits loosely into the socket of the foreshaft of the weapon and is detached from it when it strikes the animal, remaining in the wound. There are 2 main types of harpoons: (1) a simple harpoon, with a head that retains its original position after striking an animal; (2) a compound or toggle-headed harpoon in which the head assumes a transverse position when an obstruction is encountered (Jochelson 1925:53).

He then goes on to describe the type of harpoon with which we are primarily concerned in this assemblage, the simple harpoon.

The simple Aleut harpoon ... usually consists of four parts: ... [a] shaft, ... bone foreshaft, ... [and a] bone head ... with pointed barbs projecting backward. The barbed head is loosely fitted into a socket at the end of the foreshaft and when the animal is struck, it pulls out of the foreshaft. ... One end of the line is attached to the neck of the head between the point and the barbs or fastened into a line-hole of the barbed head. [The last part] is a line of braided sinew ... attached to the neck of the head between the point and the barbs or fastened into a line-hole of the barbed head. (Jochelson 1925:53).

R. G. Liapunova (1975:80, plate 6: #3, plate 7: #'s 1, 2) describes and illustrates harpoons and projectile points from the Aleutian Islands very similar to those Jochelson (1925) discusses. Fitzhugh and Crowell (1988:52, figure 52, p. 160, figure 194a) provide photographs of an Unangas sea otter dart which has a bone foreshaft and a small asymmetrical bilaterally barbed point with two barbs on one side and one on the other.

Scammon (1874:175) provides a detailed illustration of an "Aleutian Islander's sea-otter spear" and spear head. The dart point is classically Aleutian with two small barbs on one side and one larger barb on the other,

a long pointed tip, a narrow neck, and an expanded base.

Kaj Birket-Smith (1953:28, figure 9) describes similar points from Prince William Sound:

The sea otter harpoon was about 125 cm long, with a barbed head made of the bone of the black bear, and a heavy socket piece also of bone. It was thrown by means of a throwing board. A harpoon from Nuchek . . . is probably a sea otter harpoon (fig. 9). It has a bone head with two barbs on one side and one on the other . . . (Birket-Smith 1953:28).

Fritz Riddell (1955:5, plate 1b, c) describes two "bilaterally barbed bone point[s] . . . [which have] . . . a single barb on one side, and two on the other" that he recovered during his excavations on South Farallon Island (CA-SFR-1) in 1949. He adds that:

Barbed points of this type are identical to those found on Amaknak Island in the Aleutians by Jochelson (1924 *sic* [1925], p. 84, plate 24). Also identical to the South Farallon points are several specimens from atlatl darts, including 2-19342, which are catalogued as coming from Kodiak or the Aleutian Islands. Another identical specimen, UCMA 2-1761, is catalogued as coming from Unalaska, in the Aleutians. . . . It seems from the foregoing evidence, that the two bilaterally barbed bone points recovered from excavations at South Farallon could have been made by either Koniags, or by Aleuts (Riddell 1955:5).

Riddell is probably correct in his assessment of the origins of the bilaterally barbed bone points he recovered from South Farallon. The same can be said for the bilaterally barbed bone points and bases recovered from the Native Alaskan Neighborhood. According to Jochelson (1925:53) these small harpoon points would be termed *saxsi'dax'* by Aleutian speakers. They would be found on simple harpoons known as *ayu'kdax'*, and used only from skin boats in the water, propelled by throwing boards. They probably have similar functions but somewhat different names amongst the Alutiiq speaking Alutii. No dart points similar to these are found in California (Bennyhoff 1950; Gifford 1940).

Projectile Points: Miniature Dart Point

One miniature dart point was recovered from NAVS, unit 120S, 26W (NAVS-7/13/92-66-WB-1, figure 11.1d). This complete artifact measures 21.8 mm in overall length. The miniature point is relatively simple, symmetrical, and bilaterally barbed, with one barb on either side. It has a plain expanded base, similar to the larger type 1a bases described above, and a narrow shaft. It is complete, somewhat eroded, and has what may be the remains of a small hole at the base. Judging by its small size, this point is probably not functional. It may be a toy, or perhaps a model. Its real purpose is elusive, but the apparent remains of a small hole near the base suggest that this object may have been a pendant or

amulet of some sort. It is very similar in form to points illustrated in Heizer (1956:196, plate 82k) and Jochelson (1925:84, plate 24: #'s 25, 43), but much smaller.

Projectile Points: Harpoon Arrow Points

Two examples of harpoon arrow points have been recovered from FRBS. No recognizable arrow points have been recovered from NAVS to date. One of the FRBS harpoon arrow points is relatively complete, missing only the very tip, with a line hole near the base. The other arrow point example is a midsection fragment.

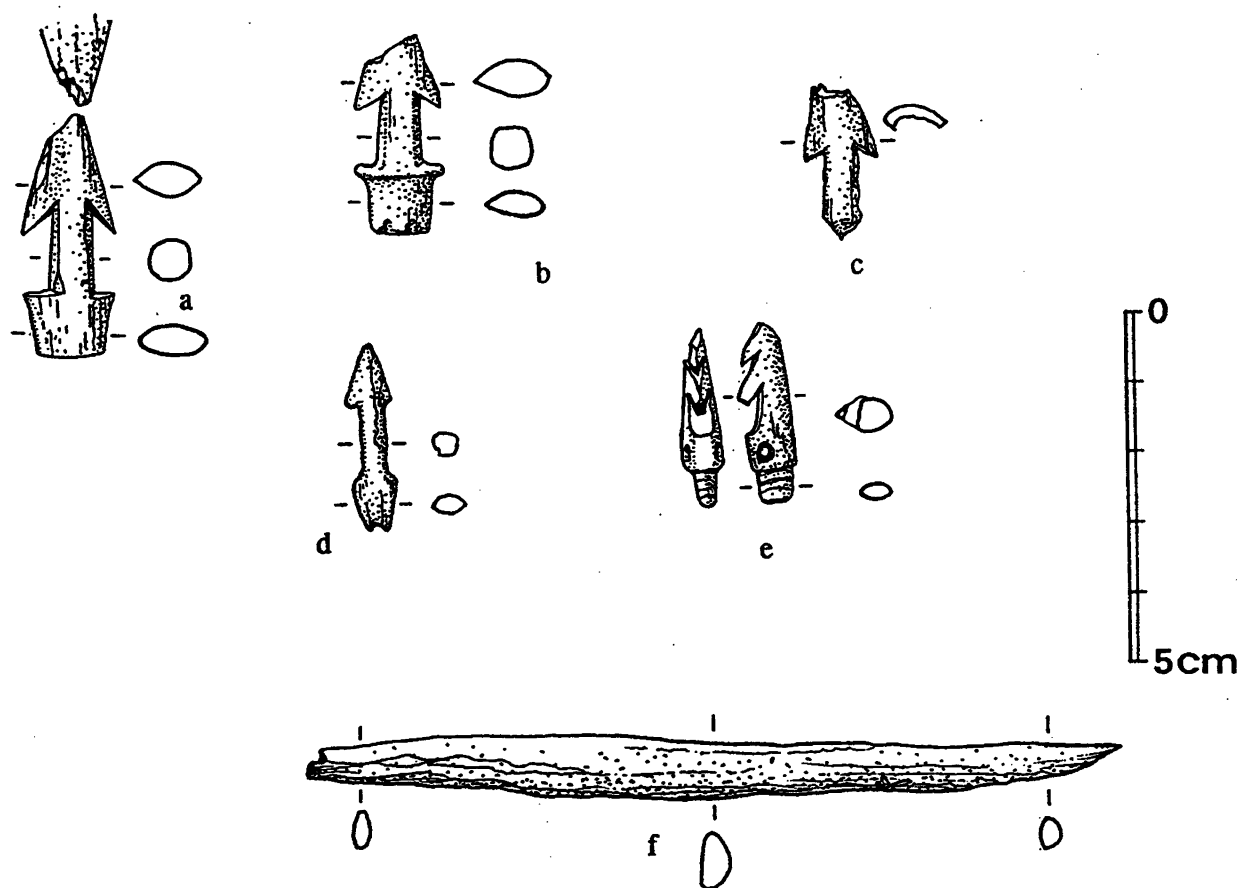
The relatively complete arrow point is small, unilaterally barbed, missing the last smallest barb, with a complete base (FRBS-6/23/88-1-WB-1, figure 11.1e). The point is more or less lozenge-shaped in cross section. The base consists of a finely carved, short, slightly tapering male projection approximately half the diameter of the un-barbed portion of the point associated with the line hole. This projection would fit nicely into the socket of the bone foreshaft of the actual arrow. The line hole lies between the base and the barbed portion of the point. This hole typically has a slim line tied through it, attaching the point to the body of the arrow. This harpoon arrow point is remarkably similar to examples illustrated by Birket-Smith (1953:31, figure 12), De Laguna 1972:1026, plate 109), Fitzhugh and Crowell (1988:72:figure 76), and Heizer (1956:176, plate 62a-e).

The second arrow point example, a midsection fragment (FRBS-6/8/89-6-WB-1), is markedly lozenge-shaped in cross section and has one complete barb and the proximal portion of another. This specimen is not as diagnostic as the one described above. It compares favorably to examples illustrated by Birket-Smith (1953:31, figure 12), Fitzhugh and Crowell (1988:72:figure 76), and Heizer (1956:176, plate 62a-e), however.

Harpoon arrow points such as these are specifically associated with sea otter hunting (Birket-Smith 1953:30; Fitzhugh and Crowell 1988:72, figure 76 caption; Rousselot et al. 1988:161). Jean-Loup Rousselot et al. (1988:161) state that "the use of harpoon arrows required two man kayaks in which the stern paddler stabilized the boat while the bowman shot." Kaj Birket-Smith (1953:28) remarks that "when bows and arrows were employed, both hunters in the baidarka had their own bows, whereas the arrows were carried in a common wooden quiver placed between them on top of the baidarka." The importance of two-person boats cannot be overlooked here; the boat must be stabilized in order for arrows to be effective. No projectile points similar to these are found in California (Bennyhoff 1950; Gifford 1940).

Projectile Points: Miscellaneous

Two other bone projectile points have been recovered from the Neighborhood. One is a simple, well-carved, pointed projectile point tip (FRBS-6/16/89-24-

Figure 11.1 *Bone Projectile Points from the Native Alaskan Neighborhood*

a. Type 1a small dart point, tip missing (NAVS-7/7/92-19-WB-1). b. Type 1b small dart point, tip missing (FRBS-6/22/88-14-WB-1). c. Type 1c small dart point, tip missing (NAVS-7/14/92-63-WB-1). d. Miniature dart point, possible hole remnant at base (NAVS-7/13/92-66-WB-1). e. Unilaterally barbed harpoon arrow point, with socket insert and line hole, tip missing (FRBS-6/23/88-1-WB-1). f. Unbarbed point, possible sea urchin or fish spear (FRBS-6/30/88-68-WB-1).

Illustrations by Judith Odgen.

WB-1). It has no base or barbs and is therefore relatively undiagnostic. It compares favorably to bone projectile point tips illustrated in Clark (1974a, 1974b), Heizer (1956), and Jochelson (1925).

The other point was recovered from the East Bench at FRBS (FRBS-6/30/88-68-WB-1, figure 11.1f). This long, slender, un-barbed point is finely finished with metal tools over its entire surface. The tip is very sharp and pointed. The base is narrower than the midsection, and the very end is squared off. This object may not be a marine mammal hunting device, although it is clearly some kind of projectile point. If it were curved and barbed, then it would be classed as a bird dart by Jochelson (1925) and Heizer (1956). However, it is quite smooth. It could be classed as an awl of some sort, but it seems too slender, and the base is uncomfortable to hold as an awl. This object most resembles an artifact illustrated by Jochelson (1925:84, plate 24) and described as a:

bone prong of an implement by which sea urchins

were obtained from the water. This implement was called *cuniga'six'* and consisted of a long shaft to the end of which four circular bone prongs (*cuniga'sim agatu'*, i.e. tooth of the implement, *cuniga'six'*) were tied (Jochelson 1925:84, figure 33 caption).

Sea urchin tests and spines are a major constituent in the midden areas of NAVS (see chapter 15). They appear to have been an exploited and perhaps important food source in the Neighborhood. They were certainly important food sources in the Aleutians. Jochelson (1925:104-107) discusses the abundance of "*echini*" at the sites he investigated and the importance of sea urchins as food in the Aleutian Islands. This pointed bone object may be a portion of a *cuniga'six'* used at Ross.

HARPOON SHAFT PIECES

Ten of the 28 carved bone marine mammal hunting implements are various shaft elements designed to

deliver the barbed points to the target. Six of these specimens are socket pieces or socket piece fragments. Three specimens are classed as finger rests, one tentatively. One specimen appears to be a hindshaft for an arrow or dart.

Harpoons: Socket Pieces

One complete, unfinished socket piece has been recovered from NAVS. The proximal half of another socket piece with its lashing tangs was recovered from FRBS. The four remaining fragments, two distal socket end fragments and two proximal lashing tangs, were recovered from NAVS.

The most complete example of a carved bone socket piece from the Neighborhood is from the South Trench of NAVS, unit 121S, 26W (NAVS-7/17/92-2-WB-1, plate 11.1a). This specimen, made of whale bone, is beautifully carved and smoothed and in its final stages of production prior to actual use. It lacks the socket hole in the distal end, and the lashing tangs are not yet completed. It also has what appears to be carnivore gnawing damage close to its proximal end on one side of the shaft. It is possible that this artifact was unhappily discarded due to that damage.

The socket piece recovered from FRBS (P15, Middle Profile) is incomplete and has some excavation damage (FRBS-6/26/88-6-WB-1, plate 11.1b). It is finely carved, smoothed, and made of whalebone like the specimens from NAVS. Obviously, considerable time and effort went into its production. Its two lashing tangs appear to have been broken off post-depositionally. This specimen may have been discarded after its use-life had ended.

The two more complete socket piece specimens are relatively small in diameter, and relatively long in length. Their small diameters indicate a mainshaft with a relatively small diameter, such as those found in sea otter darts or darts propelled by throwing boards. These two specimens are very reminiscent of specimens illustrated in Clark (1974a:215, plate 19k, l), De Laguna (1975:plate 56: # 1), Fitzhugh and Crowell (1988:figure 52, figure 194c), Heizer (1956:166, plate 52h, i), Jochelson (1925:80, plate 23: #'s 20-23, 88; plate 26: # 16), and Shubin (1990:448, figure 9: # 1). Heizer (1956:55) refers to this kind of socket piece as type 1a, "long and heavy, one-piece, with round or ovoid closed socket and bifurcated base." Relatively light bone foreshafts or socket pieces such as these, known as *tumga'kix* among the Unangan, are commonly associated with sea otter hunting (Jochelson 1925:53)

Two examples of distal foreshaft fragments have been recovered from adjoining units 125S, 23W (NAVS-8/12/91-88-WB-1) and 125S, 24W (NAVS-8/8/91-2-WB-1) at NAVS (plate 11.1c). They are finely carved and finished, and made of whalebone. These two fragments conjoin to form a nearly complete distal socket piece fragment.

The distal socket piece fragment, with an estimated diameter of 5 cm, comes from a somewhat larger and more robust foreshaft than the two more complete specimens. The fragment includes portions of a finely finished, rounded and smoothed lip which verges into the socket quite abruptly. It is reminiscent of bone foreshafts illustrated in Jochelson (1925:80, plate 23: # 24), Heizer (1956:166, plate 52m, 167, plate 53h), Fitzhugh and Crowell (1988:160, figure 194c) and Clark (1974a:215, plate 19q). These kinds of socket pieces are typically associated with the hunting of prey larger than sea otters, such as seals.

Two socket piece lashing tangs have been recovered from NAVS (plate 11.1d, e) (see Clark 1974a:215, plate 19k, l; Fitzhugh and Crowell 1988, figure 52, figure 194c; Heizer 1956:166, plate 52h, i; Jochelson 1925:80, plate 23: #'s 20-23, 88, plate 26: # 16; and Shubin 1990:448, figure 9, # 1, for illustrations of socket pieces with similar lashing tangs). Socket piece lashing tangs are projections at the bifurcated proximal end of the shaft designed to overlap the distal end of the mainshaft. This overlapping area is then firmly lashed together (Jochelson 1925:53). Both specimens appear to have broken off from the main socket piece shaft near the base of the tang. They are well finished, with smooth surfaces. The interior surface is flat, while the exterior is half round. Each specimen (NAVS-6/30/92-11-WB-1 and NAVS-7/3/92-23-WB-1, plate 11.1 d, e) is wider near the base and tapers slightly toward the distal end. Both specimens are made of whalebone. It is likely that these tangs were broken in use.

Harpoons: Finger Rests

Of the three harpoon finger rests from NAVS, one is complete and one is a burned proximal fragment. Finger rests are small carved bone, hooked projections lashed to the mainshafts of harpoons. They provide a point of purchase to impel greater force to hand cast harpoons (Heizer 1965:56). The complete specimen was recovered from unit 120S, 26W (NAVS-7/10/92-123-WB-1, figure 11.2a, plate 11.1f). It is wider at the base than the tip, with a slight convexity on the basal surface that lies against the mainshaft. One surface of the object is hooked to accept the curvature of a finger. A single lashing hole perforates the finger rest close to its base.

The other finger rest is a burned base fragment with a portion of the lashing hole. This specimen was recovered from unit 73S, 1E (NAVS-7/8/92-20-WB-1, plate 11.1g). It is very similar in aspect to the complete finger rest described above, also having a slight convexity on the basal surface, to attach more effectively to the harpoon's mainshaft.

Both specimens recovered from NAVS bear a great deal of resemblance to finger rests illustrated by Heizer (1956:194, plate 80p-s). Heizer (1956:57) states that harpoon finger rests similar to those from Uyak Bay have

a wide distribution, both temporally and spatially. No finger rests are illustrated by Jochelson (1925).

A small (25 mm in length), perforated bone object was recovered from NAVS, unit 125S, 21W (NAVS-8/7/91-6-WB-1, plate 11.1h). This object is noteworthy since it is well finished and a product of detailed carving. It has a low rounded knob at one end. The other, wider end is perforated by an interesting triangular hole. It is postulated that this object may also be some sort of fastener (Aron Crowell, personal communication 1993), or more likely, a harpoon finger rest.

Harpoons: Hindshaft

One decorated worked bone shaft fragment recovered from NAVS, unit 125S, 20W (NAVS-8/6/91-22-WB; figure 11.2b, plate 11.1i) was problematic. The finished end has a steep bevel at roughly a 40° angle. The center of the bevel at the end of the shaft has a shallow indentation. This shaft is decorated with two sets of two parallel incisions, or bands. One band is close to the beveled end of the shaft. The other band is close to the broken end of the shaft.

The broken end of the shaft may have continued into a narrower tapering projection for insertion into a mainshaft. The indentation in the center of the beveled end of the shaft would fit quite nicely onto the ivory or bone nubs found in many Alaskan throwing boards. Heizer (1956:57, plate 54e) describes what may be a "harpoon butt-piece" from Uyak Bay, Kodiak, Alaska.

FISHING IMPLEMENTS

Fifteen of the 85 diagnostic bone artifacts from NAVS and FRBS are fishing implements. Thirteen of these artifacts are portions of two-piece composite fishhooks, including barbs, shanks, and bases. Two of these artifacts are basal parts of fish spear prongs.

Fishhooks

The most common fishing implements recovered from the Native Alaskan Neighborhood are portions of fishhooks. All of the parts come from two-piece composite fishhooks used throughout the Northwest Coast and Alaska. These hooks consist of two main parts, a relatively short barbed portion and a longer, curved shank. The section with the barb often has a lashing bevel on one side of the proximal portion, a slight curve, and may have more than one barb carved into it. The shank is usually at least twice as long as the barb, with a stronger curve. Shanks often have a bevel or slot at the distal end for lashing to the barb, and a carved knob at the proximal end where the hook is tied to the line. No one-piece bone fishhooks are known from Ross.

Fish Hook Barbs

Three complete and parts of five other fish hook barb sections have been recovered from the Neighborhood.

The three most complete barbs are all very similar to each other. All of them have one mid-sized barb at the very distal end of the shaft. The largest specimen (NAVS-7/14/92-17-WB-1, figure 11.3a) is also the simplest. It has a relatively high barb, a straight shaft, and little basal modification. Another specimen (FRBS-6/13/89-5-WB-1, figure 11.3b) is actually missing its base. This specimen has a straight shaft and a finely carved barb at its tip. The smallest specimen (NAVS-7/1/92-35-WB-1, figure 11.3c) is also the best preserved. It has a relatively low barb, a bevel on one side of the base, and an overall slight curve.

The fourth barb section is fragmentary, missing only its tip (NAVS-8/12/91-21-WB-1, figure 11.3d). The very base of a barb element is visible at the tip of this specimen. The base is complete, and has a flattened bevel on one side. Three other fish hook barb pieces are basal fragments with bevels on one side of the shaft. One of them is burned and has a flattened bevel on one side. The other two are more questionable and appear to be barb shaft fragments.

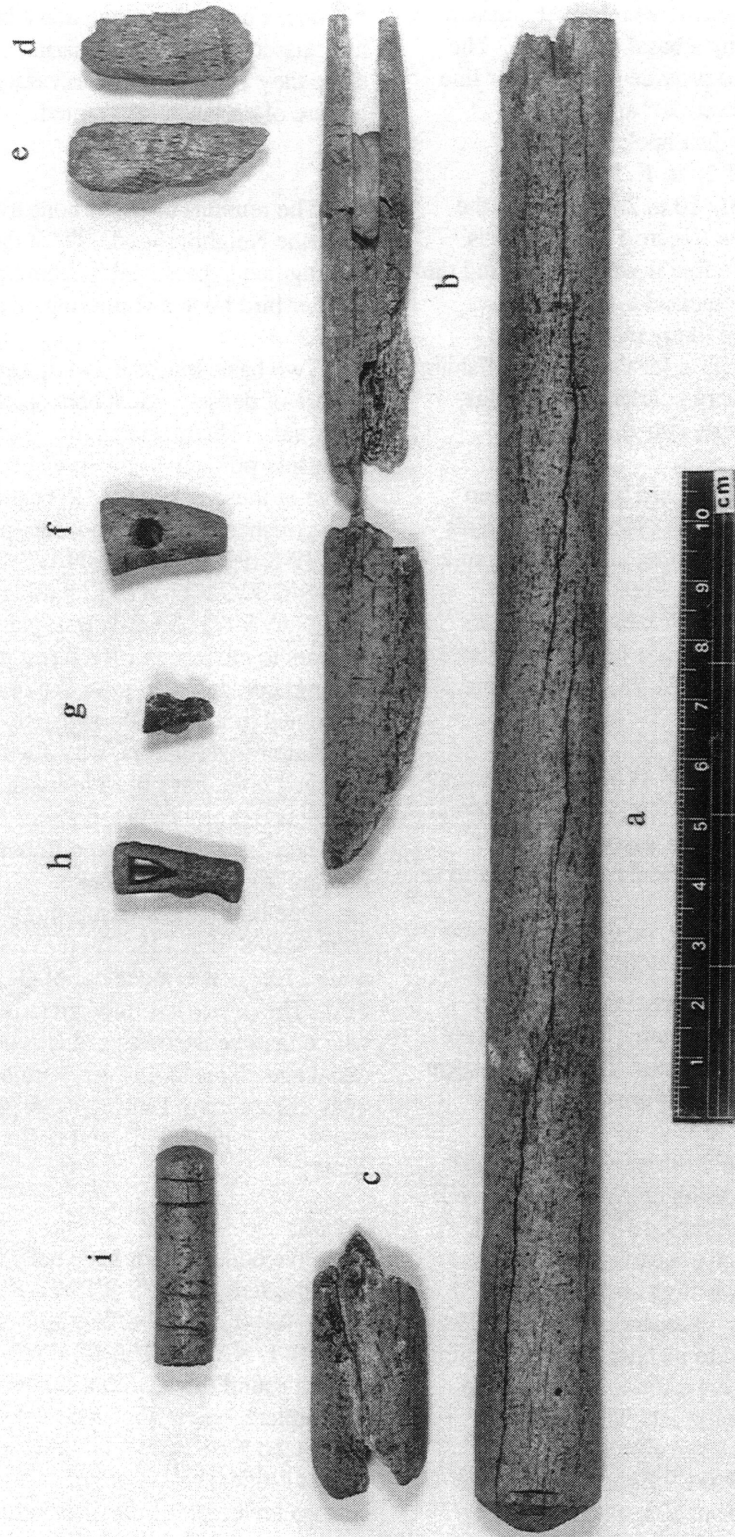
The two complete barbs, the one missing the base, and the fragment with the basal portion of a barb are all very reminiscent of fish hook barbs from Kodiak Island illustrated in Clark (1974a:217, plate 20a-j) and Heizer (1956:187, plate 73g, k-o). They also resemble the fish hook barb illustrated by Shubin (1990:447, figure 8: # 7), and one in De Laguna (1975:plate 43: # 5). These fish hook barbs share the following aspects: they are all relatively simple in that they have one, at most two, unilateral barbs at the tips; they have simple beveled or incised bases; and they are all straight or have only a slight curve.

The barbs from NAVS and FRBS are noticeably different from those from the Aleutian Islands illustrated in Jochelson (1925:86, plate 25: #'s 40-51, P. 87, figures 58a, b, c). They can also be differentiated from those in the Aleutian-style found on Kodiak Island and illustrated in Heizer (1956:175, plate 61q-t). Aleutian-style fish hook barbs tend to be relatively short and sharply curved. They often have a more intricately carved base and more numerous barbs, both interior and exterior. Sections from the Aleutian-style fish hook barbs often have a greater number of small exterior barbs, rather than large interior ones (Jochelson 1925:86, plate 25: #'s 40-51, p. 87, figures 58a, b, c; Heizer 1956:175, plate 61q-t; Liapunova 1975:74-75, figures 4, 5). The fish hook barbs recovered from the Neighborhood at Ross are obviously of the style found predominantly on Kodiak Island, and not of the Aleutian-style.

Fish Hook Shanks

No complete fish hook shanks have been recovered from the Neighborhood. Five fish hook shank fragments have been identified, however. These shank fragments, all from NAVS, include four proximal ends and one

Plate 11.1 Bone Harpoon Shaft Elements from the Native Alaskan Neighborhood



a. Unfinished small dart point socket piece (NAVS-7/17/91-2-WB-1). b. Finished small dart point socket piece, proximal end (fragments conjoined) (FRBS-6/26/88-6-WB-1). c. Finished small dart point socket piece, distal end (fragments conjoined) (NAVS-8/8/91-2-WB-1 and NAVS-8/12/91-88-WB-1). d. Socket piece lashing tang (NAVS-6/30/92-11-WB-1). e. Socket piece lashing tang (NAVS-7/3/92-23-WB-1). f. Finger rest (NAVS-7/10/92-123-WB-1). g. Finger rest fragment (NAVS-7/8/92-20-WB-1). h. Possible finger rest (NAVS-8/7/91-6-WB-1). i. Probable harpoon dart buttpiece (NAVS-8/6/91-22-WB-1). Photo by Thomas A. Wake.

midsection.

The four proximal end fragments are quite similar (NAVS-8/5/91-6-WB-1, NAVS-8/5/91-8-WB-1, NAVS-8/10/91-6-WB-1, NAVS-7/13/92-84-WB-1) (Wake 1995, figure 5.3e-h). These specimens have relatively narrow proximal shaft ends, capped by a basal expansion. The basal expansion is designed to provide purchase for line attachment with a sharply carved 90° angle. One interesting feature of the four fish hook shank line attachment areas is a series of 10 to 12 latitudinally incised lines extending roughly 10 to 20 mm down the shaft from the basal expansion (figure 11.3e). This is usually the general area where line is wrapped around the shank of the fishhook. These incised lines may be decorative, however it is more likely that they were placed there to add extra purchase for the attached fishing line. These shank bases are very similar to those illustrated in Clark (1974a:217, plate 20p-r) and Heizer (1956:187, plate 73h, i).

The midsection fragment that has been recovered (NAVS-7/14/92-138-WB-1) (Wake 1995, figure 5.3i) is curved, with a slight taper, and carved all around from a seal rib. This specimen is quite similar to fish hook shanks illustrated in Jochelson (1925:86, plate 25: #'s 44-51; p. 87, figures 58a, b, c), Heizer (1956:187, plate 73a-f, h, i), and Liapunova (1975:74-75, figures 4 and 5).

Fish Spears

Two artifacts recovered from NAVS are identified as possible fish spear fragments, apparently of two different types. One is relatively simple and the other is more intricately carved. Both appear to be bases, as opposed to barbed ends.

One specimen (NAVS-7/31/91-13-WB-1) (Wake 1995, figure 5.3j) is finely finished, polished, and has a straight bevel at the base. The bevel also has a slight concavity, to better accept a mainshaft. It does not have any sort of lashing projection common to many fish spear bases (Bennyhoff 1950:297, 331, figure 1; Heizer 1956:174, plate 60a, c).

The other specimen is more intricately crafted and better represents a fish spear prong (NAVS-8/5/91-3-WB-1) (Wake 1995, figure 5.3k). One side is unmodified, with the exception of a shallow concavity running the length of the shaft. The other is high and rounded, with more noticeable modification. It tapers slightly from its widest point at the broken end to its base. The last 3 mm of the base is expanded, forming a toe-like raised notch. This area is evidently a lashing point. This specimen bears great resemblance to fish spear prong bases illustrated in Bennyhoff (1950:331-2:figure 1v-b, figure 2a-j) and Heizer (1956:174, plate 60a, c). Regrettably, not enough of this artifact is present to make it completely diagnostic. It could be either Native Alaskan or Native Californian.

UTILITARIAN ITEMS

A variety of bone artifacts not related to hunting or fishing have been recovered from the Native Alaskan Neighborhood. These artifacts include broken awl tips, buttons, a brush fragment, and a baton or club. The items are classed broadly as utilitarian, for lack of a better term, since they all have some necessary function in daily life, but are often taken for granted.

Awls

The remains of seven bone awls have been recovered from the Neighborhood. Six of these objects are pointed tip fragments, presumably from broken awls. One is a slender bird bone awl missing its tip. All are from NAVS.

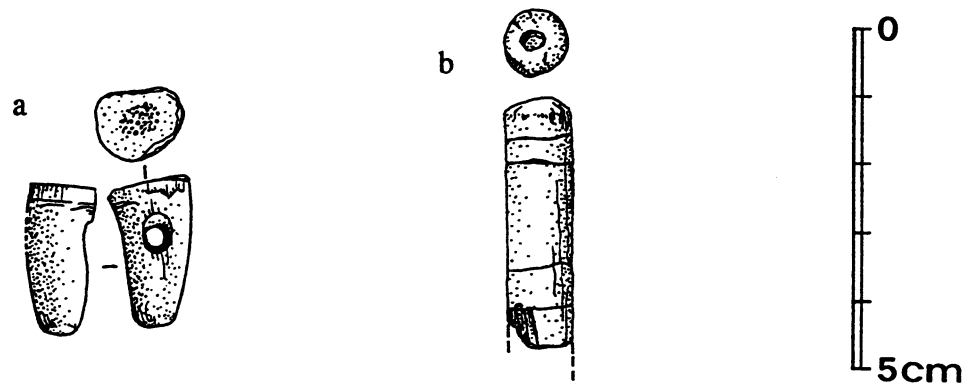
Two basic kinds of awl tips are represented at NAVS. All are of dense cortical bone, probably from terrestrial mammals. The most common awl tip found (type 1, n=4) is sharply pointed, highly polished, and relatively narrow. Three of these tips appear to be ground to a point and then polished to a smooth luster, probably through use (NAVS-8/6/91-37-WB-1, NAVS-7/14/92-9-WB-1, NAVS-6/30/92-29-WB-1, plate 11.2a-c). One of these tips (NAVS-8/15/91-2-WB-1, plate 11.2d), however, appears to have been carved to a point using a metal cutting tool, and then ground a little, and subsequently smoothed to a polish through use. Two relatively wider and flatter tips (type 2), with a wide, dull, yet highly polished point have been found at NAVS (NAVS-6/27/89-19-WB-1 and NAVS-6/28/89-17-WB-1, plate 11.2e, f). Their function may be different than the sharply pointed tips described above.

One bird bone awl, missing its tip, was recovered from NAVS, unit 74S, 2W (NAVS-7/16/92-15-WB-1, plate 11.2g). It is made out of the radius of a gull-sized bird. The object has three areas of patterned cut marks, which may be decorative, and is polished near the broken distal end. This tool is very reminiscent of bird bone awls illustrated in Heizer (1956:186, plate 72j, k), Clark (1974a:247, plate 35d), and Gifford (1940:203, type A4a1).

Buttons

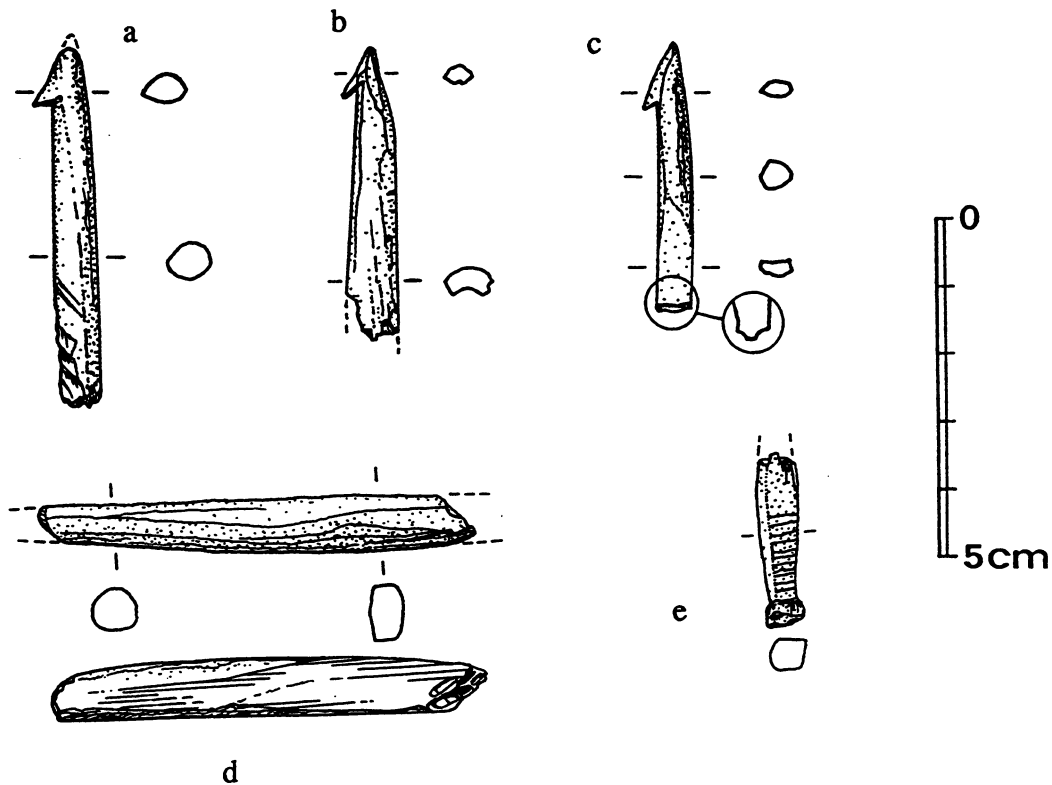
Five bone buttons have been recovered from the Neighborhood (NAVS-8/13/91-103-WB-1, NAVS-6/24/92-13-WB-1, NAVS-6/26/92-17-WB-1, NAVS-7/9/92-34-WB-1, NAVS-7/16/92-14-WB-1, plate 11.2h-l). All are flat round discs, with a single hole in the center. One is complete, one is almost complete, and three are halves. Perforated bone discs similar to these are illustrated in Heizer (1956:195, plate 81a, b, e). Single-hole bone buttons are common artifacts in the historical record in many areas (Boling 1987; Felton and Schultz 1983; Furnis 1990; MacGregor 1985). Furnis (1990:56) notes that single-hole bone buttons were made on a lathe

Figure 11.2 Bone Harpoon Shaft Elements from the Native Alaskan Neighborhood



a. Finger rest (NAVS-7/10/92-123-WB-1). b. Probable harpoon dart buttpiece (NAVS-8/6/91-22-WB-1).
Illustrations by Judith Ogden.

Figure 11.3 Bone Fishing Gear from the Native Alaskan Neighborhood



a. Fish hook barb (NAVS-7/14/92-17-WB-1). b. Fish hook barb (FRBS-6/13/89-5-WB-1). c. Fish hook barb (NAVS-7/1/92-35-WB-1). d. Fish hook barb (NAVS-8/12/91-21-WB-1). e. Fish hook shank, proximal end (NAVS-7/13/92-84-WB-1).
Illustrations by Judith Ogden.

indexing tool. MacGregor (1985:61, figures 36-38, 101, figure 58) illustrates this technique and the products of it. All of the single-hole bone buttons from NAVS bear concentric striae indicative of mass production on a lathe.

Small Brush Fragment

One small fragment of bone with remains of numerous offset holes along its margins was recovered from NAVS (NAVS-7/8/92-19-WB-1, not illustrated). This object is most likely a fragment of the bristle holding portion of a bone brush, perhaps a toothbrush. A toothbrush, dating to the early 19th century, from Kings Bay Plantation bearing remarkable similarity to this specimen is described and illustrated by Adams (1987:206, 388, figure C.6, a). Toothbrushes and similar objects are also illustrated in MacGregor (1985:184, figure 99).

Baton

A curious, rather large, worked antler baton or club was recovered from NAVS, unit 125S, 22W (NAVS-7/9/92-43-WB-1, plate 11.3, top). This object is made from the basal tine of an antler of a very large elk (*Cervus elaphus*). The tine was apparently first chopped off of the larger antler. The larger proximal end of the tine has been crudely rounded through the removal of large flakes with a heavy bladed metal tool such as a large knife. The very distal end of the tine is broken off, and one side shows large, longitudinal knife scars in the form of a shallow bevel. The sharp edges of the chop scars on the larger, bulbous, proximal portion of the tine have been smoothed and rounded, probably due to use of this object as a baton or club for impacting relatively soft objects, perhaps meat or fish.

Whale Bone Platter

A large, flat portion of a whale's vertebral epiphysis was recovered from NAVS, unit 125S, 22W (NAVS-8/15/91-202-WB-1, plate 11.3, bottom). This object was broken into three pieces, representing approximately half of the actual epiphyseal surface of the vertebral centrum. The other half was not recovered. The epiphyseal surface of the vertebra has been removed from the body of the centrum and planed relatively flat with a metal cutting tool. The entire edge of this object has been carved off with a metal tool, producing a relatively even ovate form. The actual articular surface remains on one side of the object. This surface is unmodified with the exception of a number of chop marks near the center. The object is very similar to whale bone plates illustrated in Heizer (1956:178, plate 64) and Hrdlicka (1944: figures 110, 177, 205, 206). Heizer reports that 25 complete or fragmentary examples of such plates were recovered from the Uyak site. He supposes that these plates are "a prehistoric Kodiak Islander's version of a dinner Plate," and reports that such plates are not found in the Aleutian

Islands (Heizer 1956:69).

OBJECTS OF PERSONAL ADORNMENT

A wide variety of personal adornment objects have been recovered from the Native Alaskan Neighborhood. These include a diverse array of glass and shell beads, described by Ross and Silliman (chapters 7 and 8), and a considerable number (n=25) of bone tube ornaments, described below. The ornaments described below are all hollow bone tubes of small to medium size. Few are complete, most are fragmentary. These bone tubes can be broken down into four main groups, based on design elements or a lack thereof. The majority of the bone tubes recovered have simple latitudinal incisions. Other types include, in order of abundance, plain tubes, tubes with intricate, zoned crosshatched designs, and tubes with diffuse latitudinal and diagonal incisions.

These artifacts were most likely manufactured by first removing the proximal and distal articular ends of bird long bones. Evidence for this process can be seen in De Laguna (1975:plate 47). The tubes were then smoothed and strung. Their polish may or may not have been intentional as a result of the manufacturing process or of contact with individuals' bodies.

Undecorated Tubes

Tubes having no detectable decoration are relatively common at Ross. Eight such artifacts have been found, all from NAVS. These artifacts are distinguished by their polish and their rounded and smoothed cutoff ends. Representative examples are illustrated in plate 11.4a-h.

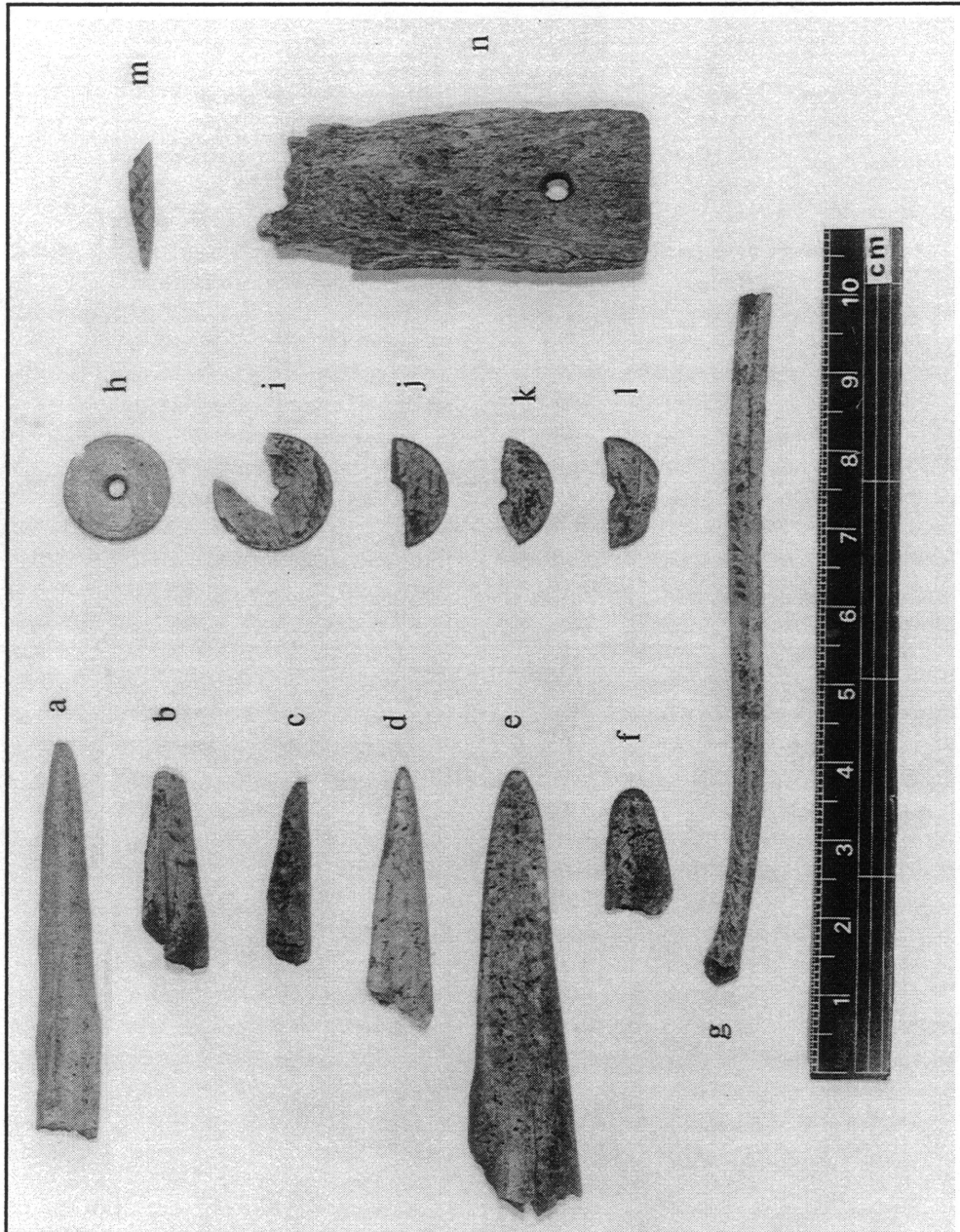
There are two basic kinds of plain tubes, those under 1 cm in diameter (n=4) and those over 1 cm in diameter (n=4). These tubes would be classed as type 1 "undecorated" by Heizer (1956:76) and type EE1a by Gifford (1940:180, 227), a "bead of tube of undecorated bird bone." Riddell (1955:6, plate 1k) illustrates a similar tube from South Farallon Island. Clark (1974a:271, plate 50a-i) portrays a variety of undecorated bird bone tubes from Kodiak Island.

Latitudinally Incised Tubes

The majority of bone tube ornaments recovered from the Neighborhood have relatively simple latitudinal incisions and are usually polished. Nine such tube fragments have been encountered. Eight are from NAVS, and 1 is from FRBS. These incised and smoothed bone tubes come in a variety of sizes, but none are really very large. The bulk (n=8) of these tubes are estimated to be just over 1 cm in diameter. One is less than 1 cm in diameter. Representative examples are illustrated in plate 11.4i-q.

The primary indicators that these bone fragments are actually artifactual are the patterned design elements; the high polish on many of them; and the smoothed, rounded, scored and cut off ends of the objects. The design

Plate 11.2 Utilitarian Worked Bone Items from the Native Alaskan Village Site



- a. Awl tip (NAVS-8/6/91-37-WB-1). b. Awl tip (NAVS-7/14/92-9-WB-1). c. Awl tip (NAVS-6/30/92-29-WB-1). d. Awl tip (NAVS-8/15/91-2-WB-1). e. Awl tip (NAVS-6/27/89/19-WB-1). f. Awl tip (NAVS-6/28/89-17-WB-1). g. Bird bone awl (NAVS-7/16/92-15-WB-1). h. Bone button, complete (NAVS-8/13/91-103-WB-1). i. Bone button fragment (NAVS-6/24/92-13-WB-1). j. Bone button fragment (NAVS-6/26/92-17-WB-1). k. Bone button fragment (NAVS-7/9/92-34-WB-1). l. Bone button fragment (NAVS-7/16/92-14-WB-1). m. Incised fragment (NAVS-7/2/92-30-WB-1). n. Ivory plaque fragment, hole at either end (NAVS-7/17/92-7-WB-1). Photo by Thomas A. Wake.

Plate 11.3 *Elk Antler Baton (top) and Whale Bone Platter (bottom) from the Native Alaskan Village Site*

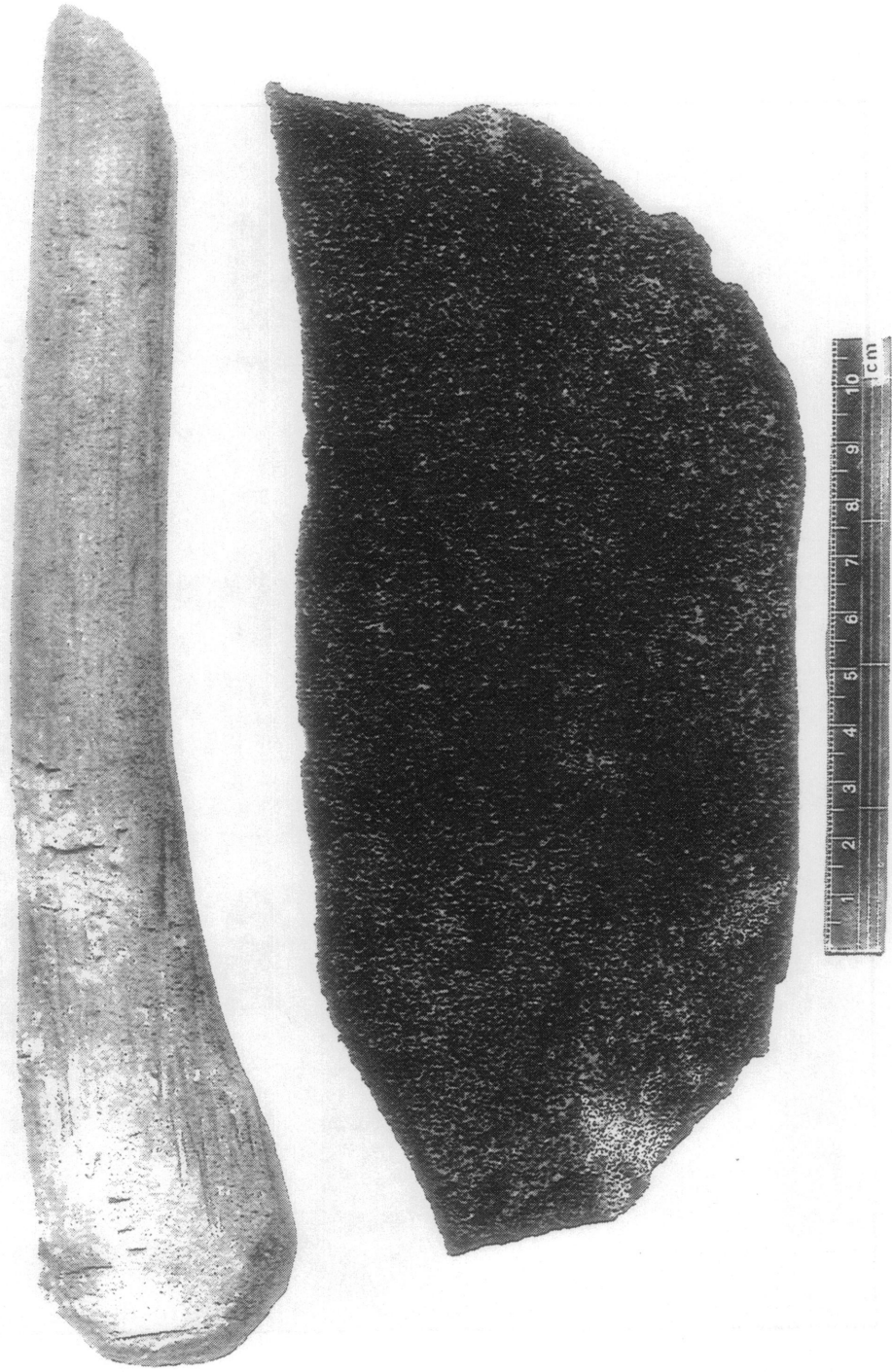


Photo by Thomas A. Wake

elements on these tubes consist primarily of evenly spaced latitudinal incisions, usually between 4 mm and 8 mm apart, depending on the specimen. Two tubes in this class have incisions at only one end. One appears to be a blank for the manufacture of smaller bone beads and is the only complete specimen in the lot (plate 11.4j). The other (figure 11.4a; plate 11.4i) has an intricate faceted band backed by a simple incision, remarkably reminiscent of tubes illustrated by Clark (1974a:271, plate 50k), and Heizer (1956:194, plate 80o).

Tubes of this type are found in both California and Alaska. Heizer (1956:76) describes bird bone tubes found at Uyak Bay as "either plain (type 1) or decorated (type 2)." These tubes would apparently be type 2. Gifford (1940:180, 228) describes such artifacts as type EE2a, a "bead or tube with more or less encircling incisions."

Tubes with Diffuse Latitudinal and Diagonal Incisions

Four tubes with diffuse encircling and latitudinal incisions have been recovered from NAVS (NAVS-8/15/91-225-WB-1, NAVS-8/15/91-225-WB-2, NAVS-7/3/92-45-WB-1, NAVS-7/2/92-33-WB-1). These artifacts are distinguished by their design elements, polish, and their rounded and smoothed cutoff ends. They all appear to be from tubes less than 1 cm in diameter and are fragmentary. The design elements on these tubes consist generally of latitudinal incisions close to the smoothed ends and diagonal crossing lines between encircling incisions further along the tube (figure 11.4b, c). Representative examples are illustrated in plate 11.4r-l.

Tubes of this type appear in both Alaska and California. This type of artifact would be classified as type 2 decorated tubes by Heizer (1956:113, plate 80). Gifford (1940:180, 227) might place these tubes in type EE2b since they have more complex design elements than type EE2a. However, the tubes illustrated by Gifford (1940:227) as belonging to type EE2b all have very complex design elements including zones filled in with finer striae or crosshatching. The tubes discussed in this section do not have the intricacy of design seen in Gifford's type EE2b.

Tubes with Intricate Designs

Four examples of tubes with intricate, zoned crosshatch designs have been recovered from the South Trench of NAVS (figure 11.4d-g). None are known from FRBS. Three examples are tubes near 1 cm in diameter. One is a much larger tube, over 1.5 cm in diameter (figure 11.4f).

These tubes are very distinctive. They have a basic zoned design consisting of areas of no decoration and areas of decoration which usually alternate. The decorated areas are filled with fine crosshatching. These alternating areas are in the form of narrow bands,

lozenges, or compressed lozenges. The tubes are illustrated in the following order in plate 11.4u-x (NAVS-6/27/92-13-WB-1, NAVS-8/8/91-16-WB-1, NAVS-8/7/91-55-WB-1, NAVS-6/30/92-115-WB-1). Tubes of this type apparently are not found in coastal Alaska, but they are well known from California (Gifford 1940:180). This style of tube is classed as type EE2b by Gifford (1940:180, 227). The four tubes from NAVS are very similar to intricately designed tubes illustrated by Barrett (1952:plate 37: #'s 1-5). These ethnically distinctive artifacts clearly indicate a Native Californian presence at NAVS.

OTHER FINISHED ARTIFACTS

A variety of finished bone artifacts of uncertain function or type have been recovered from the Native Alaskan Neighborhood. One of these objects is made of ivory, the only definitely ivory artifact found to date at Colony Ross. It was recovered from NAVS, unit 72S, 1E (NAVS-7/17/92-7-WB-1, plate 11.2n). One end is broken. One surface is flat and the other surface is rounded. A single perforation is located at each end of the object. If each end of this object had one hole and was symmetrical, the estimated actual length of the artifact would be approximately 60 mm. The function and purpose of this object is unclear. It may have been suspended, or perhaps used to secure and support other objects.

A small piece of carved bone with a crosshatched design pattern was recovered from NAVS, unit 123S, 24W (NAVS-7/2/92-30-WB-1, plate 11.2m). This object is flat and undecorated on one surface. The other surface has a rounded edge and bears the crisscrossing incised design.

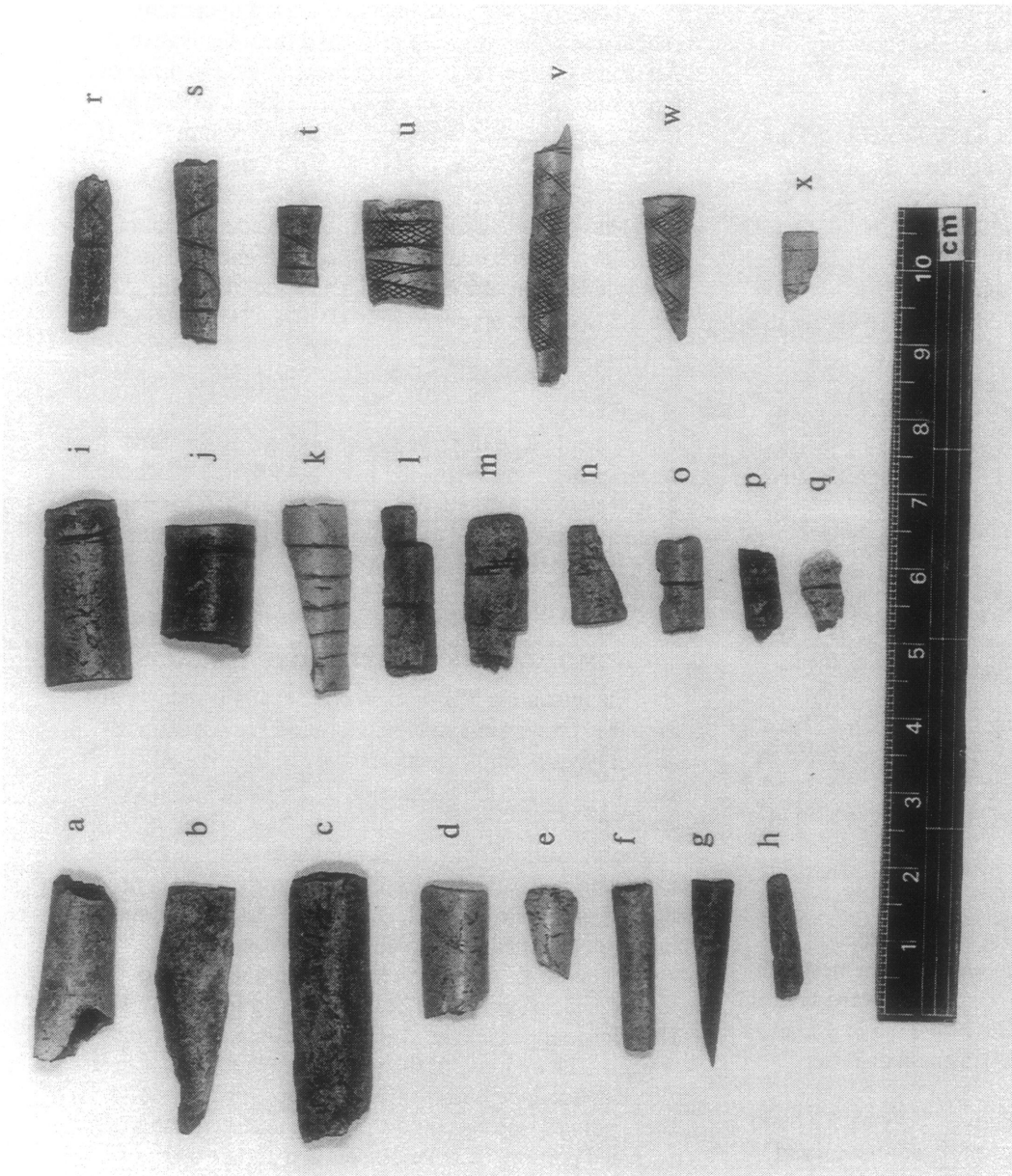
NON-DIAGNOSTIC WORKED BONE ARTIFACTS

The remaining 751 worked bone artifacts recovered from the Native Alaskan Neighborhood are not diagnostic tool types or implements. However, they are all directly related to the production of the identifiable tools described above and bone tools in general. These non-diagnostic worked bone artifacts include possible bone and antler cores, hand holds, chopped and carved bone chunks, split bone, sub-cylindrical shaft fragments, and a variety of chopped and carved bone flakes.

A number of fine to crudely carved and finished pointed bone objects have been recovered from NAVS. Their function is unclear. They may represent bone pins or pegs. The majority of them have one end that has been scored and snapped off from another portion of bone. These pointed objects could simply represent detritus or discarded portions of other objects at a certain stage of manufacture.

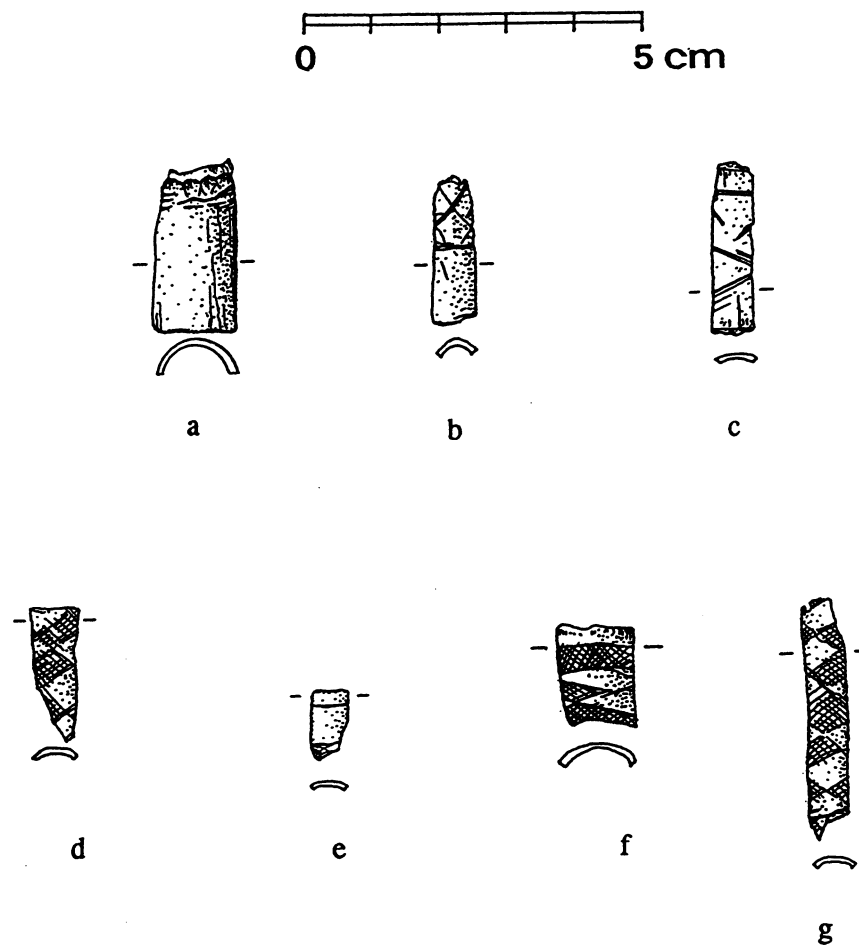
Eleven finely carved, smoothed cylindrical shaft fragments have been recovered from the Neighborhood.

**Plate 11.4 Bird Bone Tubes
from the Native
Alaskan Neighborhood**



a. Undecorated bird bone tube fragment (NAVS-7/15/92-37-WB-1). b. Undecorated bird bone tube fragment (NAVS-7/10/92-45-WB-1). c. Undecorated bird bone tube fragment (NAVS-7/1/92-7-WB-1). d. Undecorated bird bone tube fragment (NAVS-7/10/92-126-WB-1). e. Undecorated bird bone tube fragment (NAVS-7/10/92-115-WB-1). f. Undecorated bird bone tube fragment (NAVS-7/10/92-115-WB-1). g. Undecorated bird bone tube fragment (NAVS-7/14/92-37-WB-1). h. Undecorated bird bone tube fragment (NAVS-8/14/91-92-WB-1). i. Latitudinally incised bird bone tube fragment (NAVS-6/28/89-14-WB-1). j. Latitudinally incised bird bone tube fragment (NAVS-7/13/92-123-WB-1). k. Latitudinally incised bird bone tube fragment (FRBS-6/30/88-67-WB-1). l. Latitudinally incised bird bone tube fragment (NAVS-7/13/92-41-WB-1). m. Latitudinally incised bird bone tube fragment (NAVS-7/15/92-34-WB-1). n. Latitudinally incised bird bone tube fragment (NAVS-7/3/92-45-WB-1). o. Latitudinally incised bird bone tube fragment with crossing designs (NAVS-7/3/92-45-WB-1). p. Latitudinally incised bird bone tube fragment with crossing designs (NAVS-8/15/91-225-WB-1). q. Latitudinally incised bird bone tube fragment with crossing designs (NAVS-8/15/91-225-WB-1). r. Incised bird bone tube fragment with crossing designs (NAVS-7/3/92-45-WB-1). s. Incised bird bone tube fragment with crossing designs (NAVS-7/2/92-33-WB-1). t. Incised bird bone tube fragment with crossing designs (NAVS-8/8/91-16-WB-1). u. California-style incised bird bone tube fragment (NAVS-8/7/91-55-WB-1). v. California-style incised bird bone tube fragment (NAVS-8/8/91-16-WB-1). w. California-style incised bird bone tube fragment (NAVS-8/7/91-55-WB-1). x. California-style incised bird bone tube fragment (NAVS-6/30/92-115-WB-1). Photo by Thomas A. Wake.

Figure 11.4 Bird Bone Tube Fragments from the Native Alaskan Neighborhood



a. Latitudinally incised bird bone tube fragment (NAVS-7/10/92-123-WB-1). b. Bird bone tube fragment with crossing designs (NAVS-7/3/92-45-WB-1). c. Bird bone tube fragment with crossing designs (NAVS-7/2/92-33-WB-1). d. California-style incised bird bone tube fragment (NAVS-8/7/91-55-WB-1). e. California-style incised bird bone tube fragment (NAVS-6/30/92-115-WB-1). f. California-style incised bird bone tube fragment (NAVS-6/27/92-13-WB-1). g. California-style incised bird bone tube fragment (NAVS-8/8/91-16-WB-1). Illustrations by Judith Ogden.

Two of them have spiraling incisions at one end reminiscent of some sort of screw or bolt. The rest are simply smooth and almost perfectly cylindrical. They could represent portions of any of a number of Alaskan or Californian bone artifacts having a smooth, cylindrical portion, such as fishhooks, projectile points, awls, ornaments, or other tools.

CORES

Five objects that appear to be large chunks of raw material from which pieces have been removed for further reduction and/or use, otherwise known as cores, have been recovered from NAVS. These objects have numerous metal tool cut and chop marks on them

indicative of the intense force used to reduce the original skeletal element to a usable size and eventually to an artifact.

Antler Cores

Two of these objects are basal portions of extremely large elk antlers (NAVS-7/17/92-9-WB-1, not illustrated, NAVS-8/14/91-34-MB-1, plate 11.5). Both antler portions have been thoroughly abused during the removal of other smaller pieces of antler. All of the cut and chop marks on these antler cores appear to result from the use of metal manufacturing tools. Elk used to be seen in the vicinity of Ross (Khlebnikov 1976, 1990). They are now locally extirpated and found in California from mid-

Plate 11.5 *Elk Antler Core (NAVS-8/14/91-34-WB-1) from the Native Alaskan Village Site*

Photo by Thomas A. Wake

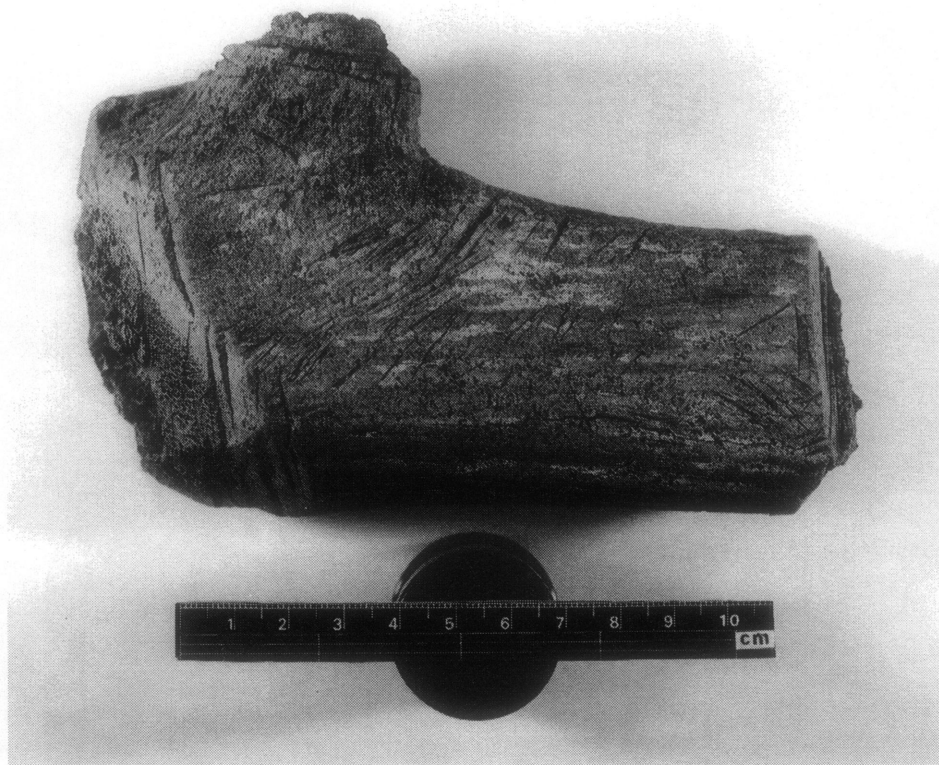


Plate 11.6 *Whale Rib Core (NAVS-8/15/91-159-WB-1) from the Native Alaskan Village Site*

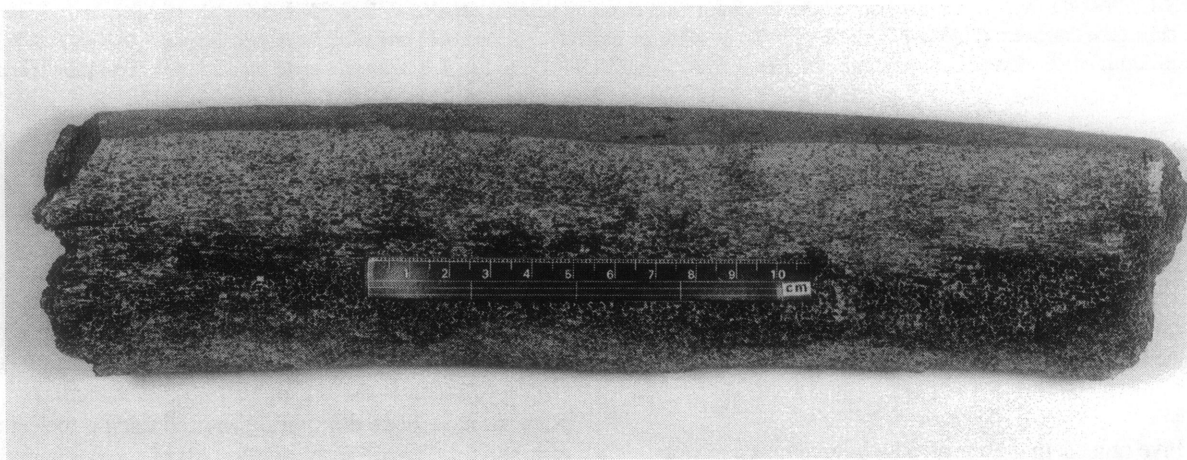


Photo by Thomas A. Wake

Humboldt County northward.

Bone Cores

One object clearly used as a source of raw material is a large portion of a whale rib (NAVS-8/15/91-159-WB-1, plate 11.6). Other potential sources of raw material for tool manufacture, or cores, have been recovered from NAVS. Both of the grizzly bear (*Ursus arctos*) elements recovered from NAVS show signs of use as cores. It should be noted that the grizzly bear is now extirpated from California and has been for the last hundred years. One element is a distal right humerus (NAVS-8/13/91-19-WB-1, plate 11.7, left). The other element is a distal right radius (NAVS-7/10/92-39-WB-1, plate 11.7, right). The distal portions of both of these bones have been removed by chopping all around the circumference of the shaft with a heavy-bladed metal tool such as a large knife or cleaver; the end of the bone was then snapped off. The remaining shaft portion was probably used in artifact manufacture. Both of the grizzly bear elements were treated quite similarly.

Another potential raw material source from NAVS is a proximal ulna of a large (probably male) juvenile Steller's sea lion (*Eumetopias jubatus*, NAVS-8/15/91-204-f-1, not illustrated). The proximal portion of the ulna recovered from unit 125S, 23W has also been removed from the shaft of the element and discarded. The remaining shaft piece with thick cortical bone was probably used as raw material for artifact production.

FLAKES

Five hundred ninety-four bone flakes have been recovered from NAVS. None have been found at FRBS to date. These flakes come in a variety of shapes and sizes. To be classed as a worked bone flake, the artifact must be longer and wider than it is thick and have one surface bearing a metal cutting tool blow. Bone flakes from Ross are subdivided into two classes: chopping flakes and carving flakes (plate 11.8). None of the recovered bone flakes appear to be pressure flakes (Johnson 1985).

Chopping Flakes

Bone bits are classed as chopping flakes if they have at least one surface bearing a metal cutting tool blow, a thickness of over 2 mm, and a minimal amount of curvature. Some curvature or curved deformation of the object often occurs close to the detaching tool blow, especially if the flake is relatively thick. These flakes commonly have one or more facets on their dorsal surface. Each facet represents a blow from a metal cutting tool detaching a previous flake of bone overlying the flake scar in question. Chopping flakes, in general, imply rapid, controlled, patterned removal of excess bone material in the process of manufacturing tools or artifacts. Representative examples of the 567 chopping

flakes identified are illustrated in plate 11.8 (left).

Carving Flakes

A more finely directed force in the removal of bone flakes is seen in the carving flakes. Bone bits classed as carving flakes are relatively longer than they are wide. They are quite thin, often less than 2 mm in thickness, and often have a twist and some curvature to them (plate 11.8, right). These artifacts bear an uncanny resemblance to slivers of antler cut with a knife illustrated in MacGregor (1985:65, figure 40a, b). Carving flakes are very similar to long, thin, twisted, and curved whittling flakes produced by long, controlled carving strokes on wood. The aspect of these bone flakes implies accurate and controlled force, much more so than the chopping flakes. These flakes often have fewer and longer facets than the latter. Twenty-seven carving flakes have been identified.

AMORPHOUS WORKED BONE CHUNKS

A wide variety of amorphous worked bone chunks and pieces have been recovered from NAVS and FRBS. All of these objects have indications, sometimes quite obvious, of reduction and working by metal cutting and chopping tools. These artifacts include sub-cylindrical shaft fragments, which are essentially crudely carved bone shafts; bone splinters with cut, carve, or chop scars; and other difficult-to-classify, worked bone bits. The artifacts in this category, although relatively amorphous, are important in that they represent the variety and intensity of bone working that occurred in the Native Alaskan Neighborhood.

Split Bone

Five of the worked bone artifacts from NAVS exhibit scars from metal cutting and chopping tools travelling along the length of the bone (Wake 1995, figure 5.11, left and right). A prime example was recovered from unit 123S, 25W (NAVS-7/7/92-74-WB-1) (Wake 1995, figure 5.11, left). These scars most likely result from attempts to split the bone lengthwise, as a part of the reduction sequence. This would produce long, slender sections of dense cortical bone more easily shaped into certain tools such as shafts, awls, and pins.

Sawn Bone

Three pieces of worked bone bearing saw scars have been recovered from NAVS. One basal portion of elk antler also bears saw marks at one end. This is especially noteworthy since none of the faunal remains discussed in chapter 12 appear to have been butchered or processed using saws. None of these three pieces bear any resemblance to bone butchered using saws, nor do they appear to be representative of any of the expected cuts of meat produced by Anglo-Americans who used saws as butchery tools.

Plate 11.7 *Grizzly Bear Ulna (left) and Radius (right) from the Native Alaskan Village Site*

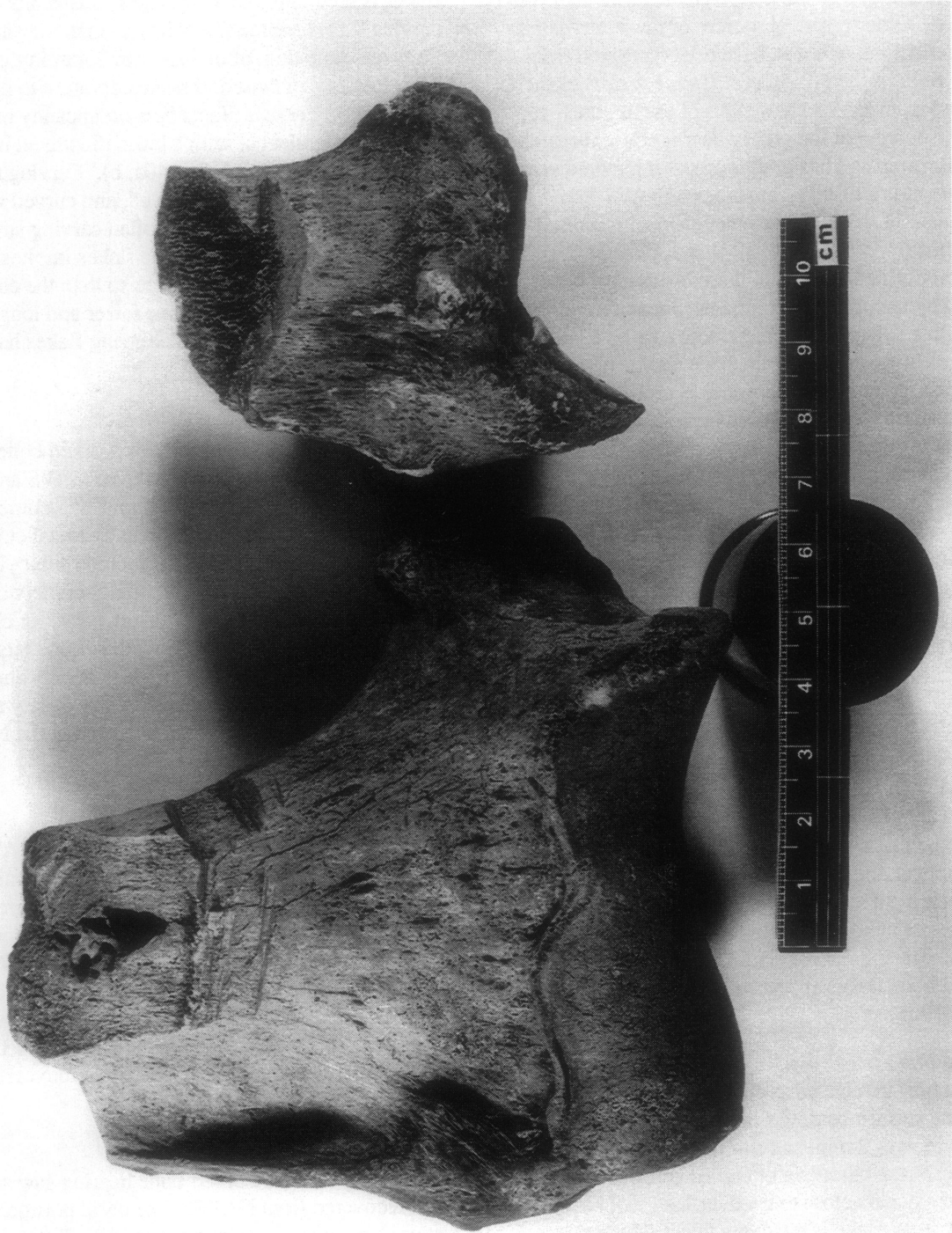


Photo by Thomas A. Wake

Plate 11.8 Chopping Flakes (left) and Carving Flakes (right) from the Native Alaskan Village Site

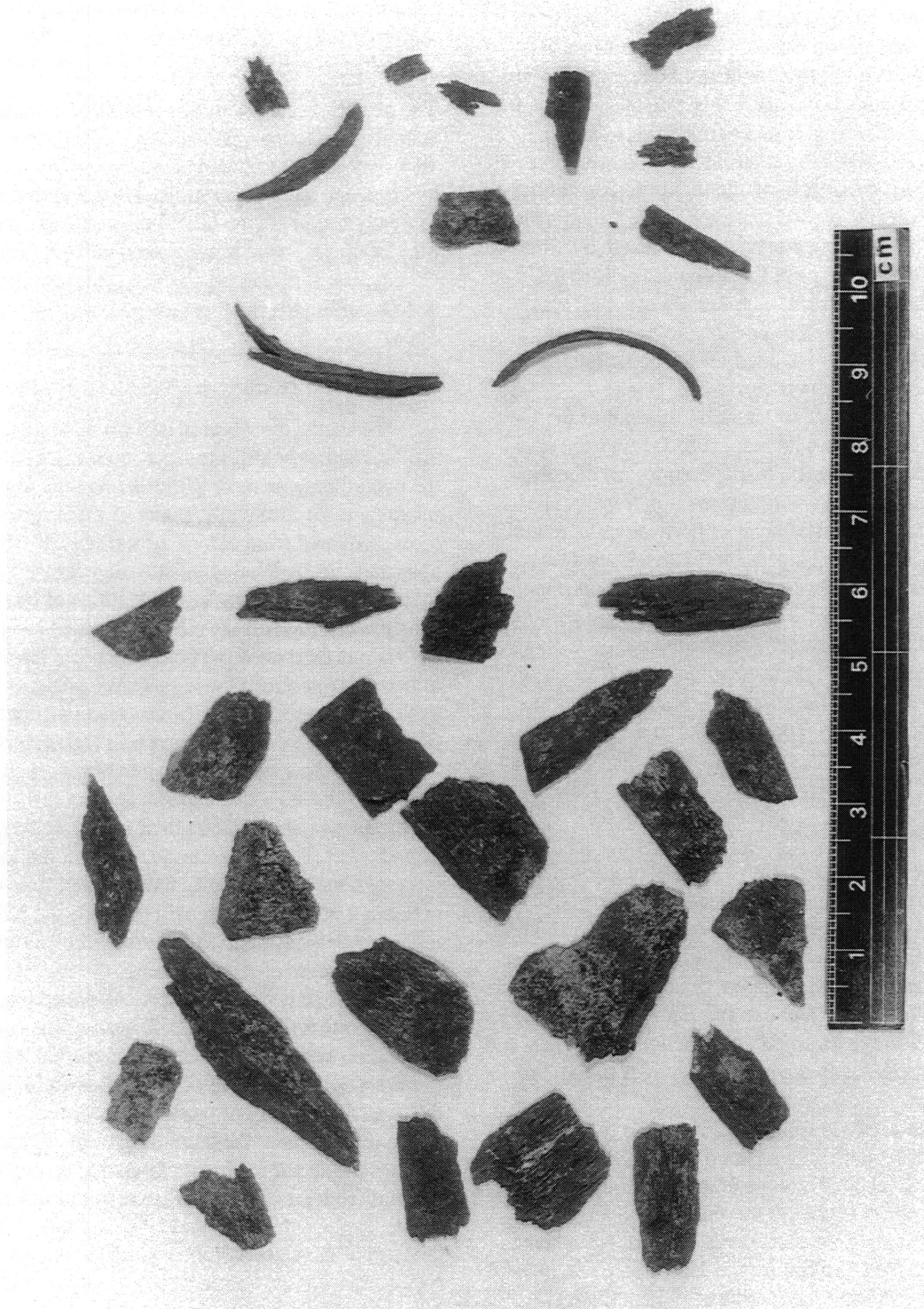


Photo by Thomas A. Wake

Based on these four sawn bone and antler bits, saws seem to have been used on bone, not for the purposes of butchery, but in the process of manufacturing bone artifacts. Two of the pieces exhibiting saw marks are quite small, and have a number of cuts travelling in a variety of directions on them. They appear to be saw detritus from the manufacture of flat bone implements.

One large sawn bone artifact is a distal femur of a young adult Steller's sea lion (*Eumetopias jubatus*) (NAVS-8/8/91-28-WB-1, plate 11.9). The femur has been cut at least twice around the circumference of the shaft with a narrow-bladed handsaw. Interestingly, the saw appears to have been used to cut through only the dense cortical bone and not the softer cancellous tissue in the interior of the element. Apparently the shaft was being cut in relatively even portions to provide rings of bone, which were then snapped off of the remaining portion for some unknown purpose.

The one sawn piece of elk antler resembles the Steller's sea lion bone with respect to the way the saw marks are distributed—the marks do not pass cleanly through the artifact. As with the sea lion femur, apparently only the dense outer layer of cortical antler material was cut by the saw. A jagged lip of cancellous tissue lying at the base of the saw cut indicates that once the dense cortical material had been sawn through, probably circumferentially, the antler was snapped in two. Saws were occasionally used on bone to produce artifacts, it seems, but not for the butchery of animals. The saws used on these elements were not used in a typical European fashion, to cut cleanly and completely through an object.

HAND HOLDS

A number of artifacts with a variety of attributes relating to the final stages of artifact production have been recovered from both NAVS and FRBS (figure 11.5a, b). These artifacts have two main attributes in common: a narrowed, scored, cut, chopped, or snapped off end and the presence of cutting and carving marks indicative of more than one stage of artifact production. Some of these objects exhibit as many as four stages of tool production including splitting, rough carving, fine carving, and hand hold removal (plate 11.10b, c, g, i, j, m).

These objects are termed hand holds, for lack of a more inclusive label. They are classed as hand holds based on the belief that they served as an underworked extension, providing purchase, of a piece of bone being worked into a tool. An object similar to those discussed here is described and illustrated by Lyman (1991:122, figure 5.10d). In his description of fish hooks from the Umpqua/Eden site, he states

one of the smaller ones is not yet completely made, and is attached at the apex of the V (base of the J-curve) to a small, flat, rectangular piece of bone (Fig.

5.10d); this specimen is otherwise completely formed. It thus seems that these hooks were shaped by cutting and grinding from a large blank, with the removal of the completed hook constituting the last step of manufacturing. *This would allow holding the blank while working on the exposed end from which the hook was produced* (Lyman 1991:122, emphasis mine).

The objects discussed in this section are similar to those described by Lyman (1991:122). They often exhibit a variety of tool production stages, probably served as handles, and were apparently cut off and discarded as the tool in question reached the final stages of completion. Similar objects have been recovered from Sonoma County, California in prehistoric contexts (Greg White and David Fredrickson, personal communication, April 1994).

SPATIAL PATTERNING OF WORKED BONE ARTIFACTS

The spatial distribution of worked bone tools and artifacts across NAVS provides interesting data regarding the overall organization of the site and the identity of its inhabitants. Additionally, many of the diagnostic bone tools recovered from NAVS are stylistically distinctive and can provide detailed information regarding their manufacturers. The probable locations of bone tool production areas and the ethnic identities associated with the various excavated portions of the site can be determined and fine-tuned through spatial analysis of the worked bone assemblage. Since fewer artifacts were found at FRBS, this discussion will focus on NAVS. Analysis of the spatial arrangement of worked bone artifacts, especially those artifacts from early stages of the production sequence such as chopping flakes, provides excellent information aiding in the location of primary bone tool production areas. Analysis of the patterning of ethnically sensitive tool types will provide more detailed information regarding the cultural identity of the occupants of specific areas.

In order to investigate intra-site patterning of the worked bone artifacts at NAVS, each of the four main excavation areas is treated as an independent assemblage in the section below. All of these excavation areas have differing frequencies of worked bone artifacts in general.

The analysis of the patterning of the mammal remains discussed in chapter 12 includes only those remains from the trench units that were excavated to sterile levels in the 1991 and 1992 seasons. The spatial analysis of the worked bone artifacts includes specimens recovered from the entire excavated areas in the 1991 and 1992 seasons, including the trenches and the area excavations.

The highest concentrations of bone flakes are associated with the bone bed deposits in the East Central and South trenches and excavation areas at NAVS. Specifically, the greatest density of flakes are located in

Plate 11.9 Sawn Sea Lion Femur (NAVS-8/8/91-28-WB-1) from the Native Alaskan Village Site

Photo by Thomas A. Wake

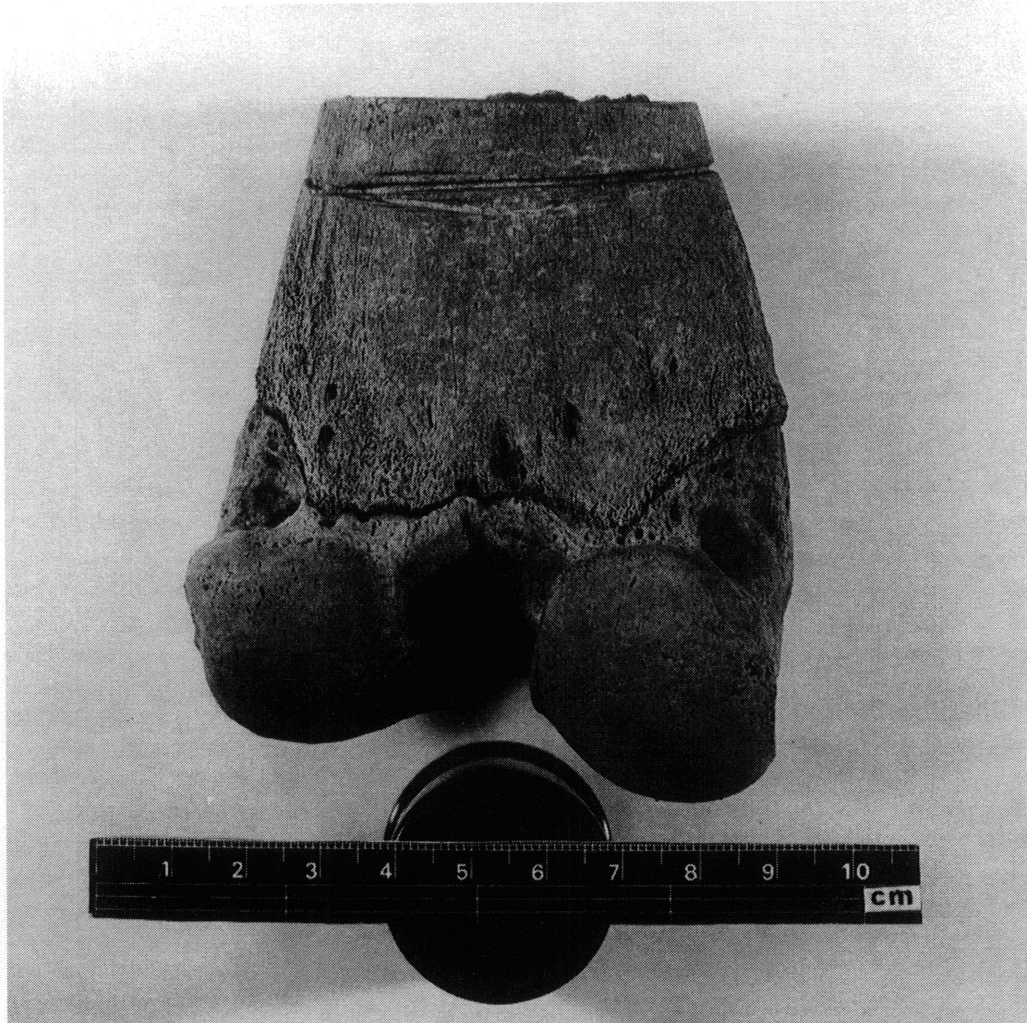
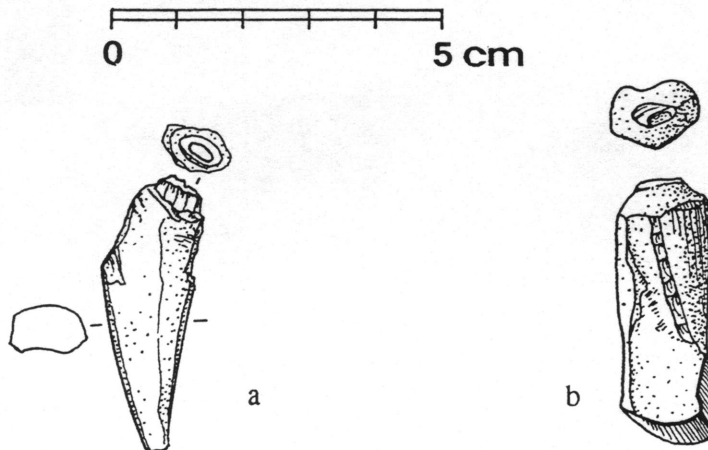
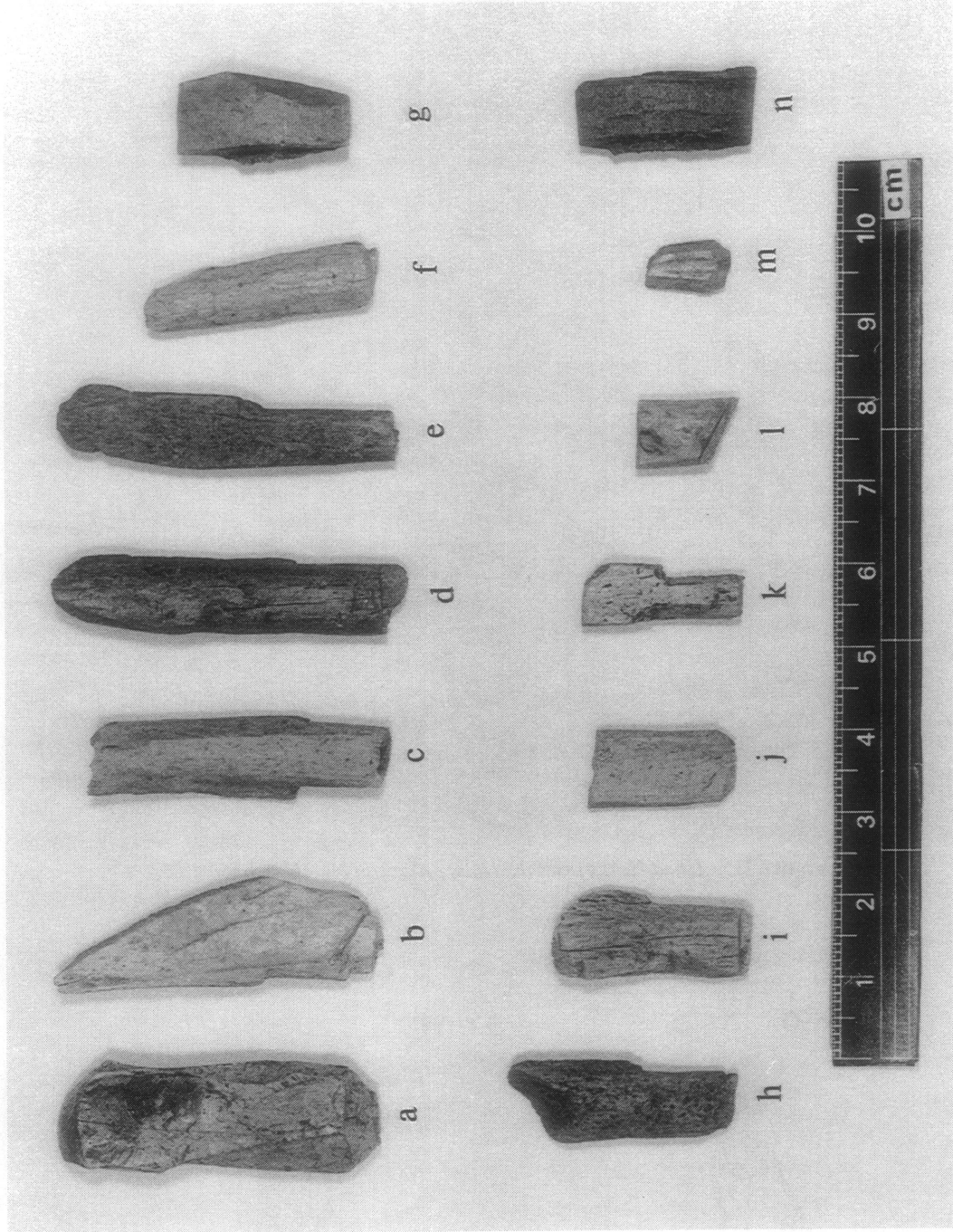


Figure 11.5 Hand Holds from the Native Alaskan Neighborhood



a. Hand hold (FRBS-6/13/89-18-WB-1) . b. Hand hold (NAVS-8/6/91-13-WB-1). Illustrations by Judith Ogden.

Plate 11.10 *Hand Holds from the Native Alaskan Neighborhood*



a. Hand hold (NAVS-8/6/91-13-WB-1). b. Hand hold (FRBS-6/13/89-18-WB-1). c. Hand hold (NAVS-8/15/91-41-WB-1). d. Hand hold (NAVS-8/6/91-7-WB-1). e. Hand hold (NAVS-7/15/92-5-WB-1). f. Hand hold (NAVS-7/1/92-26-WB-1). g. Hand hold (NAVS-8/13/91-34-WB-1). h. Hand hold (NAVS-8/13/91-3-WB-1). i. Hand hold (FRBS-6/16/89-18-WB-1). j. Hand hold (NAVS-8/12/91-122-WB-1). k. Hand hold (NAVS-6/26/89-30-WB-1). l. Hand hold (NAVS-8/12/91-16-WB-1). m. Hand hold (NAVS-8/10/91-6-WB-1). n. Hand hold (NAVS-7/7/92-75-WB-1). Photo by Thomas A. Wake.

units 75S, 0E; 75S, 1E; and 75S, 2E in the East Central Bone Bed, and units 125S, 22W; 125S, 23W; and 120S, 26W in the Abalone Dump.

A total of 682 worked bone artifacts were recovered from the entire South Area (South Trench, South Extension Trench, and South Excavation Area). A markedly lower number of worked bone artifacts (132) were recovered from the entire East Central Area (East Central Trench, East Central Extension Trench and East Central Excavation Area). Seven worked bone artifacts were recovered from the South Central Test Unit. Interestingly, no worked bone artifacts were recovered from the West Central Trench (units 75S, 16W; 75S, 18W; and 75S, 20W). Only 18 worked bone artifacts were recovered from FRBS, none of them flakes.

DIAGNOSTIC ARTIFACTS

The diagnostic bone artifacts were relatively evenly distributed between the East Central and South excavation areas. For example, 5 dart points and bases were recovered from the East Central Area, and 6 were recovered from the South Area. All of the socket piece elements at NAVS are from the South Area. Five points were recovered from FRBS. One socket piece was recovered from FRBS.

A similar pattern is seen with the fishhooks. Four fish hook elements were recovered from the East Central Area, while 6 were recovered from the South Area. One fishhook was recovered from FRBS. The bone awls also show an even distribution pattern across NAVS, with 3 recovered from the East Central Area and 3 recovered from the South Area. Similarly, relatively even distributions of diagnostic bone artifacts are observed across NAVS in both main excavation areas (Wake 1995, figures 6.21, 6.22).

One exception to the even distribution of diagnostic bone artifacts is seen in the bone buttons. Bone buttons are more common in the South Area than the East Central Area. Four bone buttons were recovered from the South Area, whereas only one was recovered from the East Central Area.

The distribution of bird bone tube bead or ornament fragments shows some interesting patterns. Of the 26 bird bone tube ornament fragments recovered from NAVS, 18 were recovered from the South Area and 8 were recovered from the East Central Area.

One bird bone tube bead fragment was recovered from FRBS. Four undecorated tube fragments were recovered from the South Area, and three from the East Central Area. This compares to 14 decorated tube fragments from the South Area, and 5 from the East Central Area. Interestingly, all 4 of the bird bone tubes bearing Native Californian decorative patterns were recovered from the South Area, suggesting a stronger Native Californian presence there.

NON-DIAGNOSTIC ARTIFACTS

The distribution of production-related bone artifacts is markedly different from the distribution of diagnostic bone tools. The general distribution of these bone artifacts across NAVS is quite uneven (Wake 1995, figures 6.19, 6.20) unlike that of the diagnostic bone tools (Wake 1995, figures 6.21, 6.22). The distribution of worked elk (*Cervus elaphus*) antler is perhaps the most intriguing. All three worked elk antler artifacts are from the East Central Area. They all appear to be cores and core fragments, or at the very least, exhausted chunks of raw material that were discarded. One worked base of a deer (*Odocoileus hemionus*) antler was recovered from unit 125S, 24W in the South Area. It would appear that most of the antler working, or at least elk antler working, occurred near the East Central Area.

This contrasts with the recovery of the majority of the production-related bone artifacts from the South Area at NAVS. The pattern is especially evident when one looks at two important production-related artifact classes: bone flakes and hand holds.

Bone Flakes

All of the bone flakes recovered at Ross are from NAVS. The vast majority (n=540) of flakes were recovered from the South Area at NAVS. Only 54 bone flakes were recovered from the East Central Area. The areas with the highest concentrations of flakes fall within the undisturbed contexts of the bone beds and appear to be localized dumping areas (Wake 1995, figures 6.19, 6.20).

In generating the artifact contour maps (Wake 1995, figures 6.20, 6.21), analysis of the bone flake distributions in the East Central and South trenches and excavation areas was standardized by including only the bone flakes from the three uppermost levels of the East Central Trench and South Trench.

Within the South Area are two main loci of bone flakes (Wake 1995, figure 6.20). These loci include unit 125S, 22W (South Bone Bed) and unit 121S, 26W (Abalone Dump). Unit 125S, 22W yielded the highest total number (104 total, 25 in the upper 30 cm) of bone flakes for any unit. The next highest number of flakes (50 total, 6 in the upper 30 cm) is found in unit 125S, 23W and in unit 121S, 26W (51 total), which is over 4 m north and west of 125S, 22W. Each of these units with high numbers of bone flakes is surrounded by a fall-off pattern in flake distributions in adjoining squares (Wake 1995, figure 6.20).

The bone flake distribution in the East Central Area (Wake 1995, figure 6.19) is not nearly as strongly patterned as in the South Area (Wake 1995, figure 6.20). Fewer flakes were recovered overall, and determining a flake concentration is somewhat more difficult. There appears to be an overall rise in numbers of flakes in units

74S, 0E and 75S, 1E. A definite fall-off pattern surrounds these two units. A slight increase in numbers is also seen in unit 75S, 4E. Again, the pattern of localized concentrations with surrounding fall-off distributions seen in the South Area is evident, but not nearly as strong in the East Central Area. Only 3 bone flakes and 4 other bone artifacts were recovered from the South Central Test Unit.

It should be noted that the flakes referred to here are produced during the relatively early stages of bone tool production and would probably not disperse widely, unless physically transported. The localized high flake concentration areas may not represent the actual tool production loci at NAVS, but they are certainly not far from the area where an individual sat and produced the artifacts. These loci probably represent unique dumping instances, possibly resulting from the cleaning of tool production areas.

Hand Holds

The distribution pattern of hand holds also is noteworthy. The most significant aspect of the hand hold artifact distribution, as with the bone flakes, is that the majority of them are from the South Area ($n=18$). The highest number of hand holds per unit (4) is seen in unit 125S, 23W. This unit is contiguous with the unit having the greatest number of bone flakes at NAVS, unit 125S, 22W. Five hand holds were recovered from the East Central Area, and 4 from FRBS.

DISCUSSION

A wide variety of diagnostic bone tools and other identifiable artifacts have been recovered from the Native Alaskan Neighborhood. An equally wide variety of non-diagnostic worked bone artifacts, bone cores, and bone flakes have been recovered from the same area. The diagnostic artifacts, the less diagnostic artifacts, and the cores, chunks, and flakes provide a great deal of information regarding the importance of bone tool technology and production at this site.

The non-diagnostic worked bone bits, chunks, splinters, flakes, cores, and hand holds from the Neighborhood are testimony to the production and maintenance of bone tool kits related to marine mammal hunting, fishing, daily activities, and possibly even ornament production. The non-diagnostic worked bone artifacts can be organized into a variety of reduction stages culminating in the production of finished bone tools. These finished tools were then used, probably sometimes broken in hunting and fishing activities, perhaps modified, and then discarded at Ross.

The reduction sequence resulting in any given tool type probably varied depending on the details involved in producing the desired object. Nonetheless, a series of generalized phases in the production of bone tools at Ross appear to include core preparation, core reduction

resulting in the preparation of blanks, rough shaping, fine shaping, and finishing.

As is typical with any tool production sequence, large pieces of the required raw material are necessary to begin the actual production process (MacGregor 1985). At least five artifacts representative of the earliest stages of bone tool production have been recovered from NAVS. These artifacts appear to be exhausted or nearly exhausted large pieces of raw material, or cores.

One of these cores is represented by the basal portion of a large elk (*Cervus elaphus*) antler (plate 11.5). The core proper was probably a complete elk antler. The item discussed here is representative of an exhausted core, the end product of reducing the entire core. The very base, the basal tine, and the rest of the antler above the basal tine have all been removed using metal chopping tools, probably large knives (Walker and Long 1977). These more manageable antler sections were then probably made into various artifacts (see MacGregor 1985:68, figure 42 for an antler reduction schematic).

The antler was reduced using numerous controlled chopping blows latitudinally around the circumference of the portion to be removed. Once cancellous tissue in the interior of the antler was reached, the portion was snapped off. The antler core shows numerous encircling blows on all ends of the artifact. Numerous other blows cover virtually the entire object. At least two areas appear to have abortive encircling blows.

The other smaller portions of elk antler, mentioned previously in the core section, are smaller than the one discussed above. However, they both appear to have been treated in a similar fashion. The tines and more distal portions of the antler have been removed using the standard scoring and snapping technique. One of these specimens is notable due to the fact that the very basal portion was removed using a saw. The antler was not cut clean through apparently, but scored with a saw, and then snapped off. Again, it appears that this section of antler was used as a source of raw material and then discarded.

Another large piece of raw material, or core, is a midsection of a whale rib (plate 11.6). Whale bone was a very important source of raw material for coastal Alaskan people and a wide variety of Native Alaskan artifacts were manufactured from it (Clark 1974a, 1974b; Crowell 1988; Fitzhugh and Crowell 1988; Heizer 1956; Hrdlicka 1944; Jochelson 1925; Jordan and Knecht 1988). Based on evidence from NAVS, a hypothetical reduction sequence of a whale rib core to a finished socket piece is discussed below (Wake 1995, figure 5.14).

The large piece of whale rib exhibits a number of core reduction stages. A whole whale rib could be reduced to manageable pieces by chopping in a controlled fashion around the circumference of the bone and then snapping it in two at the weak point. Evidence of this part of the process can be seen at either end of the artifact in question. A single whale rib could be reduced

to a number of similarly sized sections by repeating this process.

This section of whale rib recovered from NAVS appears to be the proper length for dart socket pieces. It measures 290 cm in length, 35 cm longer overall than the unfinished socket piece from NAVS, and is virtually the same kind of dense, yet slightly porous, whale bone. The quality of the bone is so similar to the unfinished and portions of two finished, broken socket pieces recovered from NAVS and FRBS that any of these artifacts could have been manufactured from the very whale rib core in question.

After reduction in length, this portion of whale rib was then sectioned lengthwise. Numerous blows from a metal tool with a slightly curved blade, possibly a small hatchet or large knife, can be seen travelling lengthwise on opposite sides of the rib section. One side of this core was reduced further subsequent to sectioning. The one side had small sections of bone, flakes essentially, removed with an adze-like instrument, possibly in preparation for even further reduction. This object was then discarded for some reason. Reducing a core in this lengthwise fashion would result in a smaller piece of raw material properly sized for the production of a socket piece.

The smaller pieces of bone, reduced from the larger cores, or split from large terrestrial mammal long bones, appear to be the primary sources of bone tool raw material, or blanks. A great deal of modification of these blanks occurred after primary core reduction. In the case of the unfinished whale bone socket piece recovered from NAVS, reduction of the core to a splinter of whale rib was only one of the early stages in the production of the finished tool.

In order to go from a minimally modified whale rib splinter to a finished socket piece, a number of stages of production must be passed through (Wake 1995, figure 5.14a-d). The sectioned whale rib from NAVS would first have to be roughly worked into the desired length and roundness. Getting the roughed out shaft more round and straight would most likely produce the relatively short, faceted chopping flakes that dominate the entire worked bone assemblage (plate 11.8). These chopping flakes could be produced with any stout-bladed metal tool such as a large knife, a hatchet, or an adze.

The chopping flakes recovered from NAVS and FRBS are almost all whale bone. Some are relatively flat and thick and appear to be the result of chopping or roughly planing a piece of bone flat using powerful blows. Many of these bone pieces have a large, flat ventral flake scar and multiple dorsal flake scars. The dorsal flake scars are often arranged in lengthwise facets travelling over the top of the bone piece from one side to the other. Such an arrangement of flake scars indicates rough rounding of a piece of whale bone. During the

rounding and straightening process, flakes of bone are removed successively in a controlled fashion that produces overlapping flake scars in a side-to-side faceting pattern.

Once the shaft is roughly rounded and straightened, the finer work can begin. This finer work, which requires more refined and continuous control of knife strokes, produces the longer, thinner, narrower, and curved carving flakes (MacGregor 1985; plate 11.8). Removal of such flakes produces a more refined surface with fewer large flake scars. It is clearly a different stage of production than the activity that produces the previously mentioned chopping flakes.

Once the finer rounding is complete, detailed work on the distal bevel, the socket, and the lashing tangs can begin (plate 11.1). From the appearance of the unfinished socket piece from NAVS, the distal bevel was completed before the other steps. The lashing tangs had just begun to take shape, as indicated by the two angled, shallow, 3 mm wide cuts at the proximal end of the shaft. The socket, at the end of the distal bevel, was not yet begun. Apparently production of the socket was one of the last stages. Similar stages of production, on a smaller scale, were probably involved in the manufacture of narrower whale bone shafts such as the harpoon end piece and some of the cylindrical shaft fragments.

SCORING AND SNAPPING

The scoring and snapping method appears to be one of the primary reduction and fabrication techniques used in bone artifact production at Ross (figure 11.5, plate 11.10). At least 110 of the amorphous worked bone pieces and identifiable artifacts recovered from NAVS and FRBS show evidence of circumferential chopping or carving, or scoring and snapping. The scoring of these bone pieces appears to have been done using metal-edged tools that could be well controlled. Most of the scored and snapped artifacts appear to have been worked on with small to medium metal knives, and rarely saws (Walker and Long 1977).

The predominance of scoring and snapping of bone at Ross also involved the use of saws in bone tool production. Why score and snap a bone when you could use a saw and cut it cleanly in two? Using saws could make reducing bone into suitably sized lengths quite straightforward. Four worked bone artifacts exhibit saw cut marks on them. Two are flat pieces of bone with more than one saw cut, one is a piece of elk antler discussed above, and one is a distal femur of a Steller's sea lion (plate 11.9). The sea lion femur is especially interesting since the saw cuts ring the circumference of the shaft and do not come together evenly. This technique apparently was repeated a number of times, or at least once more on the remainder of the femoral shaft. Saws used to cut mammal bone usually cut completely

through the bone, leaving a flat plane. It appears that in this case a saw was used to score the bone so it could be snapped off, and not cut completely through, as with the elk antler discussed above.

The availability of small saws would militate against the use of the scoring and snapping technique since saws can quickly and efficiently cut through wood or bone items at right angles. The historical record documents that saws were available at Ross (Khlebnikov 1990). Based on the great number of artifacts exhibiting signs of scoring and snapping ($n=110$), however, saws apparently were not used to cut completely through bones. Although this could point to a very limited access to saws, that is unlikely since even when saws were available, the scoring and snapping technique remained prevalent.

The presence of the scoring and snapping technique at Ross, where the technology to bypass it was present, indicates the strength of traditional approaches to the manufacture of bone tools there. The saws that were used on bones were not utilized in the typical European fashion, hence they probably were not used by Europeans. The use of these saws reflects the scoring and snapping method practiced by Native Alaskans.

The persons producing the bone tools at Ross apparently replaced their traditional manufacturing tools, which were most likely stone cutting and grinding tools, with more efficient, European-introduced metal-edged blades (Walker and Long 1977). While the manufacturing tools are different, the production techniques appear to have changed little. One might say that the production tools were replaced, but the mental template and the manufacturing techniques remained close to the precontact tradition.

OTHER TOOL PRODUCTION METHODS

Splinters of bone from animals other than whales were also important pieces of raw material. The projectile points and fish hook barbs recovered from NAVS and FRBS are manufactured from relatively dense cortical bone found in terrestrial mammals or large pinnipeds. Five long bone fragments recovered from NAVS exhibit patterned chopping blows designed to split the dense cortical bone lengthwise (Wake 1995, figure 5.11). Such long splinters of thick, dense cortical bone could then be shaped into a variety of artifacts. Each of these incipient artifacts would need some kind of a handle or hand hold to provide purchase when carving the tool. An example of such a practice is illustrated in Lyman (1991:122, figure 5.10d).

The hand hold artifact class is very important in the interpretation of bone tool manufacturing at Ross (plate 11.10). Members of this class often exhibit evidence of a number of production stages. Based on observations of a number of the artifacts categorized as hand holds, at least four stages of production were involved in finishing a

cortical bone tool. The first of these stages is to prepare a suitable blank piece of raw material by either reducing a core or using a preselected piece of bone either split or reduced from a larger chunk of raw material.

The second production step visible on some of the hand holds involves the rough shaping of the artifact. The organization of the metal tool blows is somewhat haphazard, and exhibits few aspects of fine control. The metal tool cut marks associated with this second stage are large, due to the removal of relatively large, thick flakes of bone. By the end of this stage the rough shape of the artifact in production should be evident.

The third stage involves finer shaping and more detailed craftsmanship. The tool marks associated with this stage are much smaller, due to the removal of relatively smaller flakes of bone. The cut marks representative of this stage of production are more numerous, more organized, and generally reflect the application of much more finely controlled force. At the end of this stage of production the artifact should be clearly distinguishable and virtually finished. The only step remaining is the removal of the hand hold itself.

In the fourth stage, the hand hold is removed typically using the scoring and snapping technique. The portion to be removed is grooved around the circumference of the bone and then snapped off. The final stage of artifact production inferred by the use of this technique is the finishing of the snapped-off end of the artifact in question, by carving off the small spur of broken bone near the base of the artifact.

If each artifact in the hand hold class represents a finished tool of some sort, then the number of hand holds would provide a measure of the intensity of tool production in a given area or site. In the case of the Native Alaskan Neighborhood, this artifact class represents at least 30 nearly finished artifacts. If one scored and snapped off end, plus evidence of other carving or work on the object, is all that it takes to put the artifact in the hand hold class, then the number of potential finished tools represented by hand holds at Ross jumps to 87.

Quantifying hand holds provides a much more accurate evaluation of production intensity than the number of finished or broken finished tools at a site. Finished tools often leave the areas where they were made and probably do not return. Broken tools may return to a site but probably do not say much about tool production at that location. Discarded artifacts representative of finished tools and their production, such as hand holds, would most likely tend to stay at the place of manufacture and be the best measure of tool production at that location.

All of the tool production stages mentioned above can be observed on a number of the hand holds in the NAVS and FRBS worked bone assemblages. Most, if not all, of these artifacts show splitting, rough carving with a

metal tool, finer work with a metal tool, and scoring and removal of the last bits of waste bone as one of the final stages of production.

SPATIAL RELATIONSHIPS OF BONE ARTIFACT CLASSES

The distribution of all worked bone remains including both bone flakes and diagnostic bone artifacts is similar to the distribution of the bone flakes themselves. This is not surprising since bone flakes dominate the worked bone assemblage at NAVS. The actual distribution of more diagnostic bone tools is quite different (Wake 1995, figures 6.21, 6.22). The distribution of diagnostic bone tools is generally associated with the bone bed deposits at NAVS. The diagnostic tools, however, are distributed much more evenly than the bone flakes.

COMPARISON OF THE EAST CENTRAL AND SOUTH AREAS

A similarity between the East Central and South areas is seen in the diagnostic bone artifact assemblage. Fishhooks, dart points, awls, and other diagnostic tool types are all quite evenly distributed between the two main excavation areas (Wake 1995, figures 6.21, 6.22). Bone buttons are more common in the South Area (n=4) than the East Central Area (n=1), but the numbers of buttons are too low to represent a significant pattern.

Keeping the above similarity in mind, these two areas differ in a number of important ways. The distribution of a number of the non-diagnostic worked bone artifact classes varies between the East Central and South areas (Wake 1995, figures 6.21, 6.20). Bone, specifically whale bone, and chopping and carving flakes are much more common in the South Area than they are in the East Central Area. Representatives of the hand hold artifact class are found more frequently in the South Area than the East Central Area. Worked antler, on the other hand, is more common in the East Central Area.

With an overall low flake density (Wake 1995, figure 6.19), the distribution of bone flakes is relatively even in the East Central Area, especially in comparison to the South Area. In the South Area the overall flake density is quite high (Wake 1995, figure 6.20), and the distribution of flakes is distinctly patterned with two concentrations of bone chopping flakes. Areas surrounding both of these concentrations show a fall-off pattern in numbers of flakes.

One other obvious difference between these two areas is in the bird bone artifact assemblages. The bird bone tube beads are one of the few diagnostic bone artifact classes that show any patterning. Bird bone tubes are distributed relatively evenly across NAVS. All of the tubes bearing Native California-style decorative patterns, however, are from the South Area Trench and Excavations. Based on this evidence a Native Californian presence, although diffuse, can be seen in the South Area.

ETHNICITY

Bone tools and ornaments were clearly very important to the occupants of the Native Alaskan Neighborhood. The diagnostic bone artifacts recovered provide information regarding a portion of the subsistence and day-to-day activity at the site. They also offer excellent insight into the ethnicity of the persons who produced them. Ethnic identity of the diagnostic tool types is assigned on the basis of the stylistic details of Ross artifacts compared to other artifacts from north-central coastal California, the Aleutian Islands, and Kodiak Island.

Analysis of the diagnostic bone artifacts recovered from the NAVS and FRBS indicates that two general ethnic groups, Native Alaskans and Native Californians, contributed to the worked bone assemblage. Each of these broad ethnic classifications have specific worked bone sub-assemblages associated with them. The fishing and marine mammal hunting assemblages appear to be exclusively Native Alaskan in origin. The artifacts in these assemblages have no apparent Californian homologies (Bennyhoff 1950; Gifford 1940), but do compare favorably to artifacts from the Aleutian Islands and Kodiak Island.

Within this broader Native Alaskan hunting and fishing tool group there appear to be further, ethnically based, divisions. The small dart point series from NAVS and FRBS (figure 11.1) bears a strong resemblance to artifacts found primarily in the Aleutian Islands (Jochelson 1925). Similarly sized points from Kodiak Island appear to be temporally and stylistically distinct from those in the Aleutians and at Ross, and, to date, are not found at Ross.

The fish hook barbs from Ross also show strong ethnic affinities (figure 11.3). The barbs from NAVS and FRBS bear the strongest resemblance to those on fishhooks from Kodiak Island (Clark 1974a, 1974b; Heizer 1956). The fish hook barbs from Ross do not resemble styles from the Aleutian Islands in any way (Jochelson 1925). The Ross barbs are not reminiscent of Californian fishing technology outside of the Northwest Coast tradition areas of the state (Bennyhoff 1950; Gifford 1940).

The bird bone tube ornaments are also strongly tied to certain ethnic groups. As stated previously, three of the four types of bird bone tube ornaments (undecorated, latitudinally incised, and diffuse latitudinal and diagonally incised) are essentially ethnically indistinguishable (plate 11.4a-t). These types are found in both California and Alaska (Clark 1974a, 1974b; Gifford 1940; Heizer 1956). The fourth type, represented by intricately incised crosshatched zoned bone tube fragments (figure 11.4d-g; plate 11.4u-x), appears to be exclusively Native Californian in origin (Bennyhoff 1994; Gifford 1940).

The ethnically distinct bone tool types found at

NAVS and FRBS do not appear to be distributed in any recognizable pattern, with the exception of the California-style bird bone tubes. By and large the diagnostic tool types are evenly distributed across the two main loci investigated at NAVS, the East Central Area and the South Area as well as across FRBS. Nonetheless, the production of these distinctive tool types was likely conducted by persons of different ethnicity. The California-style zoned crosshatched bird bone tube fragments are found only in the South Area at NAVS. This indicates that the Native Californians who owned the tubes, or persons in close enough contact to have acquired such items, were located in this area. The historical record strongly supports this idea (Khlebnikov 1976, 1990).

CONCLUSIONS

A much more complete interpretation of the daily lives of the individuals inhabiting NAVS is available from the archaeological record than was ever written by the Russian historians or visitors to Ross. The worked bone assemblage recovered from the Native Alaskan Neighborhood, while interesting in and of itself, provides information about tool production and ethnicity. This intensive production indicates the profound importance of bone tools and technology to the inhabitants of NAVS and FRBS, and to the Company's operation in California. Hunting tool kits must be maintained and losses replaced in order to keep the hunter viable.

It is quite clear that metal cutting tools were used almost exclusively in the manufacture of bone tools at Ross. Such tools are undoubtedly superior to their non-metal precursors in a variety of ways. The evidence that traditional tool types were still being manufactured at Ross in relatively traditional ways and that not all of the applicable European tools available, such as saws, were used in their most efficient ways indicates that the persons who manufactured these tools were by no means fully acculturated by the Europeans. They were using European tools within the production modes they were familiar with from their traditional, precontact cultures.

Apparently, bone tools were preferred for hunting marine mammals at Ross. No metal marine mammal hunting tools have been found there. In fact, no mention of the use of metal tools in the hunting of marine mammals is found in the historical record (Khlebnikov 1976, 1990). Bone tool kits were undoubtedly easier to maintain and produce than metal ones, and certainly less costly. Raw bone was also probably more readily attainable than processed metal. The techniques involved in producing tools and useful implements of bone, as opposed to metal, are much more simple and portable.

The patterning of the bone tool production debris across NAVS, particularly the pronounced presence of cores and flakes in the South Area, shows that this space was, or was near to, an important whale bone tool production area. The South Area, based on the greater

presence of hand holds, was also a production center of tools made from cortical bone of mammals other than whales. Since worked antler remains were recovered from the East Central Area only, this part of the site was likely the focus of antler tool production.

Life in the Russian-American Company demanded that the Alaskan hunters be ready to hunt or board ships to take them to hunting grounds on a moment's notice (Khlebnikov 1976, 1990). Therefore the bone elements of the hunting kit must be constantly ready, necessitating their continued production and maintenance, and resulting in a great deal of production-related detritus. The bone tools used by the Alaskan hunters were responsible for the early successes in sea otter hunting and the continued provision of marine mammals for food.

The other important aspect of the worked bone assemblage has to do with determining the ethnicity of the occupants of the Neighborhood, and their respective activities. The sea otter darts, for instance, appear to be Aleutian in overall style, implying possible Unangas dominance in sea otter hunting at Colony Ross, or at least in production of dart points there. This type of small dart point (type 1 series, figure 11.1a-c) with its associated technology was accepted by the Company as the optimal sea otter hunting method. This preference could result in production of artifacts in this style by the majority of tool carvers of different ethnicities.

In contrast to the sea otter dart points, the fishing assemblage, specifically the barb sections, appears to be Alutiiq in style (figure 11.3) suggesting that Alutiiq tool types and fishing techniques prevailed at Ross.

In sum, the bone tools and worked bone from Ross tell us that at least three ethnic groups were involved in producing the bone tool and artifact assemblage found there: Unangan, Alutiit, and Native Californians. Production and use of bone tools and artifacts was an important part of the economy at Ross, as indicated by the large number of specimens related to the manufacturing sequence. The Colony could not have been viable without the Native Americans who lived there and the bone tools they produced and used with remarkable efficiency.

REFERENCES

- Adams, William Hampton
1987 Plantation Health and Medical Care. In *Historical Archaeology of Plantations at Kings Bay, Camden County, Georgia*. William Hampton Adams, editor, pp. 199-216. University of Florida Reports of Investigations, no. 5.
- Barrett, S. A.
1952 Material Aspects of Pomo Culture. *Bulletin of the Public Museum of the City of Milwaukee, Vol. 20, Part 2*. Milwaukee, WI.

- Bennyhoff, James A.
1950 Californian Fish Spears and Harpoons. *University of California Anthropological Records* 9(4):i-iv, 295-337.
- 1994 Central California Augustine: Implications for Northern California Archaeology. In *Toward a New Taxonomic Framework for Central California Archaeology: Essays by James A. Bennyhoff and David A. Fredrickson*, edited by Richard E. Hughes, pp. 65-74. Contributions of the University of California Archaeological Research Facility, no. 52. Berkeley.
- Birket-Smith, Kaj
1953 *The Chugach Eskimo*. Nationalmuseets Skrifter. Etnografisk Raekke, no. 7.
- Boling, Sarah Jane
1987 Clothing and Personal Adornment at Kings Bay. In *Historical Archaeology of Plantations at Kings Bay, Camden County, Georgia*, edited by William Hampton Adams, pp. 217-24. University of Florida Reports of Investigations, no. 5.
- Clark, Donald W.
1974a *Koniag Prehistory: Archaeological Investigations at Late Prehistoric Sites on Kodiak Island, Alaska*. Tubinger Monographien zur Urgeschichte, Band 1. Verlag W. Kohlhammer, Stuttgart.
- 1974b *Contributions to the Later Prehistory of Kodiak Island, Alaska*. National Museum of Man, Mercury Series. Paper no. 20, Archaeological Survey of Canada.
- Crowell, Aron
1988 Dwellings, Settlement, and Domestic Life. In *Crossroads of Continents: Cultures of Siberia and Alaska*, edited by William W. Fitzhugh and Aron Crowell, pp. 194-208. Smithsonian Institution Press, Washington D.C.
- De Laguna, Frederica
1972 *Under Mount Saint Elias: The History and Culture of the Yakutat Tlingit*. Smithsonian Contributions to Anthropology vol. 7, part 1. Smithsonian Institution Press, Washington D.C.
- 1975 *The Archaeology of Cook Inlet, Alaska*, second edition. Alaska Historical Society, Anchorage.
- Felton, David L., and Peter D. Schulz
1983 *The Diaz Collection: Material Culture and Social Change in Mid-Nineteenth-Century Monterey*. California Archaeological Reports, no. 23.
- Fitzhugh, William W., and Aron Crowell
1988 *Crossroads of Continents: Cultures of Siberia and Alaska*. Smithsonian Institution Press, Washington D.C.
- Furnis, C. Lynn
1990 Buttons. In "For a Good Boy": Victorians on Sacramento's J Street, edited by Mary Praetzellis and Adrian Praetzellis, pp. 55-57. Anthropological Studies Center, Sonoma State University.
- Gifford, Edward Winslow
1940 Californian Bone Artifacts. *University of California Anthropological Records* 3(2):i-iv,153-237.
- Heizer, Robert F.
1956 Archaeology of the Uyak Site, Kodiak Island, Alaska. *University of California Anthropological Records* 17(1):i-vi,1-199.
- Hrdlicka, Ales
1944 *The Anthropology of Kodiak Island*. The Wistar Institute of Anatomy and Biology, Philadelphia.
- Istomen, Alexi A.
1992 *The Indians at the Ross Settlement: According to the Censuses by Kuskov, 1820-1821*. Fort Ross Interpretive Association, Jenner, California.
- Jochelson, Waldemar
1925 *Archaeological Investigations in the Aleutian Islands*. Carnegie Institution of Washington Publication Number 367.
- Johnson, Eileen
1983 A Framework for Interpretation in Bone Technology. In *Carnivores, Human Scavengers and Predators: A Question of Bone Technology*, edited by Genevieve M. LeMoine and A. Scott MacEachern, pp. 55-93. Proceedings of the Fifteenth Annual Chacmool Conference. The Archaeological Association of the University of Calgary.
- 1985 Current Developments in Bone Technology. In *Advances in Archaeological Method and Theory*, vol. 8, edited by Michael B. Schiffer, pp.157-235. Academic Press, New York.
- 1989 Human Modified Bones from Early Southern Plains Sites. In *Bone Modification*, edited by Robson Bonnichsen and Marcella H. Sorg, pp. 431-72. Peopling of the Americas Publications, edited Volume Series. Center for the Study of the First Americans, Institute for Quaternary Studies, University of Maine, Orono.
- Jordan, Richard H., and Richard A. Knecht
1988 Archaeological Research on Western Kodiak Island, Alaska: The Development of Koniag Culture. In *Aurora: The Late Prehistoric Development of Alaska's Native People*, edited by Robert D. Shaw, Roger K. Harritt, and Don E. DuMond, pp. 225-306. Alaska Anthropological Association Monograph Series, no. 4.
- Khlebnikov, Kirill T.
1976 *Colonial Russian America: Kyrill T. Khlebnikov's Reports, 1817-1832*. Translated and edited by Basil Dmytryshyn and E. A. P. Crownhart-Vaughan. Oregon Historical Society, Portland.
- 1990 *The Klebnikov Archive. Unpublished Journal (1800-1837) and Travel Notes (1820, 1822, and 1824)*. The Rasmuson Library Historical Translation Series, vol. 5. Edited by Leonard Shur, translated by J. Bisk. University of Alaska, Fairbanks.

- Liapunova, Roza Gavrilovna
 1975 *Ocherki po Etnografii Aleutov: Konets XVIII-Pervaia Polovina XIX*. Istitut Etnografii, Leningrad.
- Lightfoot, Kent G., Thomas A. Wake, and Ann M. Schiff
 1991 *The Archaeology and Ethnohistory of Fort Ross, California: Vol.1, Introduction*. Contributions of the University of California Archaeological Research Facility no. 49. Berkeley.
 1993 Native Responses to the Russian Mercantile Colony of Fort Ross, Northern California. *Journal of Field Archaeology* 20:159-75.
- Lyman, R. Lee
 1991 *Prehistory of the Oregon Coast: The Effects of Excavation Strategies and Assemblage Size on Archaeological Inquiry*. Academic Press, New York.
- MacGregor, Arthur
 1985 *Bone, Antler, Ivory and Horn: The Technology of Skeletal Materials since the Roman Period*. Croom Helm Ltd., London.
- Miller, Susanne J.
 1989 Characteristics of Mammoth Bone Reduction at Owl Cave, the Wasden Site, Idaho. In *Bone Modification*, edited by Robson Bonnichsen and Marcella H. Sorg, pp. 381-94. Peopling of the Americas Publications, Edited Volume Series. Center for the Study of the First Americans, Institute for Quaternary Studies, University of Maine, Orono.
- Ogden, Adele
 1941 *The California Sea Otter Trade, 1784-1848*. University of California Press, Berkeley.
- Riddell, Francis A.
 1955 Archaeological Excavations on the Farallon Islands, California. Paper on California Archaeology 34. *University of California Archaeological Survey Report, no. 32*.
- Rousselot, Jean-Loup, William W. Fitzhugh, and Aron Crowell
 1988 Maritime Economies of the North Pacific Rim. In *Crossroads of Continents: Cultures of Siberia and Alaska*, edited by William W. Fitzhugh and Aron Crowell, pp. 151-72. Smithsonian Institution Press, Washington D.C.
- Scammon, Charles M.
 1874 *The Marine Mammals of the Northwestern Coast of North America, Described and Illustrated: Together with an Account of the American Whale Fishery*. John H. Carmany and Company, San Francisco.
- Shubin, Valeri
 1990 Russian Settlements in the Kurile Islands in the 18th and 19th Centuries. In *Russia in North America: Proceedings of the 2nd International Conference on Russian America*, edited by Richard A. Pierce, pp. 425-50. Limestone Press, Fairbanks, Alaska.
- Wake, Thomas A.
 1995 *Mammal Remains from Fort Ross: A Study in Ethnicity and Culture Change*. Unpublished Ph.D. dissertation, U.C. Berkeley. University Microfilm International, Ann Arbor, Michigan.
- Walker, P. L., and J. C. Long
 1977 An Experimental Study of the Morphological Characteristics of Tool Marks. *American Antiquity* 42(4):605-16.

Mammal Remains from the Native Alaskan Neighborhood

THOMAS A. WAKE

DETAILED ANALYSIS of the vertebrate faunal remains from Colony Ross provides a substantial amount of information that aids in identifying the cultural affiliation of the occupants of various areas of the settlement and their respective levels of cultural change. The effects of interethnic relationships and interactions are registered through observation of relative frequencies of dietary constituents, element distributions, butchery patterns, fragmentation, and burning, with reference to models discussed by various authors (Crabtree 1990; Crader 1984, 1990a, 1990b; Gust 1983; Jolley 1983; Langenwaller 1980, 1987; Langenwaller and McKee 1985; Lyman 1987; McKee 1987; Moyer 1993; Reitz and Cumbaa 1983; Schulz and Gust 1983). In this chapter, I present the analysis of faunal remains recovered from the Native Alaskan Neighborhood at Colony Ross, the Fort Ross Beach Site (CA-SON-1898/H) and the Native Alaskan Village Site (CA-SON-1897/H). I also refer briefly to various north coastal Californian archaeological mammal samples in order to establish the parameters of the region's typical late prehistoric period mammalian diet.

Three ethnically distinct neighborhoods have been broadly delineated in the vicinity of the Stockade complex: Russian, Native Californian, and Native Alaskan (Lightfoot et al. 1991, 1993). Excavation of two areas within the Native Alaskan Neighborhood at Colony Ross, the Fort Ross Beach Site (FRBS) and the Native Alaskan Village Site (NAVS), has yielded large vertebrate faunal assemblages. These assemblages are especially significant due to the fact that they come from an area associated with a strong Alaskan ethnic identity, as indicated in the historical record (Fedorova 1973; Khlebnikov 1976, 1990). A map of the Ross Colony, produced in 1817 and published by Svetlana Federova

(1973), specifically points out the location of the "Aleut encampment."

Given the fact that the marine environments along the California and Alaska coasts are more similar than different, if "Aleuts" were responsible for the formation of FRBS and NAVS, then one would expect a faunal assemblage exhibiting Native Alaskan dietary patterns (Birket-Smith and De Laguna 1938; Clark 1974; De Laguna 1972; Denniston 1974; Grinnell 1901; Hughes 1984; Lantis 1984; Lippold 1972). The presence of a typical Native Alaskan faunal assemblage would indicate strong cultural continuity and a minimal level of dietary acculturation or change. A modified pattern, however, might indicate some degree of cultural or dietary exchange.

It is important to remember that the majority of Native Alaskan people present at Ross had been born and raised under Russian domination. Subtle changes in traditional diets in Alaska may have taken place before the occupation of Ross due to introductions of new dietary items by the Russians. Even more likely, the breakdown of the traditional social order and seasonal round by removal of Native Alaskan men for extended sea otter hunting expeditions (Veltre 1990) could have altered dietary patterns. On the other hand, the traditional types of Alaskan resource exploitation may have had more effect on Russian diets than the Russians had on Alaskan diets. Numerous accounts tell of Russian *promyshlenniks* adopting aspects of traditional Native Alaskan subsistence practices (Gibson 1976; Hrdlicka 1944; Khlebnikov 1990).

One other tremendously influential aspect of cultural interaction at Ross is cohabitation and marriage. The historical record makes it clear that individuals belonging to a number of different ethnic groups either lived

together or were married to one another at Ross (Jackson 1983). Ross census information from 1820 and 1821 provided by Ivan Kuskov (see chapter 1), shows clearly that interethnic cohabitation and marriage, often resulting in Creole and mixed Native Alaskan-Californian children, were commonplace. Such relationships provide the most fertile ground for cultural interaction, accommodation, and change at the Colony. NAVS was most likely composed of a number of interethnic households occupied by Native Alaskan men and Native Californian women.

The relative level of dietary acculturation of the inhabitants of NAVS and FRBS can be seen as a function of the degree of variation from traditional late prehistoric period diets. If, once assigned a tentative ethnic identity, the faunal assemblages from Colony Ross do not show much variation from traditional precontact or early contact sites, then it can be assumed that the individual Native American peoples present at the Colony were still continuing their usual dietary patterns without much influence from the other European and Native American groups there. If the Colony Ross faunal assemblages vary noticeably from Alaskan or Californian precontact dietary assemblages, however, then some level of dietary acculturation involving the incorporation of non-traditional foods into Native American diets probably occurred, and interpretations may be generated about the nature of culture change.

METHODS AND MATERIALS

The material examined in this chapter consists of the identifiable mammal remains that appear to be directly related to food consumption. A number of pieces of mammal bone recovered from both NAVS and FRBS may have been consumed as food originally, but have been modified as a result of bone tool production and hence are not included in this analysis. The worked bone specimens are described and discussed in chapter 11 of this volume.

The bulk of the whale bone recovered from NAVS and FRBS is modified as a result of tool production, but whale bone that appears to be unmodified, except for consumption related activity such as meat removal or burning, is discussed here. Six identifiable elements that show evidence of tool production related modification, but are also close to their initial post-consumption state, are included in this analysis. These include the two identified grizzly bear (*Ursus arctos*) elements, three elk (*Cervus elaphus*) antler specimens, and one Steller's sea lion (*Eumetopias jubatus*) element.

GENERAL SORTING AND IDENTIFICATION METHODOLOGY

The majority of the vertebrate faunal remains from FRBS and NAVS were sorted and catalogued in a preliminary fashion by graduate and undergraduate archaeology students enrolled in the U.C. Berkeley

laboratory analysis class, "Analysis of the Archaeological Record," offered subsequently to each Fort Ross Archaeological Project field season, during the fall semesters of 1988, 1989, and 1991. Preliminary sorting and analysis were also undertaken at various times by undergraduate students taking independent study classes and working on senior honors theses. In most instances the vertebrate faunal remains were simply separated from invertebrate faunal remains. Occasionally some bags were separated by vertebrate class, i.e. fish, bird, or mammal.

The author is responsible for the final sorting by vertebrate class and identification of all of the mammalian remains discussed in this chapter, except where noted from previously published sources. The skeletal elements included in this analysis are identifiable at least to the taxonomic level of Order, such as Insectivore, Rodent, or Carnivore. Bone not identifiable to the ordinal level is treated simply as non-identifiable bone and counted. Any evidence of modification of fragmentary bone such as burning, butchery, or artifact production is noted.

The vertebrate faunal remains were first segregated into taxonomic classes: fish, amphibians, reptiles, birds, and mammals. The remains from each major vertebrate class were then bagged separately. All of the remains belonging to each respective class were subsequently sorted into identifiable and unidentifiable categories. Each class of identifiable vertebrate faunal remains was then ascribed to the most discrete taxonomic level possible.

Actual identification of the mammalian remains to the lowest possible taxonomic level was aided by direct comparison to known specimens held in the osteological collections of the U.C. Berkeley Archaeological Research Facility, the U.C. Berkeley Museum of Vertebrate Zoology, and the California Academy of Sciences. Reference to a variety of manuals and publications designed to aid in the identification of vertebrate fauna also proved useful (DeBlase and Martin 1974; Gilbert 1980; Hall 1981; Hildebrand 1955; Hill 1937; Hillson 1992; Hooper and Hart 1962; Jameson and Peeters 1988; Kasper 1980; Lawrence 1951; Lyman 1991; Lyon 1937; Olsen 1960, 1964, 1978, 1982; Smith 1979; Vaughan 1972).

During the process of assigning each identifiable skeletal element to the most discrete taxonomic level possible, a number of biological and cultural attributes were noted. In addition to provenience information and catalog numbers, the following data were recorded: taxon, skeletal element, side, condition (complete, proximal, distal, shaft, fragment, or any combination of the previous), age, burning, and food processing and/or butchery marks.

To date, no amphibian or reptile remains have been identified from any excavations in the vicinity of the

Stockade complex at Ross. There are various species of both in the local area and it would not be surprising to find them in future investigations.

James P. Quinn of Sonoma State University identified the fish remains recovered from the 1988 excavations at FRBS. Dr. Kenneth W. Gobalet of California State University, Bakersfield identified the fish remains recovered from the 1989 excavations at FRBS and the 1991 excavations of the Native Alaskan Village Site (chapter 14). Dwight D. Simons identified the avian remains from the 1988 and 1989 excavations of FRBS and the 1991 excavations of NAVS (chapter 13).

I focus on the mammal remains from the Native Alaskan Neighborhood (or Neighborhood) for several reasons: numerically, mammals represent the bulk of the vertebrate remains recovered at these sites; mammal remains represent the greatest potential source of protein at the Colony; and mammal remains, in general, can show specific ethnic preferences and point to social stratification (Crader 1984, 1990a, 1990b; Gust 1983; Ijzereef 1989; Jolley 1983; Langenwalter 1980, 1987; Langenwalter and McKee 1985; Lyman 1987; McKee 1987; Reitz and Cumbaa 1983; Schulz and Gust 1983). This is not to say that the other classes of vertebrate faunal remains from the Neighborhood do not reveal interesting and informative patterning. On the contrary, the species frequencies and distributions observed in the fishes and birds are noteworthy and appear to show specific ethnic, technological, and social signatures (see chapters 13 and 14).

QUANTIFICATION

Quantification of the mammalian skeletal remains relies on basic counting strategies to determine the total numbers of bones and bone fragments, the number of identifiable specimens per taxon (NISP), and minimum numbers of individuals (MNI) for each mammal species (Grayson 1984; Klein and Cruz-Uribe 1984). The faunal remains recovered from each site are treated as separate stratigraphic aggregates for the purposes of NISP and MNI generation (Grayson 1984). The NISP measure is a straight count of the number of skeletal elements per identified taxon. Minimum numbers of individuals were determined by adding up numbers of the most common paired elements of a given taxon (Grayson 1984; Klein and Cruz-Uribe 1984). Both NISP and MNI measures are discussed below. These measures are also treated relative to one another as frequencies (percentages) of the total faunal assemblage in order to determine the more economically important taxa and to observe any differences in relative frequencies of mammals between the four areas within the Colony.

RESULTS

The FRBS sample consists of mammal remains recovered during surface collections; excavation of 30 m

of the eroding, ocean-facing portion of the site; and two excavation areas up slope to the north of the profiled face of the site, the Southwest Bench and the East Bench. All of these units were screened through either 6.5 mm or 3 mm mesh and excavated to sterile soil levels. The NAVS sample consists of mammal remains recovered from the 1991 and 1992 excavation of the 1 m square South Central Test Unit, and three 1 m wide trenches; the 3 m West Central Trench, the 5 m East Central Trench, and the 7 m South Trench. The East Central and South trenches were placed in surface depressions that appear to be remains of semi-subterranean house structures (chapter 3). The South Central Test Unit was excavated near the eroding cliff edge of the site. All of the sample units at NAVS in 1991 were excavated to the underlying decomposing sandstone bedrock layer or sterile clay.

IDENTIFIED MAMMALS

The identified mammals recovered from excavations at FRBS and NAVS are presented together in table 12.1. A total of 2,815 mammalian skeletal elements were identified from FRBS. Skeletal elements identifiable to more discrete taxonomic levels than simply mammal numbered 735 at FRBS (see appendix 12.1). A larger total of 11,112 mammal elements were identified from NAVS. Mammal skeletal elements identifiable to more discrete taxonomic levels numbered 1,560 at this site (see appendix 12.2). The unidentified mammal remains from both NAVS and FRBS are presented in table 12.2.

INSECTIVORES

One of the interesting aspects of the faunal assemblages from FRBS and NAVS is the relatively low number ($n=3$) of supposedly intrusive insectivores. These animals are usually much more common in Californian faunal assemblages (Basgall and Hildebrandt 1989; Bickel 1981; Chartkoff and Chartkoff 1983; Duque 1989; Gifford and Marshall 1984; Langenwalter et al. 1989; Schwaderer 1992; White 1984). Since much of the excavated sediments from both NAVS and FRBS was passed through 3 mm or 1.5 mm mesh, this pattern is not attributable to recovery bias.

It should be noted that insectivores, moles (Talpidae: *Scapanus latimanus*) specifically, were exploited by Native Californians (Gifford 1967). It is possible, but not probable, that the mole remains may not be simply intrusive. Herman James told E. W. Gifford that the skins of moles were used by the Kashaya Pomo:

The mole, ka'wa, was not eaten but the skins of albino moles were supposed to bring good luck in gambling. Ordinary mole skins were not used. The little animals were dug from the ground in search of albinos, the albino skins being kept in a skin bag like a quiver. Shamans, however, did not use these skins in their profession (Gifford 1967:17).

Table 12.1 *Identified Mammals from the Native Alaskan Neighborhood*

Common name	Scientific name	FRBS		NAVS	
		NISP	MNI	NISP	MNI
Broad-Handed Mole	<i>Scapanus latimanus</i>	2	1	1	1
Black-Tailed Jackrabbit	<i>Lepus californicus</i>	0	0	1	1
Brush Rabbit	<i>Sylvilagus bachmani</i>	1	1	0	0
Botta's Pocket Gopher	<i>Thomomys bottae</i>	0	0	156	7
Bushy-Tailed Woodrat	<i>Neotoma fuscipes</i>	1	1	0	0
California vole	<i>Microtus californicus</i>	1	1	8	2
Porpoise	Phocoenidae	4	1	8	2
Whale	Cetacea	1	1	11	1
Wolf	<i>Canis cf. lupus</i>	1	1	0	0
Coyote	<i>Canis latrans</i>	0	0	1	1
Dog	<i>Canis cf. familiaris</i>	1	1	0	0
Dog	<i>Canis sp.</i>	2	1	6	1
Canid	Canidae	0	0	1	1
Bobcat	<i>Felis rufus</i>	0	0	2	1
Mountain Lion	<i>Felis concolor</i>	0	0	6	1
Grizzly Bear	<i>Ursus arctos</i>	0	0	2	1
Bear	<i>Ursus sp.</i>	2	1	0	0
Sea Otter	<i>Enhydra lutris</i>	14	1	6	1
Mustelids	Mustelidae	1	1	3	1
Carnivore	Carnivora	4	1	12	2
Steller's Sea Lion	<i>cf. Eumatopias jubatus</i>	3	1	13	2
California Sea Lion	<i>Zalophus californianus</i>	61	2	71	6
Northern Fur Seal	<i>Callorhinus ursinus</i>	0	0	1	1
Eared Seals	Otariidae	125	2	258	3
Elephant Seal	<i>cf. Mirounga angustirostris</i>	1	1	0	0
Harbor Seal	<i>Phoca vitulina</i>	88	4	98	4
Earless Seals	Phocidae	1	1	0	0
Large Seal	Large Pinniped	5	1	4	1
Seals	Pinnipedia	116	2	181	2
Pig	<i>Sus scrofa</i>	5	1	9	2
Wapiti	<i>Cervus elaphus</i>	2	1	9	1
Black-Tailed Deer	<i>Odocoileus hemionus</i>	158	5	272	6
Cow	<i>Bos taurus</i>	41	3	87	4
Goat	<i>Capra hircus</i>	1	1	0	0
Sheep	<i>Ovis aries</i>	22	3	58	5
Cow/Sheep/Goat	Bovidae	62	2	7	1
Artiodactyl	Artiodactyla	9	1	268	2
Total		735	44	1560	64

NISP = Number of Identified Specimens per
Taxon

MNI = Minimum Number of Individuals

Table 12.2 *All Mammals from the Native Alaskan Neighborhood*

Category	FRBS	NAVS
Identified Mammals (table 12.1)	735	1560
Large Mammal	1390	1338
Medium Mammal	464	17
Small Mammal	84	6
Mammal	142	8191
Total	2815	11112

Gambling was popular with the various Pomo groups and is well known among Native Californians (Barrett 1952; Kroeber 1925; LaPlace 1986[1839]; Loeb 1926). Apparently common at Ross, Cyrille LaPlace describes gambling in a village close to the Colony (1986[1839]:70-71). Consequently, it would not be out of the question to discover mole remains in non-intrusive contexts. The conservative approach is to consider these mole remains as intrusive, however, due to a decided lack of evidence of butchery or burning and their sparse, random distribution.

RODENTS

Another interesting aspect of the FRBS and NAVS mammal assemblages is the relatively low number of supposedly intrusive rodents. Rodents, intrusive or not, are typically much more common in Californian faunal assemblages (Basgall and Hildebrandt 1989; Bickel 1981; Chartkoff and Chartkoff 1983; Duque 1989; Gifford and Marshall 1984; Langenwaller et al. 1989; Schwaderer 1992; Simons 1990, 1992; White 1984). Archaeologists, especially in California, commonly assume that rodent remains recovered from archaeological excavations are generally intrusive. There are many accounts, however, of Native Californians exploiting and consuming "intrusive" rodents for a variety of purposes (Barrett 1952; Gifford 1967; Kniffen 1939). Kniffen (1939), Gifford (1967), and Barrett (1952) all mention rodents as being consumed by the Pomo peoples.

Gifford (1967:17) states that gophers and voles, among others, were snared and killed with sticks. After their backbones had been pounded, they were then cooked over coals and eaten. Barrett (1952:97) also describes the pounding of rodents prior to cooking "... so as to reduce the meat and bones more or less to a pulp." Barrett goes on to state that animals treated in this fashion were consumed completely, meat, skin, and bones. If bones of rodents are pounded, consumed, and then passed through the digestive system, they will be difficult to recover archaeologically.

In light of the many accounts of crop destruction by rodents at Ross (Khlebnikov 1976, 1990), large numbers of rodent bones might be expected. That was simply not the case, however. Fully 87 of the 119 gopher elements recovered from unit 75S, 3E at NAVS are from one relatively recent, intrusive articulated skeleton. None of the rodent bones show any sign of burning or other modification indicative of processing or consumption by humans. These remains are most likely intrusive and not the result of exploitation for food or other purposes.

LAGOMORPHS

Rabbits are typically well represented in faunal assemblages throughout much of California (Basgall and Hildebrandt 1989; Bickel 1981; Chartkoff and Chartkoff

1983; Duque 1989; Gifford and Marshall 1984; Langenwaller et al. 1989; Schwaderer 1992; Simons 1990; White 1984). The presence of rabbits in the Ross Region is mentioned by Khlebnikov, so they were certainly available (1976:124).

I expected to find a relatively high frequency of rabbits in these samples but did not in either the Beach or Village sites. One jackrabbit element was recovered from NAVS. One brush rabbit element was recovered from FRBS. No rabbits were found in the sample from the Mad-Shui-Nui locus of CA-SON-190 (Wake 1995). It is interesting to note that no rabbit remains were recovered from the Albion sites (CA-MEN-1704, CA-MEN-1809, CA-MEN-1844) in Mendocino County (Layton 1990). Based on these data, rabbits apparently were not a very important food resource, even prehistorically, in the coastal region north of the Russian River.

In contrast, cottontail rabbits (genus *Sylvilagus*) and jackrabbits (*Lepus californicus*) were exploited widely in most areas of California for food and furs (Gifford 1967; Moratto 1984; Steward 1933). Cottontails (*Sylvilagus bachmani*) are well represented at Duncan's Point Cave (CA-SON-348/H), a coastal site near the mouth of the Russian River in southern Sonoma County (Schwaderer 1992). This site is considered by many to mark the border of Kashaya Pomo territory to the north and Coast Miwok territory to the south (Gifford and Kroeber 1937; Kroeber 1925; McClendon and Oswalt 1978; Stewart 1943).

CARNIVORES

Remains of three groups of large carnivores (bears, dogs, and cats) are present in these assemblages (see table 12.1). Although low in number, these remains are representative of animals that were a very real threat to both the colonists and livestock, especially the bears and large cats. For example, Khlebnikov (1976:118) briefly recounts what could be a somewhat apocryphal tale in the light of bull and bear fights, common in Spanish and Mexican California during this period.

During Kuskov's administration one huge bull came in all covered with blood, with pieces of flesh torn out, and his horns all gory, which indicated that he had inflicted considerable injury on his attacker.

He also states that "... sometimes livestock became separated from the herd and were killed by bears and wildcats" (Khlebnikov 1976:118).

SEA OTTERS

Much can be said about the relationship between sea otters and the Russian-American Company. It will suffice to say that the Company would not have existed were it not for the great demand for sea otter furs, and that sea otters would certainly have fared better if they

did not have such luxurious pelage. Surprisingly low numbers ($n=20$) of sea otter remains are found in the FRBS and NAVS assemblages. This was quite unexpected for a fur company trading base like Ross. The available historical record contains no mention of consumption of otters as food (Khlebnikov 1976, 1990; Tikhmenev 1978). Realistically, this pattern is probably due to the processing of otters for their pelts at sea, or elsewhere away from Ross (Ogden 1941:97).

Sea otters were quickly hunted out in areas close to the Colony (Khlebnikov 1976, 1990; Ogden 1941). This fact has serious ecological implications for the Ross area and other areas where it took place (Simenstad et al. 1978). The near shore environment at Ross is likely very different than it was when otters were present. In San Francisco Bay, though not at Colony Ross, sea otters were apparently an important, prehistoric food resource (Broughton 1994; Simons 1992).

PINNIPEDS

Seals are well represented in both samples. Two species of seals predominate: the harbor seal (*Phoca vitulina*) and the California sea lion (*Zalophus californianus*). Other seal species are found in the general area of Colony Ross. These species include the northern elephant seal (*Mirounga angustirostris*), Steller's sea lion (*Eumetopias jubatus*), and the northern fur seal (*Callorhinus ursinus*). None of these other seal species are found in significant numbers at Colony Ross, however, with the exception of a few Steller's sea lion elements. Seals, in general, provided a variety of useful raw materials for the inhabitants of Colony Ross including food, blubber, oil, furs, gut for waterproof clothing (*kamleikas*), hides for skin boats (*baidarkas* and *baidaras*), bladders for floats, and bone for tool manufacture (Khlebnikov 1976, 1990).

The less discretely identifiable seal skeletal elements are divided into two basic groups based on their relative levels of diagnosticity. Skeletal elements identifiable only as seal were classed as pinniped. Two pinniped bones show processing marks—one dismemberment mark and one chop mark from a heavy tool. Elements identifiable to a more discrete taxonomic level, such as Family, are assigned to either the Phocidae (the earless seals) or the Otariidae (the eared seals). The bulk of the elements assigned to these levels of identification lack specific diagnostic characteristics such as phalanges, bone, and teeth of some juveniles. Six of the otariid bones show evidence of butchery. Four bones show dismemberment cuts, and two bones show chopping blows from a heavy metal bladed tool. Tables 4.3 and 4.4 in Wake 1995a present further details on the seal skeletal elements.

California sea lions are common off the state's coast (Ingles 1954; Jameson and Peeters 1988; Riedman 1990;

Scheffer 1958). According to Kirill Khlebnikov (1976:123, 1990) sea lions were the most economically important pinniped species at Ross. Sea lions provided everything from fresh, salted, and dried meat, to gut and hides, and also oils and fat. California sea lions are numerous among the discretely identifiable pinniped remains from Colony Ross. Individual California sea lion skeletal elements recovered from FRBS and NAVS are presented in table 12.3.

Many of these sea lion elements at Ross were probably procured on the Farallon Islands (Khlebnikov 1976, 1990; Ogden 1941; Riddell 1955). According to Khlebnikov (1976:123):

Every year up to 200 sea lions are killed for their hides, called *lavtaks*, their intestines and meat and fat. The *lavtaks* are used to make *baidarkas* in the settlement; intestines are used for making *kamleis*, [waterproof garments] and as much as 100 or 150 puds of meat is salted; in addition, the Aleuts dry some 200 or 300 chunks of it. The fat is stored in small kegs and is used both as food for the Aleuts and for lighting purposes.

The butchery patterns and element distributions of the sea lions suggest an interesting pattern. Skeletal elements from the flippers dominate the sea lion assemblage. Other relatively numerous elements in individual sea lion skeletons, such as vertebrae and ribs, are underrepresented (see table 12.3 and Wake 1995a, figures 4.4, 4.5). Long bone elements, shoulder girdle, and pelvic girdle elements, all associated with large volumes of usable meat, are also underrepresented.

Twenty-five of the 132 California sea lion elements from both sites show evidence of processing. Butchery evidence is found on 12 of the 25 flipper elements. Thirteen of the sea lion skeletal elements exhibit exclusively dismembering cut marks. These cut marks are associated with the articular surfaces of the proximal or distal ends of bones and their associated connective tissue. All of these cut marks were made by metal tools (Walker and Long 1977). Five of the 132 sea lion elements show evidence only of filleting, the removal of meat from the bones. These cuts, near muscle attachments, are related to the removal of muscle tissue from bones. Longitudinal cut marks found on shafts are also associated with filleting. Seven bones show evidence of both filleting and dismemberment. Three bones, all flipper elements, show chopping blows from a heavy tool. This evidence suggests that at least some butchering was occurring in the Native Alaskan Neighborhood.

Harbor seals are also well represented. Interestingly, harbor seal bones are more numerous than sea lion bones in the archaeofaunal assemblages from both NAVS and FRBS. Harbor seals have a much thicker layer of blubber than California sea lions. The greater fat content of harbor seals may have made them a more desirable

Table 12.3 Identified California Sea Lion (*Zalophus californianus*) Skeletal Elements from Colony Ross (NISP)

Element	NAVS	FRBS
occipital condyle	0	1
incisor	0	1
canine	0	1
premolar	0	1
UI 2	0	2
U Pm 2	0	1
L Pm 3	0	1
atlas	1	0
axis	1	0
thoracic vertebra	4	0
lumbar vertebra	2	0
caudal vertebra	0	1
P scapula	1	0
D scapula	0	2
P humerus	0	1
S humerus	3	0
D humerus	1	2
D radius	1	1
ulna	1	0
P ulna	5	0
carpal	1	3
cuneiform	1	0
cuboid	0	1
intermedium	0	1
lunar	0	1
scapholunar	0	1
P metacarpal	0	1
D metacarpal	1	4
metacarpal 1	5	0
P metacarpal 1	0	1
D metacarpal 1	1	0
metacarpal 2	0	2
metacarpal 3	0	1
P metacarpal 3	1	0
metacarpal 4	1	0
sacrum	0	1
ilium	1	0
pubis	1	0
femur	1	0
D femur	0	1
P tibia	1	0
fibula	1	0
S fibula	1	0
D fibula	3	0
tarsal	0	2

Element	NAVS	FRBS
astragalus	4	2
calcaneus	2	1
metatarsal	0	2
P metatarsal	1	0
D metatarsal	0	1
metatarsal 2	2	0
P metatarsal 2	2	0
D metatarsal 2	0	1
metatarsal 4	1	1
P metatarsal 4	1	0
D metatarsal 4	1	0
P metatarsal 5	1	0
phalanx 1	0	4
phalanx 1 d 1	3	1
phalanx 1 d 2	1	0
phalanx 1 d 3	1	0
phalanx 1 d 4	0	1
phalanx 1 d 5	1	1
phalanx 2	4	5
phalanx 2 d 1	1	0
phalanx 2 d 3	0	2
phalanx 2 d 5	1	0
phalanx 3	3	3
phalanx 3 d 1	1	0
rib 1	0	1
Totals:	71	61
MNI:	6	2

D = Distal
MNI = Minimum Number
of Individuals
P = Proximal

S = Shaft
UI 2 = Upper Incisor 2
U Pm 2 = Upper Premolar 2
L Pm 3 = Lower Premolar 3

cont'd.

item of prey; they were probably more readily accessible from Colony Ross as well. Today they can be seen hauled out on the sand bar at the mouth of the Russian River and on some of the rocks in Fort Ross Cove. They are generally more common in sheltered areas along the rocky outer coast (Ingles 1954; Jameson and Peeters 1988; Riedman 1990; Scheffer 1958). The harbor seal skeletal elements recovered from these two sites are presented in table 12.4.

Eighteen of the 186 harbor seal bones from both sites show evidence of butchery consisting of cut marks and a chop mark produced by metal-edged tools (Walker and Long 1977). All of the butchered or processed mammal remains observed to date from Colony Ross were processed using metal tools. Ten of the harbor seal elements show dismembering marks only. Three bones show only filleting marks. Four bones exhibit both filleting and dismembering marks. One element shows a chopping blow from a relatively heavy metal bladed tool.

The butchery patterns and element distributions of the harbor seals are similar to those of the sea lions, suggesting a standardized seal butchery pattern (see figure 12.1, identified seal element frequencies; Wake 1995a, figures 4.4, 4.5). As seen in the sea lions, skeletal elements from the flipper elements dominate the harbor seal assemblage. Skeletally numerous elements such as ribs are underrepresented among harbor seals, as with the

sea lions. However, harbor seal head elements, such as skull fragments, and vertebrae are more common than their sea lion counterparts. As seen in the sea lions, harbor seal long bone elements, shoulder girdle, and pelvic girdle elements, all associated with large volumes of usable meat, are underrepresented (figure 12.1).

Only one fur seal element appears in either assemblage. This is noteworthy since, like the sea otter, the Russian-American Company sought fur seals from such places as the Farallon Islands for their valuable pelts and stored them at Ross (Khlebnikov 1976:123). According to Khlebnikov (1976:123), the Farallon Islands were heavily populated with fur seals during the first decades of the 19th century.

From the beginning of the occupation, that is from 1812 to 1815, over the period of six years during Kuskov's administration, 8,427 fur seals were taken there, an average of 1,200 to 1,500 each year. Later this gradually decreased, and in recent years not more than 200 to 300 pelts are taken there each year.

Khlebnikov (1976:123) adds that "some of the American captains said that prior to our occupation of those rocks, they had stopped there one fall and taken as many as 10,000 fur seals." The fur seals captured by the Company were probably processed on the Farallon Islands primarily for their pelts, and perhaps for their meat. They

Figure 12.1 *Frequency of Pinniped Skeletal Elements in the Native Alaskan Neighborhood*

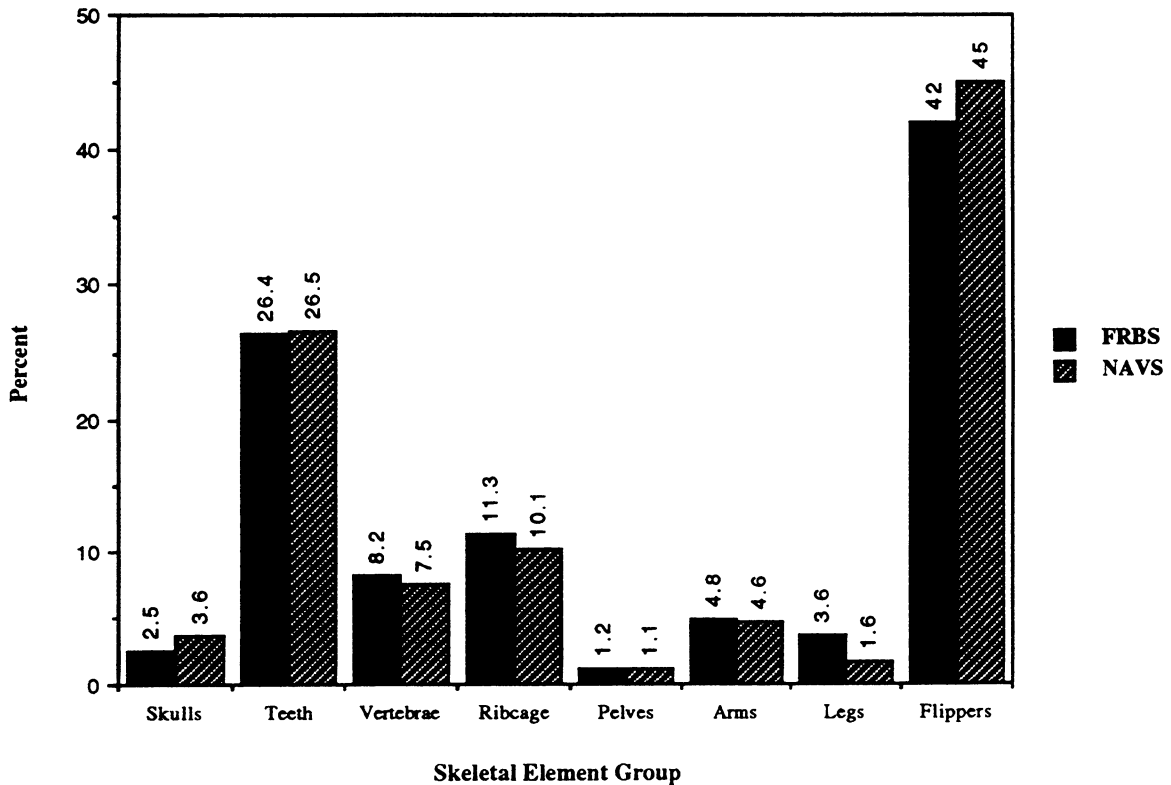


Table 12.4 Identified Harbor Seal (*Phoca vitulina*) Skeletal Elements from Colony Ross (NISP)

Element	NAVS	FRBS
temporal	2	0
squamosal	1	0
jugal	0	1
basisphenoid	0	1
occipital condyle	2	2
auditory bulla	6	6
mandible	1	0
P mandible	0	1
M mandible	0	1
incisor	0	1
canine	1	4
premolar	7	7
molar	3	1
UI 1	1	0
UC	1	0
LC	2	1
L Pm	1	1
L Pm 3	0	1
axis	1	1
cervical vertebra	2	2
thoracic vertebra	2	4
lumbar vertebra	2	1
sacral vertebra	1	0
caudal vertebra	6	0
vertebra	0	1
scapula	1	0
P scapula	0	2
humerus	1	2
P humerus	1	0
S humerus	1	2
D humerus	3	1
P radius	0	1
S radius	1	0
D radius	1	1
ulna	1	0
P ulna	0	2
S ulna	2	0
carpal	0	4
metacarpal	1	1
P metacarpal	4	5
D metacarpal	2	2
metacarpal 1	1	0
D metacarpal 1	1	0
P metacarpal 2	0	1

Element	NAVS	FRBS
P metacarpal 3	1	0
D metacarpal 4	0	1
metacarpal 5	1	0
D metacarpal 5	1	1
sacrum	1	0
immominate	1	0
ilium	1	3
pubis	2	1
femur	1	0
P femur	1	0
S femur	0	1
patella	1	0
P tibia	2	0
D tibia	0	1
S fibula	0	1
D fibula	1	1
astragalus	2	2
calcaneus	0	2
D metatarsal	0	1
metatarsal 2	0	1
P metatarsal 2	0	1
metatarsal 3	0	1
phalanx 1	1	0
phalanx 1 d 1	1	0
phalanx 1 d 5	1	0
phalanx 2	0	5
phalanx 3	8	4
rib	7	0
rib 1	1	0
Totals:	98	88
MNI:	4	4

D = Distal P = Proximal
 LC = Lower Cusped S = Shaft
 L Pm = Lower UI = Upper Incisor
 Premolar UC = Upper Cusped
 M = Medial

cont'd.

would not yield much fat or oil, since fur seals insulate themselves with fur, not blubber. It is possible that dried fur seal meat from the Farallons may have been eaten at Colony Ross. Such a practice would result in very few osseous remains at the Colony.

Interestingly, the two main attributes of FRBS and NAVS marine mammal assemblages, a low number of sea otter remains and a high percentage of seal remains, correspond well to faunal assemblages excavated from Kodiak Island (Amorosi 1987; Clark 1974, 1985; Knecht and Jordan 1985), from Yakutat Bay (De Laguna 1972), and the Aleutian Islands (Denniston 1974; Lippold 1972). The opposite is seen in the San Francisco Bay region, where sea otters appear to have been an important food resource, and seals appear much less frequently (Broughton 1994; Simons 1992).

ARTIODACTYLS

A number of elements clearly belonging to large terrestrial mammals were recovered from FRBS and NAVS. They compare most favorably to bones of artiodactyls but are not distinguishable beyond the family level. Therefore, these elements are assigned to the Artiodactyla. Three families of artiodactyls are represented in the FRBS and NAVS assemblages: pigs (Suidae), deer and elk (Cervidae), and cattle and sheep (Bovidae). For a breakdown of artiodactyl skeletal element distributions at Colony Ross, see Wake (1995a, table 4.7).

The majority of the domestic animals found in these assemblages such as cattle, sheep, and pigs were originally purchased by the Russians from the Spanish and bred at the Colony (Khlebnikov 1976, 1990). According to historical records, a substantial number of pigs were at Ross (Khlebnikov 1976, 1990), but they are not common in either assemblage. Khlebnikov (1976:120) states that 115 pigs were consumed as food during the period of October 26, 1821 to November 1822. That is the greatest number consumed in a year, according to Khlebnikov's records. From 1825 to 1829 the numbers of pigs consumed as food was considerably lower; 11 in 1825-26, 5 in 1826-27, 17 in 1827-28, and 11 in 1828-29 (Khlebnikov 1976:120).

The low numbers of pigs seen in these two assemblages is actually not that surprising. Kirill Khlebnikov (1976:119), a Russian-American Company administrator, relates that the "... pigs which wander along the shore eat shellfish and their meat has a dreadful taste." Tikhmenev (1978:226) also refers to the poor quality of pork products at Ross stating that "the unpleasant smell of the pork, probably caused by the sea lion meat in the pigs' diet, made it unsuitable for salting." Many of the pigs reported killed for food were used to provision ships (Khlebnikov 1990). Khlebnikov (1976:121) mentions shipping over 100 *puds* a year of salt pork to Sitka during the 1820s. While on Kodiak Island, the Russian explorer

Davydov (1977 [1810]:174) reported that "... it is amazing that the islanders will not eat pork, on the grounds that pigs eat dirt!" A combination of these factors, such as the physical removal of pigs for the provisioning of ships, taboos, and unpalatability may explain the poor representation of pigs in both assemblages.

Cattle were used as draft animals and provided tallow, hides, butter, and meat to the Colony (Khlebnikov 1976:121). Cattle were most important as a source of meat, it appears, since Khlebnikov (1976:121) refers to tallow, hides, and butter as by-products. Khlebnikov (1990) remarks a number of times that cattle were slaughtered in order to feed workers at the Colony. Rations of beef were also distributed as payment for manual labor (Khlebnikov 1990:146). Cyrille LaPlace (1986[1839]:68) noted that during his visit to a local Kashaya Pomo village "... some were spreading out on the embers some pieces of beef given as rations..." Salted dried beef was prepared and packed as provisions for sea voyages (Khlebnikov 1990:127). Khlebnikov (1976:120) states that 13 cattle were consumed as food in 1821-22, 18 in 1825-26, 34 in 1826-27, 38 in 1827-28, and 22 in 1828-29.

Cattle are well represented in both assemblages, in much greater numbers of identified specimens than either pigs or sheep. As far as MNI counts go, however, cattle appear to have been the second most popular domesticated meat source in these assemblages, after sheep. Sheep MNI's outnumber cattle at NAVS, 5 to 4. At FRBS, sheep and cattle are equal (three each). It is important to remember, however, that one cow can weigh as much as five sheep. The cattle skeletal elements recovered from these two sites are presented in table 12.5.

Historical records indicate that a number of sheep were present at Colony Ross (Khlebnikov 1976:120). Sheep were important for their wool. The Colony sheared roughly 50 *puds* of wool a year but did not use it all (Khlebnikov 1976:122). Sheep were even more important as meat sources (Khlebnikov 1990:146). Khlebnikov (1976:120) states that a great number of sheep were consumed as food at Colony Ross. In fact, the number of sheep consumed at the Colony is staggering, especially when compared to the numbers of cattle and pigs, separately or in combination. According to Khlebnikov (1976:120) 106 sheep were consumed as food in 1821-22, 305 in 1825-26, 282 in 1826-27, 340 in 1827-28, and 72 in 1828-29.

Sheep are present in both assemblages, but in nowhere near the numbers that Khlebnikov (1976:120) indicates. It may be impossible to determine exactly where the remains of the sheep Khlebnikov discusses might have gone. He (1976:121) mentions that "sheep are sold for the most part as food in exchange for money..." However, he does not say to whom or where the

sheep were sold. Some of them may have ended up as fresh or dried meat for ships. Sheep could also have been consumed more frequently in the Russian Village or by the inhabitants of the Stockade. They certainly are not present in the Native Alaskan Neighborhood in the great numbers reflected in Khlebnikov's reports. Discovery of high concentrations of sheep remains may shed light on certain aspects of status or ethnic differentiation at the Colony. Sheep skeletal elements recovered from FRBS and NAVS are presented in table 12.6.

Native terrestrial game mammals such as deer and elk (Cervidae) are well represented in both samples. In fact, both MNI and NISP counts show deer (*Odocoileus hemionus*) to be the most important indigenous terrestrial mammal species at both sites. The importance of cervids, especially deer, as a food resource at Ross is documented (Khlebnikov 1990:192). For a representation of the

cervid elements recovered from these two sites, refer to table 12.7 (see also Wake 1995a, figures 4.6, 4.7).

Both cervid species were hunted by all ethnic groups present at the Colony (Khlebnikov 1990:51). Khlebnikov (1990), in his accounts of hunting in the North Coast Ranges, mentions that "deer" and "goats" were taken by hunters armed with flintlocks. Considerable debate surrounds the actual nature of these two classes of terrestrial game mammals (Glenn Farris, personal communication, 1993). It should be noted that deer and elk were apparently common in the North Coast Ranges during the early 19th century (Khlebnikov 1976, 1990). However, there is no known evidence or historical record, other than Russian, of "goats" or "mountain goats" occurring in the North Coast Ranges. It is likely that the "deer" to which Khlebnikov and his translators (Khlebnikov 1990) refer are in fact elk, or *wapiti* (*Cervus*

Table 12.5 Identified Cow (*Bos taurus*) Skeletal Elements from Colony Ross (NISP)

Element	NAVS	FRBS	Element	NAVS	FRBS
cranium fragment	1	0	carpal	2	1
parietal	1	0	unciform	0	1
occipital	0	1	scaphoid	2	0
basisphenoid	0	1	cuneiform	0	0
occipital condyle	1	0	metacarpal	0	2
auditory bulla	1	0	P metacarpal	2	0
maxilla	1	0	D metacarpal	1	0
P mandible	0	0	innominate	0	1
tooth	0	0	P femur	1	1
incisor	2	0	S femur	2	1
premolar	2	0	D femur	1	0
molar	2	1	patella	2	1
L Pm 1	7	0	P tibia	2	1
L Pm 2	7	0	S tibia	1	2
U M 1	1	0	D tibia	1	0
L M 3	1	0	naviculo-cuboid	1	1
axis	0	1	astragalus	4	0
cervical vertebra	4	0	P metatarsal	0	0
thoracic vertebra	8	1	D metatarsal	0	0
lumbar vertebra	2	1	phalanx 1	2	2
sacral vertebra	1	0	phalanx 2	11	9
vertebra	3	0	phalanx 3	2	1
sternebra	0	1	long bone fragment	2	0
P scapula	1	0	rib	8	7
M scapula	0	1	Totals:	87	41
D scapula	0	1	MNI:	4	3
P humerus	0	0			
S humerus	2	0			
D humerus	2	0			
D radius	2	1			
P ulna	0	0			

cont'd.

D = Distal M = Medial
 L M = Lower Molar P = Proximal
 L Pm = Lower S = Shaft
 Premolar U M = Upper Molar

elaphus). Very similar animals belonging to the same genus and species (*Cervus elaphus*) are known as red deer in Europe. Moreover, the “goats” and “mountain goats” to which Khlebnikov and his translators (Khlebnikov 1976, 1990) refer are likely black-tailed deer (*Odocoileus hemionus*).

Thirty-one of the deer elements from FRBS and NAVS show evidence of butchery or processing. None of these cut marks appear to be the result of stone tool use, though. They all appear to be made by metal cutting tools. One pelvis portion shows an ax blow. Ten elements exhibit dismemberment marks only. A combination of filleting and dismemberment marks are visible on five elements.

Deer and elk were an important food resource throughout California (Broughton 1994; Simons 1992). Cervids are well known for their lean meat and scarcity of fat. Fats are a critical part of the human diet, however

and marrow, located primarily within long bones, is a major source of this in large terrestrial mammals. One aspect of the human consumption of cervids commonly found in California and elsewhere involves the opening of the long bones in order to extract and consume the marrow (e.g., Enloe 1993). This makes deer remains important to the interpretation of these assemblages.

BURNED BONE

The amount of burned bone in an archaeological site can shed light on the intensity of processing and consumption of animal remains at that locality. It can also provide coarse-grained information regarding methods of processing or cooking meats, as well as disposal techniques, which can help establish the ethnic affinity of a given area. The FRBS faunal assemblage contains an extraordinarily low frequency of burnt bone, only 1.14%. The NAVS sample contains a similarly low percentage

Table 12.6 Identified Sheep (*Ovis aries*) Skeletal Elements from Colony Ross (NISP)

Element	NAVS	FRBS
cranium	2	0
occipital	0	1
maxilla	3	0
P mandible	2	1
M mandible	0	1
D mandible	1	1
tooth	8	0
premolar	3	0
molar	2	0
U Pm 1	1	0
U Pm 2	3	0
U M 1	1	0
U M 2	6	0
U M 3	3	0
L Pm 3	0	1
L M 1	3	0
L M 2	1	0
L M 3	1	0
atlas	1	0
cervical vertebra	1	0
thoracic vertebra	1	0
P scapula	1	0
M scapula	1	0
D humerus	1	0
radius	1	0
P radius	1	0
P ulna	0	0
metacarpal	1	1
P metacarpal	1	7

cont'd.

Element	NAVS	FRBS
S metacarpal	0	1
D metacarpal	0	1
innominate	1	0
ilium	1	2
S femur	1	0
D femur	0	1
patella	1	0
P tibia	0	1
D tibia	1	2
astragalus	0	1
calcaneus	1	0
P metatarsal	0	1
D metatarsal	0	1
phalanx 1	0	1
phalanx 2	1	1
phalanx 3	1	2
Totals:	58	22
MNI:	5	3

D = Distal P = Proximal
 L Pm = Lower S = Shaft
 Premolar U Pm = Upper Premolar
 M = Medial U M = Upper Molar

Table 12.7 Black-Tailed Deer (*Odocoileus hemionus*) Skeletal Elements from Colony Ross

Element	NAVS	FRBS
antler	1	1
parietal	1	0
temporal	1	0
squamosal	0	0
jugal	0	2
occipital	4	1
basioccipital	0	0
occipital condyle	2	0
auditory bulla	1	0
maxilla	3	1
P mandible	2	1
M mandible	5	5
D mandible	5	0
tooth	15	12
incisor	3	3
premolar	9	3
molar	23	16
U Pm 1	2	0
U Pm 2	0	0
U Pm 3	3	0
U M 1	5	0
U M 2	2	3
U M 3	3	1
L Pm 1	7	4
L Pm 2	4	0
L Pm 3	2	1
L M 1	2	3
L M 2	3	1
L M 3	3	1
atlas	1	1
axis	3	0
cervical vertebra	3	3
thoracic vertebra	9	6
lumbar vertebra	7	1
sacral vertebra	0	0
caudal vertebra	1	0
vertebra	3	0
rib	4	2
P scapula	5	1
P humerus	5	0
S humerus	3	1
D humerus	5	1
P radius	6	1
S radius	1	2
D radius	5	3
P ulna	2	8

Element	NAVS	FRBS
S ulna	1	0
D ulna	1	0
carpal	1	0
lunar	1	0
unciform	0	3
pisiform	2	0
scaphoid	8	0
cuneiform	2	2
P metacarpal	2	2
D metacarpal	0	3
sacrum	0	0
innominate	2	2
ilium	7	1
ischium	2	1
pubis	1	0
acetabulum	3	0
P femur	4	1
S femur	1	0
D femur	5	2
patella	4	2
P tibia	6	7
S tibia	1	0
D tibia	8	7
tarsal	3	0
naviculo-cuboid	0	3
astragalus	6	3
calcaneus	6	3
P metatarsal	1	3
S metatarsal	1	2
D metatarsal	1	1
phalanx 1	3	10
phalanx 2	13	6
phalanx 3	2	5
Totals:	272	158
MNI:	6	5

D = Distal P = Proximal
M = Medial S = Shaft
L Pm = Lower U Pm = Upper Premolar
Premolar U M 1 = Upper Molar

cont'd.

(3.03%). Burned bone, as referred to here, consists of any bone or bone fragment showing signs of heating, charring, or calcination. Its presence is often assumed to represent evidence of roasting or some kind of preparation prior to consumption. Burned faunal remains also could represent some kind of disposal activity. The majority of the burned bone fragments and diagnostic elements are from terrestrial mammals.

Bones were occasionally used as a source of fuel in Russian America (Khlebnikov 1976:123). It should be noted that, according to Khlebnikov (1976:123), the occupants of the Farallon *artel* ". . . cook by burning sea lion bones that have been soaked in oil." Such a practice would undoubtedly result in a great deal of burned bone fragments. At Colony Ross, however, since wood was in abundance, it is unlikely that the inhabitants would have had to resort to such desperate measures. Such low frequencies of burned bone as seen in the faunal assemblages from outside the Stockade walls are not typical for Native Californian coastal sites, however. Most other archaeological sites in California contain somewhere between 20 to 80 percent burned bone (Basgall and Hildebrandt 1989; Duque 1989; Langenwalter et al. 1989; White 1984).

The lack of burned faunal remains at both NAVS and FRBS is interesting and problematic. The remarkably low frequency of burned bone in the Neighborhood may be attributed to food preparation techniques that would not result in the charring of animal remains. The Pomo were known to construct subterranean ovens that used smooth rocks heated by fires as a heat source (Barrett 1952:61). These ovens were used to cook a variety of vegetable foods and meats. Meat cooked in such ovens, by heat—not fire, is really baked, not roasted. Baking meats, with bones in them, will not char them like roasting can. It is quite possible that the use of earth ovens in the Native Alaskan Neighborhood not only explains the low frequency of burned and charred bones, but the considerable amount of fire-cracked rock found there as well.

SPATIAL PATTERNING AT THE NATIVE ALASKAN VILLAGE SITE

A number of recent studies have focused on the spatial patterning of faunal remains at archaeological sites (Bartram et al. 1991; Binford 1978; Jones 1993; Keeley 1991; O'Connell 1987; O'Connell and Marshall 1989; O'Connell et al. 1988, 1990, 1991). Studying the spatial patterning of artifactual and ecofactual remains at archaeological sites clearly provides valuable information regarding the distribution of activities, and hence, different aspects of the inhabitants' lives across a given area (e.g., Bartram et al. 1991; Carr 1984; Gamble 1983; Hodder and Orton 1976; O'Connell et al. 1991).

This section focuses on analysis of the spatial patterning of mammalian faunal remains at NAVS. The

goal of studying spatial patterning of dietary remains is to better understand the site's overall organization and to locate and identify specific activity areas. By observing patterns in the distribution of mammal parts or species, other potential activity areas can be identified. Analysis of the patterning of faunal remains will ultimately allow inferences to be made regarding the identity of the site's inhabitants and who may have been responsible for the formation of the archaeological patterns visible at NAVS. On the surface, differential distributions of mammal remains occur at NAVS, however to determine this requires a more detailed analysis.

MAMMAL REMAINS AT NAVS

In order to investigate intra-site patterning in the use of mammals at NAVS, the four excavation areas are each treated as an independent assemblage in the section below. All four excavation areas differ in the frequency of mammal species represented. The distribution of skeletal elements in the excavated units varies as well. Only mammal remains recovered from excavation of the trench units in 1991 and 1992 are discussed here.

The skeletal elements of the terrestrial mammal remains are grouped in the following categories. The vertebrae category includes all vertebrae, cervical, thoracic, lumbar, sacral, and caudal. The pelves category includes the three pelvic bones from both sides, the ilium, ischium, and pubis. The long bone category consists of all the upper arm and leg bones from the juncture of the axial skeleton to the wrists and ankles. The lower limb category includes all bones from the carpals and tarsals to the distal most phalanges. The teeth category consists of all of the teeth, deciduous and permanent. The skull category includes all skull bones and fragments. The rib cage category consists of all ribs and all sternal bone elements.

Categorization of the pinniped elements follows an identical pattern, but with the addition of a flipper category. This includes all bones from the carpals and tarsals to the distal most phalanges.

WEST CENTRAL TRENCH

The West Central Trench yielded a total of 216 bones and identifiable mammal fragments. The total of 216 mammal specimens averages 72 bones per 1 x 1 m unit, the lowest for any area of NAVS. Five (2.3%) of the 216 skeletal elements were identifiable to some taxonomic level more discrete than a mammal size class. Two artiodactyl teeth, two cow teeth, and one cow metapodial were identified from the West Central Trench. Four of the five identifiable elements came from the northwestern most 1 x 1 m square, the 75S, 20W unit.

Compared to the other areas, the most interesting features of the mammal assemblage from the West Central Trench are the low numbers of bones per unit, the low percentage of identifiable bone, and the overall

condition of the bone. The faunal remains from these units are more or less randomly distributed in the topsoil and dark sandy loam.

The actual physical condition of the mammal bones from the West Central Trench is poor. The whole assemblage is highly fragmented, eroded, and generally poorly preserved. The individual bones and bone fragments are not hard, rather they are relatively soft, flaky, spongy, and worn, thus making identification much more difficult.

Seventy-nine (36.6%) of the 216 bone specimens from the West Central Trench are burned, in marked contrast to the other areas of NAVS where burned bone is rare. Most of the burned bones are fragmentary, and the individual fragments quite small. Twenty-five of the burned bone specimens were recovered from an ash lens in unit 75S, 20W. It is likely that this ash lens represents the dumping of the contents of a hearth or fireplace.

EAST CENTRAL TRENCH

The East Central Trench yielded a total of 3,369 individual mammal bones and bone fragments. Identifiable skeletal elements numbered 608, or roughly 18% of the total number of bones recovered (table 12.8). On average, this trench produced 122 identifiable bones per unit. The faunal remains in this excavation, however, were not evenly distributed. Preservation of the faunal remains from this trench is excellent, especially compared to the West Central Trench. The majority of the mammal remains and all classes of faunal remains in general were recovered from units 75S, 0E; 75S, 1E; and 75S, 2E. Faunal remains were especially dense in units 75S, 0E and 75S, 1E and in the western half of unit 75S, 2E. These remains were located in a well-defined stratum roughly 10-15 cm in thickness, confined to the three previously mentioned units. This "bone bed" stratum was encountered roughly 25 cm below the present ground surface.

This stratum consists of a locally dense accumulation of mollusk, echinoderm, fish, bird, and mammal remains mixed with fire-cracked rock, chipped and ground stone debitage and tools, trade beads, and glass, ceramic and metal artifacts. This stratum overlies 30 to 40 cm of relatively loose fill, which caps a densely packed surface, apparently a pit feature floor. It appears that the deposition of the bone bed stratum was of a relatively short duration. Based on the excellent preservation and degree of completeness of the faunal remains, the debris making up this stratum was probably quickly covered over with soil, probably on purpose, to reduce the stench of rotting flesh.

The mammal remains recovered from this Trench are much more numerous and diverse than those recovered from the West Central Trench and the individual skeletal elements are also much better preserved. The majority of the bone specimens are quite hard and withstand handling

well. Few specimens are soft, spongy, and crumbly like the elements from the West Central Trench. While the condition of the individual bone specimens is quite good, the collection as a whole is highly fragmented with few whole elements. Of the 3,369 bone specimens recovered from this area, 2,761, or roughly 82% are unidentifiable, a relatively high percentage but not unusual for the Californian coast (Simons 1990). The frequency of burned bone in this area is quite low. Just 52 elements (1.5%) appear burned. This is a marked contrast to the West Central Trench, 20 m farther west, where 36% of the bones recovered are burned in some way.

The mammal assemblage from this trench is dominated by artiodactyls ($n=271$, 44.6%), followed closely by pinnipeds ($n=194$, 31.9%) (table 12.8). The identified artiodactyls are dominated by deer (*Odocoileus hemionus*, $n=132$, 62.9%), then domesticated cattle ($n=35$, 16.7%), followed by sheep ($n=33$, 15.7%). Seven (3.3%) elk elements were recovered and three (1.4%) pig elements.

The deer assemblage is dominated by teeth and tooth fragments ($n=38$, 28.8%) (figure 12.2). The more economically significant portions of a deer are represented in order by arm bones ($n=22$, 16.7%); leg bones ($n=18$, 13.6%); vertebrae ($n=17$, 12.9%); skull fragments ($n=18$, 13.6%); toes ($n=10$, 7.6%); and finally pelvis ($n=9$, 6.8%). No deer ribs were identified and no complete deer long bones were recovered. Most of the proximal and distal ends of long bones that were recovered exhibit evidence of marrow extraction.

The cattle remains are dominated by vertebrae ($n=12$, 34.3%); followed by leg bones ($n=9$, 25.7%); arm bones ($n=8$, 22.9%); skulls ($n=4$, 11.4%); and toe bones ($n=2$, 5.7%) (figure 12.2). No cattle teeth or ribs were recovered from this excavation area, nor were any complete cattle long bones. As with deer, most of the proximal and distal ends of the long bones that were recovered exhibit evidence of marrow extraction.

The sheep remains are dominated by teeth ($n=18$, 54.6%); followed by skulls ($n=7$, 21.2%); arm bones ($n=4$, 12.1%); leg bones ($n=2$, 6.1%); vertebra ($n=1$, 3.0%); and toe bones ($n=1$, 3.0%) (figure 12.2). No sheep ribs nor complete sheep long bones were recovered from this excavation area. Most of the proximal and distal ends of the long bones that were recovered also exhibit evidence of marrow extraction.

The majority of the pinniped bones from this area are identifiable only as seal (Pinnipedia, $n=57$, 29.2%) or eared seal (Otariidae, $n=82$, 42.1%). The identifiable pinnipeds are dominated by both California sea lions (*Zalophus californianus*, $n=26$, 13.3%) and harbor seals (*Phoca vitulina*, $n=26$, 13.3%), followed by Steller's sea lion (*Eumetopias jubatus*, $n=4$, 2.1%).

The element distribution for the entire East Central Trench pinniped assemblage in descending order of importance follows (figure 12.3): flipper elements

(n=91, 47.6%); teeth (n=47, 24.6%); rib cage elements (n=21, 11.0%); long bones (n=15, 7.8%), consisting of 7 (3.7%) arms and 8 (4.2%) legs; vertebrae (n=9, 4.7%); skulls (n=5, 2.6%); and pelvis (n=3, 1.6%).

The harbor seal remains are relatively evenly distributed among the 8 basic skeletal element categories for pinnipeds described previously (see figure 12.3). Teeth and flipper elements, with 6 each (23.1%), dominate the harbor seal assemblage, followed by 4 arm bones (15.4%). Three skull fragments and 3 vertebrae each make up 11.5% of the total bone count. Two leg bones represent 7.8% of the total. Ribs and pelvis are represented by 1 element each, or 3.8% of the total. In general, the harbor seal bones are relatively evenly distributed, with 8 of the 9 element categories repre-

sented.

The California sea lion remains, however, are not evenly distributed at all (figure 12.3). Only 5 of the 9 element categories are represented. This pattern could be due, in part, to the relatively generalized structure of otariid teeth, which makes specific identifications difficult. Many of the otariid teeth could belong to California sea lions. This sub-assemblage is clearly dominated by 20 flipper elements out of the 26 total bone count, or 77%. Arm and leg bones (2 each) make up 7.7% of the assemblage. The vertebrae and pelvis are each represented by 1 element (3.8%) per category.

A relatively large number of gopher (*Thomomys bottae*) elements was also recovered. Most of the gopher elements are the remains of one relatively recent,

Table 12.8 *Identified Mammals from the Native Alaskan Village Site*

Common name	Scientific name	ECT	SCTU	ST
		NISP	NISP	NISP
Broad-Handed Mole	<i>Scapanus latimanus</i>	0	0	1
Black-Tailed Jackrabbit	<i>Lepus californicus</i>	0	0	1
Botta's Pocket Gopher	<i>Thomomys bottae</i>	119	10	27
California vole	<i>Microtus californicus</i>	0	1	7
Porpoise	Phocoenidae	4	0	4
Whale	Cetacea	1	1	9
Coyote	<i>Canis latrans</i>	1	0	0
Dog	<i>Canis sp.</i>	3	0	4
Bobcat	<i>Felis rufus</i>	1	0	1
Mountain Lion	<i>Felis concolor</i>	0	1	5
Grizzly Bear	<i>Ursus arctos</i>	1	0	1
Sea Otter	<i>Enhydra lutris</i>	3	0	3
Mustelids	Mustelidae	3	0	0
Carnivore	Carnivora	6	1	5
Steller's Sea Lion	<i>cf. Eumatopias jubatus</i>	4	1	8
California Sea Lion	<i>Zalophus californianus</i>	26	2	43
Northern Fur Seal	<i>Callorhinus ursinus</i>	1	0	0
Eared Seals	Otariidae	81	24	153
Harbor Seal	<i>Phoca vitulina</i>	26	3	69
Large Seal	Large Pinniped	3	0	1
Seals	Pinnipedia	54	6	121
Pig	<i>Sus scrofa</i>	3	0	6
Wapiti	<i>Cervus elaphus</i>	7	0	2
Black-Tailed Deer	<i>Odocoileus hemionus</i>	132	15	125
Cow	<i>Bos taurus</i>	35	8	41
Sheep	<i>Ovis aries</i>	33	8	17
Cow/Sheep/Goat	Bovidae	0	1	6
Artiodactyl	Artiodactyla	61	61	144
Total		608	143	804

ECT = East Central Trench
SCTU = South Central Test Unit

ST = South Trench
NISP = Number of Identified Specimens
per Taxon

intrusive individual recovered from an old, filled-in gopher tunnel. Simons (1990) does not include gophers in his account of economically significant mammals recovered from the Albion sites.

Carnivores are present in low numbers in this area. Six unidentified carnivores, 4 canids, 6 mustelids, and 1 ursid element were recovered from this area (see table 12.8). By far the most interesting carnivore element is this ursid fragment, which is identified as the right distal humerus of a grizzly bear (*Ursus arctos*). Based on circumferential chopping marks on the proximal portion of the discarded distal end of this element, it was probably used as a source of raw material for tool manufacture. This and other worked bone artifacts are discussed in chapter 11.

Four porpoise vertebrae were recovered from the East Central Trench units. While few in number, their presence does indicate a potentially significant contribution to the overall diet of the inhabitants of this excavation area and the Colony in general. Porpoises are large mammals and can provide a large amount of meat and some blubber, which was highly desirable to Native Alaskans (e.g., Hrdlicka 1944; Tikhmenev 1978).

SOUTH CENTRAL TEST UNIT

A total of 959 mammal bones were recovered from 110S, 11W. A fraction of the total number, 143 (15%), are identifiable (table 12.8). The mammal remains from unit 110S, 11W are well preserved, but quite fragmented, as is usual for mammal remains from NAVS. Burned bone makes up 3.6% of the total sample. No well-defined bone-bearing stratum was encountered in this unit and the faunal remains were more or less randomly distributed throughout the topsoil and dark sandy loam, diminishing somewhat in number in the lower rock rubble and clay levels.

The mammal remains in this unit are clearly dominated by artiodactyls (93 elements, 65%). Deer are the most common identifiable artiodactyl with 15 (48.4%) elements. Cattle and sheep follow with 8 (25.8%) elements each.

The deer assemblage is dominated by teeth ($n=6$, 40.0%) and leg bones ($n=5$, 33.3%), though 1 vertebra (6.7%), 1 phalanx (6.7%), and 2 skull fragments (13.3%) were also recovered. The sheep bones include 2 arm bones, 1 phalanx, and 5 teeth. The cattle remains consist of 3 ribs, 3 phalanges, 1 vertebra, and 1 femoral shaft.

The second most common mammal group from this unit is the pinnipeds. A total of 36 (25.2%) pinniped remains were recovered. The majority (30) are identifiable to the Pinnipedia or Otariidae with 3 harbor seal bones, 2 California sea lions, and 1 Steller's sea lion identified to the species level. One mountain lion phalanx was recovered from this unit as well as one piece of whale bone. It should be noted that this is the only excavation area at NAVS where artiodactyls dominate the

pinnipeds by more than 30 percentage points (Wake 1995a, 1995b, figure 6.2).

SOUTH TRENCH

Of the 6,567 bone specimens recovered from the south area, 5,763, or roughly 88%, are unidentifiable. This is a relatively high frequency, but again, not unusual for the Californian coast (Simons 1990). A total of 804 (roughly 12%) mammal elements from the South Trench are identifiable (table 12.8). The mammal remains recovered from this trench are as numerous and diverse as those recovered from the East Central Trench, and individual skeletal elements are preserved as well as the ones found there. The majority of the bone specimens are quite durable and withstand handling well. Nonetheless, the collection as a whole is highly fragmented, which seems to be the rule for NAVS.

The bulk of the faunal remains were recovered from units 125S, 24W; 125S, 23W; 125S, 22W; and 125S, 21W. Preservation was quite good, with general conditions similar to those found in the bone bed area of the East Central Trench (units 75S, 0E; 75S, 1E; and 75S, 2E). The faunal remains were located in a well-defined stratum roughly 10-15 cm in thickness. This "bone bed" stratum is confined to units 125S, 23W; 125S, 22W; and the immediately contiguous areas of units 125S, 24W and 125S, 21W. Like the East Central Trench, it consists of a locally dense accumulation of mollusk, echinoderm, fish, bird, and mammal remains mixed with fire-cracked rock, chipped and ground stone debitage and tools, trade beads, and glass, ceramic, and metal artifacts. This stratum overlies 10 to 20 cm of relatively loose fill, which caps densely packed clay and/or decomposing bedrock.

The deposition of the bone bed stratum in the South Trench was a relatively short duration event, similar to the East Central Trench. The debris making up this stratum was quickly covered over with soil to reduce the noxious fumes of organic decomposition. The rapid, deliberate burial of this debris contributed greatly to its excellent preservation. Only limited post-depositional disturbance is evident in the South Trench, primarily as a result of gopher (*Thomomys bottae*) activity. The remaining three units of this trench produced much lower numbers of faunal remains.

The occurrence of burned bone in the South Trench is quite low. Just 169 (2.6%) elements appear burned which is similar to the East Central Trench's frequency of 1.5% burned bone. This is in marked contrast to the West Central Trench where 36% of the recovered bones are burned in some manner.

The mammal remains from the South Trench are dominated by pinnipeds ($n=395$, 49.2%) (table 12.8; Wake 1995a, figures 6.1, 6.2). Artiodactyls run a relatively close second with 340 identified elements or 42.4%. Rodents follow artiodactyls with 34 (4.2%) specimens including 27 gophers (*Thomomys bottae*) and

Figure 12.2 *Identified Artiodactyl Skeletal Elements from the East Central Trench*

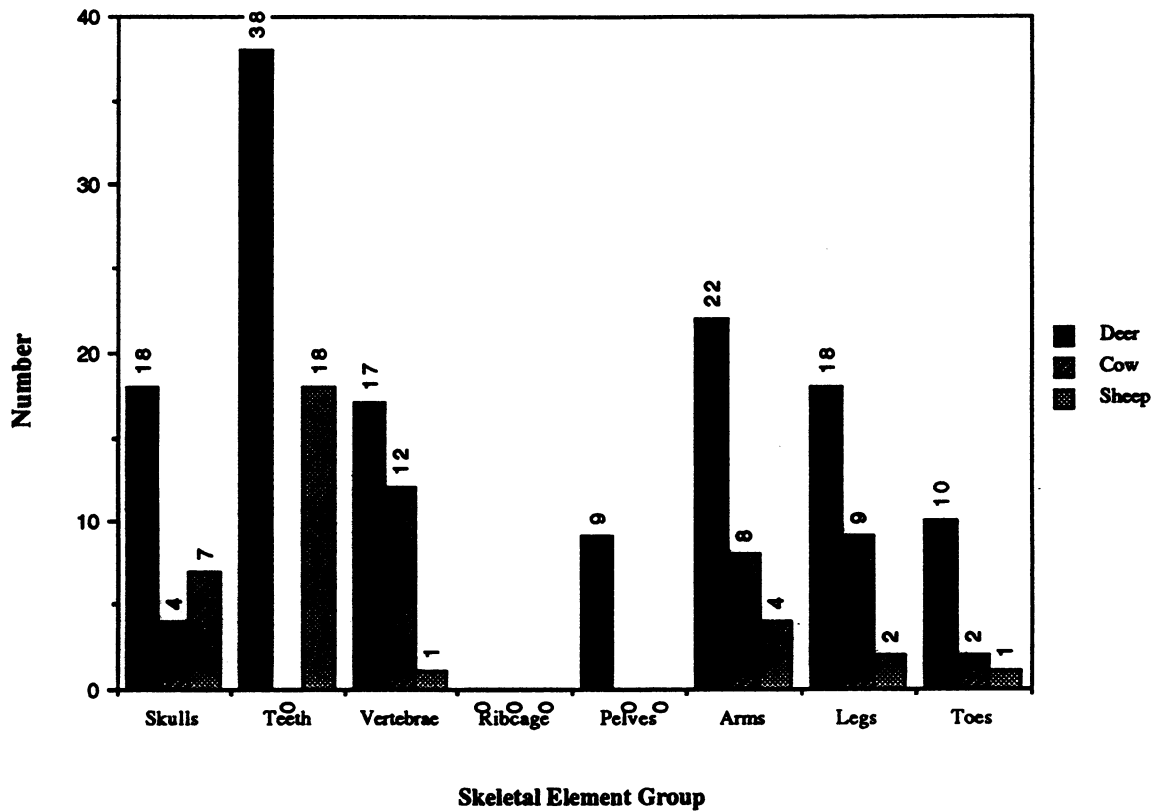
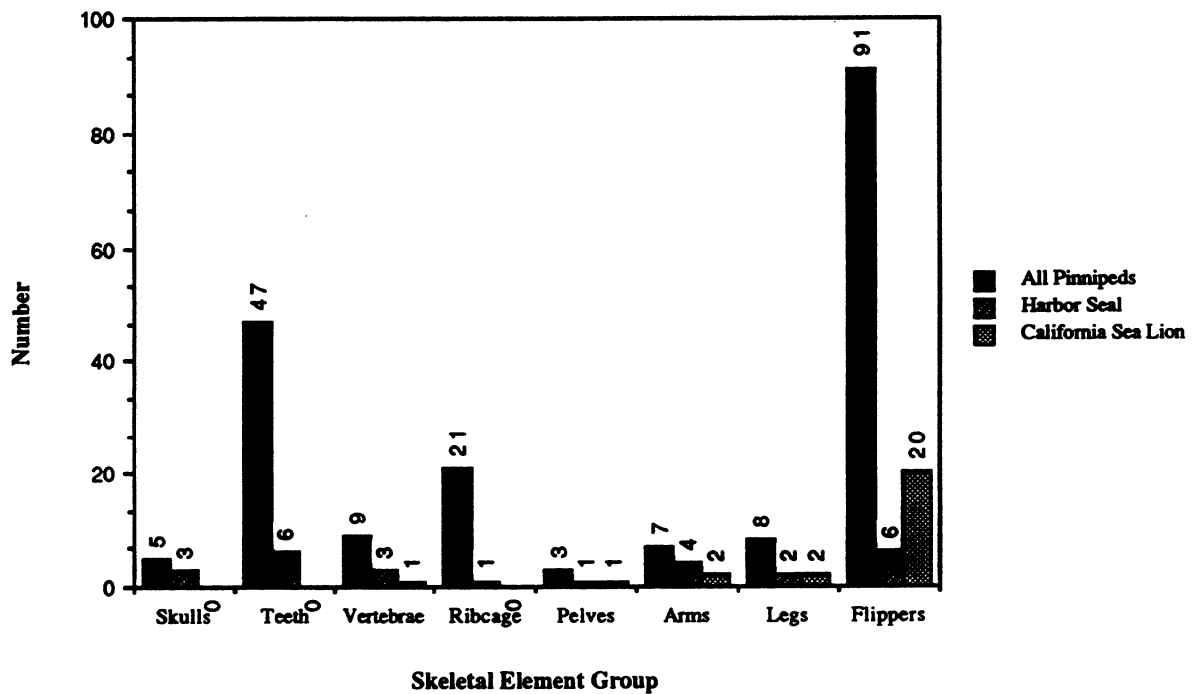


Figure 12.3 *Pinniped Skeletal Elements from the East Central Trench*



7 California voles (*Microtus californicus*). Carnivores are next with 17 specimens (2.1%), including 3 sea otters (*Enhydra lutris*), 5 mountain lion (*Felis concolor*) phalanges, and a single bobcat (*Felis rufus*) astragalus. Cetaceans are represented by 4 porpoise bones and 9 pieces of whale bone. Lagomorphs are represented by 1 jackrabbit (*Lepus californicus*) element, as are insectivores (*Scapanus latimanus*, n=1).

The majority of the pinnipeds are identifiable only to the order (n=121, 30.9%, Pinnipedia) or family (n=153, 38.7%, Otariidae) levels. Harbor seals (*Phoca vitulina*) dominate the identifiable pinnipeds with 69 (17.5%) elements. California sea lions (*Zalophus californianus*) run second with 43 (10.9%) identified elements. Steller's sea lions (*Eumetopias jubatus*) are represented by 8 (2.0%) elements.

The overall pinniped element breakdown in the South Trench (figure 12.4) is dominated by flipper elements (n=151, 39.6%). Teeth and tooth fragments (n=95, 24.9%) are the next most common elements and rib cage (n=46, 12.1%) and vertebrae elements (n=41, 10.8%) are quite close in frequency. Arms (n=21, 5.4%) and legs (n=14, 3.7%) are somewhat less common, while skulls (n=9, 2.4%) and pelves (n=4, 1.1%) are the least common pinniped elements encountered in this area. Unidentifiable pinniped bone makes up 2.3% (n=9) of the assemblage.

Element distributions of the two main identifiable pinniped species, harbor seals and California seal lions, are similar in that both are dominated by flipper elements. However, the harbor seal skeletal elements are far more evenly distributed (figure 12.4). Bones are present in 8 of the 9 element categories for harbor seals. Flipper elements represent 26.1% (n=18) of all the elements; vertebrae, 17.4% (n=12); teeth, 13.1% (n=9); skull fragments and arm bones, 11.6% each (n=8 each). Ribs make up 10.2% (n=7), with legs (n=4, 5.8%) and pelves (n=3, 4.3%) being the least common.

The California sea lion bones, on the other hand, are much less evenly distributed (figure 12.4). They have bones present in only 5 of the 9 element categories. Flipper elements (n=21, 48.9%) dominate this assemblage as well, followed by arm bones (n=9, 20.9%), vertebrae 16.3% (n=7), leg bones 11.6% (n=5), and one pelvic bone (2.3%).

The identified artiodactyl assemblage in the South Trench is dominated by deer (n=125, 65.9%) (table 12.8). Cattle make up 21.6% (n=41) of the assemblage; sheep, 8.8% (n=17); and pigs only 3.1%.

The deer skeletal remains (figure 12.5) from the South Trench show a predominance of teeth and tooth fragments (n=42, 33.6%). Long bones are the next most common bones in this assemblage with arm bones (n=28) at 22.4% and leg bones (n=24) at 19.2% of the total deer bone group. Proportions of other bone groups follow: 7.2% of the assemblage are vertebrae (n=9); 5.6% are

toes (n=7); 4.8% are pelvic bones (n=6); 4.0% are skull fragments (n=5); and 3.2% are ribs (n=4).

The cattle remains from the South Trench (figure 12.5) are dominated by toes (n=10, 25.6%). Whole and partial teeth fragments (n=8, 20.5%) are the next most common elements. Long bones are close behind with 6 arm (15.4%) and 4 leg (10.3%) elements present, along with 2 long bone shaft elements. Vertebrae and ribs are represented by 5 (12.8%) elements each. Skull fragments (n=1, 2.6%) are the least common cow element.

Sheep bones are present in this trench but in relatively low numbers. The sheep assemblage (figure 12.5) is dominated by teeth and tooth fragments (n=9, 52.8%). Vertebrae, pelves, and legs are represented by 2 (11.8%) elements each. Arm bones and skull fragments are each represented by 1 (5.9%) element.

Pigs are represented in the South Trench by 6 elements, the greatest number of pig bones from any of the NAVS excavation areas. This assemblage contains 3 arm bones, 2 teeth, and 1 phalanx.

DISCUSSION

MAMMAL REMAINS

The results of the study of mammal remains from in and around the Native Alaskan Neighborhood exhibit a number of interesting patterns that help elucidate the dietary practices, ethnic identity, and social hierarchy of some of the many members of Colony Ross. These faunal assemblages offer evidence of substantial cultural and/or dietary exchange. Other aspects of these assemblages, however, show a strong continuity of both traditional Alaskan and Californian diets.

The mammalian faunal assemblages from both FRBS and NAVS are highly fragmented, most likely due to trampling (Gifford-Gonzalez et al. 1985) and marrow extraction activities (Binford 1978; Lyman 1991). Many of the fragmented mammal long bone pieces exhibit crisscrossed scratches and abrasions characteristic of trampling (Gifford-Gonzalez et al. 1985). Several of the identifiable proximal and distal terrestrial mammal long bone elements show evidence of marrow extraction activity such as spiral fractures and opposing impact points produced by bipolar cracking of the bones through the use of the hammer and anvil technique (Binford 1978; Enloe 1993; Johnson 1983, 1985; Lyman 1991).

Besides being fragmentary, many of the mammalian skeletal elements discussed here are from juveniles or for some reason are identifiable only to the Order or Family taxonomic levels. Comparisons of faunas at even the Order level at these sites can provide general information concerning the relative importance of marine versus terrestrial mammals in different areas of the settlement. This distinction matters since maritime peoples, Native Alaskans, were present at Ross and in close contact with peoples more accustomed to hunting terrestrial game, such as the Russians and Native Californians.

Seals

Of all the mammal groups represented, the seals show some of the most interesting patterning. Seals are well represented in both NAVS and FRBS mammal assemblages, with relative numbers greater than or equal to those from the majority of late prehistoric Northern Californian coastal sites (Gifford and Marshall 1984; Hildebrandt 1979, 1984; Hildebrandt and Jones 1992; Jones and Hildebrandt 1995; Langenwalter et al. 1989; Lyman 1991, 1992, 1995; Schwaderer 1992; Simons 1990, 1992). Their frequency indicates the strongly maritime resource focus of the Native Alaskan Village and the Fort Ross Beach sites. A total of 400 seal skeletal elements were recovered from FRBS. This total includes all skeletal elements from the site that are identified as seal or to a more discrete level. Seals make up roughly 55% of the identified mammal remains at the Beach site (Wake 1995a, figure 4.10).

From NAVS, 626 seal skeletal elements were recovered. Again, this total includes all skeletal elements identified as seal or to a more discrete level. Seals make up approximately 40% of the identified mammals at the Village site.

If the numbers of seal remains from these two sites are combined, 1,026 pinniped skeletal elements are represented. Seals make up roughly 47% of the identified mammals recovered from the Neighborhood, rank first in both sites separately and combined, and are clearly the most important mammalian taxon there.

While the total frequency of seal elements between these two sites differs by 14 %, the actual frequency distribution of individual skeletal elements at both locations is virtually the same (see figure 12.1). This indicates that when seals were being used or consumed, they were treated similarly in both areas. Flipper elements make up the majority of the seal bones recovered (figure 12.1). Meatier portions of these animals (Lyman et al. 1992), such as pelves, long bones, and vertebrae, are poorly represented. Rib cage elements make up only about 11% of all seal remains, yet are ranked first in meat utility by Lyman et al. (1992). Vertebrae make up roughly 8% of the seal remains and, according to Lyman et al. (1992:531), rank third out of five classes in food utility. It should be noted that vertebrae, according to Grinnell (1901), are typically left at butchery sites. The majority of the pinniped long bone elements recovered from these sites are complete or at least very large distal or proximal ends with much of the shaft intact. These elements make up roughly 7% of all the seal remains and are ranked fourth in importance by Lyman et al. (1992). The only really underrepresented elements are pelvic elements, making up 1% of the total. Pelves rank second in overall meat utility according to Lyman et al. (1992).

The fact that flipper elements dominate these assemblages is especially interesting. Lyman et al.

(1992:531) state clearly that flippers rank as the lowest part of a seal in potential food value, based on a meat to bone ratio. With consideration of Native Alaskan seal consumption practices, strict calorie-based interpretations of skeletal element patterning may not accurately explain the distribution of animal remains observed at Colony Ross.

The patterning seen in the seal remains at both the Native Alaskan Village and the Fort Ross Beach sites, especially with respect to the flipper elements, reflects butchery practices and food preferences found in many areas of coastal Alaska (Birket-Smith and De Laguna 1938:99; Boas 1921; De Laguna 1972:396-7; Grinnell 1901; Hughes 1984; Lantis 1984; Nelson 1899:268). Seal flippers were consumed as specially prepared delicacies in parts of coastal Alaska. For example, Birket-Smith and De Laguna (1938:99) state that amongst the Eyak of the Copper River Delta, "seal flippers, *considered the best part of the seal* (emphasis mine), were never given to children . . ." Edward William Nelson (1899:268) states that "walrus flippers . . . are also among the choice bits of the Eskimo larder." The high status of seal flippers as food items among the Kwakiutl is indicated by Boas (1921:458):

1 and 2, the hind-flippers, are given to the young chiefs; 3 and 4, the fore-flippers, are given to the next ones . . . (Boas 1921:458).

Frederica De Laguna (1972:396-97) provides a detailed description of how Minnie Johnson, a Tlingit woman from Yakutat Bay, butchered a seal.

Using an ordinary kitchen carving knife, she extended the slit in the belly to the junction of the hind flippers and tail, slicing through the blubber to the meat. The skin and fat were removed in one piece, with the tail and four flippers attached to it since they had been cut through at the joints. . . . When she came to the attached flippers, she used the kitchen knife again to cut them off, leaving a small hole where the fore flippers had been, and simply slicing off the rear portion with the hind flippers and tail. . . . Although MJ threw away the flippers on this occasion because she had so much meat, she said that they were usually eaten. (De Laguna 1972:396).

De Laguna (1972:397) goes on to provide a brief description of how these seal flippers were prepared and consumed.

Four hind flippers, still in their skins, were set in a roasting pan in the oven. The others she had thrown away because she had no time to bother with them and there were too many blowflies on the front flippers. 'You peel them after you cook them. Taste like pigs' feet. But I promised I'd cook my granddaughters a good dinner. They don't like seal meat' (De Laguna 1972:397).

Figure 12.4 Pinniped Skeletal Elements from the South Trench

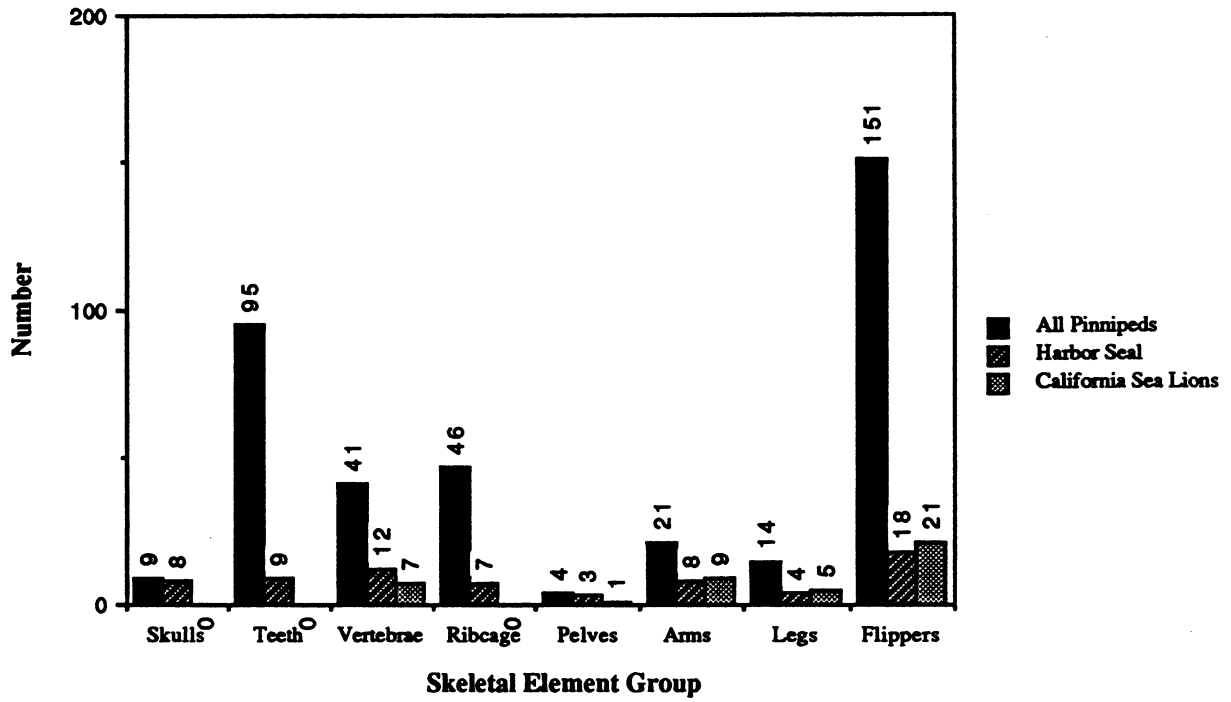
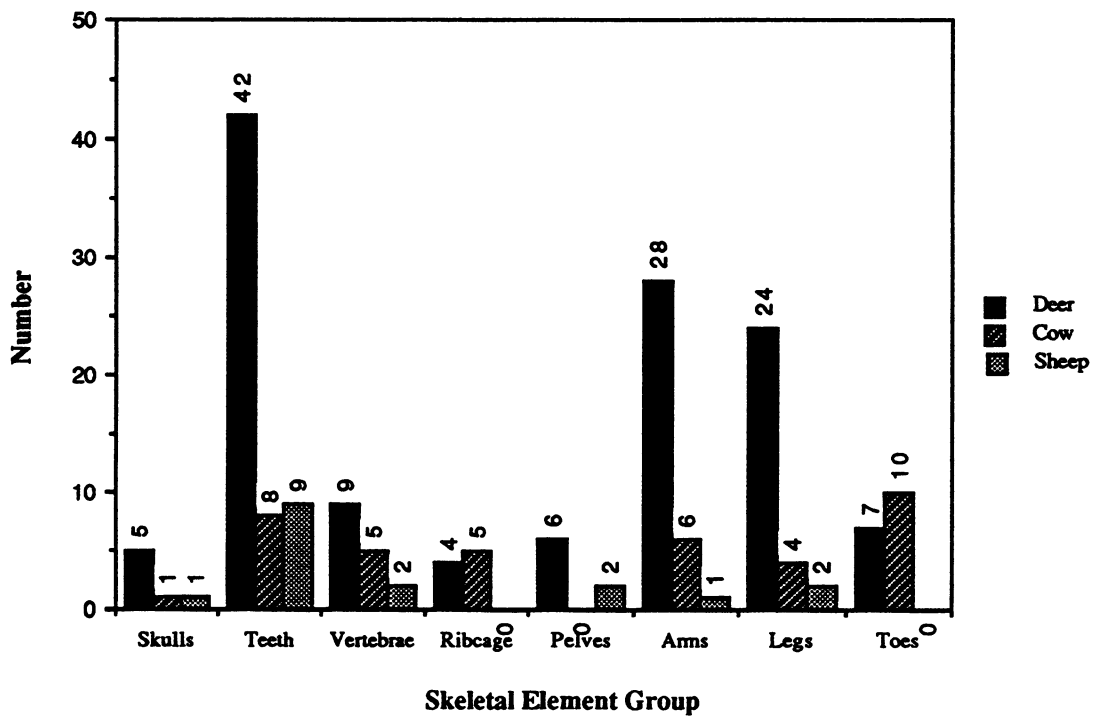


Figure 12.5 Identified Artiodactyl Skeletal Elements from the South Trench



George B. Grinnell (1901:160) was similarly impressed with the contribution of seal meat to the diet and especially with the importance of flippers.

. . . There are flippers, sides of ribs, strips of blubber and braided seal intestines. All of these things are eaten; and, in fact, during this fishing the Indians must subsist chiefly on the flesh of the seal. The flippers appear to be regarded as especially choice. We saw many women roasting them over the fire. After they were cooked the women pulled them out of the ashes, and heating an iron in the fire singed the hair which remained on the skin and then tore the flippers to pieces and picked the meat from the bones (Grinnell 1901:160).

This information provides insight on two important points regarding the Colony Ross seal assemblages. First of all, seal flippers were retained when seals were butchered and perhaps preserved, despite their low meat utility (Lyman et al. 1992). The flippers were "cut off at the joint." These joints are most likely the radio-ulno-navicular articulation (the wrist) and the tibio-astragalar articulation (the ankle). This practice helps explain the preponderance of seal flipper elements, from the astragalus to the terminal phalanges, in the Ross seal assemblages. Secondly, the flippers, fore and hind, were eaten and often treated as a delicacy. Children apparently did not like them, or could not appreciate them (Birket-Smith and De Laguna 1938:99; De Laguna 1972:396-7; Grinnell 1901).

This consumption practice, possibly the primary motivation to bring seal flippers to Colony Ross, also helps explain the great numbers of seal elements at these sites. With the ethnographic record in mind, it would appear that Lyman et al. (1992) do not take into account potential culturally directed motives for consumption of low utility seal parts in their analysis. Seals are clearly the most important mammal group in the Native Alaskan Neighborhood. This sets the Neighborhood apart from the rest of the Colony, since they do not appear to be a very important resource elsewhere at Colony Ross (see Wake 1995 for a fuller discussion of other areas at Ross).

Artiodactyls: Deer

A comparison of the deer element distributions in the Neighborhood also shows some very interesting patterns (figures 12.2, 12.5). Deer were an important part of the diet in the Neighborhood. They rank second in importance only to seals. Possibly these deer were brought to the site by Native Californian extended family members or were hunted by Native Alaskan men.

The deer element distributions at the Village site and Beach site vary only slightly. Differential preservation could possibly explain this pattern, accounting for the slightly greater number of denser elements at the Beach site. However, no portion of the deer skeleton appears to be missing from any assemblage.

Differential preservation of deer and seal skeletal elements based on their bulk densities at these two sites is not indicated (Kreutzer 1992; Lyman 1984; Lyman et al. 1992). Hence, the differences in element distributions seen in the deer remains probably are not due to differential preservation. Both the deer and seal bones have apparently been subjected to roughly the same depositional processes at both FRBS and NAVS. The patterning observed in the mammal remains from these two localities suggests that the Fort Ross Beach Site served as a dumping locus for the Native Alaskan Village atop the bluff.

A number of the deer bones show evidence of butchery in the form of cut marks and ax blows. No readily discernible stone tool cut marks were visible on any of the butchered bones. The deer appear to have been butchered using metal tools. These cut marks are very precise, steep sided, and show few multiple striae per marked area of bone (Walker and Long 1977). The ax blows are steep sided and relatively wide, much wider, for example, than cleaver blows (Langenwalter 1987). This evidence supports the Russian temporal context of the NAVS and FRBS archaeological deposits.

Artiodactyls: Domesticated Mammals

The domesticated mammals present at Ross (horses, pigs, sheep, and cattle) represent European influence on the diets of the Native American inhabitants of the Colony. Domesticated mammals, especially cattle and secondarily sheep, played an important role in the diets of the Native American inhabitants of Colony Ross (table 12.1). This is clearly reflected in the historical record (Gibson 1969, 1976; Khlebnikov 1976, 1990; LaPlace 1986[1839]; Tikhmenev 1978) and the zooarchaeological data. It is likely that both the Native Alaskans and the local Native Californians adopted European foods since domestic mammal bones are present in the archaeological assemblage.

Interestingly, pigs were apparently not exploited to any meaningful degree by the Native American inhabitants of Colony Ross (table 12.1). This may be due to traditional belief systems of the Native Americans (Davydov 1977[1810]) or simply to the poor quality of the Ross pig meat (Khlebnikov 1976; Tikhmenev 1978).

Large numbers of domestic mammals were raised at Ross (Khlebnikov 1976). Khlebnikov (1976) mentions great numbers of cattle, sheep, and pigs being killed for food there, at least some of these animals listed as killed for food may have ended up on ships stopping at Ross for provisions. As with the deer, the domestic mammals at Ross were apparently butchered primarily with metal tools.

While the zooarchaeological data show that domestic mammals were important to the diverse Native American inhabitants of Colony Ross, they appear to be more important to the European inhabitants of the Stockade

complex, as would be expected (e.g. Gibson 1969, 1976; Hoover 1985, 1992; Hoover and Costello 1985; see also Wake 1995a for comparison of the Native Alaskan Neighborhood to the Stockade complex). Faunal remains from the yet to be excavated Russian Village houses outside the Stockade walls could shed a great deal of light on the utilization and distribution of domestic mammals as food at Ross.

MARROW EXTRACTION

Many of the terrestrial mammal long bone elements from all three areas of Colony Ross discussed here exhibit characteristics commonly associated with marrow extraction such as spiral fracturing and well-defined impact zones at their distal and proximal ends exhibiting focused conchoidal fractures (Binford 1978, 1981; Enloe 1993; Johnson 1985; Lyman 1991). None of the marine mammal skeletal elements show any evidence of marrow extraction activity whatsoever. That the marine mammal bones show no evidence of marrow extraction is not surprising, since seal bones do not have medullary cavities that yield the kind of marrow attractive to humans (Lyman 1991; Lyman et al. 1992). The marrow cavities of marine mammals are filled with bony cancellous tissue. Its presence provides support for bones and keeps them from collapsing under the tremendous pressures exerted on mammal bodies during dives to great depths (Riedman 1990).

The extraction of marrow was a common practice, however, among the majority of non-maritime Native Californians, such as the Kashaya Pomo, who depended on relatively large terrestrial mammals such as deer and elk for their protein. The majority of terrestrial wild and domestic herbivore long bones from both the Native Alaskan Neighborhood sites show evidence of proximal or distal impact points and flake scars. These bones exhibit morphologies indicating purposeful, high velocity impact consistent with the bone breakage patterns observed ethnographically and experimentally during marrow extraction activity (Binford 1978, 1981; Johnson 1983, 1985; Lyman 1991). Furthermore, the characteristics of these broken bones resemble what Enloe (1993) refers to as an immediate consumption pattern, as opposed to a mass-processing pattern.

This evidence of marrow extraction is likely the result of the continuing traditional Native Californian practice or learned behavior of Native Alaskan hunters. At any rate, the facts that (1) "Californian" marrow extraction was occurring in an "Alaskan" habitation area, and that (2) deer appear to be an important food resource are strong indicators of the interaction between these two different Native American cultures. The practice of cracking open terrestrial mammal long bones, a potentially new and important food resource to Native Alaskans, makes good nutritional sense.

DISCUSSION OF SPATIAL PATTERNING

A number of intriguing distributional patterns of faunal remains are seen at NAVS. Analysis of the spatial patterning of these faunal remains leads to a number of conclusions regarding the processing and consumption of mammals across the site. The West Central Trench is clearly much different than the rest of the site. Intensive deposition of domestic trash did not occur in this area. The relative bone densities per unit here are much lower than at any other excavated area on the site, and the preservation of the bones is poor. Perhaps the most notable aspect of the West Central Trench is the high degree of burning (36%), much higher than any other excavated area of NAVS. It would seem that this area was outside the more intensively utilized living areas of NAVS, and that more burning of trash or deposition of burned materials occurred here.

The East Central and South trenches and the South Central Test Unit are similar in that they all have high densities of well-preserved mammal bone per unit and have low (not greater than 3.6%) frequencies of burned bone. All of these areas have considerable amounts of both pinniped and artiodactyl skeletal remains, unlike the West Central Trench which has primarily artiodactyl remains.

The South Central Test Unit is set apart from the East Central and South trenches in that artiodactyl remains dominate all other mammal groups by more than 25 percent, a pattern repeated nowhere else (Wake 1995a, figures 6.1, 6.2). Perhaps the most important aspect separating the South Central Test Unit from the East Central and South trenches is the absence of a discrete "bone bed" stratum. The faunal remains recovered from the South Central Test Unit appear to be randomly distributed in the soil column and not to be a part of any discrete dumping event.

EAST CENTRAL AND SOUTH TRENCHES: SIMILARITIES

The mammal assemblages from the East Central and South trenches share a number of similarities (figures 12.2-12.5). Both of these areas have diverse archaeofaunas for Colony Ross. The majority of the mammal skeletal elements in each assemblage were recovered from discrete concentrations of midden material, or bone beds. Both of these areas have low frequencies of burned bone; 1.5% in the East Central Trench and 2.6% in the South Trench. Carnivores are present in each area, but only in relatively low numbers. Pigs are also present in both areas in relatively low numbers.

The actual distributions of skeletal elements for the dominant identified species are quite similar between these two areas. The deer skeletal element distributions, in particular, are remarkably similar (figures 12.2 and 12.5). Both assemblages are dominated by teeth and

tooth fragments (33.6% S, 28.8% EC), followed closely by arm bones (22.4% S, 16.7% EC) and leg bones (19.4% S, 13.6% EC). Vertebrae, pelves, and skull fragments are all less common in each of these assemblages.

The distributions of the pinniped elements found in the East Central and South trenches also closely resemble each other (Wake 1995a, figures 12.3, 12.4). Both assemblages have elements present in all 8 of the previously described categories. Flipper elements dominate both pinniped assemblages (39.6% S, 47.6% EC). Teeth and tooth fragments make up roughly a quarter of each assemblage (24.9% S, 24.6% EC). Rib bones are the next most common elements (12.1% S, 11.0% EC). The long bones, vertebrae, pelves, and skull fragments are all less common in each assemblage.

The element distributions of the two main identified species of pinnipeds, the harbor seal and the California sea lion, differ in the same way in these two areas. In general, harbor seal skeletal elements are more evenly distributed, with bones from every part of the skeleton well represented. Sea lions, on the other hand, appear to be more restricted in their element distributions. In distributions from each area, only 5 of the 8 element categories are represented in the sea lion bone assemblage. Flipper elements make up roughly 50% or more of the sea lion elements in each assemblage.

EAST CENTRAL AND SOUTH TRENCHES: DIFFERENCES

Keeping the above similarities in mind, these two areas differ in a number of important ways. One of the more obvious differences has to do with the frequencies of the dominant mammal groups between the East Central and South trenches (Wake 1995a, figures 6.1, 6.2). The South Trench is dominated by pinnipeds (49.3%), with artiodactyls running a relatively close second, representing 42.4% of the total assemblage. The opposite is seen in the East Central Trench, which is dominated by artiodactyls (44.6%), with pinnipeds running second, making up 31.9% of the total assemblage.

The distribution of cattle remains differs noticeably between the East Central and South trenches (figures 12.2 and 12.5). Higher utility (Binford 1981) skeletal elements are much more common in the East Central Trench. Utility-based interpretations might lead to the conclusion that the occupants of the East Central Trench, in respect to cattle, were of higher status than their counterparts in the South Trench, since they consumed meatier parts of the animal. These differences could also reflect broader ethnic preferences, and not simply status-based differentiation.

Other notable differences between these two areas include the distribution of elk and whale remains. While low in overall number, the distributions of these two taxa

provide additional insight into the overall spatial patterning of certain broad mammal groups at NAVS. One whale element was recovered from the South Central Test Unit and one from the East Central Trench. The majority of non-worked identifiable whale remains are from the South Trench (n=9). Occupants of the South Trench appear to have consumed more whale than the inhabitants of the East Central Trench did.

The majority of the elk remains recovered at NAVS are from the East Central Trench (n=7). Only two elk elements were recovered from the South Trench, a tooth and a worked antler baton. Most of the identified elk remains from the East Central Trench are food remains (n=5). The three antler specimens (2 from the East Central Trench and 1 from the South Trench) all show evidence of use as sources of raw material, indicated by numerous chop blows and cut marks on many of the artifacts' surfaces. The inhabitants of the East Central Trench appear to have emphasized elk antler tool production much more than their counterparts in the South Trench. They also appear to have consumed more elk in the East Central Trench in general.

The distribution of the large carnivore remains is also interesting. One grizzly bear humerus was recovered from the East Central Trench, and one grizzly bear radius was recovered from the South Trench. Both grizzly bear elements recovered from NAVS exhibit evidence of use as sources of raw material and were worked in similar fashions. The mountain lion and half of the bobcat remains were recovered from the South Trench. The hunting of, or access to, large terrestrial carnivores may have been more strongly emphasized by the inhabitants of the South Trench.

In general, it appears that the occupants of the East Central Trench placed greater emphasis on terrestrial mammals, especially artiodactyls, while still consuming a considerable amount of marine mammals. The inhabitants of the South Trench appear to have emphasized marine mammals, including whales, more than their neighbors to the north and east did. They still consumed a considerable amount of terrestrial mammals, specifically artiodactyls. One should remember, however, that the actual distribution of the skeletal elements of both the artiodactyls, with the exception of cattle, and the pinnipeds is quite similar between the two largest excavation areas (Wake 1995a; figures 12.2-12.5).

CONCLUSIONS

Analysis of the mammal remains from Ross provides insight into aspects of life at the Colony that are poorly documented or not included at all in the historical record. Some of the dietary preferences of the Colony's inhabitants are referred to in passing by Khlebnikov (1976, 1990) and others (Essig 1933; LaPlace 1986[1839]; Odgen 1933, 1941). Little, however, was known about

the level of dietary conservatism and accommodation of the various ethnic groups present at Ross. Dietary conservatism and acculturation reflect one measure of culture change at Ross. Information regarding what was actually consumed as food and how it was treated is available only in the archaeological record.

Analysis of the mammal remains from all examined areas of the Colony has identified specific, conservative ethnic dietary patterns, such as continued consumption of seal flippers in the Native Alaskan Neighborhood. New dietary patterns directly related to multicultural colonial life are also evident, such as the combined focus on large wild and domestic terrestrial and marine mammals, and the use of metal butchery tools to process them.

Certain aspects of the diets of the people who lived in the Neighborhood appear to be quite conservative. These conservative aspects can help distinguish the ethnicities of the inhabitants of various areas of the Colony (e.g., Hesse 1986; McKee 1987; Sanders 1980). The similar skeletal element distributions and emphasis on flipper elements in both Neighborhood assemblages indicate a standardized approach to the butchery and consumption of marine mammals by the Native Alaskans at Ross (Wake 1995a, 1995b). The continued consumption of marine mammals by Native Alaskans reflects their desire to maintain traditional dietary habits by consuming familiar food resources available along the California coast.

Deer are an important part of the diet in the Native Alaskan Neighborhood, second only to pinnipeds. Also, typically Californian marrow extraction practices are strongly indicated in the deer remains (Binford 1978, 1981; Lyman 1991). The dominance of deer amongst the terrestrial mammal remains in the Neighborhood, and the evidence of marrow extraction in all the land mammals, reflects dietary conservatism by Native Californians.

For the most part, the distribution of mammal remains at NAVS is similar throughout the site. The West Central Trench has a high (36%) frequency of burned bone, the highest frequency yet seen at Ross. Skeletal elements of the dominant mammal groups at NAVS, the pinnipeds and artiodactyls, are distributed similarly in the main excavation areas. Both areas emphasize native terrestrial herbivores (deer) and have lower numbers of domestic livestock. The East Central Trench has a greater frequency of terrestrial herbivores and mammals in general than does the South Trench. In contrast, the South Trench has a greater frequency of pinnipeds than the East Central Trench and also has a great deal more whale bone than any other area at Ross.

The occupants of the East Central Trench emphasized consumption of terrestrial herbivores, while exploiting a considerable number of marine mammals, specifically pinnipeds. South Trench inhabitants placed greater emphasis on marine mammals, especially pinnipeds and whales, while consuming a considerable

number of terrestrial herbivores. The whale bone at NAVS probably derives from at least one animal reportedly captured and consumed at Colony Ross (Khlebnikov 1990). It is possible, however, that the NAVS whale bone could have been gleaned from dead whales which regularly wash ashore in California.

Based on the skeletal element distribution patterns, the inhabitants of these two main areas processed both marine mammals and terrestrial herbivores in very similar ways. Both the Native Californians and the Native Alaskans appear to have adopted some European dietary practices, as represented by cattle and sheep (Wake 1995a, figure 4.20). However, there is no evidence of a strong shift towards European foods to the exclusion of more traditional Native American mammal foods in the faunal remains. Both Native American groups definitely continued to consume familiar and locally available foods.

The Native Alaskan Neighborhood provides archaeological confirmation of the historical record, insofar as the record goes. There is much about life in the Neighborhood, and Ross in general, that was not recorded in the historical record. A much more complete interpretation of the daily lives of Neighborhood residents is available from the archaeological record than was ever written by the Russian historians or other visitors to Ross.

REFERENCES

- Amorosi, Thomas
1987 The Karluk and Uyak Bay Archaeofaunas: An Approach towards the Paleoeconomy of Kodiak Island, Alaska. Paper presented at the 52nd annual meeting of the Society for American Archaeology, Toronto.
- Barrett, Samuel A.
1952 Material Aspects of Pomo Culture, Parts 1 and 2. *Bulletin of the Public Museum of the City of Milwaukee* 20(1,2):1-508.
- Bartram, Laurence E., Ellen M. Kroll, and Henry T. Bunn
1991 Variability in Camp Structure and Bone Food Refuse Patterning at Kua San Hunter-Gatherer Camps. In *The Interpretation of Archaeological Spatial Patterning*, edited by Ellen M. Kroll and T. Douglas Price, pp. 77-148. Plenum Press, New York.
- Basgall, Mark E., and William R. Hildebrandt
1989 *Prehistory of the Sacramento River Canyon, Shasta County, California*. Center for Archaeological Research at Davis, Publication No. 9.
- Bickel, Polly McW.
1981 *San Francisco Bay Archaeology: Sites ALA-328, ALA-13, and ALA-12*. Contributions of the University of California Archaeological Research Facility, No. 43. Berkeley.
- Binford, Lewis R.
1978 *Nunamiit Ethnoarchaeology*. Academic Press, New York.

- 1981 *Bones: Ancient Men and Modern Myths*. Academic Press, New York.
- Birket-Smith, Kaj, and Frederica De Laguna
1938 *The Eyak Indians of the Copper River Delta, Alaska*. Levin & Munksgaard, Copenhagen.
- Boas, Franz
1921 *Ethnology of the Kwakiutl*. Bureau of American Ethnology, 35th Annual Report, Vol. 1, 1913-14. U.S. Government Printing Office, Washington D.C.
- Broughton, Jack M.
1994 Declines in Mammalian Foraging Efficiency during the Late Holocene, San Francisco Bay, California. *Journal of Anthropological Archaeology* 13(3):371-401.
- Carr, Christopher
1984 The Nature of Organization of Intrasite Archaeological Records and Spatial Analytic Approaches to their Investigation. In *Advances in Archaeological Method and Theory, Vol. 7*, edited by Michael B. Schiffer, pp. 103-221. Academic Press, New York.
- Chartkoff, Joseph L., and Kerry K. Chartkoff
1983 Excavations at the Patrick Site (4-Butte-1). In *The Archaeology of Two Northern California Sites*, edited by Ernestine S. Elster, pp. 1-52. Institute of Archaeology, Monograph 22. University of California, Los Angeles.
- Clark, Donald W.
1974 *Koniag Prehistory: Archaeological Investigations at Late Prehistoric Sites on Kodiak Island, Alaska*. Tubinger Monographien zur Urgeschichte, Band 1. Verlag W. Kohlhammer, Stuttgart.
- 1985 Archaeological Test at the Three Saints Bay Colony, Alaska. *Historical Archaeology* 19(2):114-21.
- Crabtree, Pam J.
1990 Zooarchaeology and Complex Societies: Some Uses of Faunal Analysis for the Study of Trade, Social Status, and Ethnicity. In *Archaeological Method and Theory, Vol. 2*, edited by Michael B. Schiffer, pp. 155-205. University of Arizona Press.
- Crader, Diana C.
1984 The Zooarchaeology of the Storehouse and the Dry Well at Monticello. *American Antiquity* 49(3):542-57.
- 1990a Faunal Remains from Slave Quarter Sites at Monticello, Charlottesville, Virginia. *Archaeozoologia* 3(1,2):229-36.
- 1990b Slave Diet at Monticello. *American Antiquity* 55(4):690-717.
- Davydov, Grigorii I.
1977 [1810] *Two Voyages to Russian America, 1802-1807*. Translated by Colin Bearne, edited by Richard A. Pierce. Materials for the Study of Alaskan History, No. 10. Limestone Press, Fairbanks, Alaska.
- De Blase, A., and R. E. Martin
1974 *A Manual of Mammalogy*. W. C. Brown, Co., Dubuque, Iowa.
- De Laguna, Frederica
1972 *Under Mount Saint Elias: The History and Culture of the Yakutat Tlingit*. Smithsonian Contributions to Anthropology Vol. 7, Part 1. Smithsonian Institution Press, Washington D.C.
- Denniston, G. B.
1974 The Diet of the Ancient Inhabitants of Ashishik Point, an Aleut Community. *Arctic Anthropology* 11(supplement):143-51.
- Duque, Mercedes
1989 Analysis of Faunal Remains from the Three Springs Valley. In *Archaeology of the Three Springs Valley, California: A Study of Functional Cultural History*, edited by Brian D. Dillon and Matthew A. Bost, pp. 102-21. Institute of Archaeology, Monograph 30. University of California, Los Angeles.
- Enloe, James G.
1993 Ethnoarchaeology of Marrow Cracking: Implications for the Recognition of Prehistoric Subsistence Organization. In *From Bones to Behavior: Ethnoarchaeological and Experimental Contributions to the Interpretation of Faunal Remains*, edited by Jean Hudson, p. 82-100. Center for Archaeological Investigations, Occasional Paper No. 21. Southern Illinois University at Carbondale.
- Essig, E. O.
1933 *The Russian Settlement at Ross*. California Historical Society, Special Publication no. 7, San Francisco.
- Fedorova, Svetlana G.
1973 *The Russian Population in Alaska and California in the Late 18th Century - 1867*. Translated by Richard A. Pierce and Alton S. Donnelly. Limestone Press, Fairbanks, Alaska.
- Frierman, Jay D.
1992 The Pastoral Period in Los Angeles: Life on the Ranchos and in the Pueblo, 1800-1850. In *Historical Archaeology of Nineteenth-Century California*, edited by Jay D. Frierman and Roberta S. Greenwood, pp. 1-52. William Andrews Clark Memorial Library, University of California, Los Angeles.
- Gamble, Lynn
1983 The Organization of Artifacts, Features, and Activities at Pitas Point: A Coastal Chumash Village. *Journal of California and Great Basin Anthropology* 5:103-129.
- Gibson, James R.
1969 *Feeding the Russian Fur Trade: Provisionment of the Okhotsk Seaboard and the Kamchatka Peninsula, 1639-1856*. University of Wisconsin Press, Madison.
- 1976 *Imperial Russia in Frontier America: The Changing Geography of Supply of Russian America, 1784-1867*. Oxford University Press, New York.

- Gifford, Diane P., and Francine Marshall
1984 *Analysis of the Archaeological Assemblage from CA-SCR-35, Santa Cruz County, California*. Archives of California Prehistory, No. 2. Coyote Press, Salinas, California.
- Gifford, Edward Winslow
1967 Ethnographic Notes on the Southwestern Pomo. *Anthropological Records* 25.
- Gifford, Edward Winslow, and Alfred L. Kroeber
1937. Culture Element Distributions: IV Pomo. *University of California Publications in Archaeology and Ethnology* 37(4):117-254.
- Gifford-Gonzalez, Diane P., David B. Damrosch, Debra R. Damrosch, John Pryor, and Robert L. Thunen
1985 The Third Dimension in Site Structure: An Experiment in Trampling and Vertical Dispersal. *American Antiquity* 50(4): 803-18.
- Gilbert, B. Miles
1980 *Mammalian Osteology*. Modern Printing Company, Laramie, Wyoming.
- Grayson, Donald K.
1984 *Quantitative Zooarchaeology: Topics in the Analysis of Archaeological Faunas*. Academic Press, New York.
- Grimell, George B.
1901 Natives of the Alaska Coast Region. In *Harriman Alaska Expedition*, Vol. 1:137-83. New York.
- Gust, Sherry M.
1983 Problems and Prospects in Nineteenth Century California Zooarchaeology. In *Forgotten Places and Things: Archaeological Perspectives on American History*, edited by A. Ward, pp. 341-48. Center for Anthropological Studies, Albuquerque, New Mexico.
- Hall, E. Raymond
1981 *The Mammals of North America*. 2nd Edition, 2 vols. John Wiley and Sons, New York.
- Heizer, Robert F.
1956 Archaeology of the Uyak Site, Kodiak Island, Alaska. *University of California Anthropological Records* 17(1):i-vi,1-199.
- Hesse, Brian
1986 Animal Use at Tel Miqne-Ekron in the Bronze Age and Iron Age. *Bulletin of the American School of Oriental Research* 264:17-27.
- Hildebrand, Milton
1955 Skeletal Differences between Deer, Sheep, and Goats. *California Fish and Game* 41(4):327-46.
- Hildebrandt, William R.
1979 Vertebrate Faunal Analysis. In *Report of the Archaeological Investigations of Shelter Cove*, edited by Valerie A. Levulett, p. 212-42. California Coastal Zone Conservation Commission, North Coast Region, Eureka, California.
- 1984 Late Period Hunting Adaptations on the North Coast of California. *Journal of California and Great Basin Anthropology* 6(2):189-206.
- Hildebrandt, William R., and Terry L. Jones.
1992 Evolution of Marine Mammal Hunting: A View from the California and Oregon Coasts. *Journal of Anthropological Archaeology* 11:360-401.
- Hill, John Eric
1937 Morphology of the Pocket Gopher: Mammalian Genus *Thomomys*. *University of California Publications in Zoology* 42(2):81-172.
- Hillson, Simon
1992 *Mammal Bone and Teeth: An Introductory Guide to Methods of Identification*. Institute of Archaeology, London, England.
- Hodder, Ian, and Clive Orton
1976 *Spatial Analysis in Archaeology*. Cambridge University Press, Cambridge.
- Hooper, Emmet T., and B. S. Hart
1962 A Synopsis of Recent North American Microtene Rodents. *Miscellaneous Publications of the University of Michigan Museum of Zoology* 120:1-68.
- Hoover, Robert L.
1985 The Archaeology of Spanish Sites in California. In *Comparative Studies of the Archaeology of Colonialism*, edited by Stephen L. Dyson, pp. 93-114. BAR International Series 233. B.A.R., Oxford.
- 1992 Some Models for Spanish Colonial Archaeology in California. *Historical Archaeology* 26(1):37-44.
- Hoover, Robert L., and Julia G. Costello (editors)
1985 *Excavations at Mission San Antonio, 1976-1978*. University of California, Los Angeles Institute of Archaeology, Monograph No. 26.
- Hrdlicka, Ales
1944 *The Anthropology of Kodiak Island*. The Wistar Institute of Anatomy and Biology, Philadelphia.
- Hughes, Charles C.
1984 Saint Lawrence Island Eskimo. In *Arctic*, edited by David Damas, pp. 262-77. Handbook of North American Indians, Vol. 5, William C. Sturtevant, general editor. Smithsonian Institution Press, Washington D.C.
- Ijzereef, F. Gerard
1989 Social Differentiation from Animal Bone Studies. In *Diet and Crafts in Towns*, edited by Dale Serjeantson and Tony Waldron, pp. 41-54. BAR International Series 199. B.A.R., Oxford.
- Ingles, Lloyd Glenn
1954 *Mammals of California and its Coastal Waters*. Stanford University Press, Stanford.
- Istomen, Alexi A.
1992 *The Indians at the Ross Settlement; According to the*

- Censuses by Kuskov, 1820-1821*. Fort Ross Interpretive Association, Jenner, California.
- Jackson, Robert
1983 Intermarriage at Fort Ross: Evidence from the San Rafael Mission Baptismal Register. *Journal of California and Great Basin Anthropology* 5:240-41.
- Jameson, E. W., Jr., and Hans J. Peeters
1988 *California Mammals*. California Natural History Guides: 52. University of California Press, Berkeley.
- Johnson, Eileen
1983 A Framework for Interpretation in Bone Technology. In *Carnivores, Human Scavengers and Predators: A Question of Bone Technology*, edited by Genevieve M. LeMoine and A. Scott MacEachern, pp. 55-93. Proceedings of the Fifteenth Annual Chacmool Conference. The Archaeological Association of the University of Calgary.
1985 Current Developments in Bone Technology. In *Advances in Archaeological Method and Theory*, Vol. 8, edited by Michael B. Schiffer, pp.157-235. Academic Press, New York.
- Jolley, Robert L.
1983 North American Historic Sites Zooarchaeology. *Historical Archaeology* 17(2):64-79.
- Jones, Kevin T.
1993 The Archaeological Structure of a Short-Term Camp. In *From Bones to Behavior: Ethnoarchaeological and Experimental Contributions to the Interpretation of Faunal Remains*, edited by Jean Hudson, pp. 101-14. Center for Archaeological Investigations, Occasional Paper No. 21, Southern Illinois University at Carbondale.
- Jones, Terry L., and William R. Hildebrandt
1995 Reasserting a Prehistoric Tragedy of the Commons: Reply to Lyman. *Journal of Anthropological Archaeology* 14(1):78-98
- Kasper, Jan C.
1980 *Skeletal Identification of California Sea Lions and Harbor Seals for Archaeologists*. Ethnic Technology Notes, No. 17. San Diego Museum of Man, San Diego, California.
- Keeley, Lawrence H.
1991 Tool Use and Spatial Patterning: Complications and Solution. In *The Interpretation of Archaeological Spatial Patterning*, edited by Ellen M. Kroll and T. Douglas Price, pp. 257-68. Plenum Press, New York.
- Khlebnikov, Kyrill T.
1976 *Colonial Russian America: Kyrill T. Khlebnikov's Reports, 1817-1832*, translated and edited by Basil Dmytryshyn and E. A. P. Crownhart-Vaughan. Oregon Historical Society, Portland.
1990 *The Klebnikov Archive. Unpublished Journal (1800-1837) and Travel Notes (1820, 1822, and 1824)*. The Rasmuson Library Historical Translation Series, Vol. 5, edited by Leonard Shur, translated by J. Bisk. University of Alaska, Fairbanks.
- Klein, Richard G., and Kathryn Cruz-Uribe
1984 *The Analysis of Animal Bones from Archaeological Sites*. University of Chicago Press, Chicago.
- Knecht, Richard A., and Richard H. Jordan
1985 Nunakakhnak: An Historic Period Koniag Village in Karluk, Kodiak Island, Alaska. *Arctic Anthropology* 22(2):17-35.
- Kniffen, Fred B.
1939. Pomo Geography. *University of California Publications in Archaeology and Ethnology* 36(6):353-400.
- Kreutzer, Lee Ann
1992 Bison and Deer Bone Mineral Densities: Comparisons and Implications for the Interpretation of Archaeological Faunas. *Journal of Archaeological Science* 19:271-94.
- Kroeber, Alfred L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78.
- Langenwalter, Paul E.
1980 The Archaeology of 19th Century Subsistence at the Lower China Store, Madera County, California. In *Archaeological Perspectives of Ethnicity in America*, edited by Robert L. Shuyler, pp. 102-12. Baywood Publishing Company, New York.
1987 Mammals and Reptiles as Food and Medicine in Riverside's Chinatown. In *Wong Ho Leun: An American Chinatown, Vol. 2: Archaeology*, pp. 53-106. The Great Basin Foundation, San Diego.
- Langenwalter, Paul E., and Larry W. McKee
1985 Vertebrate Faunal Remains. In *Excavations at Mission San Antonio, 1976-1978*, edited by Robert L. Hoover and Julia G. Costello, pp. 146-51. University of California, Los Angeles. Institute of Archaeology, Monograph No. 26.
- Langenwalter, Paul E., II, Richard L. Reynolds, Brenda Bowser, and Richard W. Huddleston.
1989 Vertebrate Animal Remains from CA-MNT-108, An Early Period Archaeological Site on the Monterey Peninsula, California. In *Archaeological Excavations at CA-MNT-108, at Fishermans Wharf, Monterey, Monterey County, California*, edited by Gary S. Breschini and Trudy Haversat, Appendix 1, pp. 97-126. Archives of California Prehistory, No. 29. Coyote Press, Salinas, California.
- Lantis, Margaret
1984 Aleut. In *Arctic*, edited by David Damas, pp. 161-84. Handbook of North American Indians, Vol. 5, William C. Sturtevant, general editor. Smithsonian Institution Press, Washington D.C.
- LaPlace, Cyrille
1986[1839] Description of a Visit to an Indian Village Adjacent to Fort Ross by Cyrille La Place, 1839 (translated by Glenn J. Farris). In *Cultural Resource Survey at the Fort Ross Campground, Sonoma County, California*, edited by Glenn J. Farris, pp. 66-81. Report on file at the

- California Department of Parks and Recreation Archaeology Laboratory, West Sacramento, California.
- Lawrence, Barbara
1951 Post-Cranial Skeletal Characters of Deer, Pronghorn, and Sheep-Goat, With Notes on *Bos* and *Bison*. *Papers of the Peabody Museum of American Archaeology and Ethnology* 35(3.2):9-43.
- Layton, Thomas N.
1990 *Western Pomo Prehistory: Excavations at Albion Head, Nighbirds' Retreat and Three Chop Village, Mendocino County, California*. Institute of Archaeology Monograph 32. University of California, Los Angeles.
- Lightfoot, Kent G.
1992 Coastal Hunter-Gatherer Settlement Systems in the Southern North Coast Ranges. In *Essays on the Prehistory of Maritime California*, edited by Terry L. Jones, pp. 73-104. Center for Archaeological Research at Davis, Publication No. 10.
1994 The Archaeological Study of Culture Change and Continuity in Multiethnic Communities. *Proceedings of the Society for California Archaeology* 7:7-12.
1995 Culture Contact Studies: Redefining the Relationship between Prehistoric and Historic Archaeology. *American Antiquity* 60(2).
- Lightfoot, Kent G., Thomas A. Wake, and Ann M. Schiff
1991 *The Archaeology and Ethnohistory of Fort Ross, California. Vol.1, Introduction*. Contributions of the University of California Archaeological Research Facility, No. 49. Berkeley.
1993 Native Responses to the Russian Mercantile Colony of Fort Ross, Northern California. *Journal of Field Archaeology* 20:159-75.
- Lippold, L. K.
1972 Mammalian Remains from Aleutian Archaeological Sites: A Preliminary Report. *Arctic Anthropology* 11(2):113-14.
- Loeb, Edwin M
1926. Pomo Folkways. *University of California Publications in American Archaeology and Ethnology* 19(2):149-404.
- Lyman, R. Lee
1984 Bone Density and Differential Survivorship in Fossil Classes. *Journal of Anthropological Archaeology* 3:259-99.
1987 On the Zooarchaeological Measures of Socioeconomic Position and Cost-Efficient Meat Purchases. *Historical Archaeology* 21(1):58-66.
1991 *Prehistory of the Oregon Coast: The Effects of Excavation Strategies and Assemblage Size on Archaeological Inquiry*. Academic Press, New York.
1992 Prehistoric Seal and Sea-Lion Butchering on the Southern Northwest Coast. *American Antiquity* 57(2):246-61.
1995 On the Evolution of Marine Mammal Hunting on the West Coast of North America. *Journal of Anthropological Archaeology* 14(1):45-77.
- Lyman, R. Lee, James M. Savelle, and Peter Whithridge
1992 Derivation and Application of a Meat Utility Index for Phocid Seals. *Journal of Archaeological Science* 19:531-55.
- Lyon, Gretchen M.
1937 Pinnipeds and a Sea Otter from the Point Mugu Shell Mound of California. *Publications of the University of California at Los Angeles in Biological Sciences* 1(8):133-68.
- McClendon, Sally, and Robert L. Oswalt
1978 Pomo: Introduction. In *California*, edited by Robert F. Heizer, pp. 274-88. Handbook of North American Indians, Vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington D.C.
- McKee, Larry W.
1987 Delineating Ethnicity from the Garbage of the Early Virginians: Faunal Remains from the Kingsmill Plantation Slave Quarters. *American Archaeology* 6(1):31-39.
- Moratto, Michael J.
1984 *California Archaeology*. Academic Press, Orlando.
- Mouer, L. Daniel
1993 Chesapeake Creoles: The Creation of Folk Culture in Colonial Virginia. In *The Archaeology of Seventeenth-Century Virginia*, edited by Dennis J. Pogue and Carter Hudgins, pp. 105-66. Archaeological Society of Virginia.
- Nelson, Edward William
1899 The Eskimo About the Bering Strait. In *18th Annual Report of the Bureau of American Ethnology, 1896-1897*, pp. 3-518. United States Government Printing Office, Washington D.C.
- O'Connell, James F.
1987 Alyawara Site Structure and its Archaeological Implications. *American Antiquity* 52:74-108.
- O'Connell, James F., and B. Marshall
1989 Analysis of Kangaroo Body Part Transport among the Alyawara of Central Australia. *Journal of Archaeological Science* 16:393-405.
- O'Connell, James F., Kristen Hawkes, and Nicholas Blurton-Jones
1988 Hadza Hunting, Butchering, and Bone Transport and their Archaeological Implications. *Journal of Anthropological Research* 44:113-62.
1990 Reanalysis of Large Mammal Body Part Transport among the Hadza. *Journal of Archaeological Science* 17:301-16.
1991 Distribution of Refuse-Producing Activities at Hadza

- Residential Base Camps: Implications for Analyses of Archaeological Site Structure. In *The Interpretation of Archaeological Spatial Patterning*, edited by Ellen M. Kroll and T. Douglas Price, pp. 61-76. Plenum Press, New York.
- Ogden, Adele
1941 *The California Sea Otter Trade, 1784-1848*. University of California Press, Berkeley.
- Olsen, Stanley J.
1960 Post-Cranial Skeletal Characters of Bison and Bos. *Papers of the Peabody Museum of Archaeology and Ethnology* 35(4).
1964 Mammal Remains from Archaeological Sites: Part 1-Southeastern and Southwestern United States. *Papers of the Peabody Museum of Archaeology and Ethnology* 56(1).
1978 Bones from Awatovi, Northeastern Arizona: The Faunal Analysis. *Papers of the Peabody Museum of Archaeology and Ethnology* 70(1).
1982 An Osteology of some Maya Mammals. *Papers of the Peabody Museum of Archaeology and Ethnology* 73.
- Reitz, Elizabeth J., and Stephen L. Cumbaa
1983 Diet and Foodways of Eighteenth-Century Spanish St. Augustine. In *Spanish St. Augustine: The Archaeology of a Colonial Creole Community*, edited by Kathleen Deagan, pp. 151-85. Academic Press, New York.
- Riddell, Francis A.
1955 Archaeological Excavations on the Farallon Islands, California. Paper on California Archaeology 34. *University of California Archaeological Survey Report, No. 32*.
- Riedman, Marianne
1990 *The Pinnipeds: Seals, Sea Lions, and Walruses*. University of California Press, Berkeley.
- Sanders, R.
1980 *E Pluribus Unum: A Review of the Harvard Encyclopaedia of American Ethnic Groups*. *The New Republic* 183(23):29-33.
- Scheffer, Victor B.
1958 *Seals, Sea Lions, and Walruses: A Review of the Pinnipedia*. Stanford University Press, Stanford.
- Schulz, Peter D., and Sherry M. Gust
1983 Faunal Remains and Social Status in Nineteenth Century Sacramento. *Historical Archaeology* 17(1): 44-53.
- Schwaderer, Rae
1992 Archaeological Test Excavation at the Duncan's Point Cave, CA-SON-348/H. In *Essays on the Prehistory of Maritime California*, edited by Terry L. Jones, pp. 55-72. Center for Archaeological Research at Davis, Publication No. 10.
- Simenstad, Charles A, James A. Estes, and Karl W. Kenyon
1978 Aleuts, Sea Otters, and Alternate Stable-State Communities. *Science* 200:403-411.
- Simons, Dwight D.
1990 Vertebrate Remains from the Albion Sites. In *Western Pomo Prehistory. Excavations at Albion Head, Nightbird's Retreat, and Three Chop Village, Mendocino County, California*, edited by Thomas N. Layton, pp. 37-51. Institute of Archaeology, Monograph 32. University of California, Los Angeles.
1992 Prehistoric Mammal Exploitation in the San Francisco Bay Area. In *Essays on the Prehistory of Maritime California*, edited by Terry L. Jones, pp. 73-104. Center for Archaeological Research at Davis, Publication No. 10.
- Smith, George S.
1979 *Mammalian Zooarchaeology, Alaska: A Manual for Identifying and Analyzing Mammal Bones from Archaeological Sites in Alaska*. Anthropology and Historic Preservation Cooperative Park Studies Unit, Occasional Paper no. 18. University of Alaska, Fairbanks.
- Steward, Julian H.
1933 Ethnography of the Owens Valley Paiute. *University of California Publications in Archaeology and Ethnology* 33:233-350.
- Stewart, Omer C.
1943 Notes on Pomo Ethnogeography. *University of California Publications in Archaeology and Ethnology* 40(2):29-62.
- Tikhmenev, Petr Aleksandrovich
1978 *A History of the Russian American Company*. Translated and edited by Richard A. Pierce and Alton S. Donnelly. University of Washington Press, Seattle.
- Vaughan, Terry A.
1972 *Mammalogy*. W. B. Saunders Company, Philadelphia.
- Velte, Douglas W.
1990 Perspectives on Aleut Culture Change during the Russian Period. In *Russian America: The Forgotten Frontier*, edited by Barbara Sweetland Smith and Redmond J. Barnett, pp. 175-84. Washington State Historical Society, Tacoma.
- Wake, Thomas A.
1994 Social Implications of Mammal Remains from Fort Ross, California. *Proceedings of the Society for California Archaeology* 7:19-32.
1995a *Mammal Remains from Fort Ross: A Study in Ethnicity and Culture Change*. Unpublished Ph.D. dissertation. University of California, Berkeley.
1995b Acculturation and Food: A Study of Dietary Patterns Observed at Fort Ross, California. In *Proceedings of the 25th Annual Chacmool Conference*, edited by

Dennis Sandgathe. The Archaeological Association of the University of Calgary.

Walker, P. L., and J. C. Long
1977 An Experimental Study of the Morphological Characteristics of Tool Marks. *American Antiquity* 42(4):605-16.

White, Greg
1984 *The Archaeology of Lak-510, Near Lower Lake, Lake County, California*. Report prepared for the California Department of Transportation: Business, Transportation & Housing Agency. Anthropological Studies Center. Sonoma State University Academic Foundation, Rohnert Park.

13

Bird Remains from the Fort Ross Beach and Native Alaskan Village Sites

DWIGHT D. SIMONS

MATERIALS AND METHODS

UPON RECEIPT OF THE BIRD BONES from the Fort Ross Beach Site (FRBS) and the Native Alaskan Village Site (NAVS), identifiable bones were segregated from unidentifiable specimens. The former were identified to order/family/genus/species level whenever possible. This was accomplished using comparative osteological collections maintained by the Department of Ornithology and Mammalogy, California Academy of Sciences, San Francisco, California, and the Department of Biology, San Jose State University, San Jose, California.

Following identification, various data were recorded for each specimen. Among these were: (1) taxonomic identity; (2) skeletal element; (3) side of the body or body segment; (4) element configuration, that is, whole element, proximal portion, distal portion, fragment; and, (5) adult, juvenile, or neonatal status. Additional observations included signs of cultural modification, such as intentional breakage, presence of butchering marks, burning, and modification into an artifact. If present, signs of non-cultural modification, including animal gnaw marks, weathering, and post-depositional breakage, also were noted for each specimen. After recordation, these data were tabulated and summarized. Skeletal element counts were made for each identified bird taxon by tallying the total numbers of identified skeletal elements assigned to each. Minimum numbers of individuals representing each identified bird taxon were determined by counting the number(s) of the most abundant skeletal element(s).

THE FORT ROSS AVIFAUNAS

Table 13.1 summarizes numbers of identifiable

species (NISP) and minimum numbers of individuals (MNI) of bird taxa present at FRBS and NAVS. A total of 16 bird taxa, represented by 500 bones from at least 71 birds, occurred at both sites (see appendices 13.1 and 13.2). At FRBS, 12 bird taxa (loon, shearwater, pelican, cormorant, goose, duck, eagle, chicken, willet, gull, murre, and guillemot) contributed 132 elements, which came from a minimum of 24 birds. A larger avifaunal assemblage, composed of 14 bird taxa (loon, albatross, pelican, cormorant, goose, duck, condor, eagle, chicken, coot, gull, murre, guillemot, auklet) and 368 bones from 47 individuals, occurred at NAVS. Ten bird taxa (loon, pelican, cormorant, goose, duck, eagle, chicken, gull, murre, guillemot) were common to both sites.

Common murrens are the most abundant birds at both sites (FRBS: $n=93$, 71%; NAVS: $n=260$, 71%). Gulls are second at both (FRBS: $n=8$, 6%; NAVS: $n=56$, 15%). At FRBS, ducks come in third ($n=7$, 5%); and at NAVS, pelicans ($n=16$, 4%). Eagles are in fourth place at FRBS ($n=5$, 4%), while ducks ($n=12$, 3%) occupy this position at NAVS. Thus the sites are similar in that murrens and gulls are the first and second most abundant bird taxa, with the percentage representation of murrens identical at both. Ducks also are relatively common at both sites. Additionally, domestic chickens occur in comparable numbers at FRBS ($n=3$, 2%) and NAVS ($n=6$, 2%). Significant differences, however, characterize comparative abundances of all other bird taxa occurring at both sites.

All bird taxa from the Fort Ross sites, with the exception of domestic chickens, are or were native to the immediate vicinity of Fort Ross (Bolander and Parmeter 1978; Cogswell 1977; Grinnell and Miller 1944; Small 1974). The California condor (*Gymnogyps californianus*), represented by a proximal left ulna from

Table 13.1 Bird Remains from the Native Alaskan Neighborhood

Bird Taxa		FRBS NISP/MNI	NAVS NISP/MNI
Loon	(<i>Gavia</i> sp.)	2/1	2/1
Sooty Shearwater	(<i>Puffinus griseus</i>)	2/1	—
Short-Tailed Albatross	(<i>Diomedea albatrus</i>)	—	1/1
Pelican	(<i>Pelecanus</i> sp.)	2/1	16/2
Cormorant	(<i>Phalacrocorax</i> sp.)	4/1	4/1
Goose	(<i>Anser/Chen/Branta</i> sp.)	2/1	3/2
Duck	(<i>Anas/Aythya/Melanitta</i> <i>Bucephala/Mergus/Oxyura</i> sp.)	7/2	12/2
California Condor	(<i>Gymnogyps californianus</i>)	—	1/1
Bald Eagle	(<i>Haliaeetus leucocephalus</i>)	5/1	2/1
Chicken	(<i>Gallus gallus</i>)	3/1	6/2
American Coot	(<i>Fulica americana</i>)	—	1/1
Willet	(<i>Catoptrophorus semipalmatus</i>)	1/1	
Gull	(<i>Larus</i> sp.)	8/2	56/5
Common Murre	(<i>Uria aalge</i>)	93/11	260/26
Pigeon Guillemot	(<i>Cephus columba</i>)	3/1	2/1
Cassin's Auklet	(<i>Ptychoramphus aleuticus</i>)	2/1	—
Totals:		132/24	368/47

NAVS, occurred historically (Koford 1953; Simons n.d.; Wilbur 1978) and prehistorically (Morejohn and Galloway 1983; Simons 1983, and unpublished data) throughout California. Also found at NAVS was the distal left carpometacarpal of a probable Short-Tailed Albatross (*Diomedea albatrus*). Remains of this largest of California's marine birds occur in a number of prehistoric coastal sites (Bleitz 1993; Guthrie 1980, 1993; Morejohn and Galloway 1983; Porcasi 1995a, 1995b; Simons 1990a:40-1). Until its numbers were decimated in the early 1900s as a consequence of overhunting for the feather trade (Austin 1949; Greenway 1958; Hasegawa and DeGange 1982; Sanger 1972), it was relatively common along the coast of California.

DISCUSSION

PLACES OF PROCUREMENT

Preferred habitats of FRBS and NAVS bird taxa are presented in table 13.2. Based on habitat preferences, behavior, and taxonomic assignment, birds from the two sites belong to one of seven groups. These include: oceanic birds; colonial nesting seabirds; anseriform waterfowl; other marine waterfowl; shorebirds; raptors; and domestic poultry. Numbers of bird bones assigned to each of these categories at FRBS and NAVS are found in table 13.3.

Inspection of data contained in table 13.3 reveals the majority of bird remains at both of these sites comes from colonial nesting seabirds (i.e., cormorants, gulls, murres, and other alcids). Taken together, anseriform (geese, ducks) and other marine waterfowl (loons, pelicans, coots), make up the second most abundant group.

Oceanic birds, shorebirds, raptors, and domestic poultry make up the rest of the avifaunal assemblages from these sites.

Determination of possible places from where these bird taxa probably were taken can be made using historical records and modern bird population data. Information contained in SOWLS et al. (1980:142-79) and the Santa Rosa, 1:250,000 scale, Pacific Coast Ecological Inventory Map (U.S. Fish and Wildlife Service 1981) suggests cormorants, gulls, and guillemots could have been hunted on a number of offshore rocks arrayed along the outer Mendocino, Sonoma, and Marin county coasts from Point Arena in the north to Tomales Point in the south. Localities of particular note within an approximate 15 km radius of Fort Ross include, from north to south: Cannon Gulch to Stump Beach, Gerstle Cove to Stillwater Cove, Russian Gulch, the Russian River Rocks, Peaked Hill Rock, and Gull Rock. Loons, pelicans, geese, ducks, raptors, coots, and shorebirds probably had population concentrations centered around the mouth of the Russian River, and the lowermost 5 km of the Russian River estuary (Bolander and Parmeter 1978:75-76; U.S. Fish and Wildlife Service 1981). These birds also likely occurred to some extent along the outer coast in the immediate vicinity of Fort Ross (Bolander and Parmeter 1978:75-77).

Fort Ross fowling also probably took place farther afield. Currently, no Common Murre or Cassin's Auklet nesting colonies occur in the vicinity of Fort Ross (SOWLS et al. 1980:142-79). The closest murre colony of note is found on rocks immediately off of Point Reyes, in central Marin County (SOWLS et al. 1980:182-83). Others are

Table 13.2 *Habitat Preferences of Birds from the Fort Ross Sites*

Bird Taxa	Habitat Preferences
Loon	Open ocean; bays
Sooty Shearwater	Offshore waters; open ocean and communicating channels; flocks frequently come close inshore
Albatross	Open ocean; pelagic
Pelican	Open ocean; seacoast, just outside surf-line; larger bays; nests on coastal islands and rocks of small to moderate size
Cormorant	Inshore belt of water and islets; just within or outside surf zone; sometimes bays, estuaries, harbors; islets/islands and cliffs for breeding
Goose	Coastal bays and lagoons; freshwater marsh near seacoast; marshy ponds; grassy flats and hill slopes; near-shore ocean
Duck	Coastal bays and estuaries; adjacent marshes; ocean littoral/surf-line; beaches
California Condor	Formerly had an extensive foraging range over mountains, grasslands, savannahs, and coast
Bald Eagle	Seacoast; islands; sea cliffs; coastal lagoons
American Coot	Coastal bays and estuaries; adjacent marshlands
Willet	Open coastal salt marshes; sandy sea beaches; mud flats; estuaries
Gull	Open ocean; seacoast; bays; harbors; lagoons; estuaries; beaches; offshore islands/islets for breeding
Common Murre	Chiefly offshore waters; open ocean; offshore islands/islets for breeding
Pigeon Guillemot	Seacoast and adjacent ocean waters; coastal seacliffs and offshore islands/islets for breeding
Cassin's Auklet	Open ocean, mostly well-offshore; offshore islands/islets for breeding

Data Sources: Cogswell (1977); Grinnell and Miller (1944); Small (1974)

Table 13.3 *Major Groupings of Birds from the Native Alaskan Neighborhood*

Bird Group	FRBS	NAVS
Oceanic Birds	2 (1.5%)	1 (0.3%)
Colonial Nesting Seabirds	108 (81.8%)	324 (88.0%)
Anseriform Waterfowl	9 (6.8%)	15 (4.1%)
Other Waterfowl	4 (3.0%)	19 (5.2%)
Shorebirds	1 (0.8%)	—
Raptors	5 (3.8%)	3 (0.8%)
Domestic Poultry	3 (2.3%)	6 (1.6%)
Totals	132 (100%)	368 (100%)

located to the south along the Marin County coast at Point Resistance and Double Point Rocks (Sowls et al. 1980:184-85, 196-97).

The largest Common Murre nesting colonies are found on the Farallon Islands, along with large cormorant, gull, guillemot, and Cassin's Auklet colonies (Ainley and Boekelheide 1990; DeSante and Ainley 1980; Sowls et al. 1980:188-91). The history of marine bird populations on the Farallons is profiled by Ainley and Lewis (1974) and Doughty (1971). Both focus upon the American Period egg collecting era which lasted from about 1849 to 1909. Unfortunately, little attention is paid to Russian activities during the early 1800s. Ainley and Lewis (1974:433-34) note in passing that the impact of

Russian marine mammal hunters on Farallon bird populations is not known, except that they used birds and their eggs for food. Doughty (1971:560) observes:

The Russians remained on the Farallons for about twenty-five years, during which time they continued to hunt fur seals - almost to the point of extinction by the end of the 1830s - and supplied their mainland settlement of Fort Ross with seal skins, sea-lion meat, and the feathers and down of sea birds.

It seems likely some of the bird remains present at FRBS and NAVS are those of birds hunted on or near the Farallons. Hunting forays to other sites situated at a distance from Fort Ross, such as Point Reyes, Point

Resistance, and Double Point in Marin County, and San Pedro and Devil's Slide Rocks in San Mateo County (Sowls et al. 1980:192-93) also may have taken place. Primary prey in these long-distance hunting rounds probably included murre and gulls, with cormorants, guillemots, and auklets taken as well. Oceanic birds (i.e., shearwaters, albatrosses), anseriform waterfowl, and other marine waterfowl (i.e., loons, pelicans) probably were taken if they were encountered and circumstances warranted. The overall fowling strategy practiced by Native Alaskan hunters from Fort Ross possibly resembled the co-harvesting strategy postulated by Yesner (1976:274-75; 1981:162) and Yesner and Aigner (1976:102) for prehistoric peoples hunting birds in the Aleutians. This highly opportunistic method of fowling undoubtedly made use of a wide variety of hunting implements, including nets, javelins, spears, darts, snares, and baited hooks and lines (Yesner 1976:275; Yesner and Aigner 1976:99; see also Clark 1984:189).

Seasonal availability of birds in the Fort Ross avifaunas varies according to taxa (Bolander and Parmeter 1978; Cogswell 1977; Grinnell and Miller 1944). Year-round residents include cormorants, condors, and eagles. Population sizes of other year-round residents differ through the year. Ducks, for example, reach their annual population high from September/October to April, with their population nadir occurring from June to August. Coots also attain their annual population peak from mid-fall until mid-spring. Willets are common throughout the year, except from mid-May to mid-July. Gulls are most numerous from October through April, decline in numbers in May, hit their annual low point in June, and increase thereafter. Cassin's Auklet reaches its annual population high in December-January, and is fairly common for the remainder of the year. Murre commonly occur from May to January, and are rare from February to April. Guillemots are most abundant from mid-April to mid-October, and are fairly common for the rest of the year. Shearwaters are commonest from April through October, and not uncommon at other times.

Loons are abundant from roughly September/October through April, and all but absent during the summer. Geese have a highly similar annual pattern. In contrast, pelicans are common from June/July to December/January, and are gone from February through May. Breeding seasons of colonial nesting seabirds (i.e., cormorants, gulls, murre, guillemots, auklets) last from approximately the beginning of March until the end of September (Cogswell 1977; Sowls et al. 1980). A peak of breeding activity occurs from late April until the start of September.

Taking seasonality data into account, one notes at FRBS, 81.8% of the avifaunal assemblage is composed of colonial nesting seabirds, while 75.8% consists of birds (including some of the colonial nesters) that are

most abundant from mid-late spring to early-mid winter. At NAVS, 80.0% are colonial nesters, and 75.5% are birds most likely to reach their annual population highs in the summer and fall. Therefore, people inhabiting the Native Alaskan Neighborhood were exploiting birds occurring in greatest numbers during the spring, summer, and fall. This, of course, is the part of the year relatively free of storms and adverse weather, when fowling could have been conducted most effectively and safely.

AN ETHNIC SIGNATURE?

As Simons (1992:4.81-4.82) notes, the study of ethnicity and social status has been a dominant interpretative theme in the zooarchaeology of Californian historic sites. Particular attention has been given to American Chinese sites (Collins 1987a, 1987b; Dansie 1979; Greenwood 1980; Gust 1982a, 1984, 1993; Langenwaller 1980, 1987; Langenwaller and Langenwaller 1987; Schulz 1982a, 1984 [see also Colley 1990:225-26]; Simons 1984). Crabtree (1990:178) regards Langenwaller's (1980) work as a trend-setting "classic" in zooarchaeological studies of ethnicity.

Spanish/Mexican ethnicity also has been investigated by zooarchaeologists working in California. Langenwaller and McKee (1985), McKee and Langenwaller (1985), and Salls (1989) have analyzed faunal remains obtained from deposits associated with California's missions. Others (i.e., Gust 1982b; Simons and Gust 1985) have studied bones from Hispanic household deposits. Zooarchaeological remains from Mexican-American sites have been reported upon by Felton and Schulz (1983), Schulz (1987), and Schulz et al. (1987). The zooarchaeology of a southern California Basque site is summarized by Whitney-Desautels (1983).

Historic Period social status has been extensively studied at several localities in California. Largely focused upon Euroamerican sites, this work includes Schulz's (1979) prototypic analysis of diet and status in Panamint City, a 19th century California boomtown; and Praetzellis and Praetzellis's (1983) and Simons's (1989) work with bones derived from household deposits in Santa Rosa. The most detailed, exhaustive zooarchaeological studies of historic period ethnicity and social status in California have been undertaken in Sacramento. Overview statements are provided in Gust (1983) and Schulz (1982b). These investigations began with analysis and interpretation of fish (Schulz 1980), bird (Simons 1980a), and mammal (Gust and Schulz 1980) remains from deposits occurring on the Golden Eagle Hotel block. Based on this and other analyses of mammal remains from additional Historic Period Euroamerican deposits located in downtown Sacramento, Schulz and Gust (1983a, 1983b) conclusively demonstrated the utility of combining historical documentation with data derived from faunal analysis (cf. Thomas 1989:375-77).

Focusing specifically upon studies of ethnicity and social status conducted via analysis of Historic Period avifaunal assemblages in California, Simons (1980a, 1982, 1984, 1989, 1990b, see also Schulz 1982b:245-46) observes that a combination of wild anseriform and domestic galliform birds commonly occurs in late 19th century Euroamerican sites in Sacramento and other localities in central California. This results from a pattern of poultry consumption, which emphasized use of poultry products produced from the market hunting and eggling of wild birds and harvesting of domestic fowl. As time progresses, domestic poultry increasingly dominates Euroamerican avifaunal assemblages.

Studies of American-Chinese avifaunal assemblages (Simons 1984) reveal an emphasis on use of domestic fowl, with less utilization of wild birds than occurs at contemporary Euroamerican sites. Distinctive poultry butchering patterns, consistent with cookbook and present-day American-Chinese culinary practices, were noted. It was concluded from these studies of avifaunal assemblages from American Chinese and Euroamerican sites that both types of assemblages were characterized by strong "ethnic signatures," manifesting themselves in the representation of particular species of birds consumed, and/or the ways in which they were prepared.

Consideration of the composition of the avifaunal assemblages from FRBS and NAVS raises the question of whether the Alutiiq people living and working at these sites left an "ethnic signature" comparable to those characterizing archaeoavifaunas from mid to late nineteenth century American-Chinese and Euroamerican sites in central California. The high numbers of colonial nesting seabirds, especially murre and gulls, support such an inference. Overall composition of the avifaunal assemblages from both of these sites matches what one expects would result from the fowling activities of far-ranging marine vertebrate hunters. These people would have encountered and taken a wide variety of marine waterfowl through their use of ocean-going watercraft, combined with the use of a sophisticated marine vertebrate hunting technology and techniques.

This conclusion is supported when the Fort Ross avifaunas are compared with those derived from prehistoric Native American sites located along the central California coast in Mendocino and Sonoma counties to the north (Schwaderer 1992; Simons 1990a; Greg White, unpublished data) and the San Francisco Bay Area to the south (Simons 1979, 1980b, 1981, 1985). For the most part, these avifaunas are consistently dominated by remains of anseriform waterfowl. Marine waterfowl (especially loons, grebes, pelicans, cormorants, shorebirds, gulls, and murre) frequently are common also, but generally do not overwhelmingly dominate the avifaunal assemblages as is the case at Fort Ross. Interestingly, dominance of prehistoric Native American avifaunal assemblages by non-anseriform marine waterfowl occurs

at Channel Island sites in southern California (Bleitz 1993; Guthrie 1980; Porcasi 1995a, 1995b). These were inhabited by marine hunters and fishers, using sophisticated marine vertebrate hunting strategies dependent upon use of ocean-going watercraft.

SUMMARY AND CONCLUSIONS

In conclusion, analysis of the avifaunal assemblages from FRBS and NAVS indicates their Native Alaskan inhabitants exploited a number of marine waterfowl, with a particular focus upon colonial nesting seabirds, murre and gulls especially. It is very possible that Native Californians who resided in interethnic households in the Native Alaskan Neighborhood, as well as on the Farallon Islands *artel*, also participated in the harvesting and processing of marine waterfowl. Spring, summer, and fall probably were preferred times for fowling. These birds may have been taken locally, or in forays to the Farallon Islands and/or other seabird colonies located near the entrance of San Francisco Bay. Overall configuration of the Fort Ross avifaunas suggests they contain an "ethnic signature," resulting from Native Alaskan fowling practices that are reflected in an abundance of particular bird taxa, especially colonial nesting seabirds.

The preceding account is a preliminary analysis and interpretation of the Fort Ross avifaunas, focused upon conclusions mainly drawn from analysis of the avifaunas themselves, and what they can reveal directly regarding Native Alaskan fowling practices during the first decades of the 19th century in central California. To expand these interpretations, further work is needed. This includes:

1. Comparison of the Fort Ross avifaunas with those from prehistoric and Historic Period sites on Kodiak Island and adjacent portions of the Alaskan mainland to confirm the validity of the apparent "ethnic signature" displayed by the former.
2. Summarization of ethnohistoric and historic accounts regarding fowling techniques practiced by Native Alaskan hunters in southern Alaska and Fort Ross
3. Investigation of how El Niño/Southern Oscillation (ENSO) events affected waterfowl abundance, availability, and procurement during the early part of the 19th century at Fort Ross.

ACKNOWLEDGMENTS

I wish to extend my deep appreciation to Kent Lightfoot for allowing me the opportunity to study the Fort Ross avifaunas, and having the patience to endure what at times probably seemed an interminable wait for tangible results! Thanks also are given to Ann Schiff and Tom Wake for sharing data and insights concerning the Native Alaskan occupancy of Fort Ross. This work was supported in part by a National Science Foundation grant, (SBR-9304297) administered by the Archaeological Research Facility, University of California, Berkeley.

REFERENCES

- Ainley, David G., and Robert J. Boekelheide, editors
1990 *Seabirds of the Farallon Islands: Ecology, Dynamics, and Structure of an Upwelling-System Community*. Stanford University Press, Stanford.
- Ainley, David G., and T. James Lewis
1974 The History of Farallon Island Marine Bird Populations, 1854-1972. *Condor* 76:432-46.
- Austin, O. L., Jr.
1949 The Status of Steller's Albatross. *Pacific Science* 3:283-95.
- Bleitz, Dana E.
1993 The Prehistoric Exploitation of Marine Mammals and Birds at San Nicolas Island, California. In *Third California Islands Symposium: Recent Advances in Research on the California Islands*, edited by F. G. Hochberg, pp. 519-36. Santa Barbara Museum of Natural History, San Barbara, California.
- Bolander, Gordon L., and Benjamin D. Parmeter
1978 *Birds of Sonoma County, California: An Annotated Checklist and Birding Gazetteer*. Grape Press Printing, Napa, California.
- Clark, Donald W.
1984 Pacific Eskimo: Historical Ethnography. In *Handbook of North American Indians, Volume 5, Arctic*, edited by David Damas, pp. 185-97. Smithsonian Institution, Washington D.C.
- Cogswell, Howard L.
1977 *Waterbirds of California*. California Natural History Guides no. 40, University of California Press, Berkeley.
- Colley, Sarah M.
1990 The Analysis and Interpretation of Archaeological Fish Remains. In *Archaeological Method and Theory*, vol. 2, edited by Michael B. Schiffer, pp. 207-53. University of Arizona Press, Tucson.
- Collins, Donna
1987a Emerging Archaeological Evidence of the Chinese Market Fisheries of Early California. *Pacific Coast Archaeological Society Quarterly* 23(2):63-68.
1987b Tradition and Network: Interpreting the Fish Remains from Riverside's Chinatown. In *Wong Ho Leun: An American Chinatown, Volume 2, Archaeology*, edited by the Great Basin Foundation, pp. 121-32. Great Basin Foundation, Center for Anthropological Research, San Diego, California.
- Crabtree, Pam J.
1990 Zooarchaeology and Complex Societies: Some Uses of Faunal Analysis for the Study of Trade, Social Status, and Ethnicity. In *Archaeological Method and Theory*, vol. 2, edited by Michael B. Schiffer, pp. 155-205. University of Arizona Press, Tucson.
- 1984 Mammalian Fauna from the Woodland Opera House Site. In *The Chinese Laundry on Second Street: Papers on Archeology at the Woodland Opera House Site*, edited by D. L. Felton, F. Lortie, and P. D. Schulz, pp. 181-92. California Archeological Reports no. 24, California Department of Parks and Recreation, Cultural Resource Management Unit, Sacramento.
- 1993 Animal Bones from Historic Urban Chinese Sites: A Comparison of Sacramento, Woodland, Tucson, Ventura, and Lovelock. In *Hidden Heritage: Historical Archaeology of the Overseas Chinese*, compiled and edited by Priscilla Wegars, pp. 177-212. Monographs in Archaeology Series, Baywood Publishing Company, Inc., Amityville, New York.
- Gust, Sherri M., and Peter D. Schulz
1980 Mammalian Remains. In *Historical Archaeology at the Golden Eagle Site*, edited by Mary Praetzelis, Adrian Praetzelis, and Marley R. Brown, III, pp. 3-1 to 3-19. Cultural Resources Facility, Anthropological Studies Center, Sonoma State University, Rohnert Park, California.
- Guthrie, Daniel A.
1980 Analysis of Avifaunal and Bat Remains from Midden Sites on San Miguel Island. In *The California Islands: Proceedings of a Multidisciplinary Symposium*, edited by Dennis M. Power, pp. 689-702. Santa Barbara Museum of Natural History, Santa Barbara, California.
1993 New Information on the Prehistoric Fauna of San Miguel Island, California. In *Third California Islands Symposium: Recent Advances in Research on the California Islands*, edited by F. G. Hochberg, pp. 405-16. Santa Barbara Museum of Natural History, Santa Barbara, California.
- Hasegawa, Hiroshi, and Anthony R. DeGange
1982 The Short-Tailed Albatross, *Diomedea albatrus*, Its Status, Distribution, and Natural History. *American Birds* 35:806-14.
- Koford, Carl B.
1953 *The California Condor*. Research Report no. 4, National Audubon Society, New York.
- Langenwalter, Paul E., II
1980 The Archaeology of 19th Century Chinese Subsistence at the Lower China Store, Madera County, California, California. In *Archaeological Perspectives on Ethnicity in America: Afro-American and Asian American Culture History*, edited by Robert L. Schuyler, pp. 102-12. Monographs in Archaeology no. 1, Baywood Publishing Company, Inc., Farmingdale, New York.
1987 Mammals and Reptiles as Food and Medicine in Riverside's Chinatown. In *Wong Ho Leun: An American Chinatown, Volume 2, Archaeology*, edited by the Great Basin Foundation, pp. 53-106. Great Basin Foundation, Center for Anthropological Research, San Diego, California.

- Langenwaller, Paul E., II, and Rebecca E. Langenwaller
1987 Overview of the Vertebrate Faunal Remains from Riverside's Chinatown. In *Wong Ho Leun: An American Chinatown, Volume 2, Archaeology*, edited by the Great Basin Foundation, pp. 45-52. Great Basin Foundation, Center for Anthropological Research, San Diego, California.
- Langenwaller, Paul E., II, and L. W. McKee
1985 Vertebrate Faunal Remains from the Neophyte Dormitory. In *Excavations at Mission San Antonio 1976-1978*, edited by Robert L. Hoover and Julia G. Costello, pp. 94-116. Monograph no. 26, Institute of Archaeology, University of California, Los Angeles.
- McKee, Larry W., and Paul E. Langenwaller, II
1985 Vertebrate Faunal Remains from the Kiln. In *Excavations at Mission San Antonio 1976-1978*, edited by Robert L. Hoover and Julia G. Costello, pp. 146-51. Monograph no. 26, Institute of Archaeology, University of California, Los Angeles.
- Morejohn, G. V., and J. F. Galloway
1983 Identification of Avian and Mammalian Species Used in the Manufacture of Bone Whistles Recovered from a San Francisco Bay Area Archaeological Site. *Journal of California and Great Basin Anthropology* 5:87-97.
- Porcasi, Judith F.
1995a Identification and Analysis of Mammalian and Avian Remains Recovered from the 1994 Excavation at Eel Point, San Clemente Island, California. Paper presented at the Annual Meeting of the Society for California Archaeology, Eureka, California.
1995b Evidence of Short-Tailed Albatross Extirpation on the Southern California Channel Islands During the Middle Holocene. Ms. in possession of the author.
- Praetzellis, Mary, and Adrian Praetzellis
1983 The Contents of Mrs. Menefee's Well: Possibilities for the Archaeological Study of Family Life. *Pacific Coast Archaeological Society Quarterly* 19(1):27-37.
- Salls, Roy A.
1989 The Fisheries of Mission Nuestra Senora de la Soledad, Monterey County, California. *Research in Economic Anthropology* 11:251-84.
- Sanger, G.A.
1972 The Recent Pelagic Status of the Short-Tailed Albatross. *Biological Conservation* 4:189-93.
- Schulz, Peter D.
1979 Historical Faunal Remains from Panamint City: Notes on Status and Diet in a California Boom Town. *Pacific Coast Archaeological Society Quarterly* 15(4):55-63.
1980 Fish Remains. In *Historical Archaeology at the Golden Eagle Site*, edited by Mary Praetzellis, Adrian Praetzellis, and Marley R. Brown, III, pp. 2-1 to 2-18. Cultural Resources Facility, Anthropological Studies Center, Sonoma State University, Rohnert Park, California.
1982a Fish, Reptile, and Cephalopod Remains. In *Archaeological and Historical Studies of the 1156 Block, Sacramento, California: An Early Chinese Community*, edited by Mary Praetzellis and Adrian Praetzellis, pp. 74-86. Cultural Resources Facility, Anthropological Studies Center, Sonoma State University, Rohnert Park, California.
1982b Sacramento: Urbanism in the Pacific West. *North American Archaeologist* 3:243-57.
1984 Nineteenth Century Fish Remains from Woodland, California. In *The Chinese Laundry on Second Street: Papers on Archeology at the Woodland Opera House Site*, edited by David L. Felton, R. Lortie, and Peter D. Schulz, p. 5. California Archeological Reports, no. 24, California Department of Parks and Recreation, Cultural Resource Management Unit, Sacramento.
1987 Archaeological Evidence for Early Bone Lime Production in Old Town San Diego. *Pacific Coast Archaeological Society Quarterly* 23(2):52-8.
- Schulz, Peter D., and Sherri M. Gust
1983a Faunal Remains and Social Status in 19th Century Sacramento. *Historical Archaeology* 17(1):44-53.
1983b Relative Beef Cut Prices in the Late Nineteenth Century: A Note for Historic Sites Faunal Analysis. *Pacific Coast Archaeological Society Quarterly* 19(1):12-18.
- Schulz, Peter D., Ronald Quinn, and Scott Fulmer
1987 Archaeological Investigations at the Rose-Robinson Site: Old Town San Diego. *Pacific Coast Archaeological Society Quarterly* 23(2):1-51.
- Schwaderer, Rae
1992 Archaeological Test Excavation at the Duncans Point Cave, CA-SON-348/H. In *Essays on the Prehistory of Maritime California*, edited by Terry L. Jones, pp. 55-71. Publication no. 10, Center for Archaeological Research at Davis, Davis, California.
- Simons, Dwight D.
1979 Appendix 4: Avian and Mammalian Remains from Four Archaeological Sites (CA-CCO-268, CA-CCO-269, CA-CCO-270, Ca-CCO-271), Situated in San Pablo, Contra Costa County, California. In *Final Report of the Testing of Cultural Resources Within the Wildcat and San Pablo Creeks Flood Control and Water Resources Project, Contra Costa County, California*, edited by P. M. Banks and R. I. Orlins, pp. 15.1-15-45. California Archaeological Consultants, Inc. Submitted to the U.S. Army Corps of Engineers, San Francisco, California, Contract No. DACW07-78-6-0016. Copies available from California Archaeological Consultants, Inc., Woodland, California.
1980a Bird Remains. In *Historical Archaeology at the Golden Eagle Site*, edited by Mary Praetzellis, Adrian Praetzellis, and Marley R. Brown, III, pp. 1-1 to 1-12. Cultural Resources Facility, Anthropological Studies

Center, Sonoma State University, Rohnert Park, California.

1980b Appendix I: Mammal and Bird Species Represented at CA-CCO-275. In *An Archaeological Investigation of Prehistoric Site CA-CCO-275 (Richmond I), Richmond, Contra Costa County, California*, edited by P. M. Banks and R. I. Orlins, pp. 1.1-1.5. California Archaeological Consultants, Inc. Submitted to the Department of Public Works, City of Richmond, California, Order no. 8-911. Copies available from California Archaeological Consultants, Inc., Woodland, California.

1981 Appendix 1: Avian and Mammalian Remains from Prehistoric Sites in the Richmond Harbor Area. In *Investigation of Cultural Resources Within the Richmond Harbor Redevelopment Project 11-A, Richmond, Contra Costa County, California*, edited by P. M. Banks and R. I. Orlins, pp. 12.1-12.73. California Archaeological Consultants, Inc. Submitted to the City of Richmond, California. Copies available from California Archaeological Consultants, Inc., Woodland, California.

1982 Nineteenth-Century Bird Remains from Old Sacramento: Perspectives on Market Hunting and the Rise of the Domestic Poultry Industry. Ms on file, California Department of Parks and Recreation, Cultural Resource Management Unit, Sacramento.

1983 Interactions Between California Condors and Humans in Prehistoric Far Western North America. In *Vulture Biology and Management*, edited by Sanford R. Wilbur and Jerome A. Jackson, pp. 470-94. University of California Press, Berkeley.

1984 Avifaunal Remains at the Woodland Opera House Site. In *The Chinese Laundry on Second Street: Papers on Archeology at the Woodland Opera House Site*, edited by David L. Felton, R. Lortie, and Peter D. Schulz, pp. 167-180. California Archeological Reports no. 24, California Department of Parks and Recreation, Cultural Resource Management Unit, Sacramento.

1985 Appendix I: Avian and Mammalian Remains from CA-CCO-299, Richmond, Contra Costa County, California. In *Final Report: Limited Archaeological Excavations at CA-CCO-299, Stege Mound, Contra Costa County, California*, edited by P. M. Banks and R. I. Orlins, pp. 143-52. California Archaeological Consultants, Inc. Submitted to Pacific Gas and Electric Company, San Francisco, California, Contract no. 2-16-0009-84. Copies available from California Archaeological Consultants, Inc., Woodland, California.

1989 Bird and Mammal Remains from the Day's Inn Site, Sonoma County, California. In *Carriage Maker to Undertaker Or the Redmonds Clean House: Archaeology of an 1870s Family*, edited by Mary Praetzelis and Adrian Praetzelis, Appendix B, pp. 1-10. M. and A. Praetzelis, Santa Rosa, California.

1990a Vertebrate Remains from the Albion Sites. In *Western Pomo Prehistory: Excavations at Albion Head, Nighthbirds' Retreat, and Three Chop Village, Mendocino*

County, California, edited by Thomas N. Layton, pp. 37-51. Monograph no. 32, Institute of Archaeology, University of California, Los Angeles.

1990b Bird Remains. In *"For a Good Boy": Victorians on Sacramento's J Street*, edited by Mary Praetzelis and Adrian Praetzelis, pp. 205-10. Cultural Resources Facility, Anthropological Studies Center, Sonoma State University, Rohnert Park, California.

1992 Zooarchaeological Research Design. In *Tar Flat, Rincon Hill, and the Shore of Mission Bay: Archaeological Research Design and Treatment Plan for SF-480 Terminal Separation Rebuild*, volume 2, edited by Mary Praetzelis and Adrian Praetzelis, pp. 4-72 to 4-90. Anthropological Studies Center, Sonoma State University. Submitted to CALTRANS District 4, San Francisco, California, Contract no. 0F841-EP, SF 480, P.M. 0.0/0.7. Copies available from Anthropological Studies Center, Sonoma State University, Rohnert Park, California.

n.d. Historic Period California Condor Remains from San Jose, California. Ms. in possession of the author.

Simons, Dwight D., and Sherri M. Gust

1985 Appendix D: Fauna In *Report of Phase III Research for Block 1, San Antonio Plaza, San Jose*, edited by David A. Fredrickson and V. Bente, pp. D-1 to D-63. Cultural Resource Facility, Anthropological Studies Center, Sonoma State University. Submitted to The Redevelopment Agency, City of San Jose, San Jose, California. Copies available from the Cultural Resources Facility, Anthropological Studies Center, Sonoma State University, Rohnert Park, California.

Small, Arnold

1974 *The Birds of California*. Winchester Press, New York.

Sowls, Arthur L., Anthony R. DeGange, Jay W. Nelson, and Gary S. Lester.

1980 *Catalog of California Seabird Colonies*. Biological Services Program Report FWS/OBS-80-37, U.S. Department of the Interior, Fish and Wildlife Service, Washington DC.

Thomas, David H.

1989 *Archaeology*, Second Edition. Holt, Rinehart, and Winston, Fort Worth, Texas.

United States Fish and Wildlife Service

1981 *Santa Rosa, California: 1:250,000-Scale Map of Pacific Coast Ecological Inventory*. U.S. Department of the Interior, Fish and Wildlife Service, Washington DC.

Whitney-Desautels, Nancy A.

1983 The Encino Roadhouse Complex. *Pacific Coast Archaeological Society Quarterly* 19(1):39-46.

Wilbur, Sanford R.

1978 *The California Condor, 1966-76: A Look At Its Past and Future*. North American Fauna no. 72, United States Department of the Interior, Fish and Wildlife Service,

Washington D.C.

Yesner, David R.

1976 Aleutian Island Albatrosses: A Population History. *Auk* 93:263-80.

1981 Archaeological Applications of Optimal Foraging Theory: Harvest Strategies of Aleut Hunter-Gatherers. In *Hunter-Gatherer Foraging Strategies: Ethnographic and*

Archaeological Analyses, edited by Bruce Winterhalder and Eric A. Smith, pp. 148-70. University of Chicago Press, Chicago.

Yesner, David R., and Jean S. Aigner

1976 Comparative Biomass Estimates and Prehistoric Cultural Ecology of the Southwest Umnak Region, Aleutian Islands. *Arctic Anthropology* 13(2):91-112.

Fish Remains from the Early 19th Century Native Alaskan Habitation at Fort Ross

KENNETH W. GOBALET

THIS CHAPTER RECORDS THE fish remains recovered during the excavation of the Native Alaskan Village Site (NAVS) (CA-SON-1897/H) and the Fort Ross Beach Site (FRBS) (CA-SON-1898/H). In an effort to determine whether or not the fishing practices resulting from the combined influences of the Russians, Native Alaskans, local Kashaya Pomo and Coast Miwok were different from the practices of other coastal Native Californians, the findings from the Native Alaskan Neighborhood have been compared with findings from other excavations of Native American sites along the northern and central California coast.

Sections of the coastlines from Humboldt and Monterey counties have been chosen for comparison because of their similar fish habitats (tables 14.1, 14.2). These sites are generally associated with rocky reefs, kelp beds, rocky intertidal, and to a lesser degree, flat-bottomed and beach environments. Numerous sites have been studied south of Point Conception (Salls 1988), but considering them would be inappropriate because of a major marine zoogeographic shift to the south of Point Conception. The San Luis Obispo coastline has been studied extensively (Fitch 1972; Gobalet 1992; Gobalet and Jones 1995; Salls et al. 1989), however the freshwater influence of Morro Creek and the protected Morro Bay create aquatic habitats that contrast sharply with those at Fort Ross. The same is true for Monterey Bay localities where the freshwater influence of the Pajaro and Salinas rivers, the deep submarine canyon, and the extensive beaches distinguish the numerous archaeological sites here from the Native Alaskan Neighborhood sites (e.g., Gobalet 1990a, 1993; Gobalet and Jones 1995; Langenwalter et al. 1989).

The 10 Humboldt County sites are all located within the King Range National Conservation Area along a 53

km section of the coast 97 km south of Eureka and approximately west of the small communities of Petrolia and Garberville. The region was occupied "late in time" by the Mattole and Shelter Cove Sinkyone. Three of the sites are clustered at the mouth of the Mattole River (CA-HUM-175, -176, -177), three at Spanish Flat (CA-HUM-277, -279, -281), and four at Shelter Cove near Point Delgada (CA-HUM-182, -184, -186, -248) (Levulett 1985).

Nineteen Monterey County sites are included in this analysis. The northern-most Monterey County sites considered (CA-MNT-110 through -116) are located along a 1.5 km section of open coast in Pacific Grove and are considered as a group (Dietz and Jackson 1981).

The southern-most sites considered in Monterey County (CA-MNT-759/H, -1227, -1228, -1232/H, -1233, and -1277/H) are within 2.5 km of the coast in the Landels-Hill Big Creek Reserve of the Nature Conservancy, just north of the community of Lucia (Jones and Haney 1992). Fish remains from CA-MNT-1223 and CA-MNT-1235 within the Landels-Hill Reserve, CA-MNT-73 and CA-MNT-63 at the mouth of the Big Sur River in Andrew Molera State Park, and CA-MNT-376 in Julia Pfeiffer Burns State Park on Partington Creek have been reported by Gobalet and Jones (1995). Archaeological site CA-MNT-170 is located on Pescadero Point in Pebble Beach (Dietz 1991).

METHODS

The identifications of fish remains from NAVS and FRBS have been made by comparison with materials housed at California State University, Bakersfield. Nomenclature follows Robins et al. (1991). The identifications of remains from the Humboldt and Monterey county sites have been supplemented with materials from

the California Academy of Science, San Francisco, and the Natural History Museum of Los Angeles County. Leonard Compagno, South African Museum, Capetown, South Africa, identified the Elasmobranch material from the Humboldt County sites.

Identifications were made to the most confident taxonomic level. In monotypic genera or families, the confidence level is quite high, but there rarely seems to be sufficient comparative material for discriminating between species or genera within many groups. The rockfishes of the genus *Sebastes* are a particularly challenging group because 59 species are known from California (Lea 1992:117). Even fishery biologists often have difficulty distinguishing between whole rockfishes (Deweese 1984:15), and no collection exists that has multiple skeletons of all species in a range of sizes. Thus, the level of confidence is extremely low for identifications made to rockfish species, particularly with fragmentary remains.

Although the number of species to consider is much smaller, a similar problem exists for members of the families Carcharhinidae (10 species), Clupeidae (2 species), Atherinidae (3 species), Bothidae/Pleuronectidae (32 species of flatfishes), and for members of the following genera: *Oncorhynchus* (5 species), *Amphistichus* (3 species), *Embiotoca* (2 species), *Porichthys* (2 species), *Xiphister* (2 species), *Hexagrammos* (2 species), and *Hemilepidotus* (2 species). Not only is discriminating among the species in these taxa problematic when diagnostic elements are lacking, but in some cases the ecological differences between the species are minor (e.g., Pacific herring, *Clupea harengus*, and Pacific sardine, *Sardinops sagax*, in the family Clupeidae or topsmelt, *Atherinops affinis*, and jacksmelt, *Atherinopsis californiensis*, in the family Atherinidae). Discrimination in these cases doesn't add to the understanding of the fishery. Within the genera *Porichthys*, *Xiphister*, *Hexagrammos*, and *Hemilepidotus*, even though one species is much more common and there are major size differences, the identifications are made conservatively. Species ranges have likely changed at least transiently over time during such well-documented events as El Niño. Appendices 14.1 and 14.2 list the full assemblage of analyzed fish remains from NAVS and FRBS, including taxa, provenience, and counts.

RESULTS AND DISCUSSION

NATIVE ALASKAN NEIGHBORHOOD FINDINGS

At least 22 species of fishes have been identified from the combined Native Alaskan Village Site (NAVS) and Fort Ross Beach Site (FRBS) (table 14.1). Of the total of 1662 elements identified, 1440 (86.7%) are from NAVS. As a consequence, one would expect a greater diversity of species represented at NAVS than at FRBS. Since this is the case, and because the 3 top taxa are

represented by almost identical percentages at each location [cabezon (*Scorpaenichthys marmoratus*): 49% NAVS, 53% FRBS; *Sebastes* spp.: 26% NAVS, 28% FRBS; lingcod (*Ophiodon elongatus*): 16% NAVS, 14% FRBS], the differences between the two sites probably reflect differences in site richness for fish material. Thirteen taxa were found only at NAVS: Carcharhinidae, *Oncorhynchus* spp., Pacific hake (*Merluccius productus*), Atherinidae, Pacific barracuda (*Sphyræna argentea*), *Xiphister* sp., *Hexagrammos* sp., buffalo sculpin (*Enophrys bison*), flatfishes (Bothidae and Pleuronectidae), Cottidae, Stichæidae, Cyprinidae, and Sacramento sucker (*Catostomus occidentalis*). Only a single sturgeon element (*Acipenser* sp.) was found at FRBS and not NAVS.

The presence of salmon (*Oncorhynchus* spp.), Pacific barracuda, cyprinids, and Sacramento sucker, only at NAVS may support the conjecture of Wake (in press) that the proximity of the Village site to the Stockade may have provided access to fish available from the Russians. Although only 7 elements from these 4 fishes were found, their possible capture sites suggest an expanded range of fishing. The Sacramento sucker and cyprinid are freshwater species. Based on comparative skeletal material, the two pleural rib fragments recovered from the suckers were estimated to be from individuals 300 to 425 mm in standard length.

Moyle (1976:8) indicates that only three large cyprinids are native to the northern California coastal streams, the hardhead (*Mylopharodon conocephalus*), hitch (*Lavinia exilicauda*), and Sacramento squawfish (*Ptychocheilus grandis*). If a regression of precaudal vertebrae width versus standard length for Sacramento squawfish is used (Gobalet and Fenenga 1993:5), the two vertebrae recovered are from individuals approximately 370 mm in standard length. Since the body form of all large native California minnows is similar, the regression should work for estimating the size of all large cyprinids. A similar strategy has been used previously by Casteel (1974: figure 4) and Gobalet (1989:232). The precaudal vertebra, however, is probably not from the Sacramento squawfish. The recovered element lacks the longitudinal ridge within the recess on the dorsal surface of the centrum below the neural arch that is found in all members of the squawfish genus *ptychocheilus*. The atlas vertebra is probably not from a squawfish either because the midventral recess of the centrum of the recovered element lacks the raised lateral areas of comparative vertebrae. The dorsal surface of the recovered atlas has a pair of symmetrically positioned recesses while the Sacramento squawfish has more than a single pair.

Judging from the rarity or absence of Sacramento squawfish and hardhead in Central Valley archaeological sites (Schulz and Simons 1973:108; Schulz 1979:275), or coastal sites with a major freshwater fish component

Table 14.1 Summary of Fish Remains (number of elements identified) from the Native Alaskan Neighborhood and Humboldt County Coastal Sites

	Native Alaskan Neighborhood Sites					Humboldt Sites (HUM-†)										
	NAVS	FRBS	Total	175	176	177	182	184	186	248	277	279	281	Total		
Carcharhinidae	5	-	5	-	-	4	-	-	-	-	-	-	10	14		
Rajidae	-	-	-	-	-	-	-	-	-	-	2	-	8	10		
Elasmobranch*	2	1	3	-	-	-	-	-	-	-	2	-	1	3		
Acipenser sp.	-	1	1	-	-	-	-	-	-	-	-	-	-	-		
Oncorhynchus spp. ^b	1	-	1	1	2	1	-	-	-	-	-	-	1	5		
Clupeidae	39	1	40	-	-	1	-	-	-	-	-	-	-	1		
northern clingfish	-	-	-	-	-	-	-	1	1	67	1	11	-	81		
Pacific hake	19	-	19	-	-	16	-	4	-	34	-	-	1	55		
Atherinidae	1	-	1	-	-	-	-	-	-	-	-	-	-	-		
Embiotocidae	24	4	28	-	1	7	-	1	-	3	1	1	-	14		
Amphistichus sp.	-	-	-	-	-	1	-	-	-	-	-	-	2	3		
Embiotoca sp.	-	-	-	1	4	3	82	1	23	41	13	18	-	209		
pile perch	3	1	4	-	-	5	-	-	-	-	-	1	-	6		
Pacific barracuda	2	-	2	-	-	-	-	-	-	-	-	-	-	-		
Stichaeidae	2	-	2	-	-	-	-	-	-	-	-	-	-	-		
monkeyface prickleback	1	2	3	-	-	2	-	1	-	3	-	-	-	6		
Xiphister sp.	19	-	19	4	1	-	52	2	24	2	1179	150	1335	2749		
Sebastes spp.	373	62	435	1	3	1	3	-	2	1	20	3	4	38		
Hexagrammos sp.	3	-	3	-	14	9	18	-	6	1	102	111	148	409		
lingcod	235	32	267	8	1	2	14	-	14	-	28	12	66	145		
Cottidae ^c	1	-	1	-	-	1	-	16	-	3	-	1	-	21		
cabezon	703	118	821	6	2	5	84	2	8	4	96	77	141	425		
buffalo sculpin	2	-	2	-	-	1	1	-	5	-	1	4	39	51		
Hemilepidotus sp.	-	-	-	2	-	1	3	-	-	-	6	2	19	33		
Bothidae and/or Pleuronectidae ^d	1	-	1	-	1	-	-	-	-	-	1	-	-	2		
Cyprinidae	2	-	2	-	-	-	-	-	-	-	-	-	-	-		
Sacramento sucker	2	-	2	-	-	-	-	-	-	-	-	-	-	-		

† California state trinomial designated by HUM-## (e.g., HUM-175); identifications as reported by Levulett (1985).

a. 1 salmon shark at HUM-277, 3 bat rays at HUM-281

b. 1 Salmonidae at HUM-176, 1 steelhead at HUM-182

c. 1 sailfin sculpin at HUM-281

d. 1 starry flounder and 1 Pacific sanddab at HUM- 186, 1 petrale sole at HUM-277

Table 14.2 Summary of Fish Remains (number of elements identified) from Monterey County Sites (listed from north to south)

	Monterey County Sites (MNT-) [†]														Total
	110-116 ^a	170 ^b	73	63	376	1223	759H ^c	1227 ^c	1232H ^c	1228 ^c	1235	1233 ^c	1277H ^c		
Carcharinidae	2	-	-	1	-	-	-	-	5	-	-	-	-	-	8
bat ray	3	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Clupeidae	156	-	-	11	-	-	-	-	-	-	-	2	-	-	182
northern anchovy	-	-	-	-	-	-	-	-	-	-	-	11	-	-	11
steelhead rainbow trout	-	-	-	12	-	-	-	-	-	-	-	-	-	-	12
<i>Porichthys</i> sp.	25	-	-	-	-	-	-	-	-	-	-	-	-	-	25
Pacific hake	4	-	-	2	-	-	2	15	-	-	-	9	1	-	33
Atherinidae	8	-	-	1	-	-	-	-	-	-	-	-	-	-	9
Embiotocidae	-	15	34	19	7	-	35	8	-	-	-	68	3	-	189
<i>Amphistichus</i> sp.	5	1	-	2	-	-	-	-	-	-	-	-	-	-	8
white seaperch	14	-	-	-	-	-	-	-	-	-	-	-	-	-	14
<i>Embiotoca</i> sp.	20	-	-	4	1	-	5	-	-	-	-	-	1	-	31
rainbow surfperch	3	-	-	-	-	-	-	-	-	-	-	-	-	-	3
pile perch	15	-	-	-	-	-	-	-	-	-	-	1	-	-	16
rubberlip seaperch	7	-	-	-	-	-	-	-	-	-	-	-	-	-	7
striped kelpfish	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
barracuda	4	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Stichaeidae	-	-	-	-	-	-	1	2	2	-	-	-	-	-	5
monkeyface prickleback	31	1	31	117	2	8	-	4	2	-	-	1	-	-	197
<i>Xiphister</i> sp.	9	-	14	8	5	2	-	16	9	-	-	6	5	-	74
chub mackerel	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
<i>Sebastes</i> sp.	204	19	43	369	342	90	-	303	48	2	6	747	144	-	2317
<i>Hexagrammos</i> sp.	7	1	27	38	15	6	-	28	3	1	-	32	15	-	173
lingcod	29	1	19	24	12	1	-	9	10	-	-	35	2	-	142
cabezon	145	1	102	198	98	15	-	109	109	7	-	88	48	-	920
sand sole	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Pacific sanddab	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
California halibut	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2
petrale sole	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
starry flounder	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2

[†] California state trinomial designated by MNT- # (e.g., MNT-170); Pacific Grove to Big Sur.

a. Gobalet 1981

b. Dietz 1991

c. Jones and Haney 1992

(Gobalet 1990a:682, 1993:221), it seems likely that both vertebrae are from particularly large hitch, unless they are from exotic (possibly imported Asian) species. Comparative material from large hitch is lacking for confirmation.

The likely location of the large hitch capture is the Russian River to the south of Fort Ross, which is also the closest location for the Sacramento sucker (Moyle 1976:17). The Russian River might have been fished during overland transit between the Russian harbor at Bodega Bay and Fort Ross. The only minnow or sucker in the Gualala River, over 25 km northeast of Fort Ross, is the small roach, *Hesperoleucas symmetricus* (Moyle 1976:17).

The salmon vertebra recovered was from an individual at most 400 mm in standard length, probably a modest sized Chinook salmon (*O. tshawytscha*). The size and number of the pores on the centrum can be used to distinguish the salmon from those of steelhead rainbow trout (*O. mykiss*). Since Fort Ross Creek is too small to accommodate fishes of this size, the Russian River is also a likely capture spot for salmon. On the other hand, salmon are anadromous and this individual might have been captured directly from the Pacific Ocean.

The finding of two partial Pacific barracuda vertebrae is unexpected. Though they have a range as far north as Prince William Sound, Alaska, their occurrence north of Pt. Conception is sporadic (Fitch and Lavenberg 1971:141). Elements of barracuda have been found north of Pt. Conception at archaeological sites in Half Moon Bay (CA-SMA-139, Gobalet 1988), in Monterey County (CA-MNT-108, Langenwalter et al. 1989; CA-MNT-298, Craig and Roeder 1978; CA-MNT-101, Gobalet 1987; CA-MNT-112, Gobalet 1981), and in San Luis Obispo County (CA-SLO-165, Salls et al. 1989). Interestingly CA-MNT-298, CA-MNT-101, and CA-MNT-112 may have historic components, suggesting that technological improvements in hook-and-line nearshore fishing (but not necessarily from shore) introduced by the Spanish or Russians may have led to increases in the capture of this predatory fish.

The only sturgeon bone identified was from FRBS. Since white sturgeon, *Acipenser transmontanus*, are

known to make limited spawning runs up the Russian River (Moyle 1976:96), it too may have been taken there. Both white and green sturgeon (*A. medirostris*) are anadromous and may have been taken from the ocean, though such capture is rare. Sturgeon remains were extremely abundant at CA-CCO-268, -269, -600, and -601 on San Pablo Creek in Contra Costa County (Gobalet 1990b:239, 1994).

Collectively 91.6% of the identified remains from NAVS and FRBS are from cabezon (49.4%), *Sebastes* spp. (rockfishes, 26.2%), and lingcod (16.1%) (table 14.3). Most of the remains recovered from these species are from large individuals. Cabezon are the largest sculpin and may be as large as 11 kg and 99 cm total length. They are found in tidepools, on rocky reefs, and in kelp beds. They are common and prized by anglers who fish the rocky shoreline (Deweese 1984:50). Rockfishes are numerous and occupy a diversity of habitats, depending on the species. They are found in bays, along shore, in kelp beds, and offshore to 457 meters (Eschmeyer et al. 1983:132). Commercially important rockfishes off northern California include the black (*Sebastes melanops*), canary (*S. pinniger*), yellowtail (*S. flavidus*), and copper (*S. caurinus*) rockfishes (Deweese 1984:17). The black rockfish is one of the most common shallow-water rockfishes off northern California (Gotshall 1981:11). The young of the canary rockfish are found in shallow water and copper rockfish are common in rocky areas or areas with rock-sand bottoms (Eschmeyer et al. 1983:136,141). The three most common rockfishes at Fort Ross are black, blue (*S. mystinus*), and olive (*S. serranoides*) (Dan Murley, State Parks Ranger, pers. comm. June 7, 1993). Lingcod are another important sport and commercial species, prized by anglers. Adult lingcod are found near rocks inshore and to 427 meters in deeper water. Specimens to 152 cm and 32 kg are known (Eschmeyer et al. 1983:156). Miller and Geibel (1973) have discussed the natural history of this species. The relative abundance of these three species, cabezon, rockfish, and lingcod, is what one would expect with hook-and-line fishing from shore rather than offshore (Dan Murley, State Parks Ranger,

Table 14.3 Comparative Frequency of Total Elements Identified of Top Species Represented from the Native Alaskan Neighborhood (NAN) Excavations and from 10 Archaeological Sites on the Humboldt County Coast and 19 Archaeological Sites on the Monterey County Coast

Species	NAN	Humboldt Coast	Monterey Coast
<i>Sebastes</i> Sp.	0.262	0.009	0.527
cabezon	0.494	0.099	0.209
lingcod	0.161	0.033	0.032
<i>Hexagrammos</i> sp.	0.002	0.095	0.039
<i>Xiphister</i> sp.	0.011	0.64	0.017
monkeyface prickleback	0.002	0.001	0.045

pers. comm., 1993).

The remaining species in the assemblage are the expected inshore residents of the rocky intertidal, kelp bed, and sandy-bottomed habitats. Information on the biology of these fishes can be obtained from numerous general sources (e.g., Clemens and Wilby 1961; Eschmeyer et al. 1983; Dewees 1984; Fitch and Lavenberg 1971; Goodson 1988; Gotshall 1981; Hart 1973; Miller and Lea 1972). Moyle (1976) discusses the biology of the freshwater fishes and the marine species that move into fresh water.

COMPARATIVE DATA

Because sampling recovery, preservation, and site specific characteristics vary among the coasts off Humboldt and Monterey counties and Fort Ross, the numbers of elements of each species recovered have been combined to allow broad comparison. Tables 14.1 and 14.2 summarize the fish remains: 1662 from the Native Alaskan Neighborhood, 4280 from the Humboldt County coast and 4392 from the Monterey County coast. The three most abundant taxa represented in each of these regions are compared by frequency with other coastal locations in table 14.3. Cabezon (49.4%), *Sebastes* spp. (26.2%), and lingcod (16.1%) are the three most abundant fish remains from the Native Alaskan Neighborhood. Along the Monterey County coast the top three are *Sebastes* spp. (52.7%), cabezon (20.9%), and monkeyface prickleback (*Cebidichthys violaceus*) (4.5%), a rocky intertidal and rocky reef dweller; and for the Humboldt section, *Xiphister* sp. (64.0%), cabezon (9.9%), and *Hexagrammos* sp. (9.5%).

Clearly cabezon are a significant resource all along the northern and central California coast. As a percentage of the assemblage, they are more than two and a half times more abundant among the remains from the Native Alaskan Neighborhood, than at the Monterey County sites and five times more abundant than at the Humboldt County sites. Rockfishes make up more than half the remains along the Monterey coast, a quarter of the remains at the Native Alaskan Neighborhood, and less than one percent at the Humboldt County sites. The remains of lingcod (16.1%) found at the Native Alaskan Neighborhood are five times more abundant than at either of the other coastal sections. The greenling, which are third in abundance at the Humboldt sites, probably would have been captured with smaller hooks than those used for the larger species. Kelp greenling (*Hexagrammos decagrammus*) are one of the most important anglers' catches along the rocky shore of the north coast (Fitch and Lavenberg 1971:76). Their comparative rarity at the Native Alaskan Neighborhood (0.2%) apparently reflects a fishing bias for larger lingcod, rockfishes, and cabezon. Greenling and *Xiphister* sp. make up three quarters of the remains at the Humboldt County sites. Since rock prickleback (*X. mucosus*) reach 58 cm in total length,

about twice the length of the black prickleback (*X. atropurpeus*) (Eschmeyer et al. 1983:253), it is probably the species that was identified because of the relative ease of recovery of its larger elements. Both are common in the rocky intertidal of the California coast. The collective finding of cabezon, greenling, and rock prickleback (83.4% of remains) at the Humboldt County sites suggests extensive exploitation of the rocky intertidal for generally modest-sized fishes, perhaps by hand collection, spearing, or even poisoning. Horn (1983:346) netted numerous herbivorous pricklebacks by hand in the rocky intertidal of southern California. This is quite a different capture strategy from that suggested by the FRBS and NAVS assemblages.

Although the Native Alaskan Neighborhood and Monterey coastal remains appear to be similar with cabezon and rockfishes making up 76% of the remains from the Neighborhood and 73.6% of the remains from the Monterey sites, the relative abundance of these fishes (*Sebastes* spp., 26.2% of remains at the Neighborhood, 52.7% at Monterey sites; cabezon, 49.2% at Neighborhood, 20.7% at Monterey sites), along with the large size of individuals represented among the Neighborhood remains, suggests a significant difference in procurement strategy. Fishing from shore may result in a greater frequency of capture of cabezon because larger cabezon range into the rocky intertidal. During breeding season the males are doggedly territorial as they protect their nests (Goodson 1988:76). Most cabezon captured by sport fishermen are obtained from shore (Fitch and Lavenberg 1971:60). Large rockfishes, on the other hand, would tend to be more abundant near shore than in the rocky intertidal, and thus comparatively rare in the catch of a person fishing from the shoreline. This suggests that the Native Californians of the Monterey coast perhaps were fishing offshore occasionally with watercraft.

The few flatfishes captured at these sites probably reflect local proximity to flat-bottomed seafloor. The Monterey County sites closest to Monterey Bay, and its flat bottom, are CA-MNT-110 through CA-MNT-116. At these sites, Pacific sanddab (*Citharichthys sordidus*), California halibut (*Paralichthys californicus*), petrale sole (*Eopsetta jordani*), and starry flounder (*Platichthys stellatus*) have been recovered (table 14.2). The starry flounder and petrale sole at the Humboldt County sites also reflect local access to flat-bottomed environments (table 14.1, Levulett 1985). CA-MNT-234 at the former estuary of the Salinas River, Elkhorn Slough, on Monterey Bay contains over 25% flatfish material, particularly starry flounder (Gobalet and Jones 1995), which illustrates the correlation between proximity to appropriate habitat and relative abundance of remains. The bulk of the fishing along the Monterey and Humboldt county coasts and at Native Alaskan Neighborhood was local.

SUMMARY

Of the 22 species (at minimum) of fishes identified from the Native Alaskan Village and Fort Ross Beach sites outside the Stockade, at least 21 have been recovered from NAVS and at least 9 from FRBS. The two sites are not considered significantly different however because a far greater number of elements was recovered from NAVS (1440 versus 222) and the percentage of the three most abundant species at each site is virtually identical.

The remains of cabezon, rockfishes, and lingcod make up 91.7% of the total remains recovered from NAVS and FRBS. The remains tend to be from large-sized individual fish. The relative abundance of these species, with cabezon making up nearly half the remains, suggests extensive fishing from shore with hook and line for the large individuals and less interest in the smaller species of the rocky intertidal. At the Humboldt sites, rock prickleback constitute 64.0% of the remains and greenling and cabezon make up about 10% each of the recovered remains. These fish remains suggest a fishing emphasis (and technological simplicity) different from that at the Native Alaskan Neighborhood, with extensive exploitation of the rocky intertidal for smaller species. At Monterey sites, rockfishes (52.7% of remains) and cabezon (20.9%) predominate. Local Native American fishing on the Big Sur coast may have been close in method and technology to that used at the Native Alaskan Neighborhood, but with the suggestion of a somewhat greater exploitation of the rocky intertidal, as evidenced by the relative abundance of monkeyface prickleback. Also, some nearshore utilization of watercraft is suggested along the Monterey coast by a greater percentage of large rockfishes.

Fishes brought to the Native Alaskan Neighborhood sites, probably from the Russian River, included the Sacramento sucker, a large cyprinid (possibly hitch), a sturgeon, and a salmon. Among these remains is the most northerly record of Pacific barracuda for a California archaeological site.

Overall, residents in the Native Alaskan Neighborhood at Fort Ross appear to have been quite fond of cabezon. They were selectively fishing for large individuals, perhaps because they were fishing only to supplement foods obtained from the Fort. These findings provide evidence that the local residents of the Native Alaskan Neighborhood had different fishing strategies from prehistoric coastal Native Californians.

ACKNOWLEDGEMENTS

My thanks to Tom Wake for making these remains available for study. The State of California, Department of Parks and Recreation, provided support for the analysis. Discussions with Glenn Farris and Dan Murley provided background information. Terry Jones, Steve

Dietz, Tom Jackson, and Valerie Levulett supplied the remains from the Monterey and Humboldt County coasts and support for their identification. Tom Wake, Terry Jones, and Bob Lea reviewed and Julie Gunn-White typed the manuscript. Jeff and Micky Schimmel, Scott Pfeifer, Yolanda Ahumada, Traci Alexander, Carrie Meurer, Marissa Williams, Fernando Gomez, and Sam Esparza sorted remains from the Monterey coast sites.

REFERENCES

- Casteel, Richard W.
1974 A Method for Estimation of Live Weight of Fish from the Size of Skeletal Elements. *American Antiquity* 39:94-8.
- Clemens, W. A., and G. V. Wilby
1961 *Fishes of the Pacific Coast of Canada*. Fisheries Research Board of Canada. Bulletin 68 (second edition).
- Craig, Steve, and Mark Roeder
1978 Fish and Sea Mammal Remains. In *Heritage on the Halfshell: Excavating at MNT-298* by W. Roop and C. Flynn, editors pp. 462-90. Report to City of Monterey Urban Renewal Agency, Monterey, California.
- Deweese, Christopher
1984 *The Printer's Catch, An Artists Guide to Pacific Coast Edible Marine Life*. Sea Challengers, Monterey, California.
- Dietz, Stephen A.
1991 Final Report of Archaeological Investigation at Pescadero Point: Data Recovery Excavation and Monitoring of CA-MNT-170. Manuscript on file. Archaeological Consulting and Research Services, Santa Cruz, CA.
- Dietz, Stephen A., and Thomas L. Jackson
1981 Find Report of Archaeological Excavations at Nineteen Archaeological Sites for the Stage I Pacific Grove-Monterey Consolidation Project of the Regional Sewerage System. Manuscript on file. City of Pacific Grove.
- Eschmeyer, William N., Earl S. Herald, and Howard Hammann
1983 *A Field Guide to Pacific Coast Fishes of North America from the Gulf of Alaska to Baja, California*. Peterson Field Guide Series. Houghton Mifflin Company, Boston.
- Fitch, John E.
1972 Fish Remains, Primarily Otoliths, from a Coastal Indian Midden (SLO-2) at Diablo Cove, San Luis Obispo County, California. *San Luis Obispo Archaeological Society occasional paper* no. 7.
- Fitch, John E., and Robert J. Lavenberg
1971 *Marine Food and Game Fishes of California*. University of California Press, Berkeley.
- Gobalet, Kenneth W.
1981 Analysis of Fish Remains from Seven Pacific Grove

- Monterey County Archaeological Sites (MNT-110, 111, 112, 113, 114, 115, 116), Volume 3, pp. E1-E29. In Final Report of Archaeological Excavations at Nineteen Archaeological Sites for the Stage I Pacific Grove - Monterey Consolidation Project of the Regional Sewerage System. Stephan A. Dietz and Thomas L. Jackson, editors. Manuscript on file, Archaeological Consulting and Research Services, Inc., Santa Cruz, California.
- 1987 List of Fish Species Identified from Unit 2, pp. 200-209. In Final Report Archaeological Test Investigations CA-MNT-101, CA-MNT-298, CA-MNT-929, and El Castillo at the Presidio and City of Monterey, Monterey County, California, edited by Stephen A. Dietz. Manuscript on file, Archaeological Consulting and Research Services, Inc., Santa Cruz, California.
- 1988 Fish Remains from the Shell Midden CA-SMA-139, Half Moon Bay State Beach, San Mateo County, California. Manuscript on file, State of California, Department of Parks and Recreation, Sacramento, California.
- 1989 Remains of Tiny Fish from a Late Prehistoric Pomo Site Near Clear Lake, California. *Journal of California and Great Basin Anthropology* 11(2):231-39.
- 1990a Prehistoric Status of Freshwater Fishes of the Pajaro-Salinas River System of California. *Copeia* 1990(3):680-85.
- 1990b Fish Remains from Nine Archaeological Sites in Richmond and San Pablo, Contra Costa County, California. *California Fish and Game* 76(4):234-43.
- 1992 Fish Remains from Archaeological Site CA-SLO-977. Appendix 2. In *Hunters and Gatherers at CA-SLO-977, San Luis Obispo County, California*, edited by Herb Dallas, Jr. Coyote Press Archives of California Prehistory 37:1-27.
- 1993 Additional Archaeological Evidence for Endemic Fishes of California's Central Valley in the Coastal Pajaro-Salinas Basin. *Southwestern Naturalist* 38(3):218-23.
- 1994 A Prehistoric Sturgeon Fishery in San Pablo, Contra Costa County, California: An Addendum. *California Fish and Game*, 80(3):125-27.
- Gobalet, Kenneth W., and Gerrit L. Fenenga
1993 Terminal Pleistocene-Early Holocene Fishes from Tulare Lake, San Joaquin Valley, California with Comments on the Evolution of Sacramento Squawfish (*Ptychocheilus grandis*: Cyprinidae). *PaleoBios* 15(1):1-8.
- Gobalet, Kenneth W., and Terry L. Jones
1995 Prehistoric Native American Fisheries of the Central California Coast. *Transactions of the American Fisheries Society*, 124:813-23.
- Goodson, Gar
1988 *Fishes of the Pacific Coast*. Stanford University Press, Stanford.
- Gotshall, Daniel W.
1981 *Pacific Coast Inshore Fishes*. Western Marine Enterprises, Ventura, California.
- Hart, J. L.
1973 *Pacific Fishes of Canada*. Board of Canada.
- Horn, Michael
1983 Strategies of Two Herbivorous Fishes from a Temperate Rocky Intertidal Zone. *Oecologia* 58:345-50.
- Jones, Terry L., and Jefferson W. Haney
1992 Excavation and Conservation of Six Archaeological Sites at Landels-Hill Big Creek Reserve, Monterey County, California. Report on file, The Nature Conservancy, San Francisco, California.
- Langenwalter II, Paul E., Richard L. Reynolds, Brenda Bowser, and Richard W. Huddleston
1989 Vertebrate Animal Remains from CA-MNT-108, an Early Period Archaeological Site on the Monterey Peninsula, California, p. 97-126. In *Archaeological Excavations at CA-MNT-108, at Fisherman's Warf, Monterey, Monterey County, California*. Gary S. Breschini and Trudy Haversat (eds). Coyote Press Archives of California Prehistory 29:1-190.
- Lea, Robert, N.
1992 Rockfishes. In *California's Living Marine Resources and their Utilization*, edited by William S. Leet, Christopher M. Dewees, and Charles W. Haugen, pp 114-17, California Sea Grant, University of California, Davis.
- Levulett, Valerie Anne
1985 The Prehistory of Southwestern Humboldt County: A Study of Coastal Archaeological Sites in the King Range National Conservation Area. Unpublished Ph.D. dissertation. Department of Anthropology, University of California, Davis.
- Miller, Daniel J., and Robert N. Lea
1972 *Guide to the Coastal Marine Fishes of California*. Fish Bulletin 157, State of California Department of Fish and Game.
- Miller, Daniel J., and John J. Geibel
1973 *Summary of Blue Rockfish and Lingcod Life Histories; A Reef Ecology Study; and Giant Kelp, *Macrocystis pyrifera*, experiments in Monterey Bay, California*. Fish Bulletin 158, State of California Department of Fish and Game.
- Moyle, Peter B.
1976 *Inland Fishes of California*. University of California Press, Berkeley.
- Robins, C. Richard, Reeve M. Bailey, Carl E. Bond, James R. Brooker, Ernest A. Lachner, Robert N. Lea, and W. B. Scott
1991 *Common and Scientific Names of Fishes from the United States and Canada (fifth edition)*. American Fisheries Society Special Publication 20.

Salls, Roy A.

1988 Prehistoric Fisheries of the California Bight. Unpublished Ph.D. dissertation. Department of Anthropology, University of California, Los Angeles.

Salls, Roy A., Richard Huddleston, and Dana Bleitz-Sanburg

1989 The Prehistoric Fishery at Morro Creek, CA-SLO-165, San Luis Obispo County, California. Manuscript on file Clay Singer and Associates, 726 Copeland Ct., Santa Monica, California.

Schulz, Peter D.

1979 Fish Remains from a Historic Central California Indian

Village. *California Fish and Game* 65(4):273-76.

Schulz, Peter D., and Dwight D. Simons

1973 Fish Species Diversity in a Prehistoric Central California Indian Midden. *California Fish and Game* 59(2):107-13.

Wake, Thomas A.

in press Acculturation and Food: A Study of Dietary Patterns Observed at Fort Ross, California. In Proceedings of the 25th Annual Chacmool Conference. The Archaeological Association of the University of Calgary, Calgary, Alberta.

15

Shellfish Remains at the Fort Ross Beach and Native Alaskan Village Sites

ANN M. SCHIFF

THIS CHAPTER PROVIDES descriptions of the shellfish assemblages found at the Fort Ross Beach Site (FRBS) and at the Native Alaskan Village Site (NAVS). The review encompasses aggregate Native Alaskan Neighborhood deposits and reports on individual provenience areas within each site as well. The areas of FRBS include the East Profile, the Middle Profile, the West Profile, the FRBS Pit Feature, the Southwest Bench and the East Bench. The NAVS analysis areas are the South Central Test Unit, the West Central Trench, the East Central Trench, the South Trench, the East Central Bone Bed and the South Bone Bed. Broad classes of shellfish remains and stratigraphic context are described.

CLASSIFICATION SYSTEM

As discussed in chapter 3 of Volume 1, the Sonoma coast is typified by rocky, wave-pounded shores fringed by precipitous cliffs and weather-beaten headlands. Fort Ross coastal environs display characteristic features of the northern California shoreline. The rocky intertidals support an assortment of shellfish and other invertebrates that were harvested by the Native Californians, including abalone, sea urchin, barnacle, chiton, limpet, olivella, and turban (Lightfoot et al. 1991:appendix 3). In addition to the local intertidal resources, hard shelled clam species, highly valued for use in the production of clam shell beads, were gathered and/or traded from Bodega Bay, where they thrived in the sandy, muddy flats (Barrett 1952:284; Gifford; 1967:21; Stewart 1943:61). These ethnographic reports of importation, however, do not preclude the possibility that clams were procured locally from various beaches in the Ross area.

Shellfish remains are sorted into the following groups: barnacle (*Balanus sp.*, *Pollicipes polymerus*);

sea urchin (*Strongylocentrotus sp.*); and mollusk. The last group includes: 1) gastropods—abalone (*Haliotis sp.*, probably *rufescens*), limpet (Fissurellidae, Acmaeidae), horned slipper shell (*Crepidula sp.*), dogwinkle (Thaididae), olivella (*Olivella biplicata*), periwinkle (*Littorina sp.*), turban (Trochidae, Turbinidae), and other snail (Gastropoda); 2) bivalves—mussel (*Mytilus sp.*, probably *californianus*), clam (Veneridae, Cardiidae), and oyster (*Ostrea lurida*); and 3) chiton (Polyplacophora).

Presence or absence of abalone and sea urchin is recorded. For all the other classes, Minimum Number of Individuals (MNIs) are calculated, based on observable diagnostic elements (Waselkov 1987:154-61) as outlined in Volume 1. Limpets and horned slipper shell MNIs are calculated by totalling the number of caps in each assemblage—one cap per individual. Mussel, clam, and oyster MNIs are determined by counting the number of umbos (hinges) for each class and dividing the totals by two—two hinges per individual. Dogwinkle, olivella, periwinkle, turban, and other snail MNIs are estimated by recording the numbers of shell apertures (openings) or columellae (interior central axis); each individual in the assemblage is represented by one aperture or one columella. Chiton MNIs are calculated by counting the total number of plates and dividing by eight; each chiton has eight plates. Barnacle MNIs are estimated by dividing the number of pieces by 20, standardizing this analysis with our previous analysis of survey sites (Lightfoot et al. 1991), and making it comparable to Swiden's work at CA-SON-1455 (1986:56). Detailed percentages and MNI counts for the Neighborhood collection can be found in tables 15.1 and 15.2, and figures 15.1 and 15.2. Appendices 15.1 and 15.2 list the counts and proveniences for FRBS and NAVS shellfish specimens.

As well as a review of shellfish deposits by class, this analysis will discuss interpretative source specific and functional groupings of the Fort Ross mollusk assemblages: "local" vs. "imported" shells and "food" vs. "raw material" shells. Possible imported mollusk varieties include clams and oysters, available in abundance from the Bodega Bay (Port Rumiantsev) area. The constant movement of goods between Fort Ross and Port Rumiantsev (Volume 1, chapter 2) may have facilitated this importation, but some clams may have been available locally as well from areas like the Fort Ross Cove. All other shellfish varieties in the classification system can be obtained in abundance from the local rocky intertidal. An analysis of clam and oyster in the Fort Ross deposits may provide some insight into the trade activities of the Russians, Native Alaskans, and/or Native Californians in the Ross community.

The raw material group is composed of hard shelled clam, which is used in the production of clam shell disk beads. Although clam in the deposit could represent an additional marine food resource, ethnographic sources report the use of hard shelled clam (*Saxidomus nuttalli*, *Saxidomus giganteus*, and *Cordium corbis*) in bead production (Barrett 1952:284-5; Gifford 1967:21; Stewart 1943:61). The analysis of clam from the Fort Ross deposits may indicate bead production activities and/or at least the availability of raw materials used in bead manufacture.

FRBS SHELLFISH ASSEMBLAGE - TOTAL SITE

The FRBS shellfish assemblage consists of a total of 748 MNIs. Chiton makes up the smallest proportion of the deposit (3.3%). Bivalves constitute almost 30% of the total shellfish deposit, with mussels contributing to about 93% of the total bivalve MNIs. Clam and oyster are equally represented in the collection. The majority of the deposit MNIs is made up of gastropods (66.7%). Abalone is present in almost 19% of the specimen bags collected, whereas in the aggregate, only one barnacle MNI is recovered from the site.

SHELLFISH ASSEMBLAGE - EAST BENCH

Excavations at 0N, 12W on the eastern side of the bench recovered 129 shellfish MNIs. The majority of the collection is bivalve (46.5%), including almost 97% mussel. One ground mussel umbo is found in this deposit (FRBS-6/30/88-66-MO-1). This bivalve constituent is the highest on the site. One clam and one oyster individual are represented in the deposit. Although gastropods comprise over 51% of the East Bench deposit, this proportion is the lowest at FRBS. Chitons are present in amounts a little less (2.3%) than the site average (3.3%). Of interest, a full 50% of the area specimen bags reveal the presence of abalone, which represents the greatest occurrence at the Beach site. One drilled abalone fragment is found in this collection

(FRBS-6/30/88-66-MO-1).

A review of the distribution of shellfish MNIs by stratigraphic levels reveals that 97% of the MNIs are recovered from the midden level. This total rises to 99% for both the midden and the mottled brown clay levels.

SHELLFISH ASSEMBLAGE - SOUTHWEST BENCH

Excavations at the Southwest Bench occurred in six units: 7S, 17W; 7S, 18W; 7S, 19W; 8S, 17W; 8S, 18W; and 8S, 19W. The assemblage consists of 309 MNIs. Gastropods represent about 74% of the collection, the highest proportion at the site. Conversely, the bivalve occurrence of 21.7% is the site low. Mussel MNIs constitute 88% of the bivalve collection, with the remainder divided between clams (7.5%) and oysters (4.4%). Chiton occurs with frequencies (4.2%) approaching site norms. Abalone is present in 21% of the area specimen bags.

A stratigraphic analysis of the assemblage indicates that over 95% of the MNIs are recovered from the mottled brown clay level, with an additional 3.7% evident in the highly mottled clay level. The upper mixed levels contain less than 2% of the total collection.

SHELLFISH ASSEMBLAGE - EAST PROFILE

Excavations on the East Profile included nine units: P1 through P9. A total of 77 MNIs makes up the assemblage from this area. As in the Southwest Bench, the East Profile displays a higher-than-site-average proportion of gastropods and a correspondingly lower bivalve component: 70.1% and 27.3% respectively. Over 85% of the bivalve MNIs are mussels, with only two oyster MNIs and one clam MNI in the deposit. Chitons represent 2.6% of the assemblage. This area reveals the second largest abalone presence at FRBS; abalone is present in 31% of the total specimen bags.

As evidenced by a review of the stratigraphic details of the collection, about 91% of the MNIs occur in the midden level. The clay level displays an additional 3.2% of the assemblage for the East Profile.

SHELLFISH ASSEMBLAGE - MIDDLE PROFILE

Excavations on the Middle Profile included eight units (P11 through P18) and produced 215 shellfish MNIs. Gastropods characterize about 64% of the Middle Profile collection, with chiton representing almost 3%. Thirty-three percent of the assemblage is bivalve, almost 93% of which is mussel. One ground mussel umbo is found in this assemblage (FRBS-6/29/88-22-MO-1). Clam and oyster almost equally constitute the remaining bivalves. Only 16% of the specimen bags demonstrate the presence of abalone, including one drilled abalone fragment (FRBS-6/23/88/5-MO-1).

Stratigraphic distributions in the Middle Profile reveal that over 86% of the shellfish MNIs are recovered from the midden levels. The bulk of the remaining

Figure 15.1 Fort Ross Beach Site Shellfish Assemblage

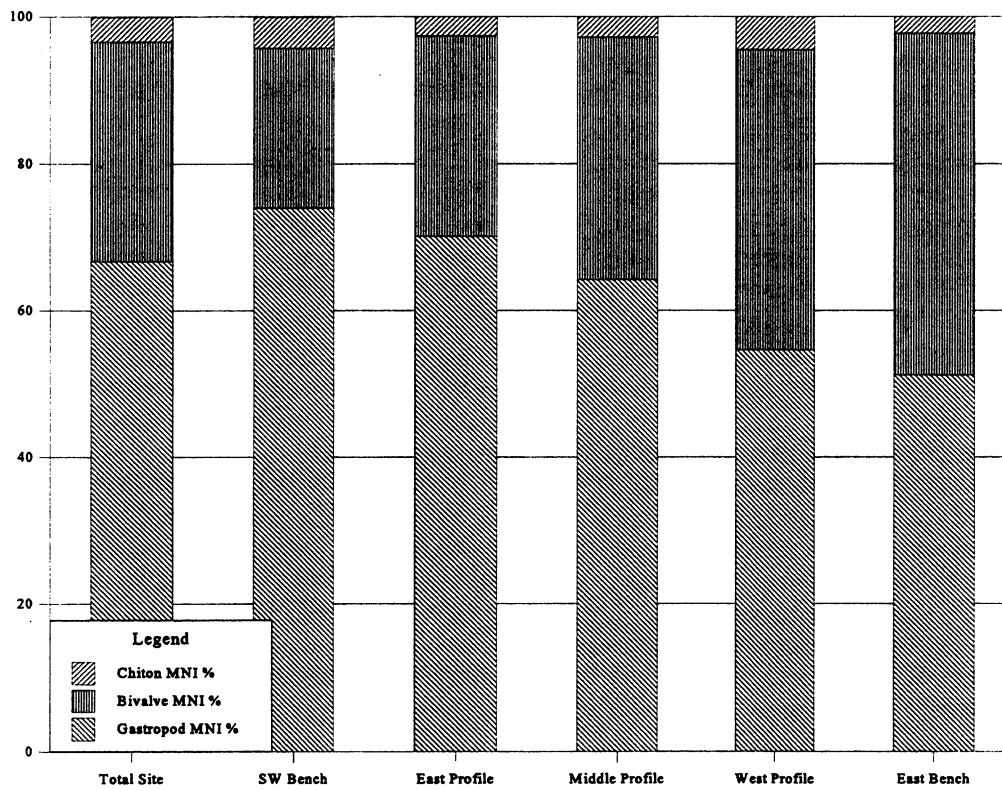


Table 15.1 Fort Ross Beach Site Shellfish Assemblage MNIs

	Total Site	East Bench	SW Bench	East Profile	Middle Profile	West Profile
Chiton	25	3	13	2	6	1
Mussel	207	58	59	18	66	8
Clam	9	1	5	1	2	1
Oyster	8	1	3	2	3	0
Turban	113	23	38	9	42	1
Limpet	64	10	25	6	21	2
Other Snail	321	33	165	39	75	9
Barnacle	1	.15	.3	0	.15	.15
Abalone-Presence/Absence	72	7	20	15	21	9

Note: reported in whole individuals; rounding in area counts will sum greater than total.
MNI = minimum number of individuals

individuals appear in the mixed midden/mottled brown clay levels.

SHELLFISH ASSEMBLAGE - WEST PROFILE

Excavations on the West Profile included 11 units: P20 through P30. This collection contains only 22 shellfish individuals. The assemblage displays the most equal proportions of gastropods (54.6%) and bivalves (40.9%) at FRBS, representing the second lowest gastropod component and the second highest bivalve component at the site. Eight mussel MNIs and one clam MNI are present in the assemblage; no oyster is found in the West Profile deposits. About 4.5% of the collection MNIs are chiton. Abalone is exhibited in 13% of the specimen bags, characterizing the lowest area proportion in evidence at FRBS.

Given the small sample size, stratigraphic analysis is difficult. However, 21 of the 22 total MNIs recovered came from the mottled brown clay levels. No shellfish are evident in the lower clay and gravel levels.

SHELLFISH ASSEMBLAGE - FRBS PIT FEATURE

Excavations in the FRBS Pit Feature produced 78 shellfish MNIs, 72 from the fill and 6 from the pit floor. The highest proportion of gastropods (75.7%) are in evidence here. Correspondingly, the pit feature reveals a low bivalve component (21.8%), the second lowest at the site. Fifteen mussel MNIs, one clam, and one oyster are present in the deposit. Chiton constitutes the remaining 2.6% of the collection. Abalone is in evidence in 11% of the specimen bags, representing a site-low; a drilled abalone fragment is found in the pit feature (FRBS-6/23/88-5-MO-1).

FRBS SHELLFISH ASSEMBLAGE - SUMMARY

A review of the various shellfish assemblages across the site reveals several issues of interest. These include spatial and stratigraphic patterning, post-depositional preservation, and cultural attributions.

Although the complex depositional history and geological context of FRBS make it difficult to reach firm spatial or stratigraphic conclusions, certain findings bear discussion. Chitons (2.3% to 4.5% range) and barnacles (one or fewer MNI) occur with a fairly constant frequency across the site areas. In all areas, gastropods occur in greater proportions than bivalves, approaching similar proportions only in the East Bench. While the ratio of bivalves as a whole fluctuates across the site, the mix of mussel/clam/oyster remains reasonably consistent, with the percentage of mussel to total bivalve ranging from roughly 86% to 97%.

In addition to these spatial patterns, a stratigraphic distinction is apparent between the upper midden and the lower clay levels. Ninety to ninety-nine percent of all shellfish remains are recovered in the midden and mottled brown clay levels. This would suggest that the

majority of the shellfish deposit at FRBS is associated with the historic occupation of Ross, reflecting food processing and possibly bead production/raw material acquisition activities of the Neighborhood residents. Alternatively, at most 4% of the collection is found in the lower clay levels. This minimal assemblage suggests sporadic shellfish deposition associated with prehistoric, long use-duration, special purpose sites, as discussed in Volume 1. (Note: FRBS lithic analysis suggests these same midden/historic and clay/prehistoric correlations.) With shellfish, however, the issue of preservation is always at hand, and pedogenic analysis of these prehistoric soils sheds additional light on the intensity of shellfish deposition (see Price, chapter 4).

Post-depositional issues are equally intriguing. The East Bench displays the highest portion of bivalves and the lowest component of gastropods. Conversely, the Southwest Bench exhibits the largest segment of gastropods and the smallest bivalve constituency. Similarly, the pit feature, unlike the parent Middle Profile area, has a higher proportion of gastropods and a lower incidence of bivalves. These pit feature distributions most closely resemble the shellfish deposits in the Southwest Bench. A partial reason for this distribution could be the differential preservation propensities of more durable snail columellae verses fragile mussel shells (Ford 1992: 286; 314-23; Muckle 1994:129-31; Stein 1992:10; Waselkov 1987:158-9), with destructive post-depositional processes perhaps affecting the deposits in the East Bench less negatively than those in the rest of the site. Likewise, post-depositional activities in the feature could have affected differential shellfish preservation, resulting in distributions skewed about the parent profile distributions. Gastropods' hardy columellae may have a better chance of surviving post-depositional trauma than do delicate, thin-shelled mussels.

Several patterns are possibly cultural in origin. In the profile sections of FRBS, there is an apparent trend from east to west. Moving west, the MNI amounts of gastropod and the presence of abalone decrease, while the proportion of bivalves increases. The presence of abalone is greatest in the East Bench and the East Profile, reflecting a larger incidence of abalone processing/dumping at the east side of FRBS, perhaps associated with food-processing activities. (Interestingly, this observation correlates with the greater occurrence of NAVS lithic food processing artifacts in the East Bench and the East Profile, as discussed in chapter 9.)

The distributions may also provide insight into trade patterns and resource sharing activities of the Neighborhood inhabitants. About 4% clam and 4% oyster make up the possibly "imported" bivalve contingent at FRBS. This translates to an overall imported shellfish component of 2.3%. FRBS profile areas exhibit a slightly higher imported segment (2.9%), but a more interesting observation can be made in reference to the differences in

the imported components at the two bench areas. At the East Bench, which exhibits the highest bivalve proportion (46.5%), the lowest imported component (1.6%) is in evidence. This reflects greater deposition at the East Bench of refuse associated with the more locally plentiful food resource. Conversely, the Southwest Bench, which displays the lowest bivalve constituent (21.7%), demonstrates a greater, possibly imported, clam and oyster segment (2.6%). Although the numbers are still very small, this could suggest a larger occurrence of imported mollusk processing/refuse deposition at the Southwest Bench.

The "raw material" component at FRBS, possibly indicative of clam shell bead raw material acquisition/production as discussed previously, averages 1.2%, with little variation across the site. An exception is the West Profile, which displays a somewhat higher raw material component (4.5%), although the small sample size limits any strong conclusions. Of interest, the Southwest Bench exhibits twice the East Bench raw material component.

NAVS SHELLFISH ASSEMBLAGE - TOTAL SITE

For this analysis, the NAVS total site assemblage is defined as shellfish from the South Central Test Unit (110S, 11W), the West Central Trench (75S, 16W; 75S, 18W; and 75S, 20W), the East Central Trench (75S, 0-4E) and the South Trench (125S, 18-24W). The NAVS shellfish assemblage consists of a total of 5,299 MNIs. Barnacle comprises the smallest segment of the deposit: 1.4%; chiton represent 5.5% of the collection. Bivalves constitute almost 8% of the total assemblage, with mussels contributing over 7% and clam constituting the remaining .7%.

The largest proportion of the NAVS shellfish collection is gastropod (83.7%). Turban makes up almost 11% of the aggregate assemblage, and 9.6% of the shellfish remains are in the limpet category. Horned slipper represents 1.8%, while dogwinkle, olivella, and periwinkle each contribute less than 1% to the total. The other snail segment (62.2%) contains the remaining gastropods, resulting in the largest single component at NAVS. Abalone is present in 13.5% of the collected specimen bags, while over 5% of the specimen bags contain evidence of sea urchin. In addition, ten worm casts, one abalone button (NAVS 8/6/91-35-O-1), and one ground mussel umbo (NAVS 8/12/91-89-O-1) are found in the deposit.

SHELLFISH ASSEMBLAGE - SOUTH CENTRAL TEST UNIT

Excavations at 110S, 11W produced 295 shellfish MNIs. The majority of the collection is other snail (65.6%), with an additional 14.7% turban in the assemblage. These segment proportions are the largest at NAVS. Bivalves comprise over 7% of the deposit, including 5.3% mussel and almost 2% clam. The mussel percentage is the lowest at NAVS, while the clam

proportion is the highest. Chiton constitute 7.5% of the total shellfish MNIs at the South Central Test Unit, representing the site maximum.

On the other hand, limpets (2.7%) and horned slipper (1%) proportions serve as site minimums. The barnacle component (1.2%) approximates the site norm. Abalone is present in site average numbers, while sea urchin, present in 3.6% of the specimen bags, reflects a site low.

A review of shellfish MNIs by stratigraphic levels reveals that over 85% of the assemblage is found in the upper topsoil and dark sandy loam levels. The topsoil level exhibits greater proportions of bivalve, chiton, and barnacle than the lower strata. No bivalves are present in the clay level.

SHELLFISH ASSEMBLAGE - WEST CENTRAL TRENCH

Excavations in the West Central Trench occurred in three units: 75S, 16W; 75S, 18W; and 75S, 20W. Only five barnacle fragments and one specimen bag with abalone present constitute the shellfish assemblage in this trench. All are found in the upper topsoil and dark sandy loam levels.

SHELLFISH ASSEMBLAGE - EAST CENTRAL TRENCH

Excavations in the East Central Trench included five units: 75S, 0E; 75S, 1E; 75S, 2E; 75S, 3E; and 75S, 4E. A total of 2,047 MNIs make up the assemblage from this area. While the overall frequency of gastropods (84%) approaches the site norm, the East Central Trench has higher components of turban (13.8%) and lower constituencies of other snail (59.1%). Limpet (9.5%), dogwinkle (.9%), olivella (.1%), and periwinkle (.6%) all approximate overall site proportions. Chiton account for 4% of the collection, and barnacle and horned slipper each contribute about 2% to the total.

Eight percent of the shellfish MNIs are mussel and .5% are clam, resulting in an overall bivalve segment somewhat higher than the NAVS average. The extent of the presence of both abalone and sea urchin in the East Central Trench typifies overall site occurrences.

Stratigraphic analysis displays variations in shellfish distributions across soil levels. Almost 90% of the collection is located in the upper levels, about 11% in the lower sandy loam, and only .3% in the clay level. All pit/mottled fill levels approximate trench shellfish class proportions, whereas the topsoil horizon contains greater segments of other snail and fewer bivalves and limpets. No bivalves or barnacles are present in the clay levels.

SHELLFISH ASSEMBLAGE - EAST CENTRAL BONE BED

Excavations in the East Central Bone Bed occurred in three units at the western end of the East Central Trench (75S, 0E; 75S, 1E; and 75S, 2E) and extended across two 10 cm levels (20-30 cm and 30-40 cm). The assemblage consists of 411 shellfish MNIs. As in the parent trench, the East Central Bone Bed exhibits a low

Figure 15.2 Native Alaskan Village Site Shellfish Assemblage

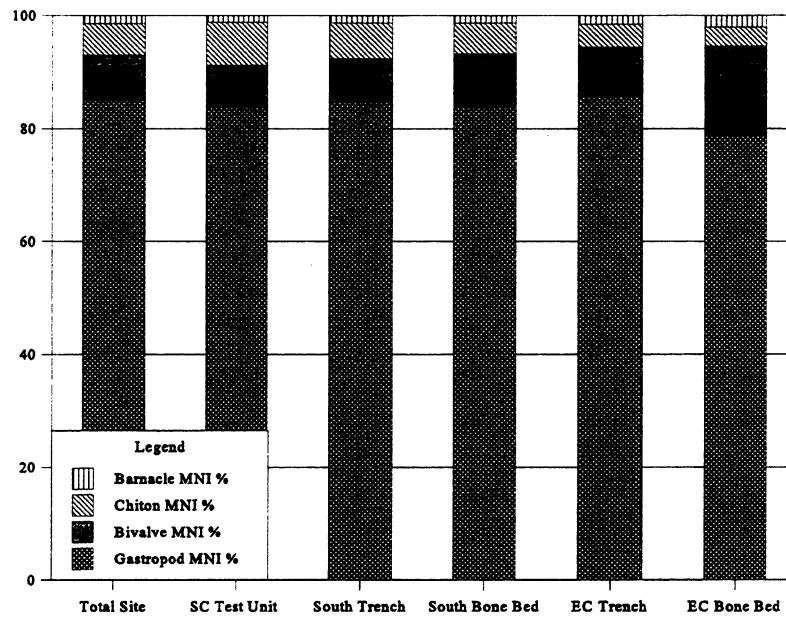


Table 15.2 Native Alaskan Village Site Shellfish MNIs

	Total Site	South Central Test Unit	West Central Trench	East Central Trench	South Trench	East Central Bone Bed	South Bone Bed
Chiton	289	23	0	83	185	14	28
Mussel	375	16	0	164	196	60	43
Clam	35	6	0	11	19	3	3
Limpet	509	8	0	194	307	51	86
Horn Slipper	94	3	0	40	51	13	9
Dogwinkle	35	0	0	18	17	2	1
Olivella	10	0	0	3	7	3	0
Periwinkle	16	0	0	13	3	1	1
Turban	569	43	0	282	244	53	41
Other Snail	3,294	192	0	1,208	1,894	202	291
Barnacle	73	4	.25	31	39	9	7
Abalone-Presence/Absence	272	11	1	115	145	34	25
Sea Urchin-Presence/Absence	109	3	0	58	48	36	14

MNI = minimum number of individuals

proportion of other snail (49.4%, a site low). However, greater than average proportions of turban (13%), horned slipper (3.2%, a site high), and limpet (12.5%) are in evidence. Dogwinkle, olivella, and periwinkle each constitute less than 1% of the shellfish MNI total, as in overall NAVS and parent trench distributions, but with a slightly greater olivella segment. Nevertheless, this bone bed contains the smallest overall gastropod component (76.3%) at NAVS.

Conversely, almost twice the site proportion of bivalves is in evidence in the East Central Bone Bed (15.2%), with increased mussel occurrence accounting for the discrepancy. Clams make up less than 1% of the assemblage, as is the case for the entire site. Chiton constitute a little over 3% of the collection, a site low. Barnacles (2%) occur with somewhat greater frequency than in NAVS as a whole. Of interest, the East Central Bone Bed evidences the largest percentage (13.6%) of sea urchin presence at NAVS, over twice the site occurrence. Abalone is present in 12.8% of the specimen bags.

SHELLFISH ASSEMBLAGE - SOUTH TRENCH

Excavations in the South Trench included seven units: 125S, 24W; 125S, 23W; 125S, 22W; 125S, 21W; 125S, 20W; 125S, 19W; and 125S, 18W. A total of 2,962 shellfish MNIs constitutes the assemblage from this area. Both the abalone button and the ground mussel umbo are found in this deposit. As is the case with the East Central Trench, the South Trench closely parallels the distributions found in the total site. Gastropods (83.5%) comprise the majority of the collection, allocated among other snail (64%), turban (8.2%), horned slipper (1.7%), dogwinkle (.6%), olivella (.2%), and periwinkle (.1%). Limpets represent 10.4% of the shellfish deposit, a slightly greater segment than is found in the assemblage as a whole.

Bivalves (7.2%) occur with somewhat less frequency than in NAVS as a whole, and consist of 6.6% mussel and .6% clam. Corresponding to the site proportions, barnacle accounts for less than 2% of the collection, while chiton proportions are somewhat greater at 6.2%. Indications of both abalone (14%) and sea urchin (4.6%) deviate somewhat from the proportions in the overall accumulation: abalone is higher and sea urchin is lower.

A stratigraphic review of this area suggests that over 85% of the shellfish MNIs are found in the upper topsoil and dark sandy loam levels, with the remaining 15% occurring in the lower pit fill strata. Topsoils demonstrate higher proportions of other snail, compared with greater segments of limpet and bivalve in the loam and fill levels. Chiton and barnacle are constant throughout.

SHELLFISH ASSEMBLAGE - SOUTH BONE BED

Excavations in the South Bone Bed occurred in three units near the west end of the South Trench (125S, 23W; 125S, 22W; and 125S, 21W) and extended across two 10-

cm levels (20-30 cm and 30-40 cm). The assemblage consists of 510 shellfish MNIs. The South Bone Bed exhibits several deviations from the parent South Trench distributions, an observation also made for the East Central Trench as discussed earlier. Other snail represents about 57% of the shellfish MNIs, less than in either the parent trench or the overall site distributions. Dogwinkle and periwinkle each account for less than .2% of the collection, and there is no evidence of olivella in the South Bone Bed. As in the parent South Trench deposit, turban represents about 8% of the shellfish MNIs, the lowest proportion at NAVS.

On the other hand, the South Bone Bed contains a greater proportion of bivalves (9%) than in either the parent South Trench or the total collection. As in the East Central Bone Bed, this discrepancy is explained wholly by a larger proportion of mussel (8.4%), while the clam segment (.6%) approaches site norms. Barnacle, horned slipper, and chiton components almost exactly resemble NAVS totals. The largest proportion of limpets (16.9%), however, is found in this bone bed, which is significantly greater than the 9.6% total site component. Of particular interest, abalone is present in a larger percentage of specimen bags that anywhere else at NAVS: 14.7%. Sea urchin also turns up in 8.2% of the specimen bags, almost twice as often as in the parent South Trench.

NAVS SHELLFISH ASSEMBLAGE - SUMMARY

A review of the assemblages from various areas across NAVS provides several observations. As with the FRBS deposits, spatial and stratigraphic patterning, post-depositional preservation, and cultural attributions will be discussed.

Spatial patterns are in evidence for several shellfish groups. Barnacles occur in all areas and with a fairly constant frequency (1.2% to 2% range). Abalone presence is also consistent in all locations across the site, with presence percentages ranging from 12.8% to 14.7%. In all cases, the proportion of gastropods is far larger than the bivalve segment, although gastropod percentages range from a high of almost 84% to a low of about 76%. With the exception of the East Central Bone Bed, all areas evidence between a 7% and 9% bivalve segment.

The two bone bed bearing trenches (South and East Central) evidence similarities in the distributions of shellfish remains: each contains like proportions of clam and the same overall gastropod segments. The two bone beds (South and East Central) contained within the trenches are more like each other than either is like its own parent trench deposit: high levels of sea urchin and limpet, low levels of other snail. Nonetheless, each bone bed displays several distributional peculiarities. The East Central Bone Bed exhibits the highest percentage of sea urchin presence, the largest bivalve segment, and the greatest mussel constituent. In the South Bone Bed, the greatest segment of limpets is manifest, as well as the

highest percentage of abalone presence.

Stratigraphic analysis of NAVS deposits reveals that the majority of the shellfish remains are found on the upper horizons: 85% to 90%. Among the few shellfish remains found in the lowest clay levels, no bivalves are evident.

Shellfish MNI densities reveal various rates of shell deposition across the NAVS landscape. The southern area has higher densities than the central area, and both bone beds have higher densities than the surrounding parent trenches. In the East Central Trench, shellfish MNIs occur at the rate of 585 per cubic meter. By contrast, the density rate for the South Trench is 898 MNIs per cubic meter. This central/south density pattern also holds true within the bone beds: 822 MNIs per cubic meter in the East Central Bone Bed and 1020 MNIs per cubic meter in the South Bone Bed. Interestingly, a similar central/south density pattern is also observed for NAVS lithic artifacts (chapter 9).

Post-depositional factors may account for the distributional differences seen in the South Central Test Unit. The South Central Test Unit displays the largest segment of clam, chiton, and other snails, but the smallest portion of mussels and sea urchin presence. It is possible that post-depositional activities in the South Central Test Unit area adversely affected the preservation of mussels and sea urchin, both fragile species, as compared to hard shelled clam, chiton plates, and snail columella. Diagnostically representative limpet and horned slipper are present in site low proportions; identifiable dogwinkle, periwinkle, and olivella are not in evidence at all in the test unit. While this may simply be a function of the smaller sample size, differential preservation can not be ruled out. Differential post-depositional preservation factors may also be at work with opposite effects in the East Central Bone Bed. The bone bed proportions of sea urchin, mussel, and identifiable horned slipper are the highest at NAVS, and are suggestive of protective post-depositional factors (rapid burying?) possibly occurring in this area.

Cultural factors may be reflected in the shellfish distributional differences seen at NAVS; the deposits may be the results of specific processing and cooking activities associated with the bone bed deposits. The general density patterns in and of themselves may suggest more intense activities occurring in the bone beds and in the southern areas of NAVS. Also, the absence of shellfish in the West Central Trench suggests that the remains of processing and/or cooking shellfish were not deposited in this area, as the West Central Trench is spatially separate from the units excavated in both of the bone beds and in the southern, cliff-edge midden locations. Additionally, site-high proportions of limpets in the South Bone Bed compared with site-high proportions of mussels in the East Central Bone Bed may indicate food-processing

locations and/or culinary preferences of different NAVS residents.

Imported and/or bead-raw-material clam proportions of .5% to .7% consistently appear in all locations, exclusive of the South Central Test Unit (1.9%). This suggests that deposition of the possible imported food or disk bead raw material is fairly evenly distributed across the site, but two to four times greater in the South Central Test Unit. Additionally, the highest presence of abalone at NAVS and the abalone button found in the South Trench may reflect abalone working in the south.

COMPARATIVE ANALYSIS - FRBS AND NAVS

A comparison of the shellfish remains from the two Native Alaskan Neighborhood sites reveals several similarities as well as some differences. FRBS exhibits smaller gastropod percentages and larger bivalve constituencies than NAVS. It is possible that human impact at NAVS, such as trampling, may have differentially destroyed more bivalves than gastropods, while dumping episodes at FRBS tended to preserve both equally. It is also possible, however, that the mix of shellfish is an accurate reflection of the numbers of bivalves and gastropods deposited around the Neighborhood. The latter explanation would suggest a cultural origin for the distributional differences.

Both NAVS and FRBS display greater total proportions of gastropods than bivalves across all site areas. These similarities could be purely a function of post-depositional deterioration forces; snail may preserve better than mussel. Or, as mentioned above, cultural factors may be at play.

NAVS and FRBS display similar percentages of limpet, while NAVS evidences somewhat greater numbers of chiton. In both areas, barnacle remains are few: one MNI at FRBS and 73 MNIs at NAVS. FRBS evidences greater presence of abalone than NAVS. Since it is unlikely that preservation factors would explain this difference, it is possible that dumping episodes by the residents of NAVS are responsible for the larger occurrence of abalone at FRBS.

The NAVS East Central Bone Bed and the FRBS East Bench both display the highest mussel proportions in their respective sites. This may reflect spatially related areas where mussels were processed, cooked, and deposited. Additionally, both areas may have been subject to minimal post-depositional destructive factors.

FRBS exhibits larger proportions of possibly imported shellfish and clam shell raw materials. Both of these segments are a function of shellfish remains associated with Native Californian activities: pre-historic/historic trade with and procurement from Bodega Bay, and the use of hard shelled clam in the production of clam shell disk beads. Of interest, this aspect of the

FRBS deposit may reflect earlier (pre-NAVS) Native Californian activities on the beach, unrelated to trade or raw material procurement. Alternatively, FRBS may have been the locus of Native Californian activities that were coincident with the occupation of NAVS. Also, the constant flow of goods from Bodega Bay to Fort Ross during Russian times, discussed earlier in this chapter, must be considered as a possible source of importation of shellfish as food and/or raw material for any or all of the Neighborhood inhabitants.

Both NAVS and FRBS disclose a dearth of shellfish remains in the lower clay levels. The relative infrequency of shell characterizes the prehistoric non-site manifestations often found on the coastal terrace. Sporadic, temporary visits, not associated with shellfish gathering and processing, would result in minimal deposition of shellfish remains.

ACKNOWLEDGEMENTS

I thank Kent Lightfoot and Antoinette Martinez for their insightful remarks on earlier drafts of this chapter. In addition, I thank Hannah Ballard and Thomas Wake for their practical advice on shellfish classification systems. I thank the many people who have supported or participated in the Fort Ross Archaeology Project since its inception in 1988, including UCB field school participants, laboratory analysts, and Archaeological Research Facility personnel. I am especially indebted to the many people at the Fort Ross State Historic Park and the California Department of Parks. I am most grateful for the sage counsel and constant advocacy of Kent Lightfoot. Finally, I thank Robert Schiff for his understated guidance and immutable good humor.

REFERENCES

- Barrett, S. A.
1952 Material Aspects of Pomo Culture. *Bulletin of the Public Museum of the City of Milwaukee*, Vol. 20, Part 2.
- Ford, P. J.
1992 Interpreting the Grain Size Distributions of Archaeological Shell. *Deciphering a Shell Midden*, edited by J. Stein, pp. 283-325. Academic Press, New York.
- Gifford, E. W.
1967 Ethnographic Notes on the Southwestern Pomo. *Anthropological Records*, Vol. 25. University of California Press, Berkeley.
- Keen, A. M., and Coan, E.
1963 *Marine Molluscan Genera of Western North America: An Illustrated Key*. Stanford University Press.
- Lightfoot, K., Wake, T., and Schiff, A.
1991 *The Archaeology and Ethnohistory of Fort Ross, California, Volume 1, Introduction*. Contributions of the University of California Archaeological Research Facility No. 49. Berkeley.
- Morris, P. A.
1966 *A Field Guide to Pacific Coast Shells*, 2nd ed. Houghton Mifflin Company, Boston.
- Muckle, R. J.
1994 Differential Recovery of Mollusk Shell from Archaeological Sites. *Journal of Field Archaeology*, 21 (1): 129-31.
- Smith, R. I., and Carlton, J. T.
1975 *Light's Manual: Intertidal Invertebrates of the Central California Coast*. University of California Press, Berkeley.
- Stein, J. K.
1992 Analysis of Shell Middens. *Deciphering a Shell Midden*, edited by J. Stein, pp.1-24. Academic Press, New York.
- Stewart, O. C.
1943 Notes on Pomo Ethnography. *University of California Publications in American Archaeology and Ethnology*, Vol. 40, No. 2, pp. 29-62. University of California Press, Berkeley.
- Swiden, C.
1986 Analysis of Shellfish Remains from SON-1455. Appendix A in *Cultural Resource Survey at the Fort Ross Campground, Sonoma County, California* by Glenn Farris, pp. 55-64. On file, Archaeology Laboratory, California Parks Department, Sacramento.
- Waselkov, G. A.
1987 Shellfish Gathering and Shell Midden Archaeology. *Advances in Archaeological Method and Theory*, Vol.10, edited by M. Schiffer, pp. 93-209. Academic Press, New York.

Chronology of Archaeological Deposits from the Fort Ross Beach and Native Alaskan Village Sites

KENT G. LIGHTFOOT AND STEPHEN W. SILLIMAN

THE TEMPORALLY DIAGNOSTIC European/Asian artifacts from FRBS and NAVS date primarily to the Russian occupation of Fort Ross, from A.D. 1812 to 1841. In his analysis of the ceramic artifacts (chapter 7), Silliman concludes that most of the diagnostic refined earthenwares are handpainted blue, transferprint blue, and handpainted polychrome types manufactured primarily in the 1820s and 1830s. The ceramic assemblages of FRBS and NAVS are quite similar, suggesting a very close chronological relationship between the two sites. Ross's study of the glass and ceramic beads (chapter 8) identifies the majority as inexpensive, drawn embroidery beads that were manufactured in Europe in the early 19th century. The one notable exception is the Prosser-molded ceramic bead from FRBS that was manufactured after 1840 (FRBS 6/15/89-7-be-1). Although the sample of beads from FRBS is small ($n=16$), most of the FRBS bead types are found in the larger assemblage at NAVS ($n=548$), again indicating a comparable bead chronology for the two sites.

The above findings indicate that European/Asian materials postdating the Russian Period are uncommon in both FRBS and NAVS archaeological contexts. As Farris emphasizes in chapter 6, this is an important observation because the archaeological deposits unearthed in the Russian Stockade contain historic materials dating to the later American Period (post A.D. 1846), when the remnant Stockade buildings were used as a hotel, saloon, dance hall, and storage facilities. Consequently, the excavations at FRBS and NAVS are among the very few at Fort Ross to have produced a discrete assemblage of historic materials that date almost exclusively to the Russian occupation.

While there is little evidence at either FRBS or NAVS for the mixing of early 19th century artifacts with

later material culture, the contextual relationship of the historic assemblage to remains that predate the Russian occupation is not so straightforward. Some archaeological deposits, such as the clay stratum at FRBS, contain only lithic artifacts that may be prehistoric in age, an observation made by Schiff in chapter 9. In other deposits characterized by diverse cultural remains, it is not clear whether the lithic artifacts found in direct association with temporally diagnostic European/Asian artifacts were manufactured and used in the early 19th century or many years before the Russians settled Fort Ross.

Most archaeologists who have worked in or near the Russian Stockade have unearthed lithic artifacts (both chipped and ground stone) that appear to be prehistoric in age (see Smith 1974; Treganza 1954:18). The recent excavations of the east wall of the Stockade by Purser et al. (1990:42-52) unearthed chert and obsidian tools, as well as a rock feature, at depths of 50 to 70 cm or more below surface. In using the obsidian hydration chronology generated for the southern North Coast Ranges (as outlined below), they date the obsidian artifacts from the Lower Archaic Period (6000 B.C.-3000 B.C.) to the Upper Emergent Period (A.D. 500-A.D. 1500). The hydration band measurements of 13 obsidian artifacts from the 1989 surface collection of NAVS also suggest prehistoric dates ranging from the Upper Archaic Period (1000 B.C.-A.D. 500) to the Upper Emergent Period. Only one obsidian artifact is probably historic in age (Lightfoot et al. 1991:109). These findings are consistent with other archaeological sites on raised marine terraces in the Ross Region, where we detected broadly dispersed, low-density lithic scatters that were dated as early as 8000 to 6000 years ago (Lightfoot et al. 1991:110-12).

Smith (1974) and others argue that the majority of

the chipped stone and ground stone artifacts recovered in the archaeological deposits at Fort Ross were produced, used, and discarded along the marine terrace before the Russians and their multiethnic work force founded the colonial outpost. The common occurrence of projectile points, flakes, shatter, and grinding and hand stones with 19th century artifacts is explained by the mixing of prehistoric and historic materials in disturbed contexts, such as those created by rodent bioturbation (e.g., Purser et al. 1990:42). This observation has serious implications for our study of culture change and continuity of the Native Alaskans and Native Californians at NAVS and FRBS. If the majority of the lithic assemblage described in chapter 9 is not contemporaneous with the Russian outpost but dates to prehistoric times, then we may greatly overstate the degree of continuity and/or adoption of traditional Native Californian cultural practices by including these artifacts in our analysis of the material culture of the Native Alaskan Neighborhood.

This chapter presents the chronology of specific archaeological deposits at FRBS and NAVS and considers the temporal relationship of the lithic artifacts to the early 19th century assemblage of ceramic, glass, and metal artifacts. The chronological assessment is based on 172 obsidian hydration measurements, 2 Accelerator Mass Spectrometry (AMS) radiocarbon dates, and the contextual association of these dated materials with diagnostic European/Asian artifacts.

SOUTHERN NORTH COAST RANGES OBSIDIAN HYDRATION CHRONOLOGY

The obsidian hydration chronology for the southern North Coast Ranges has been established for four of the principal obsidian sources in the region: Annadel near Santa Rosa, Borax Lake and Mt. Konocti near Clear Lake, and Napa Valley (see Fredrickson 1987, 1989; Jackson 1989; Tremaine and Fredrickson 1988; Tremaine 1989; Origer 1987; and Origer and Wickstrom 1982). Employing Tremaine's (1989:69-70) "comparison constants" derived from induced obsidian experiments, hydration band measurements of obsidians from these different sources can be compared with one another. In this chapter, comparison constants are calibrated to the hydration rate of the Annadel flow by multiplying Napa Valley and Mt. Konocti readings by .77 and Borax Lake measurements by .62. A fifth obsidian source has recently been defined by Jackson (1986) as Franz Valley located 15 km north of Santa Rosa. A comparison constant has not yet been calculated for this source.

Obsidian hydration is generally best used as a relative dating method. However, since our primary purpose is to distinguish prehistoric obsidian artifacts from those manufactured and used in the early 19th century, we employ Origer's (1987:55-59) regression equation to assign the hydration band measurements of

Annadel obsidian into prehistoric and historic periods. The regression equation is based on obsidian readings from radiocarbon dated contexts in six sites in the southern North Coast Ranges. Origer's (1987) study provides a rough approximation of the hydration band measurements of Annadel obsidian in microns for the following periods:

Lower Archaic (6000 B.C.-3000 B.C.)	6.6-5.3 microns
Middle Archaic (3000 B.C.-1000 B.C.)	5.2-4.1 microns
Upper Archaic (1000 B.C.-A.D. 500)	4.0-2.9 microns
Lower Emergent (A.D. 500-A.D. 1500)	2.8-1.7 microns
Upper Emergent (A.D. 1500-A.D. 1812)	1.6-1.0 microns
Historic (post A.D. 1812)	< 1.0 microns

The Historic Period is further divided into three phases that are too fine grained for the current obsidian hydration chronology:

Russian Period (A.D. 1812-1841)

Mexican Period (A.D. 1841-1846)

American Period (post A.D. 1846)

The above chronology, we recognize, will continue to be refined as our understanding of the obsidian hydration rates of the five sources, especially under different temperature, moisture, and depositional conditions in coastal environments, becomes more sophisticated (see Lightfoot et al. 1991:67). For the purposes of differentiating historic from prehistoric obsidian artifacts, however, we feel relatively confident that thin hydration band readings of ca. 1.0 microns accurately discriminate young, or possibly historic, artifacts from older and clearly prehistoric artifacts with thicker hydration bands of 2.0 or more microns. Origer's (1990) recent study of debitage from Ishi's obsidian knapping sometime around 1915 shows that detectable and measurable hydration rims form in less than 100 years. His results suggest that the mean hydration band readings of Napa Valley, Mt. Konocti, and Borax Lake obsidians used by Ishi, when standardized to the hydration rate of the Annadel flow, vary between .45 to .58 microns.

The obsidian samples from FRBS and NAVS were analyzed by the Obsidian Hydration Laboratory, Sonoma State University, under the direction of Thomas Origer. Obsidian artifacts were visually identified to one of the above four sources based on macroscopic attributes. Thin sections were prepared for one or more edges of the artifacts, and six measurements of the hydration band were taken at several locations along the edge of each thin section. The mean of these six readings was then calculated; this figure was used for chronological purposes.

In addition to visual sourcing, a large sample of the obsidian specimens was sourced by Silliman using the

energy dispersive x-ray fluorescence (EDXRF) spectrometer in the Department of Geology and Geophysics at the University of California, Berkeley. The EDXRF trace element analysis identified the chemical characterization for each obsidian sample based on trace elements [thorium (Th), rubidium (Rb), strontium (Sr), yttrium (Y) and zirconium (Zr) ppm concentrations] that have proven useful for sourcing northern California obsidians (Jackson 1986). The geochemical signature for each sample then was assigned to an obsidian source through comparison with source characterization values outlined in Jackson (1986). Trace element analysis identified the five major sources (Annadel, Franz Valley, Napa Valley, Borax Lake, and Mt. Konocti).

AMS radiocarbon dates were provided by Beta Analytic Inc. whose technicians pretreated the charcoal specimens and submitted them for analysis to the Accelerator Mass Spectrometry Facility at the Lawrence Livermore National Laboratory (CAMS) in California. C13/C12 corrections were applied to the conventional C14 age. The Pretoria Calibration Procedure program was employed by the Beta Analytic staff to convert B.P. radiocarbon age determinations into calendar years.

FORT ROSS BEACH SITE

The sampling design to select obsidian specimens for analysis involved stratifying FRBS into five areas (East Profile, Middle Profile, West Profile, Southwest Bench, and East Bench) and then selecting specimens, when available, from the different archaeological deposits represented in each area as described in chapter 2. Samples were usually selected from the stratigraphic profiles of two to four excavation units in each area that contained the largest number of obsidian artifacts. When multiple specimens were available from the same area and deposit, we chose a sample that characterized the diversity of lithic categories present. In selecting the obsidian samples, we were particularly interested in comparing obsidian readings from the midden and clay deposits.

Eighty-four obsidian specimens were submitted to the Obsidian Hydration Laboratory at Sonoma State University. Eighty-two were assigned a source through visual inspection, and of these, 74 exhibited hydration bands that could be measured with precision.

We submitted 64 of the visually sourced specimens (78%) for EDXRF trace element analysis, the results of which indicate that only 6 specimens (7%) had been misidentified. Three specimens macroscopically identified as Annadel are from Franz Valley (n=2) and Napa Valley (n=1); two believed to be from Napa Valley are chemically sourced as Annadel and Franz Valley; while one classified as Borax Lake should be Napa Valley. For subsequent analyses of hydration band readings, particularly the calculation of comparison constants, we use the obsidian sources identified by the EDXRF analysis and

rely on macroscopic identifications only for those specimens for which no EDXRF data is available. All hydration readings reported are comparison constants calibrated to the hydration rate of the Annadel source with the exception of Franz Valley specimens. Information on the catalog number, unit, level, archaeological deposit, visual source, chemical source, hydration reading, and comparison constant for each obsidian specimen analyzed is presented in appendix 16.1 (FRBS). The results of the EDXRF trace element analysis are presented in appendix 16.2 (FRBS).

Table 16.1 presents the summary statistics for the FRBS obsidian artifacts. The majority are sourced as Annadel (52%) and Napa Valley (35%), followed by Borax Lake (6%), Mt. Konocti (3%), and Franz Valley (3%). One specimen's source is unknown. Of the sourced obsidian artifacts that yielded interpretable hydration band readings (n=74), designated as "Total Hydration" in table 16.1, all but one are prehistoric in age. The mean hydration readings for the five sources range from a low of 1.9 microns (sd=0) for Mt. Konocti to a high of 2.5 microns for Napa Valley (sd=.6) and Franz Valley (sd=0). The chronology of FRBS deposits is outlined below for the five areas of the site (East Profile, Central Profile, West Profile, Southwest Bench, and East Bench).

EAST PROFILE

Five obsidian artifacts were submitted for hydration band measurements and sourcing from the East Profile (4 from P5, 1 from P9). Hydration bands were measured on four flakes, identified as Annadel (2) and Borax Lake (2) obsidians (table 16.2). Three of the artifacts were recovered from the clay stratum and one from the midden deposit. The average hydration reading for artifacts from the clay stratum is 2.1 microns (sd=.4), while the single hydration band measurement from the midden is 1.6 microns. Given the small sample size, little can be said about the chronology of the East Profile. The midden deposit contains diagnostic ceramic and glass artifacts suggesting an early 19th century date, but the one obsidian reading suggests a prehistoric age. The clay deposit probably predates the establishment of Fort Ross. It contains no diagnostic historic remains, and the obsidian artifacts present have hydration readings ranging from 1.7 to 2.6 microns dating them to the Lower Emergent Period (see table 16.2).

MIDDLE PROFILE

Seventeen obsidian artifacts (16 flakes and 1 biface fragment) from the Middle Profile (6 from P12, 3 from P14, 5 from P15, and 3 from P16) were submitted for analysis. Sixteen of the specimens yielded interpretable hydration band measurements (table 16.3). The majority are sourced as Annadel (12), followed by Napa Valley (2), Mt. Konocti (1), and Borax Lake (1). The sample

includes obsidian artifacts from the midden (2), the midden/clay interface (1), the clay deposit (3), and the fill (8) and floor (2) of the pit feature. All of the deposits contain prehistoric lithic material based on hydration readings. The mean hydration readings for the midden, midden/clay interface, and clay deposits are 1.8 (sd=0), 2.3 (sd=0), and 1.9 (sd=.1) microns, respectively. Again, the paucity of European/Asian historical materials in the clay deposit and the obsidian hydration readings ranging from 1.7 to 2 microns suggest a prehistoric date, probably sometime during the Upper Emergent Period. The midden stratum probably was formed in the early 19th century when many types of ceramic and glass artifacts dating to the Russian occupation were deposited (see chapter 7). The presence of prehistoric lithics with hydration readings greater than 1.0 microns in this stratum, however, suggests that precontact artifacts were also integrated

into this historic age deposit. This stratum was then capped by rock fill produced from the 1920s construction and rerouting of the Fort Ross Cove Road located directly above the FRBS deposits.

The FRBS Pit Feature also contains a mixture of prehistoric and historic materials. The mean hydration readings for the pit fill and floor are 2.5 (sd=1) and 2.1 (sd=.3) microns, respectively. The large standard deviation in micron readings for the pit fill suggests an extensive time span for the obsidian artifacts, dating to as early as the Middle Archaic Period (4.6 microns) and the late Upper Emergent Period (1.3 microns). The recovery of early 19th century artifacts and faunal remains, including pinnipeds associated with Native Alaskan hunting (see chapter 12), suggests that the infilling of the pit depression took place during or even after the Russian occupation. A .05 g charcoal sample recovered from the floor of the pit feature was submitted to Beta Analytical

Table 16.1 *Fort Ross Beach Site Obsidian Hydration Summary Statistics*

Source	Total	Sourced	Total Hydration		Hydration (in microns)			
	#	%	#	%	mean	sd	min	max
Annadel	43	52	40	53	2.1	.6	1.1	4.6
Borax Lake	5	6	5	7	2.3	.5	1.7	2.9
Franz Valley	2	3	2	3	2.5	0	2.5	2.6
Mt. Konocti	2	3	2	3	1.9	0	1.8	1.9
Napa Valley	29	35	25	34	2.5	.6	.9	3.7
Unknown	1	1						
Total	82		74		2.3	.6	.9	4.6

Table 16.2 *Hydration Readings for the East Profile by Source, Deposit, and Artifact Type*

	Count	%	Hydration (in microns)			
			mean	sd	min	max
Source						
Annadel	2	50	2.1	.5	1.6	2.6
Borax Lake	2	50	1.8	.1	1.7	1.9
Deposit						
Midden	1	25	1.6	0	1.6	1.6
Clay	3	75	2.1	.4	1.7	2.6
Type						
Biface Thinning Flake	2	50	1.6	0	1.6	1.6
Interior Flake	1	25	1.9	0	1.9	1.9
Secondary Cortical Flake	1	25	2.6	0	2.6	2.6

Inc. for AMS radiocarbon dating. The conventional radiocarbon age is 380 +/- 80 B.P., which, when calibrated to a calendar date, yields an age of cal A.D. 1410 to 1670 (2 sigma, 95% probability). The pit feature was probably constructed shortly before or during the Russian occupation and subsequently filled with both prehistoric and early 19th century artifacts.

WEST PROFILE

Sixteen obsidian specimens were selected from across the stratigraphic strata in the West Profile for analysis (1 from P20, 10 from P21, 1 from P26, 3 from P27, and 1 from P28). Thirteen artifacts (10 flakes, 1 shatter, 1 core fragment, and 1 projectile point fragment) produced interpretable hydration band measurements (table 16.4). The majority are identified as Napa Valley (8), a significant deviation from the predominance of Annadel obsidian found in other FRBS locations. Only two artifacts are sourced to Annadel, while the remainder are characterized geochemically as Borax Lake (1), Franz Valley (1), and Mt. Konocti (1). Obsidian artifacts were selected for analysis from the mottled brown clay (9), beach gravel (2), and yellow clay (2). Again, all of these deposits contain prehistoric lithics based on hydration readings. The mean hydration reading for the mottled brown clay is 2.2 (sd=.6) microns, while the mean hydration measurements for the beach gravel and yellow clay are 2.5 (sd=0) and 2.8 (sd=0), respectively.

The beach gravel and yellow clay appear to be

prehistoric deposits. No European/Asian remains were recovered here, and, while the sample size is quite small, all of the obsidian hydration readings are clearly prehistoric in age.

In contrast, the mottled brown clay stratum was probably formed during the Russian Period. It contains a wide assortment of diagnostic early 19th century ceramic and glass artifacts as well as a diverse range of obsidian hydration band measurements (.9 to 2.8 microns) suggesting that the chronology extends from the Lower Emergent to Historic periods. These hydration readings document that prehistoric obsidian artifacts have been deposited in the same context as European/Asian materials and at least one historic age obsidian artifact. The youngest obsidian artifact is a formal tool—a notched projectile point fragment (FRBS 6/19/89-17-L-1)—with a hydration band measurement of .9 microns. Notched projectile points are believed to be diagnostic markers of the Upper Emergent or Historic periods (see Schiff, chapter 9). Again, as in the Middle Profile, the mottled brown clay has been capped with rock fill from the construction and rerouting of the Fort Ross Cove Road in the 1920s.

SOUTHWEST BENCH

A large sample of obsidian was selected for analysis from across the stratigraphic sequence of the Southwest Bench from two units (14 from 7S, 17W and 24 from 8S, 19W). Thirty-six obsidian artifacts (31 flakes, 4 pieces of

Table 16.3 Hydration Readings for the Middle Profile by Source, Deposit, and Artifact Type

	Count	%	Hydration (in microns)			
			mean	sd	min	max
Source						
Annadel	12	75	2.3	.8	1.6	4.6
Borax Lake	1	6	2	0	2	2
Mt. Konocti	1	6	1.8	0	1.8	1.8
Napa Valley	2	13	1.8	.5	1.3	2.3
Deposit						
Midden	2	12.5	1.8	0	1.8	1.8
Midden/Clay	1	6	2.3	0	2.3	2.3
Clay	3	19	1.9	.1	1.7	2
Pit Feature Fill	8	50	2.5	1	1.3	4.6
Feature Floor Fill	2	12.5	2.1	.3	1.8	2.4
Type						
Biface	1	6	1.9	0	1.9	1.9
Biface Thinning Flake	6	37.5	2.1	.5	1.7	3.3
Edge-Modified Flake	1	6	2.4	0	2.4	2.4
Interior Flake	6	37.5	2.4	1.1	1.3	4.6
Secondary Cortical Flake	2	13	2.1	.1	2	2.3

Table 16.4 *Hydration Readings for the West Profile by Source, Deposit, and Artifact Type*

	Count	%	Hydration (in microns)			
			mean	sd	min	max
Source						
Annadel	2	15	2.2	.3	1.9	2.5
Borax Lake	1	8	2.8	0	2.8	2.8
Franz Valley	1	8	2.5	0	2.5	2.5
Mt. Konocti	1	8	1.9	0	1.9	1.9
Napa Valley	8	61	2.4	.6	.9	2.8
Deposit						
Mottled						
Brown Clay	9	70	2.2	.6	.9	2.8
Yellow Clay	2	15	2.8	0	2.8	2.8
Beach Gravel	2	15	2.5	0	2.5	2.5
Type						
Biface	3	23	2.6	.2	2.3	2.8
Thinning Flake						
Core Fragment	1	8	2.5	0	2.5	2.5
Edge-Modified						
Flake	2	15	2.2	.3	1.9	2.5
Interior Flake	3	23	2.7	.2	2.4	2.8
Projectile	1	8	.9	0	.9	.9
Secondary						
Cortical Flake	2	15	2.5	0	2.5	2.5
Shatter	1	8	1.9	0	1.9	1.9

shatter, and 1 uniface fragment) produced interpretable hydration band measurements (table 16.5). Most are sourced as Annadel (21) and Napa Valley (13) obsidians, while Franz Valley (1) and Borax Lake (1) obsidians are also present. Obsidian specimens were selected from the topsoil (1), the mottled brown clay (10), the interface between the mottled brown clay and highly mottled clay (4), the highly mottled clay (15), the interface between the highly mottled clay and the clay (2), and the underlying clay stratum (4). Significantly, all of the deposits contain prehistoric obsidian based on the hydration results. The mean hydration readings for the stratigraphic sequence range from 2.1 microns (sd=.5) for the mottled brown clay, 2.2 microns (sd=.5) for the highly mottled clay, and 2.5 microns (sd=.5) for the clay. The hydration band measurements across all strata overlap considerably, a pattern suggesting that the obsidian artifacts were not deposited in a straightforward temporal sequence from early to late prehistoric.

We interpret the chronology for the Southwest Bench as follows. The underlying clay stratum at the interface of bedrock appears to be prehistoric in age, probably deposited in the Upper Archaic and Lower Emergent periods, an interpretation based on the absence of diagnostic historical remains and the presence of obsidian hydration band widths ranging from 1.8 to 3.2 microns. The highly mottled clay appears to have been deposited over an extensive duration, primarily spanning the Lower and Upper Emergent periods given the relative paucity of

diagnostic European/Asian artifacts (as reported in chapter 7) and the dates of the obsidian hydration readings (1.5-2.9 microns). A .26 g sample of charcoal from the interface of the clay and highly mottled clay stratum (8S, 19W; level 11) was submitted to Beta Analytical Inc. for AMS dating. The conventional radiocarbon age is 2400 +/- 60 B.P. The calibrated calendar age is cal B.C. 770 to 380 (2 sigma, 95% probability), placing it in the Upper Archaic Period.

The mottled brown clay was deposited primarily during the Russian Period, an interpretation predicated primarily on the large number of early 19th century materials recovered (see chapter 7) and the extensive midden deposit containing faunal remains, many of them pinniped bones associated with maritime hunting of the Native Alaskans (see chapter 12). This stratum, however, contains little evidence of historic obsidian, as the hydration band measurements for the ten obsidian artifacts range between 1.6 and 3.2 microns. The mottled brown clay is capped by the rock fill of the 1920s construction of the Fort Ross Cove Road. The topsoil overlying the rock fill is only about seventy years old, although it contains a diverse range of prehistoric and historic artifacts that have been redeposited downslope from the Native Alaskan Village.

EAST BENCH

Six obsidian specimens were selected from the midden deposit of the East Bench (ON, 12W) for

Table 16.5 Hydration Readings for the Southwest Bench by Source, Deposit, and Artifact Type

	Count	%	Hydration (in microns)		min	max
			mean	sd		
Source						
Annadel	21	58	2.0	.4	1.5	2.7
Borax Lake	1	3	2.9	0	2.9	2.9
Franz Valley	1	3	2.6	0	2.6	2.6
Napa Valley	13	36	2.7	.5	1.5	3.6
Deposit						
Topsoil	1	3	2.7	0	2.7	2.7
Mottled Brown Clay	10	28	2.1	.5	1.6	3.2
Mottled Brown Clay/ Highly Mottled Clay	4	11	2.8	.6	1.8	3.6
Highly Mottled Clay	15	42	2.2	.5	1.5	2.9
Highly Mottled Clay/Clay	2	5	2.0	.5	1.5	2.5
Clay	4	11	2.5	.5	1.8	3.2
Type						
Biface Thinning Flake	14	39	2.4	.6	1.5	3.6
Edge-Modified Flake	8	22	2.0	.4	1.5	2.8
Interior Flake	8	22	2.3	.5	1.8	3.2
Secondary Cortical Flake	1	3	2.8	0	2.8	2.8
Shatter	4	11	2.2	.5	1.5	2.7
Uniface Fragment	1	3	1.6	0	1.6	1.6

analysis. Five obsidian artifacts (3 flakes, 1 piece of shatter, and 1 projectile point fragment) yielded interpretable results (table 16.6). The obsidian sources for the artifacts are Annadel (3) and Napa Valley (2). The obsidian specimens from the midden yield a mean hydration reading of 2.6 (sd=.9) microns. The midden stratum appears to have been deposited during the Russian Period, given the diverse assemblage of early 19th century artifacts (chapter 7) and faunal remains, including pinniped remains (chapter 12). The obsidian hydration readings suggest Upper Archaic to Upper Emergent dates, with band widths ranging from 1.1 to 3.7 microns. The youngest obsidian artifact is a fragment from a projectile point (FRBS 6/30/88-61-L-3).

CHRONOLOGY OF FRBS: SUMMARY

Our interpretation of the chronology of the Fort Ross Beach Site, based on obsidian hydration readings, AMS dates, the presence of European/Asian and temporally diagnostic lithic artifacts, and other chronological evidence follows. The clay stratum (including the highly mottled clay in the Southwest Bench) was apparently laid down in prehistoric times. The lithic artifacts associated with it date to the Upper Archaic and Lower Emergent periods, a time when prehistoric hunter-gatherers were commonly using the marine terraces near Fort Ross Cove for harvesting and processing coastal and terrestrial resources (see Lightfoot et al. 1991:109-12). Some of the materials in the clay stratum may have been redeposited by erosion and colluvial action from the marine terrace

above, while other lithic artifacts may have been discarded in or near activity areas located in the Fort Ross Cove.

The overlying midden deposits (including the mottled brown clay in the West Profile and Southwest Bench) probably formed during the Russian Period (A.D. 1812-1841). The midden deposits contain an abundance of early 19th century artifacts and dense concentrations of faunal remains associated with Native Alaskan sea mammal hunting. Furthermore, the only obsidian artifact (from unit P27) that dates to the Historic Period is found in a midden deposit.

The remainder of the stratigraphic sequence at FRBS was deposited after the Russian occupation. The overlying rock fill, a temporal horizon capping most of the FRBS deposits, dates to the construction and rerouting of the Fort Ross Cove Road in the 1920s. The thin top soil that has formed over the rock fill is only about 70 years old.

NATIVE ALASKAN VILLAGE SITE

We selected obsidian specimens for analysis from four areas of NAVS (West Central Trench, East Central Trench, South Central Test Unit, and South Trench). Within each area, we stratified the sample so that obsidian was chosen from the full range of archaeological deposits. Specimens were usually selected from the stratigraphic profiles of the two to four excavation units that contained the largest number of obsidian artifacts. When multiple specimens were available from the same provenience, we chose a sample that represented the

Table 16.6 Hydration Readings for East Bench by Source, Deposit, and Artifact Type

	Count	%	Hydration (in microns)			
			mean	sd	min	max
Source						
Annadel	3	60	2.2	.9	1.1	3.2
Napa Valley	2	40	3.2	.5	2.7	3.7
Deposit						
Midden	5	100	2.6	.9	1.1	3.7
Type						
Biface Thinning Flake	2	40	3.2	.5	2.7	3.7
Interior Flake	1	20	2.3	0	2.3	2.3
Projectile Point	1	20	1.1	0	1.1	1.1
Fragment Shatter	1	20	3.2	0	3.2	3.2

diversity of the lithic categories present.

One hundred and four obsidian specimens submitted to the Obsidian Hydration Laboratory were sourced visually, and of these, 96 exhibited hydration bands that could be measured with a high degree of accuracy. We then subjected 70 of the latter (67%) to EDXRF trace element analysis. Eighteen specimens or 26% had been misidentified by visual sourcing. Nine specimens macroscopically identified as Annadel obsidian should be Napa Valley (6) and Franz Valley (3) obsidians, while another nine artifacts visually sourced as Napa Valley obsidian have chemical signatures that are assigned as Annadel (4), Borax Lake (3), and Franz Valley (2) obsidians. Following the methodology outlined for FRBS obsidians, we classify obsidian sources by EDXRF results and only employ macroscopic identifications when no EDXRF data are available. All readings are reported as comparison constants calibrated to the Annadel flow with the exception of Franz Valley. Appendix 16.3 presents the catalog number, unit, level, visual source, chemical source, hydration reading, and comparison constant for each obsidian artifact analyzed from NAVS. The results of the EDXRF analysis are provided in appendix 16.4.

The summary statistics for the NAVS obsidian artifacts are presented in table 16.7. The primary obsidian sources are Annadel (62%) and Napa Valley (29%), followed by Franz Valley (5%) and Borax Lake (4%). The pattern of obsidian types occurring at NAVS resembles that at FRBS, although Annadel is more common and Napa Valley less frequent overall. The most significant difference is the dearth of Clear Lake obsidian sources represented at NAVS, whereas Clear Lake obsidians make up 9% of the total sourced specimens at FRBS. Borax Lake obsidians are barely present and Mt. Konocti absent at NAVS.

The results vary significantly for the 96 artifacts from which bands could be measured with precision

(designated as 'Total Hydration' in table 16.7). Franz Valley artifacts exhibit hydration readings (2.4 to 3.1 microns) that are presumably prehistoric in age. However, since a comparison constant with the Annadel flow has not yet been calibrated for Franz Valley, its chronological placement in the southern North Coast Ranges chronology is unknown. While the mean hydration measurement for Napa Valley specimens is relatively high (2.8 microns), the large standard deviation (1.1 microns) indicates a long chronology, spanning the Middle Archaic to the Historic periods (5.2 to .8 microns). Although Annadel artifacts tend to be slightly younger (\bar{x} =2.3 microns, sd =1), they display the greatest time depth, dating to the Lower Archaic Period and persevering into the Historic Period (range=6.5-.9 microns). Finally, the hydration band measurements for Borax Lake artifacts, ranging from 3.3 to 1.2 microns, also represent an extensive temporal duration, dating from the Upper Archaic Period to the late Upper Emergent Period. The chronology of NAVS deposits is outlined below for the excavation units from four areas (West Central Trench, East Central Trench, South Central Test Unit, and South Trench).

WEST CENTRAL TRENCH

Eight specimens were selected for analysis from the West Central Trench (4 from 75S, 16W and 4 from 75S, 20W). All eight artifacts (7 flakes, 1 projectile point) yielded interpretable hydration band measurements (table 16.8). Annadel obsidian (6) is the most common, followed by Napa Valley obsidian (2). The sample includes obsidian specimens from the interface of the topsoil and dark sandy loam (2), the dark sandy loam (3), and the interface of the dark sandy loam and clay (3). The mean hydration band measurements for the three deposits are 1.7 (sd =.8), 3.7 (sd =1.1), and 2.0 (sd =.1) microns, respectively.

No cultural remains were recovered in the clay

Table 16.7 Native Alaskan Village Site Obsidian Hydration Summary

Source	Total Sourced		Total Hydration		Hydration (in microns)			
	#	%	#	%	mean	sd	min	max
Annadel	65	62	60	63	2.3	1.0	.9	6.5
Borax Lake	4	4	4	4	2.2	.9	1.2	3.3
Franz Valley	5	5	5	5	2.7	.2	2.4	3.1
Napa Valley	30	29	27	28	2.8	1.1	.8	5.2
Total	104	100	96	100	2.4	1.1	.8	6.5

stratum. The clay substratum appears to predate the construction of Colony Ross and possibly human occupation of the Fort Ross Region.

The obsidian specimens recovered at the interface of the clay and dark sandy loam are all prehistoric in age (1.9 to 2.1 microns), dating to the Lower Emergent Period. The dark sandy loam contains a diverse assemblage of early 19th century ceramic and glass artifacts, as well as nails and one spike (see chapter 7). Nonetheless, the obsidians analyzed from this stratum, clearly prehistoric in age (2.5-5.1 microns), date to the Middle Archaic, Upper Archaic, and Lower Emergent periods. Similar to many of the FRBS deposits, both historic and prehistoric materials occur in the dark sandy loam. The deposits at the interface of the clay and dark sandy loam may have formed initially in late prehistoric times when hunter-gatherers first began to use the marine terrace. Some of the dark sandy loam probably built up during the occupation of NAVS.

Given the relative lack of early 19th century materials recovered in the topsoil, this stratum probably was formed in post-Ross times (see chapter 7). Interestingly, the only obsidian artifact of historic age based on hydration readings is a notched projectile point (NAVS 7/

31/91-6-L-4) with a hydration band measurement of .9 microns recovered at the interface of the top soil and dark sandy loam.

EAST CENTRAL TRENCH

Twenty obsidian specimens were selected from the stratigraphic profiles of three units in the East Central Trench, including 7 from 75S, 0E; seven from 75S, 1E; and six from 75S, 3E. All of the obsidian artifacts (16 flakes, 2 pieces of shatter, 1 projectile point, and 1 other) submitted for hydration analysis produced interpretable results (table 16.9). Annadel obsidian (13) is the most common, followed by Napa Valley (5), Franz Valley (1), and Borax Lake (1) obsidians. The sample includes specimens selected from the topsoil (2), the interface of the topsoil and dark sandy loam (1), the dark sandy loam (7), the interface of the dark sandy loam and pit fill (1), the pit fill (4), the interface of the pit fill and mottled fill/silty loam (3), the interface of the silty loam and clay (1), and the clay (1). While prehistoric obsidian materials are well represented in all strata, only the dark sandy loam contains historic obsidian artifacts with hydration readings of 1.0 micron or less (n=3).

We interpret the chronology of the East Central

Table 16.8 Hydration Readings for the West Central Trench by Source, Deposit, and Artifact Type

Source	Count		Hydration (in microns)			
		%	mean	sd	min	max
Annadel	6	75	2.4	1.3	.9	5.1
Napa Valley	2	25	2.9	.4	2.5	3.4
Deposit						
Topsoil/Dark						
Sandy Loam	2	26	1.7	.8	.9	2.5
Dark Sandy Loam	3	37	3.7	1.1	2.5	5.1
Dark Sandy						
Loam/Clay	3	37	2.0	.1	1.9	2.1
Type						
Edge-Modified						
Flake	1	12	3.4	0	3.4	3.4
Interior Flake	6	76	2.7	1.1	1.9	5.1
Projectile Point	1	12	.9	0	.9	.9

Trench as follows. The underlying clay stratum appears to predate the Ross Colony since it contains no diagnostic European/Asian artifacts. We did uncover one obsidian flake (3.3 microns) and some fragments of mollusk remains in the bottom level of 75S, 3E (level 8) below the floor of the pit structure. The excavators noted, however, that artifacts were found only in disturbed contexts where there was clear evidence of bioturbation from rodents. We believe that the underlying clay substratum is sterile and predates any human occupation of the marine terrace.

The specific construction date of the East Central Pit Feature is not known. We believe it could be a modified semi-subterranean house structure built by NAVS workers (chapter 17). As detailed in the next chapter, the cultural remains unearthed on the floor of the structure are consistent with an early 19th century assemblage. They include 2 bottle glass sherds, 2 window glass fragments, 1 worked glass artifact, 1 glass bead, 1 ceramic sherd, 4 nails, 1 spike, 1 worked bone flake, and some faunal remains. The fill of the pit (including the pit fill, mottled fill, and silty loam strata) contains a diverse

range of historic materials as detailed in chapter 7. The predominance of handpainted blue, handpainted polychrome, transferprint blue, and undecorated forms of refined earthenwares suggest an 1820s or 1830s date. The obsidian artifacts associated with this early 19th century assemblage date primarily to the Lower Emergent and Upper Emergent periods. The mean hydration reading of nine obsidian specimens from the fill of the East Central Pit Feature is 2.0 (sd=.7) microns. Two of the artifacts [an interior flake and notched projectile point (NAVS 8/9/91-38-L-1)] exhibit hydration bands readings of only 1.1 to 1.2 microns, however.

The East Central Bone Bed was formed after the pit feature was filled. Nonetheless, as noted in chapter 7, the ceramics recovered in the bone bed, primarily handpainted blue and transferprinted blue refined earthenwares, also date to the 1820s or 1830s. A notched projectile point may date to either the Upper Emergent or Historic periods. The evidence does not suggest that the bone bed is significantly younger than the underlying pit fill because similar types of diagnostic ceramics and projectile points are found in both deposits. Obsidian

Table 16.9 *Hydration Readings for the East Central Trench by Source, Deposit, Feature, and Artifact Type*

	Count	%	Hydration (in microns)			
			mean	sd	min	max
Source						
Annadel	13	65	1.6	.5	1.0	2.4
Borax Lake	1	5	3.3	0	3.3	3.3
Franz Valley	1	5	2.6	0	2.6	2.6
Napa Valley	5	25	2.7	1.6	.8	5.2
Deposit						
Topsoil	2	10	2.6	.4	2.2	3.1
Topsoil/Dark						
Sandy Loam	1	5	3.3	0	3.3	3.3
Dark Sandy Loam	7	35	1.9	1.4	.8	5.2
Dark Sandy						
Loam/Pit Fill	1	5	1.2	0	1.2	1.2
Pit Fill	4	20	1.6	.6	1.1	2.6
Pit Fill/Mottled						
Fill	2	10	1.9	.3	1.6	2.2
Pit Fill/Silty Loam	1	5	1.5	0	1.5	1.5
Silty Loam/Clay	1	5	2.4	0	2.4	2.4
Clay	1	5	3.3	0	3.3	3.3
Feature						
Bone Bed Level 1	3	25	2.5	1.9	1.0	5.2
Bone Bed Level 2	0	0				
Pit Feature	9	75	2.0	.7	1.1	3.3
Type						
Edge-Modified Flake	3	15	2.1	.4	1.6	2.6
Interior Flakes	11	55	1.8	1.2	.8	5.2
Other	1	5	2.2	0	2.2	2.2
Projectile Point	1	5	1.2	0	1.2	1.2
Secondary Cortical Flake	2	10	2.4	.8	1.6	3.3
Shatter	2	10	2.8	.4	2.4	3.3

artifacts of both historic and prehistoric age, based on hydration readings, are directly associated with this early 19th century artifact assemblage. The three interior flakes from level 1 of the bone bed yield hydration bands of 1.0, 1.2, and 5.2 microns.

The bone bed is a discrete cultural deposit situated in the lowest level of the dark sandy loam stratum. The dark sandy loam is situated above the fill deposits of the East Central Pit Feature, suggesting that this deposit was laid down after the construction, use and abandonment of the pit feature. It contains a diverse range of early 19th century artifacts (see chapter 7) and obsidian artifacts dating to both prehistoric and historic periods. It was probably formed during the occupation of NAVS in the 1820s and 1830s.

The development of top soil probably occurred after the abandonment of NAVS. Although it contains early 19th century ceramic and glass artifacts, only prehistoric obsidian artifacts have been identified from this stratum.

SOUTH CENTRAL TEST UNIT

Nine obsidian artifacts (8 flakes and 1 piece of shatter) submitted to the Obsidian Hydration Laboratory from the South Central Test Unit (110S, 11W) yielded interpretable results (table 16.10). The artifacts are manufactured from Napa Valley (5), Annadel (3), and Franz Valley (1) obsidians. We selected specimens for analysis from the entire stratigraphic sequence of 110S, 11W—the topsoil (1), the interface of the topsoil and dark sandy loam (2), the dark sandy loam (2), the rock rubble (1), the interface of the rock rubble and the clay (2), and the clay (1). With the exception of the topsoil, all of the obsidian analyzed from the deposits are prehistoric in age, dating almost exclusively to the Upper Archaic and Lower Emergent periods.

The age of the clay substratum is somewhat ambiguous. We recovered three lithic artifacts (1 obsidian and 2 chert), one ceramic sherd, one glass fragment, and several fragments of mollusks from this stratum. The obsidian artifact has a hydration band measurement of 2.9 microns. The excavators noted, however that artifacts were found only in discolored areas disturbed by rodent bioturbation. We believe that the cultural remains were introduced into the clay stratum at a much later date and that the marine terrace clay predates human occupation of the marine terrace.

The overlying rock rubble appears to be associated with a local construction episode of the Native Alaskan Village when the settlement's landscape was modified and possibly leveled along the cliff edge. The rock rubble contains a moderate density of early 19th century materials, including ceramic, glass, and metal artifacts (chapter 7).

The dark sandy loam that rests on the rock rubble also appears to be associated with the occupation of the

Native Alaskan Village. It contains a high density of early 19th century materials as well as a diverse assemblage of faunal remains, including pinniped remains probably resulting from Native Alaskan sea mammal hunting (see chapters 7, 12). It seems somewhat contradictory that none of the obsidian analyzed from the rock rubble or dark sandy loam dates to the Historic Period. This paradox may relate to the small sample of obsidian analyzed or to other mitigating factors detailed below.

The topsoil was probably deposited after the abandonment of the Native Alaskan Village. It contains the only obsidian of historic age (.8 micron) analyzed from the South Central Test Unit.

SOUTH TRENCH

A total of 59 obsidian artifacts (47 flakes, 1 core fragment, 1 biface, 1 uniface, 4 projectile points and fragments, and 5 pieces of shatter) were analyzed from the South Trench (table 16.11). The majority are identified as Annadel (38), followed by Napa Valley (15), Borax Lake (3), and Franz Valley (3). Specimens were carefully selected to provide adequate sampling of the stratigraphic profiles of the South Trench, the South Bone Bed, and the South Pit Feature. The sample includes materials from five units, including 125S, 24W (14); 125S, 23W (17); 125S, 22W (17); 125S, 21W (2); and 125S, 18W (9). Obsidian was available from all but the clay stratum (see table 16.11). Hydration band measurements for obsidian recovered in most deposits date to the Upper Emergent, Lower Emergent, and Upper Archaic periods—the topsoil (1.5-3.1 microns), topsoil/dark sandy loam (1.2-2.7 microns), dark sandy loam/mottled dark sandy loam (2.3-3.0 microns), dark sandy loam/pit fill/mottled dark sandy loam (1.8-2.3 microns), dark sandy loam/clay (2.7-3.7 microns), and pit fill/clay (1.7-2.0 microns). The mottled dark sandy loam/clay (1.7-5.2 microns) and dark sandy loam (1.1-6.5 microns) also contain similarly aged obsidian, but some specimens date back as early as the Lower and Middle Archaic periods. Only the dark sandy loam/pit fill (.8-2.5 microns) includes historic age obsidian.

We interpret the chronology of the South Trench as follows. The clay substratum contains no cultural materials and was probably formed before human occupation took place on the marine terrace. The pit feature was excavated directly into the clay substratum. A ridge of mottled dark sandy loam sediments, which can be observed in the profile of 125S, 19W (see figure 3.36), appears to be a berm running along the edge of the feature where sediments dug from the interior of the pit were piled by its builders. Significantly, the berm sits directly on the clay horizon, suggesting that either little soil build-up had taken place or that the extant soils were removed in preparation for digging the pit feature.

The precise construction date of the South Pit

Table 16.10 *Hydration Readings for the South Central Test Unit by Source, Deposit, and Artifact Type*

	Count	%	Hydration (in microns)			
			mean	sd	min	max
Source						
Annadel	3	33	2.7	.4	2.3	3.3
Franz Valley	1	11	2.4	0	2.4	2.4
Napa Valley	5	56	2.6	.9	.8	3.4
Deposit						
Topsoil	1	11	.8	0	.8	.8
Topsoil/Dark						
Sandy Loam	2	22	3.0	.2	2.8	3.3
Dark Sandy Loam	2	22	2.3	.1	2.3	2.4
Rock Rubble	1	11	2.9	0	2.9	2.9
Rocky Rubble/Clay	2	22	2.9	.5	2.4	3.4
Clay	1	11	2.9	0	2.9	2.9
Type						
Edge-Modified Flake	1	11	3.3	0	3.3	3.3
Interior Flake	7	78	2.5	.8	.8	3.4
Shatter	1	11	2.4	0	2.4	2.4

Table 16.11 *Hydration Readings for the South Trench by Source, Deposit, Cultural Feature, and Artifact Type*

	Count	%	Hydration (in microns)			
			mean	sd	min	max
Source						
Annadel	38	64	2.5	1.1	1.1	6.5
Borax Lake	3	5	1.9	.7	1.2	2.9
Franz Valley	3	5	2.8	.2	2.5	3.1
Napa Valley	15	26	2.9	1.1	.8	4.2
Deposit						
Topsoil	3	5	2.2	.7	1.5	3.1
Topsoil/Dark						
Sandy Loam	5	8	2.0	.5	1.2	2.7
Dark Sandy Loam	33	57	2.8	1.1	1.1	6.5
Dark Sandy Loam/Mottled						
Dark Sandy Loam	2	3	2.6	.3	2.3	3.0
Dark Sandy Loam/Pit Fill	2	3	1.6	.8	.8	2.5
Dark Sandy Loam/Pit						
Fill/Mottled Dark Sandy Loam	3	5	2.1	.2	1.8	2.3
Mottled Dark Sandy Loam/Clay	6	11	2.5	1.3	1.7	5.2
Dark Sandy Loam/Clay	2	3	3.2	.5	2.7	3.7
Pit Fill/Clay	3	5	1.8	.1	1.7	2.0
Cultural Feature						
Bone Bed Level 1	5	14	2.2	.6	1.4	3.2
Bone Bed Level 2	6	16	3.3	1.9	1.1	6.5
Bone Bed Level 3	7	19	2.7	.9	1.7	4.1
Bone Bed Level 4	3	8	2.7	.1	2.6	2.8
Pit Feature	16	43	2.2	.9	.8	5.2
Type						
Biface Fragment	1	2	2.6	0	2.6	2.6
Core Fragment	1	2	5.2	0	5.2	5.2
Edge-Modified Flake	5	8	2.2	.4	1.7	2.7
Interior Flake	42	71	2.7	1.1	.8	6.5
Projectile Point	1	2	1.5	0	1.5	1.5
Projectile Point						
Fragment	3	5	1.1	.1	1.1	1.2
Shatter	5	8	2.1	.3	1.8	2.5
Uniface Fragment	1	2	1.7	0	1.7	1.7

Feature is not known. We believe this pit feature was a shallow, semi-subterranean structure constructed during the early occupation of the Native Alaskan Village (see chapter 17). The fill deposits of the South Pit Feature include mottled dark sandy loam and pit fill strata, along with their various interfaces with adjacent strata (figure 3.36). The ceramics identified from these deposits, including handpainted blue, transferprint blue, one transferprint black, and undecorated forms of refined earthenwares, date primarily to the 1820s and 1830s (see chapter 7). Similar to the East Central Pit Feature, obsidian hydration dates indicate that both prehistoric and historic lithic remains were deposited into the South Pit Feature. The hydration band readings (.8 to 5.2 microns) for the 16 artifacts analyzed from the fill deposits suggest a long chronology, spanning from the Middle Archaic to Historic periods.

The bone bed in the South Trench—which caps the fill deposits of the pit feature—was also created during the occupation of the Native Alaskan Village, probably shortly after the pit feature was filled and leveled with rock rubble and sediments. Similar to the East Central Bone Bed, the ceramics from the South Bone Bed are primarily handpainted blue and transferprint blue refined earthenware. There is no evidence that the bone bed is significantly younger than the floor and fill deposits of the underlying pit feature.

Prehistoric obsidian artifacts are found in all four levels of the South Bone Bed. The hydration band measurements for five obsidian specimens in level 1 (1.4–3.2 microns) date from the Upper Archaic, Lower Emergent, and Upper Emergent periods. The six artifacts from level 2 produce a wide range of hydration measurements (1.1 to 6.5 microns), extending from the Lower Archaic to Upper Emergent periods. The hydration rims for seven artifacts in level 3 (1.7–4.1 microns) suggest a long chronology spanning the Middle Archaic to Lower Emergent periods, while the three specimens in level 4 (2.6–2.8) indicate a Lower Emergent age.

The South Bone Bed is a discrete cultural deposit situated at the base of the dark sandy loam. The bone bed was laid down after abandonment of the pit feature and its subsequent infilling. The dark sandy loam is probably associated with the later occupation of the Native Alaskan Village. Its diverse range of early 19th century artifacts and pinniped remains supports this interpretation (see chapter 7, 12). The obsidian artifacts recovered from this stratum date from the Early Archaic to the Upper Emergent periods. Two notched projectile points (NAVS 8/6/91-37-L-1 and NAVS 8/5/91-17-L-1) of late Upper Emergent age were recovered from the dark sandy loam or its interface with the topsoil. The hydration band measurements for the Annadel and Borax Lake obsidian points are 1.1 and 1.2 microns, respectively.

The topsoil has formed in the 150 years since the

Native Alaskan Village was abandoned. It contains a diverse assemblage of historic age ceramics, glass, and metal artifacts as well as prehistoric obsidian remains.

CHRONOLOGY OF NAVS: SUMMARY

Our interpretation of the chronology of NAVS is based on 96 obsidian hydration readings, the presence of diagnostic European/Asian artifacts, and projectile point types as well as other lines of chronological evidence. We believe that the clay substratum resting directly on the marine sedimentary bedrock is sterile and was formed prior to any human occupation of the marine terrace. The handful of artifacts and faunal remains in the clay stratum were recovered in discolored contexts disturbed by rodent bioturbation. NAVS clay differs from that of FRBS in which the clay horizon, as well as the beach gravels and yellow clay deposits, contain prehistoric materials in undisturbed contexts. We suggest that some components of the colluvial toe at FRBS were laid down over the last 8000 to 6000 years, while the clay horizon on the marine terrace at NAVS was formed many years prior to that time.

The East Central and South pit features were excavated into the underlying clay substratum sometime between 1812 and the 1820s or 1830s. In the profile of the South Trench (figure 3.36), it appears that either minimal soil development had taken place on top of the marine sedimentary clay when the South Pit Feature was constructed or that the native builders removed the original sediments. Outside this pit feature, as illustrated in the profiles of units 125S, 19W and 125S, 18W, the clay is located only 30 to 40 cm below ground surface. As discussed more fully in chapter 3, the East Central Pit Feature, in contrast, appears to have been excavated into a yellow-brown sandy loam and yellow-brown silty loam as well as the underlying clay stratum (see figure 3.22). There is evidence of sediment build-up over the clay stratum in the East Central Area prior to the occupation of the Native Alaskan Village. Here the clay stratum is located about 70 cm below present day ground surface outside the pit feature. The yellow-brown sediments may represent the original land surface associated with the use of the marine terrace by prehistoric hunter-gatherers. A similar observation was made during the excavation of the east wall of the Russian Stockade where prehistoric lithic remains, unearched to a depth of 70 cm or more below surface, were found in sandy clay deposits sandwiched between the dark sandy loam and the yellow clay substratum (see Purser et al. 1990).

Sometime during the 1820s or 1830s the pit features were abandoned and the NAVS residents filled them with sediments, artifacts, and in the case of the South Pit Feature, with tons of rock rubble. We believe that the local denizens were intentionally leveling the entire landscape of the East Central and South excavation areas

to the height of the current ground surface. Shortly after leveling these areas, the East Central Bone Bed, the South Bone Bed, and the Abalone Dump were deposited directly on the fill deposits. The South Bone Bed and East Central Bone Bed were deposited on fill in the boundaries of the old pit structures. The historic artifacts in the bone beds are not significantly younger than the cultural materials found in the underlying fill deposits of the pit features.

The rock rubble stratum in the South Central Test Unit is also suggestive of intentional dumping by NAVS residents, possibly to raise the ground level and smooth its surface. Further fieldwork is necessary to evaluate the scope of the landscape modification in this area. The rock rubble layer contains early 19th century artifacts and faunal remains.

The overlying dark sandy loam deposits probably date to the later occupation of the Native Alaskan Village. They contain diverse assemblages of early 19th century material culture, including ceramic sherds, glass fragments, metal artifacts, faunal remains, and some obsidian artifacts. The dark sandy loam deposits in the East Central Trench, South Central Test Unit, and South Trench sit on cultural features or rock rubble that date prior to the 1830s. In areas outside the cultural features or fill deposits, the lower levels of the dark sandy loam, and especially its interface with the clay substratum, may date to the prehistoric use of the marine terrace. This interpretation would certainly account for the co-occurrence of prehistoric and historic obsidian artifacts in the dark sandy loam deposits. The topsoil appears to have formed after the abandonment of NAVS.

THE CHRONOLOGICAL RELATIONSHIP OF THE LITHIC ASSEMBLAGES

We now consider the chronological relationship of the FRBS and NAVS lithic assemblages. Were they associated primarily with the residents of the Native Alaskan Village and/or with earlier prehistoric hunter-gatherers who created the large lithic scatter on the marine terrace? Two findings of the obsidian hydration study are especially pertinent to this question.

First, the majority of the obsidian artifacts are prehistoric in age. Only one of the 76 (1%) obsidian artifacts at FRBS and six of the 96 (6%) obsidian artifacts at NAVS with interpretable hydration bands are identified as historic in age (band measurements less than or equal to 1.0 microns).

Second, historic obsidians and early 19th century ceramic, glass and metal materials commonly co-occur with prehistoric obsidian artifacts in historic age deposits in the Native Alaskan Neighborhood. This finding indicates that the historic materials associated with the residents of the Native Alaskan Village are not segre-

gated, either stratigraphically or spatially, from the lithic tools of earlier prehistoric hunter-gatherers. Since most of the obsidian artifacts are prehistoric in age and found in historic deposits, this raises the distinct possibility that many of the FRBS and NAVS deposits are highly disturbed or were formed in secondary contexts. Furthermore, there is a high probability that much of the non-obsidian chipped stone and ground stone artifacts described in chapter 9 are also prehistoric in age. If this is the case, then we may greatly exaggerate the degree of continuity with traditional Native Californian lifeways or the adoption of these tools by Native Alaskans if they are included in our analysis of the material culture of the Neighborhood.

We consider four possible explanations for the co-occurrence of prehistoric and historic obsidian artifacts in historic age deposits: problems with dating historic age obsidian artifacts, gopher bioturbation, formation processes of historic age deposits, and the recycling of prehistoric lithic artifacts by Ross residents.

1) Problems with Dating Historic Age Obsidian Artifacts. It is possible that historic artifacts from some obsidian sources in northern California do not exhibit detectable hydration bands. Origer (1990:70) notes that the Obsidian Hydration Laboratory at Sonoma State University has analyzed more than 10,000 obsidian artifacts, "yet only a handful of specimens (a few dozen) have hydration bands measuring less than one micron." In addressing why thin hydration bands are rarely encountered in archaeological samples, Origer undertook his innovative study of Ishi's obsidian flakes and debitage kept in the Phoebe Hearst Museum of Anthropology at U.C. Berkeley since 1915. He demonstrates that recent artifacts (less than 100 years old) from Napa Valley, Mt. Konocti, and Borax Lake obsidians produce measurable and detectable hydration bands of less than 1.0 micron and concludes that the "paucity of artifacts from archaeological sites with hydration bands measuring less than 1.0 probably is a function of the relative lack of archaeological investigation of recent historic-era Native American sites, or at least a lack of samples from such sites submitted for hydration dating" (1990:76).

It is also possible that historic artifacts from some obsidian sources in northern California are characterized by hydration bands thicker than 1.0 micron. The hydration rate of certain obsidians in the Fort Ross Region may be more rapid in the last two centuries than expected in the southern North Coast Ranges chronology. Some of the obsidian artifacts from Fort Ross with comparison constants (calibrated to the Annadel flow) of 1.3 to 1.0 microns may be historic in age. However, even if this were the case, it would not alter the major finding of the obsidian hydration study—that most of the obsidian artifacts are prehistoric in age. It would only increase the number of "historic" obsidian artifacts to 3 (4%) at FRBS

and 12 (13%) at NAVS. The vast majority still date solidly to prehistoric times with hydration readings greater than 1.5 microns. Clearly, other reasons need to be considered for the incongruous proportion of historic and prehistoric age obsidians in historic deposits at Fort Ross.

2) Rodent Bioturbation. The most common explanation for the co-occurrence of prehistoric and historic materials at Fort Ross is that the deposits are disturbed, most likely from rodent action. There is little doubt that rodents are responsible for transporting artifacts and faunal remains into new contexts and for creating "mixed" deposits. The recovery of artifacts in the clay stratum at NAVS is a good example. Rodent bioturbation may also explain why no neat relationship exists between vertical stratification and age of obsidian artifacts in most deposits.

Nonetheless, we believe that rodents alone can not account for the transportation of large numbers of prehistoric obsidian artifacts into historic deposits. The ratio of historic to prehistoric obsidian artifacts in NAVS units is 1 in 8 (12%) for the West Central Trench, 3 in 20 (15%) for the East Central Trench, 1 in 9 (11%) for the South Central Test Unit, and 1 in 59 (2%) in the South Trench. These figures indicate that an unbelievably large number of prehistoric artifacts would have been transported into historic age deposits by rodents.

That rodent bioturbation is responsible for the "mixing" together of prehistoric and historic remains is especially troublesome for the cultural features. In the East Central Trench, none of the 9 (0%) obsidian artifacts in the fill deposits of the pit feature and one of three (33%) obsidian specimens in level 1 of the bone bed are historic in age. In the South Trench, one of the sixteen obsidian (6%) specimens in the fill deposits of the pit feature and none of the twenty-one (0%) obsidian artifacts for the four levels of the bone bed are historic in age. We stress that the presence of obsidian artifacts of different ages in the bone beds can not be explained simply as the result of rodent activity. The presence of whole abalone shells, clam shells, sea urchin spines, and articulated fish vertebrae indicates that the deposits have been protected from trampling and rodent bioturbation both during and after deposition. As outlined in chapter 3, the spatial integrity of the deposits may have been maintained by the high density of fire-cracked rocks and milling stones creating a firm surface that discouraged rodent penetration. This is especially true of the rock rubble underlying the South Bone Bed and the Abalone Dump creating a virtually impervious barrier to rodents. It is difficult to rationalize the presence of prehistoric obsidian in these deposits as a consequence of rodent disturbance. For example, the oldest dated obsidian artifact at NAVS is an interior flake (Annadel, NAVS 8/15/91-206-L-1) with a hydration reading of 6.5 microns.

Recovered during laboratory processing and cleaning, it was deeply embedded inside a whole abalone shell in level 2 of the South Bone Bed.

3) Formation Processes of Historic Deposits.

Another important factor to consider is the formation of historic deposits and how prehistoric artifacts may be present as background constituents in these sediments. The colluvial toe of FRBS may represent an artifact trap in which cultural remains have been redeposited downslope from the adjacent marine terrace due to erosional and colluvial transportation. FRBS deposits at the foot of the marine terrace may include artifacts that have been carried downhill from the prehistoric lithic scatter on the marine terrace, as well as historic refuse dumped over the terrace side by people living in the Native Alaskan Village. In addition, some of the historic materials may have been used and discarded directly into FRBS deposits by Ross workers undertaking various processing and industrial activities in the Fort Ross Cove.

It is not surprising that landscape modifications and construction activities at NAVS would produce sediments containing prehistoric remains. For example, the pit features at NAVS were excavated into extant sediments that may have contained artifacts from the prehistoric lithic scatter on the marine terrace. These sediments may have been discarded outside the structures or used in the construction of structural berms or even as roofing material. In the 1820s or 1830s, when the East Central and South pit features were abandoned and their depressions filled to the level of the surrounding ground surface, some of these same sediments containing prehistoric remains may have been dumped back into the open depressions along with early 19th century garbage, including a few historic obsidian objects. This scenario may help to explain the high ratio of prehistoric to historic obsidian objects recovered in some fill deposits, such as from the South Pit Feature.

We argue, however, that the co-occurrence of historic and prehistoric artifacts in the bone bed deposits can not be wholly explained by the presence of prehistoric materials as background constituents in NAVS sediments. As detailed in chapters 3 and 17, the East Central Bone Bed, South Bone Bed, and the Abalone Dump appear to be intact deposits where NAVS residents discarded domestic garbage into small refuse dumps, probably not far from the households that produced the trash. If our interpretation of the bone bed deposits is correct, then we expect that few prehistoric remains would be inadvertently discarded in domestic dumps used by NAVS residents. That is, in contrast to the archaeological deposits created during NAVS construction projects and landform alterations, we expect that house sweeping and the cleaning of nearby activity areas, with the intentional discard of these materials in refuse dumps, would result in few prehistoric remains, unless they were being used

and discarded purposely by NAVS residents.

4) The Scavenging and Recycling of Prehistoric Artifacts by Ross Residents. Recent obsidian studies caution that native peoples sometimes scavenged raw materials and tools left behind by earlier occupants, especially if access to obsidian sources (either through trade or direct procurement) became restricted or curtailed (Goldberg and Skinner 1990; Hull et al. 1995; Jackson 1984; Skinner 1986, 1988). Skinner's (1988) research in the central and south-central Sierra Nevada mountains and foothills suggests that cores, and large dart points, bifaces, flakes, and knives from earlier prehistoric contexts were being reworked by later peoples into smaller arrow points and useable flakes. She further notes that bipolar reduction methods were probably employed to rework old bifaces into suitable tools.

We maintain that some residents in the Native Alaskan Neighborhood were selectively scavenging prehistoric artifacts from the greater Ross Region, and that the recovery of these materials in historic deposits may be a consequence of their recycling in early 19th century contexts more than the result of mixing or secondary deposition. In this scenario, lithics manufactured and used by prehistoric hunter-gatherers were later picked up and reused by NAVS residents in carrying out various domestic and processing activities. It is also possible that some formal obsidian tools dating to the late Upper Emergent were curated by local Kashaya Pomo families and reused in the Native Alaskan Village and in the Fort Ross Cove.

There is very limited evidence of historic obsidian knapping in the Native Alaskan Neighborhood. The historic age obsidian artifacts (less than or equal to 1.0 micron) include a notched projectile point from FRBS, 1 projectile point from NAVS, and 5 interior flakes. The paucity of historic debitage suggests that the production of these projectile points probably did not take place at NAVS or FRBS or that the locations where lithic production remains were discarded have not yet been excavated. Other obsidian artifacts that are late prehistoric or protohistoric in age (or even possibly historic) with hydration bands between 1.0 to 1.3 microns are also projectile points or interior flakes. They include another notched projectile point from FRBS, 4 notched or broken projectile points from NAVS, and 7 interior flakes. These data suggest that Neighborhood peoples were highly selective in the kinds of obsidian artifacts that their Native Californian kin and friends probably obtained for them either through exchange or recycling. However, the majority of the obsidian lithic assemblage found at NAVS and FRBS appear to be prehistoric flakes picked up from nearby lithic scatters for expedient reuse by Village residents. We are hard pressed to explain the presence of prehistoric obsidian flakes in the bone bed deposits in any other way.

Skinner (1988) details a research design for evaluating scavenging in obsidian assemblages that involves the cutting of multiple thin sections from selected areas of individual artifacts. The thin sections would measure hydration rims from reworked edges, fractures, detachment scars, and on the flake scars of original manufacture. This research design is now being applied in some areas of California (e.g., Hull et al. 1995). Since our original obsidian hydration analysis was not designed to evaluate scavenging, we are in the process of implementing such a study on the obsidian artifacts from the bone bed deposits.

The scavenging and recycling of prehistoric artifacts at Ross may have been stimulated by several factors. First, difficulties in procuring obsidian in the early 19th century may have increased, an observation supported by the very low ratio of historic to prehistoric obsidian at both NAVS and FRBS. This observation was first made by Farris (1989:492) who noted that Spanish/Mexican colonization of the North Bay area, including the founding of Mission San Francisco Solano at Sonoma and nearby ranchos, may have interrupted the flow of obsidian to the Kashaya Pomo. In our analysis of the survey sites in the Fort Ross Region, we suggest that access to Annadel obsidian became restricted in historic times, while an exchange link continued to allow Napa Valley obsidian to reach Fort Ross (Lightfoot et al. 1991:116). At FRBS and NAVS there is slightly more Napa Valley obsidian (n=4) that is historic in age (1.0 or less micron) than Annadel (n=3). More importantly, the number of historic obsidian artifacts is so few as to indicate that minimal exchange or direct procurement was taking place between either obsidian source and the Neighborhood.

Second, during the Historic Period, glass may have become a preferred or more readily accessible raw material for the manufacture of chipped stone tools. Considerable evidence indicates that residents at NAVS and the Metini site located north of the Russian Stockade were recycling bottle glass and window glass, possibly from Russian dumps, and producing formal tools and expedient flake tools from them (see chapters 6, 7; Ballard 1995). The recycling of glass artifacts into flakes and notched projectile points at Ross suggests that obsidian was possibly being replaced as the primary raw material for chipped stone tool manufacture. This shift to glass as an acceptable substitute for obsidian was probably accelerated by the disruption of obsidian exchange networks in the early 19th century.

The third reason for the paucity of historic age obsidian artifacts and scavenging of prehistoric lithics may relate to ethnic and gender composition of NAVS households. The Alutiiq men, a major segment of the Native Alaskan Neighborhood, had little prior experience with obsidian on Kodiak Island, and chipped stone tools

made up a small proportion of their traditional lithic assemblage. As described in chapters 10 and 17, ground slate artifacts comprised the majority of their lithic tradition. The production and use of obsidian artifacts would have been associated with Native Californian identities at Ross. The paucity of debitage and historic age tools suggests that Native Alaskan people did not actively embrace obsidian as part of their cultural repertoire at Ross.

The primary users of the historic age obsidian tools and recycled prehistoric artifacts were probably the Pomo and Miwok women at Ross. Some of the traditional uses of obsidian artifacts in various processing and domestic activities possibly were replaced by other raw materials (i.e., glass) and new tool types (metal knives). It is also possible that the relative scarcity of Native Californian men in the Native Alaskan Neighborhood, according to the Kuskov censuses in 1820-1821, may have affected the procurement of obsidian and the use of some artifact forms. If Kashaya Pomo men differentially participated in such activities as inter-group exchange and hunting large terrestrial mammals, as suggested in some ethnohistoric accounts and ethnographies (see Lightfoot et al. 1991:125-40), then their absenteeism may have exacerbated problems already evident in the procurement of obsidian through long distance exchange and limited the production of some tool types, such as projectile points for bow and arrow hunting. Native Californian women may have been increasingly compelled to recycle artifacts from nearby prehistoric sites if they could not count on their own kin ties and social networks to provide them with a sufficient quantity of obsidian raw material or finished obsidian artifacts. We believe many of the recycled prehistoric obsidian flakes were used expediently in various domestic and subsistence-related chores performed by the Native Californian women in interethnic households at NAVS.

In conclusion, there is good reason to be cautious about including the lithic assemblages from FRBS and NAVS in the study of culture change and continuity of village residents at Fort Ross. Most of the obsidian artifacts date to the Archaic and Emergent periods, and a strong possibility exists that much of the non-obsidian lithic materials also may be prehistoric in age. The co-occurrence of prehistoric and historic obsidian artifacts in historic age deposits may be a consequence of rodent bioturbation and the formation of historic deposits that include prehistoric materials as background constituents. The latter may have resulted from downslope colluvial and erosional transportation at FRBS or early 19th century landscape modifications of prehistoric lithic scatters at NAVS. We recognize that the indiscriminate inclusion of prehistoric lithics from disturbed or secondary contexts in our analysis would certainly overstate the degree of continuity with traditional Native Californian

cultural practices and/or the adoption of such practices by Native Alaskan residents.

On the other hand, we can not assume that archaeological deposits containing both prehistoric and historic remains are necessarily disturbed or mixed. It is possible that some Ross residents (Native Californian women) were selectively reusing prehistoric artifacts in historic contexts. Consequently, the formation processes of each deposit must be evaluated on a case-by-case basis. In some cases the association of historic and prehistoric remains may be fortuitous, while in other cases it may result from historic recycling of older materials. Unfortunately, for most of the FRBS and NAVS deposits, there is no way to discriminate critically whether the presence of specific lithic artifacts in historic age deposits resulted from rodent bioturbation, colluvial transportation, historic construction activities, or early 19th century recycling of prehistoric tools. The bone bed deposits are the major exception. These intact domestic dumps have not been significantly disturbed by rodent burrowing and contain artifacts that were intentionally discarded by NAVS residents. The deposits were probably not created by the mixing of prehistoric and historic sediments that resulted from historic landscape modifications or construction activities. We argue that the diverse range of chipped stone and ground stone lithic artifacts found in the bone beds are directly attributable to NAVS residents, with some representing recycled prehistoric materials. In the following chapter, our investigation of the material culture of NAVS residents will focus on the spatial organization of the ceramic, glass, metal, lithic, and faunal remains in the bone bed deposits.

REFERENCES

- Ballard, Hannah
1995 Searching for Metini: Synthesis and Analysis of Unreported Archaeological Collections from Fort Ross State Historic Park, California. Senior honor's thesis, Dept. of Anthropology, University of California, Berkeley.
- Farris, Glenn J.
1989 The Russian Imprint on the Colonization of California. In *Columbian Consequences, Vol. 1, Archaeological and Historical Perspectives on the Spanish Borderlands West*, edited by David Hurst Thomas, pp. 481-97. Smithsonian Institution Press, Washington DC.
- Fredrickson, David
1987 The Use of Borax Lake Obsidian Through Time and Space. Paper presented at the Annual Meeting of the Society for California Archaeology, Fresno, California.
- 1990 Spatial and Temporal Patterning of Obsidian Materials in the Geysers Region. In *Current Directions in California Obsidian Studies*, edited by Richard Hughes, pp. 95-110.

Contributions of the University of California Archaeological Research Facility 48.

Goldberg, Susan K., and Elizabeth J. Skinner

1990 Cultural Resources of the Crane Valley Hydroelectric Project Area, Madera County, California, Volume IV: Bass Lake Erosion Control Project, Limited Archaeological Site Data Recovery at CA-MAD-223, -244, and -392. Infotec Research Incorporated. Report on file, Pacific Gas and Electric Co., 77 Beale Street, San Francisco, CA.

Hull, Kathleen, Russell W. Beville, W. G. Spaulding, and Mark R. Hale

1995 Archaeological Site Subsurface Survey, Test Excavations, and Data-Recovery Excavations for the Tuolumne Meadows Sewer Replacement Project in Tuolumne Meadows, Yosemite National Park, California. Dames and Moore. Report on file, USDI National Park Service, Yosemite National Park.

Jackson, Thomas L.

1984 A Reassessment of Obsidian Production Analyses for the Bodie Hills and Casa Diablo Quarry Areas. In *Obsidian Studies in Great Basin*, edited by R. E. Hughes, pp. 135-72. Contributions of the University of California Archaeological Research Facility 45.

1986 Late Prehistoric Obsidian Exchange in Central California. Ph.D. dissertation, Department of Anthropology, Stanford University, Stanford, CA.

1989 Late Prehistoric Obsidian Production and Exchange in the North Coast Ranges, California. In *Current Directions in California Obsidian Studies*, edited by Richard Hughes, pp. 79-94. Contributions of the University of California Archaeological Research Facility 48.

Lightfoot, Kent G., Thomas A. Wake, and Ann M. Schiff

1991 *The Archaeology and Ethnohistory of Fort Ross, California: Vol. 1, Introduction*. Contributions of the University of California Archaeological Research Facility 49.

Origer, Thomas M.

1987 *Temporal Control in the Southern North Coast Ranges of California: The Application of Obsidian Hydration Analysis*. Papers in Northern California Anthropology 1. Northern California Anthropological Group, Berkeley.

1990 Hydration Analysis of Obsidian Flakes Produced by Ishi

During the Historic Period. In *Current Directions in California Obsidian Studies*, edited by Richard E. Hughes, pp. 69-78. Contributions of the University of California Archaeological Research Facility 48.

Origer, Thomas M., and Brian Wickstrom

1982 The Use of Hydration Measurements to Date Obsidian Materials from Sonoma County, California. *Journal of California and Great Basin Anthropology* 4:123-31.

Purser, Margaret, Vicki Beard, and Adrian Praetzellis

1990 Archaeological Investigations for the Stockade Wall Replacement Project, Fort Ross State Historic Park, Sonoma County, California. On file, Anthropological Studies Center, Sonoma State University.

Skinner, Elizabeth J.

1986 Appendix A.3: Lithics Analysis: Conclusions and Recommendations. In Cultural Resources of the Crane Valley Hydroelectric Project Area, Madera County, California, Vol. III: Archaeological Testing, Resource Evaluation Impact Assessment, and Management Planning, Susan K. Goldberg et al. Infotec Research Incorporated. Report on file, Pacific Gas and Electric Company, 77 Beale Street, San Francisco, CA.

1988 Scavenging and Reuse: An Alternative to Models of Late Prehistoric Trans-Sierran Exchange in Central California. Paper presented at the 22nd Annual Meeting of the Society for California Archaeology, Redding, California.

Smith, Janice C.

1974 Pomo and Promyshlenniki: Time and Trade Goods at Fort Ross. M.A. thesis, University of California, Los Angeles.

Treganza, Adan E.

1954 *Fort Ross A Study in Historical Archaeology*. Reports of the University of California Archaeological Survey 23:1-26.

Tremaine, Kim

1989 Obsidian as Time Keeper: An Investigation in Absolute and Relative Dating. M.A. thesis, Cultural Resource Management, Sonoma State University.

Tremaine, Kim, and David Fredrickson

1988 Induced Obsidian Hydration Experiments: An Investigation in Relative Dating. *Materials Research Society Symposium Proceedings* 123:271-78.

Culture Change and Persistence in the Daily Lifeways of Interethnic Households

KENT G. LIGHTFOOT, ANN M. SCHIFF, ANTOINETTE MARTINEZ,
THOMAS A. WAKE, STEPHEN W. SILLIMAN,
PETER R. MILLS, AND LISA HOLM

THIS CHAPTER CONSIDERS THE implications of interethnic interaction and cohabitation on the material culture and day-to-day lives of the people who resided in the Native Alaskan Neighborhood. To what extent did interethnic relationships promote culture change and innovation? To what extent did such relationships encourage the persistence of traditional practices of Native Alaskans and Californians? As outlined in chapter 1, people in multiethnic communities may initiate different strategies to extend their social relations beyond their own group, to cement alliances with “other” peoples who may provide access to valued resources or higher status positions, and even to forge new identities for themselves. Some individuals and households may perceive advantages in the breakdown or manipulation of traditional sociopolitical structures, providing them with enhanced social mobility for the acquisition of valued goods and the achievement of high status positions. They may choose to transform their native identities so as to assimilate directly into “other” groups in multiethnic communities, or they may choose to create distinctive cultural constructs that set them apart from everyone else.

Other households may decide to remain faithful to their traditional values and prestige systems, a decision probably not uncommon for at least a few indigenous elites and their followers who could lose their favored positions if the underlying sociopolitical structure changed dramatically. They may follow a more conservative, “traditionalist” cultural pattern that attempts to reproduce many aspects of the ceremonial calendar, residential customs, and sociopolitical relationships as they existed prior to sustained contact with “other” peoples (see Lightfoot and Martinez 1995). Still other

elites may perpetuate their own power base by intentionally cultivating relations with colonial administrators, providing them with powerful allies, and sources of trade goods and material possessions.

The purpose of this chapter is not to assign ethnic attribution to the residents of the Native Alaskan Village *per se* since we already know the ethnic composition of households based on census data (see chapter 1). Here we are more concerned with the broader world views and organizational principles of the Native Alaskan and Californian peoples who made up the interethnic Village. Did some Native Alaskan Village Site (NAVS) households follow the traditional practices of Alutiiq and/or Kashaya Pomo peoples, maintaining strong cultural and ethnic ties with their own respective homelands? Or did some households identify and relate more closely with peoples of “other” ethnic backgrounds at Fort Ross, including the Creoles, Siberians, or Russians? Or did still other NAVS households construct new identities and world views that were not simply blends of Alutiiq and Kashaya Pomo constructs and practices, but innovative syncretisms that signalled the creation of new multiethnic groups?

While ethnohistorical documents identify the ethnicity of NAVS residents, they are largely silent about their world views, organizational principles, and intra-community affiliations. No extant accounts document the degree to which interethnic relationships promoted culture change or the reproduction of traditional practices in the Native Alaskan Neighborhood. We believe these kinds of questions are well suited to archaeological investigation and therefore undertake a detailed examination of the spatial patterning and association of archaeo-

logical remains in the Neighborhood to address them. Specifically, we examine the organizational principles of NAVS residents by considering their daily practices in the use of material culture. As outlined in chapter 1, we view material culture as an active agent in multiethnic communities whereby material choices are exercised to broadcast the identities, social relations, and alliance formations of individuals and households. Much can be learned about the organizational principles of households through a careful examination of the kinds of material culture employed, how daily domestic chores and recreational activities are conducted, and how space was created and used in and around household complexes.

We proposed initially to focus our investigation on the spatial organization of house structures and related extramural space. Employing the comparative method outlined in chapter 1, we would compare the internal arrangements of NAVS houses and associated extramural space with ethnohistoric observations and archaeological reports of relevant late 18th and early 19th century structures at Russian-American Company outposts in the North Pacific. Excellent descriptions of the floor plans, internal features, dimensions, architectural elaborations, and overall organization of space are known for Russian log-style structures in Siberia (Opolovnikov and Opolovnikov 1989), the Kurile Islands (Shubin 1990:431-32), and Fort Ross (Farris 1989, 1990). Similarly detailed observations are reported for late prehistoric and early historic Alutiiq semi-subterranean houses on Kodiak Island (Clark 1974:127, 1984:191; Davydov 1977:154-55 [1802-1803]; Gideon 1977:90-91 [1804-1807]; Knecht and Jordan 1985; Lisiansky 1814:212-14 [1805]; Merck 1980:100 [1790]) and the Kurile Islands (Shubin 1990:434, 1994:340-42). Early ethnohistoric accounts (Corney 1896:33-34; Kostromitinov 1974:8 [1830-1838]; LaPlace 1986:66-67 [1839]; Lutke 1989:275 [1818]; Schabelski 1993:10 [1822-1823]; Wrangel 1974:3-4 [1833]) and later ethnographic reports (Barrett 1908:24-25, 1975; Kniffen 1939:386; Loeb 26:158-61) abound for Pomo and Coast Miwok structures in the Fort Ross Region. Finally, Crowell (1994:159-81) summarizes known accounts of interethnic structures in the North Pacific and describes the excavation of a hybrid-style worker barracks that combined Native Alaskan building techniques with Russian stylistic touches at Three Saints Bay on Kodiak Island.

In attempting to implement the above approach, we found that a detailed study of the floor plans, internal features, building materials, and architectural styles of NAVS house structures is not yet possible. The discovery of dense bone bed deposits in the fill of abandoned house structures greatly curtailed our ability to expose extensive areas of internal and extramural residential space. Rather than detailing the internal spatial arrange-

ment of house structures, we spent most of our time recording and mapping the proveniences of materials in the bone bed deposits. While the focus of the project remained Neighborhood households, the emphasis shifted from the analysis of architectural space to the study of household refuse disposal practices.

This chapter considers the spatial organization of household trash and the kinds of household practices that contributed to specific refuse areas in the Neighborhood. A detailed microscale analysis of the bone bed deposits makes up most of the chapter. We begin by examining the contextual relationship and spatial association of material remains in the East Central and South bone beds. The domestic practices that produced the bone beds are then compared to the cooking methods, craft production and use of ceramic and glass objects by Native Alaskan and Native Californian peoples in their respective homelands. As noted in chapter 1, the comparison will focus primarily on the Kodiak Island Alutiiq and Kashaya Pomo because they make up most of the population of the Neighborhood, including many of the interethnic households. Furthermore, their ancestral homelands (Kodiak Island, Alaska and the southern North Coast Ranges, California, respectively) are well documented in pertinent ethnohistoric sources and archaeological reports. This documentation provides an excellent data base for comparing the daily practices of each group to those interpreted from the bone bed deposits at Fort Ross.

We next consider the construction, use, and upkeep of the pit features as residential structures in the Village. While the limited testing of the FRBS Pit Feature, the East Central Pit Feature, and the South Pit Feature precludes a detailed analysis of their spatial organization, we believe they contain important insights on trash disposal practices in residential space. By comparing these practices to those of the Alutiiq and Kashaya Pomo, several implications concerning the cleaning and maintenance of Neighborhood features are outlined.

Finally, we turn to the intrasite layout of NAVS and its spatial relation to FRBS. The results of the surface collection, geophysical survey, and trench and area excavations are synthesized in order to examine the spatial organization of architectural structures, communal space, and refuse dumps across the Neighborhood. This spatial model is then compared to the organizational principles used by Kodiak Island Alutiiq and Kashaya Pomo peoples in locating and laying out their settlements.

THE BONE BED DEPOSITS

In previous chapters, we argue that the bone beds are relatively intact refuse dumps where domestic trash was deposited on intentionally created surfaces, sometime during the 1820s or 1830s. The presence of articulated fish bones, sea urchin spines, and whole abalone shells

suggests that the debris was covered with sediments shortly after deposition and that the refuse areas were protected from trampling and many other post-depositional processes. It is possible that some of the structural components of the abandoned houses (posts, walls) were still in place, providing an artificial barrier that both contained and protected the trash deposits.

We assume that the bone bed deposits were produced by households who were discarding residential trash a short distance from their living quarters. This assumption is supported by: 1) the relatively small size of the trash deposits [they measure less than 4 m in diameter], 2) the shallow depth of the deposits sampled [less than 15 to 20 cm thick], and 3) the large number of bone bed deposits that probably occur at NAVS, since three separate trash dumps (e.g., East Central Bone Bed, South Bone Bed, Abalone Dump) were detected in the relatively small space that was sampled. Furthermore, the shallow depth and modest size of the bone beds suggest that they were relatively discrete deposits, probably formed over a short time by the discard practices of one or two related households. Because the bone beds appear to be distinct, short-term trash dumps produced by one or two related households, we believe that they are ideal deposits for examining the material culture and residential practices associated with different NAVS households and for interpreting household organizational principles and broader world views.

Three different analyses are reported for the East Central and South bone beds. The first involves the analysis of material remains from the 1991 excavations of the East Central and South trenches. Counts of faunal remains and artifacts are tabulated and densities computed (n/m^3). In addition, for every artifact and faunal assemblage examined, percentages are calculated for specific categories. The assemblages include mammals, fish, birds, shellfish, worked bone, ceramic, glass, metal, beads, and lithics. These data are presented in table 17.1.

The second analysis is the flotation of bone bed sediments to detect floral remains, and the sorting and weighing of cultural constituents recovered in the light and heavy fractions. Sediment samples (one and two liters in size) are first weighed, then dumped into a frothing flotation tank where the light fraction is collected in a .5 mm mesh, dried, and sorted. The remaining heavy fraction is poured through nested screens of 2 mm, 1 mm, and .5 mm mesh. After drying the heavy fraction, all cultural materials are sorted into categories (artifact types, animal bones, shellfish, charcoal) and weighed. The weights of cultural and noncultural materials are then calculated as percentages, and the combined weight of the artifacts, shell, animal bones, and charcoal is divided by the total weight of the sediment sample to determine the percentage of cultural remains recovered in each sample. These data are tabulated in tables 17.2 and 17.3.

The third analysis investigates the spatial arrangement of cultural materials mapped *in situ* in the first two excavation levels of the East Central and South bone bed deposits. The precise association and spatial context of artifacts and faunal remains in the bone bed and adjacent deposits are determined. The spatial distribution of materials in these bone beds provides insights into dumping events, the kinds of materials that were discarded together, and food refuse from individual meals. The plan maps for each bone bed level drawn in the field are first converted into x, y, z coordinates suitable for entry into the SURFER software program. Artifact types and faunal remains are coded as symbols and their point proveniences entered into SURFER. The SURFER data points are then translated into the CorelDRAW software program, in which rodent burrows, shell concentrations, soil stains, and nonartifactual rocks from the original plan maps are added to the bone bed maps. The strength of CorelDRAW is that all the materials included in the original plan maps—artifact categories, faunal remains, elevation contours, and background surfaces (nonartifactual rocks, rodent burrows, soil stains)—are entered as separate files so that any combination of these data can be represented in any one map. The spacial organization of the bone beds is illustrated in figures 17.1 to 17.58.

The spatial analyses of the bone bed deposits involve *two* overlapping, but *different*, populations of cultural materials. Not all of the artifacts and faunal remains recovered in the 1991 trench excavations are illustrated in the plan maps of the bone bed deposits. Only those materials exposed on the upper surfaces of excavation levels 1 and 2 are mapped and included in the spatial analysis, as well as artifacts and faunal remains exposed in the area excavations in 1992. Consequently, the counts illustrated in the plan maps (figures 17.1-17.58) differ from those reported for the trench excavations in table 17.1.

In the following section we present the results of our detailed analyses of the East Central Bone Bed and South Bone Bed. We recognize fully that the presentation can be rather tedious and involved, but it provides the essential basis for making three basic interpretations of daily practices conducted in the Native Alaskan Neighborhood. First, a significant portion of the bone bed refuse was probably produced from the discarded remains of meat dishes prepared and cooked using a "hot rocks" method according to the traditional Kashaya Pomo/Coast Miwok conventions. It appears that nearby underground ovens were cleaned out and their contents—both food remains (e.g., bones, shellfish) and cooking residue (e.g., fire cracked rocks, ground stone "other" artifacts, small amounts of charcoal)—were then tossed into the bone beds. This culinary method was apparently employed to slow bake and steam terrestrial game, domesticated mammal and marine mammal meats.

Table 17.1 *Counts, Percentages, and Densities of Artifacts and Faunal Remains from Native Alaskan Village Site and Fort Ross Beach Site[†]*

ASSEMBLAGE	ECT			ECBB			ST			SBB		
	n	%	n/m ³	n	%	n/m ³	n	%	n/m ³	n	%	n/m ³
Mammal	605	100	173	199	100	398	801	100	243	257	100	514
Artiodactyl	270	45	77	104	52	208	340	43	103	78	30	156
Deer	131	22	37	56	28	112	125	16	38	31	12	62
Cattle	35	6	10	19	9.5	38	41	5	12	14	5	24
Sheep	33	5.5	9	18	9	36	17	2	5	5	2	10
Pig	3	.5	.9	1	.5	2	6	.7	2	3	1	6
Elk	7	1	2	4	2	8	1	.3	.3	0	0	0
Unidentified	61	10	17	6	3	12	150	19	45	25	10	50
Pinniped	195	32	56	76	38	152	395	49	120	156	61	312
Eared Seal	81	13	23	18	9	36	153	19	46	28	11	56
Cal. Sea Lion	26	4	7	20	10	40	43	5	13	26	10	52
Harbor Seal	26	4	7	12	6	24	69	9	21	35	14	70
Stel. Sea Lion	4	.7	1	1	.5	2	8	1	2	8	3	16
Nor. Fur Seal	1	.3	.3	1	.5	2	0	0	0	0	0	0
Unidentified	57	10	16	24	12	48	122	15	37	59	23	118
Other Mammal	140	23	40	19	10	38	66	8	19	23	9	46
Fish	392	100	112	83	100	166	819	100	248	171	100	342
Cabezon	221	56	63	40	48	80	351	43	106	60	35	120
Rock Fish	103	26	29	20	24	40	246	30	75	38	22	76
Lingcod	48	13	14	18	22	36	126	16	38	47	27	94
Surfperch	7	2	2	1	1	2	18	2	5	6	4	12
Prickleback	3	.5	.9	2	2	4	12	1	4	2	1	4
Pacific Hake	2	.5	.6	1	1	2	15	2	4	6	4	12
Other Fish	8	2	2	1	1	2	51	6	15	12	7	24
Bird	102	100	29	26	100	52	216	100	65	90	100	180
Murre	83	81	24	21	81	42	136	63	41	47	53	94
Gull	3	3	.9	0	0	0	50	23	15	27	30	54
Pelican	3	3	.9	1	4	2	12	6	4	10	11	20
Duck	6	6	2	3	11	6	5	2	2	1	1	2
Goose	1	1	.3	0	0	0	2	.5	.6	1	1	2
Chicken	0	0	0	0	0	0	5	2	2	1	1	2
Cormorant	3	3	.9	0	0	0	1	.5	.3	0	0	0
Other Bird	3	3	.9	1	4	2	5	2	2	3	3	6
Shellfish	2047	100	585	411	100	822	2962	100	898	510	100	1020
Chiton	83	4	24	14	4	28	185	6	56	28	6	56
Mussel	164	8	47	60	15	120	196	7	59	43	8	86
Clam	11	.5	3	3	.7	6	19	.8	6	3	.6	6
Limpet	194	9	55	51	12	102	307	10	93	86	17	172
H. Slipper	40	2	11	13	3	26	51	2	15	9	2	18
Dogwinkle	18	.8	5	2	.4	4	17	.8	5	1	.2	2
<i>Olivella</i>	3	.1	.8	3	.7	6	7	.3	2	0	0	0
Periwinkle	13	.6	4	1	.2	2	3	.1	.9	1	.2	2
Turban	282	14	81	53	13	106	244	8	74	41	8	82
Other Snail	1208	59	345	202	49	404	1894	64	574	291	57	582
Barnacle	31	2	9	9	2	18	39	1	12	7	1	14
Oyster	0	0	0	0	0	0	0	0	0	0	0	0
Abalone	13% of bags			13% of bags			14% of bags			15% of bags		
Sea Urchin	7% of bags			14% of bags			5% of bags			8% of bags		
Worked Bone	118	100	34	23	100	46	651	100	197	175	100	350
Tools	11	9	3	1	5	2	26	4	8	11	6	22
Flakes	54	46	15	7	30	14	536	82	162	150	86	300
Chunks	18	15	5	13	56	26	16	2	5	8	5	16
Handholds	5	4	1	0	0	0	18	3	5	5	2.5	10
Other	30	26	9	2	9	4	55	9	17	1	.5	2

continued

† Key to be found at end of table.

ASSEMBLAGE	ECT			ECBB			ST			SBB		
	n	%	n/m ³	n	%	n/m ³	n	%	n/m ³	n	%	n/m ³
Ceramic	165	100	48	34	100	68	477	100	145	35	100	70
Refined	127	77	37	25	74	50	382	80	116	23	66	46
Porcelain	32	19	9	9	26	18	81	17	25	10	29	20
Other	6	4	2	0	0	0	14	3	4	2	5	4
Ceramic Form	42	100	12	10	100	20	128	100	39	12	100	24
Plate	14	33	4	5	50	10	26	20	8	3	26	6
Bowl	2	5	.6	1	10	2	12	10	4	0	0	0
Saucer	13	31	4	3	30	6	44	34	13	4	33	8
Tea Cup	7	17	2	1	10	2	31	24	9	4	33	8
Tea Pot	0	0	0	0	0	0	5	4	2	0	0	0
Pitcher	1	2	.3	0	0	0	2	2	.6	0	0	0
Pipe Stem/Bowl	1	2	.3	0	0	0	7	5	2	1	8	2
Other	4	10	1	0	0	0	1	1	.3	0	0	0
Worked Ceramic	1	100	.3	0	0	0	6	100	2	1	100	2
Glass Fragment	324	100	93	45	100	90	831	100	252	65	100	130
Vessel	140	43	40	19	42	38	184	22	56	7	11	14
Window	182	56	52	26	58	52	643	77	195	58	59	116
Lamp	2	1	.6	0	0	0	4	1	1	0	0	0
Worked Glass	33	100	9	3	100	6	28	100	8	1	100	2
Flake	12	36	3	2	67	4	18	64	5	1	100	2
Projectile Point	3	10	1	1	33	2	0	0	0	0	0	0
Other	11	54	3	0	0	0	10	36	3	0	0	0
Metal	136	100	39	15	100	30	203	100	61	23	100	46
Nail Iron/Brass	50	37	14	7	46	14	94	46	28	11	48	22
Nail/Wire	17	12	5	0	0	0	11	6	3	1	4	2
Spike	1	1	.3	0	0	0	3	1	1	0	0	0
Bullet/Shot	4	3	1	1	7	2	5	2	2	0	0	0
Copper Sheet/Strip	5	4	1	1	7	2	6	3	2	0	0	0
Iron Wire/Plate	45	33	13	5	33	10	57	28	17	8	35	16
Other	14	10	4	1	7	2	27	14	8	3	13	6
Beads												
Glass	79	100	23	13	100	26	278	100	84	23	100	46
Shell/Bone	19	100	5	1	100	2	27	100	8	4	100	8
Clam disk	11	58	3	1	100	2	7	26	2	2	50	4
Olivella	0	0	0	0	0	0	3	11	.9	0	0	0
Other shell	0	0	0	0	0	0	2	7	.6	0	0	0
Bone	8	42	2	0	0	0	15	56	.5	2	50	4
Lithic	307	100	88	121	100	242	1326	100	402	268	100	536
Flaked	148	48	42	16	13	32	1038	78	315	98	36	196
Debitage	131	43	37	15	12	30	994	75	301	95	35	190
Edge-Modified	12	4	3	0	0	0	28	2	9	1	.3	2
Formal	5	1	1	1	1	2	16	1	5	2	.7	4
Ground Stone	23	8	7	19	16	38	26	2	8	12	5	24
Tool	15	5	4	11	9	22	10	1	3	4	2	8
Other	8	3	2	8	7	16	16	1	5	8	3	16
Cobble	82	26	23	60	49	120	188	14	57	101	38	202
Fire-Cracked	48	16	14	26	22	52	68	5	21	56	20.7	112
Gun Flint	3	1	.9	0	0	0	2	.5	.6	0	0	0
Other	3	1	.9	0	0	0	4	.5	1	1	.3	2
Cooking	138	45	39	94	78	188	272	20	82	165	62	330

continued

ASSEMBLAGE	WCT			SCTU			FRBS		SW Bench		
	n	%	n/m ³	n	%	n/m ³	n	%	n	%	n/m ³
Mammal	5	100	4	139	100	253	735	100	329	100	67
Artiodactyl	5	100	4	95	68	173	300	41	162	49	33
Deer	0	0	0	15	11	27	158	21	65	20	13
Cattle	3	60	3	8	6	15	41	6	18	5	4
Sheep	0	0	0	8	6	15	22	3	17	5	3
Pig	0	0	0	0	0	0	5	.7	2	.6	.4
Elk	0	0	0	0	0	0	2	.3	1	.4	.2
Unidentified	2	40	2	64	45	116	72	10	59	18	12
Pinniped	0	0	0	30	22	54	400	54	154	47	31
Eared Seal	0	0	0	24	17	44	125	17	59	18	12
California Sea Lion	0	0	0	2	2	4	61	7.6	32	10	6
Harbor Seal	0	0	0	3	2	5	88	12	33	10	7
Steller's Sea Lion	0	0	0	1	1	2	3	.4	3	1	.6
Unidentified	0	0	0	0	0	0	123	17	27	8	5
Other Mammal	0	0	0	14	10	25	35	5	13	4	3
Fish	0	0	0	72	100	131	222	100	183	100	37
Cabezon	0	0	0	53	74	96	118	53	103	56	21
Rock Fish	0	0	0	9	12	16	62	28	46	25	9
Lingcod	0	0	0	2	3	4	32	14	27	15	5
Surfperch	0	0	0	3	4	5	4	2	0	0	0
Prickleback	0	0	0	0	0	0	0	0	0	0	0
Pacific Hake	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	5	7	9	6	3	7	4	1
Bird	0	0	0	10	100	18	132	100	61	100	11
Murre	0	0	0	6	60	11	93	71	39	64	8
Gull	0	0	0	0	0	0	8	6	6	10	1
Pelican	0	0	0	0	0	0	2	1.5	0	0	0
Duck	0	0	0	1	10	2	7	5	5	8	1
Goose	0	0	0	0	0	0	2	1.5	2	3	.4
Chicken	0	0	0	1	10	2	3	2	0	0	0
Cormorant	0	0	0	0	0	0	4	3	3	5	.6
Other	0	0	0	2	20	4	13	10	6	10	1
Shellfish	1	100	1	295	100	536	748	100	309	100	63
Chiton	0	0	0	23	8	42	25	3	13	4	3
Mussel	0	0	0	16	5	29	207	28	59	19	12
Clam	0	0	0	6	2	11	9	1	5	2	1
Limpet	0	0	0	8	3	15	64	9	25	8	5
Horned Slipper	0	0	0	3	1	5	0	0	0	0	0
Dogwinkle	0	0	0	0	0	0	0	0	0	0	0
Olivella	0	0	0	0	0	0	0	0	0	0	0
Periwinkle	0	0	0	0	0	0	0	0	0	0	0
Turban	0	0	0	43	15	78	113	15	38	12	8
Other Snail	0	0	0	192	65	349	321	43	165	54	33
Barnacle	1	0	0	4	1	7	1	.1	1	.3	.2
Oyster	0	0	0	0	0	0	8	.9	3	.7	.6
Abalone		1 bag			13.3% of bags			19% of bags		21% of bags	
Sea Urchin		0% of bags			3.6% of bags			0% of bags		0% of bags	
Worked Bone	0	0	0	7	100	13	17	100	4	100	.8
Tools	0	0	0	0	0	0	7	41	3	75	.6
Flakes	0	0	0	4	57	7	0	0	0	0	0
Chunks	0	0	0	0	0	0	2	11	0	0	0
Handholds	0	0	0	0	0	0	5	30	1	25	.2
Other	0	0	0	3	43	5	3	18	0	0	0
Ceramic	94	100	85	101	100	184	213	100	130	100	26
Refined	77	81	70	84	83	153	180	85	115	89	23
Porcelain	15	16	14	14	14	25	28	13	11	8	2
Other	2	2	2	3	3	5	5	2	4	3	.6

continued

ASSEMBLAGE	WCT			SCTU			FRBS		SW Bench		
	n	%	n/m ³	n	%	n/m ³	n	%	n	%	n/m ³
Ceramic Form	16	100	15	22	100	40	61	100	37	100	8
Plate	3	19	3	3	14	5	11	18	7	19	1
Bowl	3	19	3	3	14	5	11	18	7	19	1
Saucer	4	25	4	7	32	13	20	33	11	30	2
Tea Cup	2	12.5	2	7	32	13	15	24	10	24	2
Tea Pot	0	0	0	1	4	2	1	2	0	0	0
Pitcher	1	6	1	0	0	0	2	3	2	8	.4
Pipe Stem/Bowl	1	6	1	1	4	2	1	2	0	0	0
Other	2	12.5	2	0	0	0	0	0	0	0	0
Worked Ceramic	2	100	2	2	100	4	0	0	0	0	0
Glass Fragment	214	100	195	183	100	333	291	100	161	100	33
Vessel	69	32	63	52	29	95	134	46	79	49	16
Window	143	67	130	129	70.9	234	156	53.7	81	50	16
Lamp	2	1	2	2	.1	4	1	.3	1	1	.2
Worked Glass	7	100	6	1	100	2	16	100	13	100	3
Flake	5	71	5	1	100	2	9	56	8	62	2
Projectile Point	0	0	0	0	100	0	2	13	2	15	.4
Other	2	29	2	0	0	0	5	51	3	23	.7
Metal	31	100	28	38	100	69	66	100	49	100	10
Nail Iron/Brass	15	48	14	10	26	18	30	46	24	49	5
Nail/Wire	2	7	2	3	8	5	3	4	1	2	.2
Spike	0	0	0	1	3	2	6	9	4	8	.8
Bullet/Shot	0	0	0	5	13	9	2	3	0	0	0
Copper Sheet/Strip	1	3	1	3	8	5	1	2	3	6	.6
Iron Wire/Plate	12	39	11	14	37	25	18	27	12	25	2
Other	1	3	1	2	5	4	6	9	5	10	1
Beads											
Glass	68	100	62	72	100	131	19	100	16	100	3
Shell/Bone	0	0	0	2	100	4	4	100	3	100	.6
Clam Disk	0	0	0	2	100	4	2	50	2	67	.4
Olivella	0	0	0	0	0	0	1	25	1	33	.2
Other Shell	0	0	0	0	0	0	0	0	0	0	0
Bone	0	0	0	0	0	0	1	25	0	0	0
Lithic	67	100	61	138	100	251	2485	100	1267	100	257
Flaked	55	82	50	131	95	238	1852	75	1138	90	231
Debitage	48	72	44	124	90	225	1703	69	1056	83	214
Edge-Modified	5	7	4	6	4	11	125	5	74	6.3	15
Formal	2	3	2	1	1	2	24	1	8	.6	2
Ground Stone	2	3	2	0	0	0	176	7	7	.6	1
Tool	1	1.5	1	0	0	0	40	2	4	.3	.8
Other	1	1.5	1	0	0	0	136	5	3	.3	.6
Cobble	2	3	2	0	0	0	28	1	4	.3	.8
Fire-Cracked	3	4.5	3	4	3	7	407	16	101	8	20
Gun Flint	2	3	2	3	2	5	2	.1	1	.1	.2
Other	3	4.5	3	0	0	0	20	.9	16	1	3
Cooking	6	9	5	4	3	7	571	23	108	8.5	22

KEY: ECT = East Central Trench; ECBB = East Central Bone Bed; ST = South Trench; SBB = South Bone Bed;
WCT = West Central Trench; SCTU = South Central Test Unit; FRBS = Fort Ross Beach Site; SWBench = Southwest Bench

Second, household manufacture of some Native Alaskan crafts are represented in the bone bed deposits, including worked bone tools and debitage, and circumstantial evidence exists for the production of *kamleikas*, birdskin parkas, and the repair of *baidarkas*. However, other household equipment or furniture commonly found in historic Kodiak Island houses, such as ground slate artifacts, are rare or nonexistent. Finally, small fragmentary pieces of ceramics and glass from multiple vessels or window panes were recovered in the bone bed deposits. These artifacts appear to have been recycled from broken or discarded objects as sources of raw material by the residents who were using the bone bed deposits. The three interpretations are taken up in detail following the presentation of the bone bed data analyses.

EAST CENTRAL BONE BED

1) *East Central Bone Bed: Artifacts and Faunal Remains Recovered in the Trench Excavation.* Table 17.1 presents the counts, percentages, and densities for the faunal and artifact assemblages from the bone bed deposit in 75S, 0E; 75S, 1E; and 75S, 2E.

a) Mammals. Artiodactyls make up more than half the mammal remains in the East Central Bone Bed, with deer (28%) the most common constituent, followed by cattle (9.5%) and sheep (9%), and lastly elk (2%) and pig (.5%). Pinnipeds are also common, representing 38% of the mammal remains. California sea lions dominate (10%), followed by unidentifiable eared seal (9%), harbor seal (6%), some Steller's sea lion (.5%), and Northern fur seal (.5%). Other identifiable mammal bones include Botta's pocket gopher (5.5%), skunks (1.5%), porpoise (1.5%), carnivores (1%), and one grizzly bear element (.5%). The densities of artiodactyl and pinniped bones are 208 and 152 NISP per cubic meter, respectively.

b) Fish. Cabezon (48%), rock fishes (*Sebastes* sp.) (24%), and lingcod (22%) from intertidal and subtidal waters make up the majority of the fish remains. As Gobalet suggests, these fishes were probably captured with hook and line from shore near Fort Ross. They may also have been caught offshore in *baidarkas*. The presence of Pacific hake, buffalo sculpin, surf perches (Embiotocidae), and black or rock prickleback (*Xiphister*) is noted as well. The density of fish remains in the bone bed deposit is 166 NISP per cubic meter.

c) Birds. More than 80% of the bird bones are from the common murre, followed by duck (11%), pelican (4%), and California condor (4%). The density of identifiable bird remains is 52 per cubic meter of bone bed deposit. The California condor was probably not hunted for food and may be related to ceremonial activities of the household(s) proximate with the bone bed deposit, a matter taken up below.

d) Shellfish. Gastropods, especially other snails (49%), turbanes (13%), and limpets (12%), constitute the

majority of the shellfish assemblage. Bivalves are represented primarily by mussels (15%) with a small presence of clams. Chitons are also present, along with barnacles, abalones, and a high proportion of sea urchins. The density of shellfish is 822 MNIs per cubic meter of bone bed deposit.

e) Worked Bone. Of the 23 worked bone artifacts identified in the East Central Bone Bed, the great majority (95%) are nondiagnostic pieces including various amorphous pieces of worked bone chunks (56%), worked flakes (30%), and worked antler (9%). The only diagnostic artifact (5%) is a worked bird ulna. The density of worked bone artifacts is 46 per cubic meter.

f) Ceramics. Refined earthenwares (primarily handpainted blue and transferprinted blue) constitute the majority of the ceramic assemblage, along with a few porcelain sherds. The ceramic forms include plates (50%), saucers (30%), bowls (10%), and tea cups (10%). The 34 ceramics from the bone bed deposit produce a density of 68 sherds per cubic meter. None of the sherds are worked.

g) Glass Sherds. Window glass (58%) slightly outnumbers vessel glass (42%), while no lamp glass is reported. The 45 glass sherds generate a density of 90 sherds per cubic meter. Three glass pieces are worked—two flakes and one projectile point.

h) Metal. Iron and brass nails (46%) make up the majority of the metal artifacts, followed by iron wire/plates and unknown objects (33%), a lead shot piece (7%), a copper sheet (7%), and one button hook (7%). The total density of metal objects is 30 per cubic meter.

i) Beads. Color classifications of the thirteen undecorated glass beads (26/m³) follow: white (38.5%), brownish-red green or black (23.1%), blue to bluish-green (15.4%), purplish-red (7.7%), purplish-blue (7.7%), and yellow (7.7%). One clam shell disk bead is also present.

j) Lithics. Only 13% of the lithic assemblage consists of flaked stone tools or debitage. The vast majority are cobbles (49%), fire-cracked rocks (22%), and ground stone artifacts (16%). The ground stone tools include 1 basin millstone fragment, 1 nutting stone, 3 pestle fragments, and 6 slab millstone fragments. One polished ground slate tabular fragment is identified from the bone bed deposit. The density of lithic specimens in this deposit is 242 per cubic meter.

2) *East Central Bone Bed: Flotation and Constituent Analysis.* Two samples from 75S, 0E, each containing two liters of sediments, are analyzed from Level 2 of the bone bed. Three sediment samples are floated and sorted from 75S, 1E: a two-liter sample from Level 1 of the bone bed feature and two- and one-liter samples from Level 2 of the deposit. The results of the flotation and constituent analysis are presented in table 17.2.

a) Cultural Materials. Cultural materials (flora,

Table 17.2 Cultural Constituents by Weight and Percentage in the Bone Bed Deposit of the East Central Trench

	75S, 0E LEVEL 2 (2 liters)		75S, 0E LEVEL 2 (2 liters)		75S, 1E LEVEL 1 (2 liters)		75S, 1E LEVEL 2 (2 liters)		75S, 1E LEVEL 2 (1 liter)	
	g	%	g	%	g	%	g	%	g	%
charcoal	2.66	5.8	3.80	6.2	3.60	6.8	2.28	3.5	1.1	3.8
wood	0	0	.36	.6	0	0	0	0	0	0
seed	0	0	.06	.1	.42	.8	.01	.02	.01	.03
fauna	8.15	17.9	12.10	20.7	14.45	27.1	12.14	18.5	6.47	22.5
chiton	1.16	2.6	.78	1.33	.08	.17	.98	1.4	.01	.03
mussel	19.53	42.9	24.88	42.6	20.91	39.3	32.96	50.1	11.51	40.1
clam	.36	.8	0	0	.52	1.0	1.38	2.1	0	0
limpet	0	0	0	0	.01	.02	0	0	3.1	1.1
hs	0	0	.25	.5	0	0	0	0	0	0
snail	1.47	3.2	1.3	2.2	2.26	4.2	2.11	3.2	.72	2.5
barnacle	1.82	4.0	.78	1.33	.56	1.0	2.74	4.2	2.05	7.12
abalone	1.14	2.5	3.25	5.6	2.76	5.2	2.4	3.6	1.44	5.0
su frag.	4.8	10.6	5.37	9.2	4.20	7.9	4.66	7.1	2.21	7.7
su spine	3.14	6.9	3.51	6.0	3.04	5.7	2.95	4.5	1.57	5.5
shellfish	1.17	2.6	1.92	3.3	.01	.02	.84	1.3	.90	3.12
worked bone	0	0	0	0	.26	.5	.17	.28	.21	.7
ceramic	0	0	0	0	0	0	0	0	0	0
glass sherd	0	0	.01	.02	.11	.2	0	0	0	0
metal	0	0	0	0	0	0	0	0	0	0
glass bead	0	0	0	0	0	0	0	0	.24	.8
ch if	.1	.2	0	0	0	0	0	0	0	0
ob if	0	0	.01	.02	.05	.09	.12	.2	0	0
Cultural Materials:										
Total	45.53	100	58.38	100	53.24	100	65.74	100	28.75	100
Percent of Entire Sample:										
Cultural	45.53	1.5	58.38	1.9	53.24	1.7	65.74	2.2	28.75	1.9
NonCultural	2940.47	98.5	2997.62	98.1	3095.26	98.3	2895.26	97.8	1469.25	98.1

Key: hs = horned slipper, su = sea urchin, ch if = chert interior flake, ob if = obsidian interior flake
g = weight in grams % = percent of cultural materials

fauna, artifacts) constitute 1.5 to 2.2 percent of the sediment samples by weight. The largest quantities come from Level 2 of the bone bed deposit in 75S, 1E, and they decrease in mass in Level 1 of 75S, 1E and Level 2 of 75S, 0E.

b) Floral Remains. Charred seeds or nuts are rare inclusions in either the light or heavy fraction. Uncharred floral remains are also sparse—the majority of them identified as introduced grasses of the *Bromus* and *Festuca* families that probably have migrated into the bone bed deposit in recent years. Charcoal wood makes up 3.5 to 6.8 percent of the cultural remains recovered in the sediment samples by weight. The greatest amount of charcoal wood is in Level 1 of the bone bed deposit in 75S, 1E and Level 2 of 75S, 0E. Charcoal decreases in weight in the Level 2 sample from 75S, 1E.

c) Mammal, Fish, Bird Bones. Animal bones constitute 17.9 to 27.1 percent of the cultural remains by

weight recovered in the sediment samples. The greatest quantity is found in Level 1 of the bone bed deposit in 75S, 1E, while the smallest mass of bone pieces is in Level 2 of 75S, 0E. Most of the bones are in a fragmented state and are not sorted into specific taxa.

d) Shellfish. Shellfish make up the great bulk of the faunal remains and artifacts recovered in sediment samples, representing anywhere from 65.5 to 77.5 percent of all the cultural remains by weight. The smallest weight of shellfish is from Level 1 of 75S, 1E, while the greatest numbers are from Level 2 of both 75S, 0E and 75S, 1E. Interestingly, mussel umbos and fragments are the most common cultural constituent in the sediment samples, making up between 39 to 50 percent of the cultural remains by weight. Shell weight greatly increases the known presence of mussels in the East Central Bone Bed in contrast to percentages based only on MNI counts (number of umbos divided by 2, see

chapter 15, table 17.1). The next most common shellfish type, sea urchin spines and fragments, constitute 11.6 to 17.5 percent of all cultural remains by weight. Between 2.5 to 5.6 percent of the cultural remains by weight is composed of abalone fragments. The remainder of the shellfish types (snails, chitons, barnacles, etc.) represent a much smaller portion of the shellfish remains in either level of the East Central Bone Bed.

e) Artifacts. Ceramic sherds, glass fragments, and obsidian and chert interior flakes constitute a very small percentage of the cultural remains by weight. With the exception of one glass bead in Level 2 of 75S, 1E, only very small slivers or fragments of ceramic, lithic, and glass artifacts are found. Worked bone occurs only in levels 1 and 2 of the bone bed deposit in 75S, 1E.

3) *East Central Bone Bed: Spatial Analysis.* The spatial patterning of archaeological remains is examined for both levels of the bone bed deposit. Level 1 includes not only cultural remains from the bone bed in the East Central Trench (75S, 0E; 75S, 1E; 75S, 2E) excavated in 1991, but also materials exposed along the top surface of the bone bed deposit in 1992. In addition, archaeological remains outside the bone bed deposit proper unearthed in the East Central Trench (75S, 3E; 75S, 4E) in 1991 and the areal excavation in 1992 are included in the spatial analysis. Level 1 consists of a 23 square meter area of both bone bed and contiguous archaeological deposits. The elevation of the upper surface of Level 1 varies from about 25.92 to 25.72 m asl. Appendix 17.1 presents the following information for each artifact and faunal specimen mapped in Level 1: catalog number (when collected), item code (as keyed into plan maps), artifact/faunal identification, unit, size (length/width), and three dimensional provenience.

The spatial analysis of Level 2 involves only the East Central Trench excavated in 1991. Level 2 includes the underlying tier of the bone bed deposit in 75S, 0E; 75S, 1E; and 75S, 2E as well as the archaeological remains unearthed adjacent to the bone bed in 75S, 3E and 75S, 4E. The elevation of the upper surface of Level 2 ranges from 25.78 to 25.54 m asl. Appendix 17.2 lists the catalog number, item code, artifact/faunal identification, unit, size, and three dimensional provenience for each artifact and faunal remain mapped in Level 2.

EAST CENTRAL BONE BED: LEVEL 1

a) Mammal (Level 1). Deer and elk (figure 17.1), cattle and sheep (figure 17.2), and marine mammal bones, including California sea lion and harbor seal elements, (figure 17.3) exhibit very similar spatial organizations. The majority of the faunal remains are distributed along the boundary of 75S, 0E and 75S, 1E as well as in discrete clusters in the western half of 75S, 1E, the eastern half of 74S, 1W, and the western half of 74S, 1E. Marine mammal remains are also concentrated in

73S, 1E and 73S, 2E, while some artiodactyl bones are found in 73S, 0E. Interestingly, two major breaks in the spatial patterning of both marine and artiodactyl bones occur in 74S, 0E and 75S, 1W. Animal bones (primarily marine mammal and cattle) are present but uncommon outside the bone bed deposit.

The spatial patterning of several of the bone clusters suggests that they were tossed in small aggregates from containers by people facing the bone bed deposit from the south. The greatest concentration of elements in these bone clusters tends to be located along the southern edge of each cluster with the number of elements decreasing in a linear pattern to the north. Furthermore, elements from the same species tend to be associated together, suggesting that refuse from the preparation of individual meals may occur as discrete dumping events. For example, California sea lion elements are clustered along the southern boundary of 75S, 0E and 75S, 1E and along the boundary of 75S, 0E and 74S, 0E. The sea lion elements include 1 femur, 1 ilium, 1 tibia, 1 calcaneum, 1 thoracic vertebra, 1 humerus, and a tooth (see appendix 17.1). Deer elements are concentrated in the se quad of 74S, 1W; the sw quad of 75S, 1E; and the northern boundary of 75S, 1E. Again, the diverse range of body parts that exhibit little redundancy suggest that one (or possibly two) butchered deer are represented. The deer elements from these spatial clusters include 2 ilia, 1 axis, 1 left maxilla, 1 maxilla fragment, 1 right maxilla, 2 humeri, 1 calcaneum, 3 innominate pieces, 2 tibias, 2 femurs, 1 scapula, and a radius (appendix 17.1). Cattle elements are distributed in the sw quad of 75S, 1E and along the boundary of 75S, 0E and 75S, 1E, while sheep elements are found in the ne quad of 75S, 1E and along the boundary of 75S, 0E and 74S, 0E. Cattle and sheep bones are distributed together in 74S, 1W and 73S, 0E. The cattle and sheep parts in Level 1, primarily representing the skull, vertebra, and long bones (appendix 17.1), indicate few individuals are present.

A final observation is that the spatial distribution of some clusters of deer, cattle, sheep, and marine mammal bones overlap, especially in 75S, 0E; 75S, 1E; and 74S, 1W. This pattern indicates that the remains of wild game, domesticated artiodactyls, and marine mammals were often deposited together into the refuse dump. Some of these animal remains likely were discarded from the same container, suggesting that they were prepared and cooked by the same households and may even represent the remains of the same meal. In any event, there appears to have been little segregation in the disposal treatment of terrestrial and marine mammals.

b) Fish (Level 1). Fish bones display a different spatial organization than the mammal remains (figure 17.4). While two elements are found in 75S, 2E and 75S, 1W, respectively, the majority (n=6) are clustered in the northern halves of 73S, 0E and 73S, 1E where few mammal bones are discarded, with the exception of the

Figure 17.1 *Spatial Distribution of Deer and Elk Elements in Level 1, East Central Bone Bed*

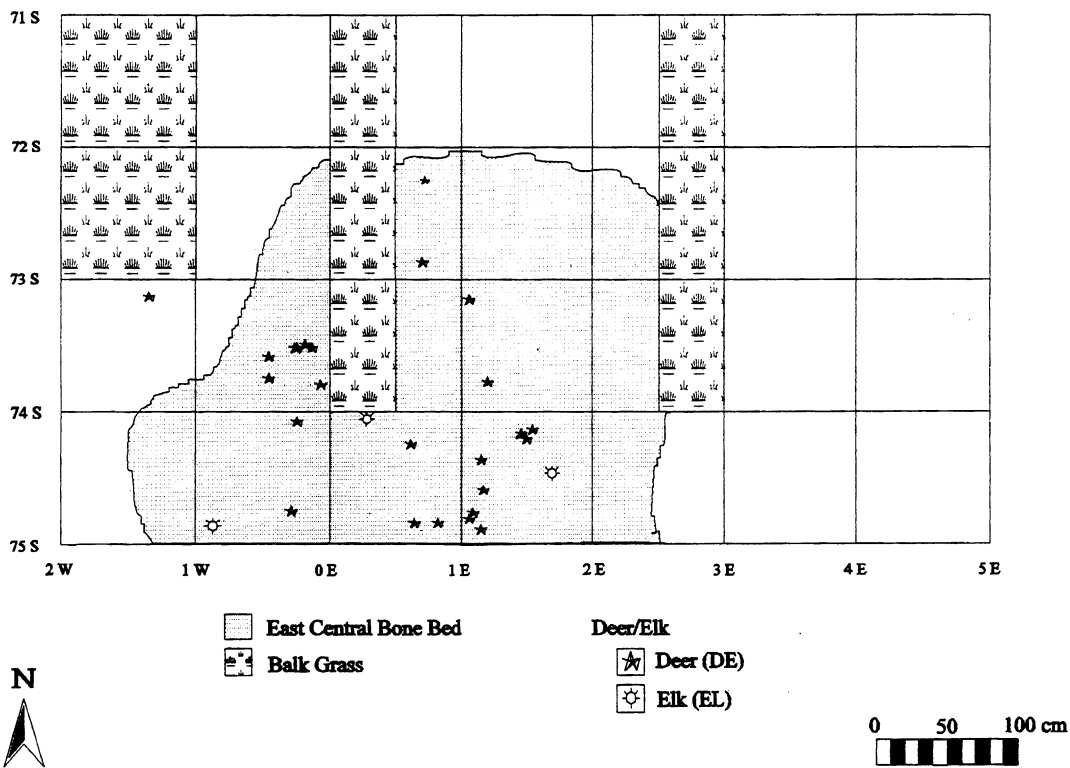


Figure 17.2 *Spatial Distribution of Domesticated Mammal Elements in Level 1, East Central Bone Bed*

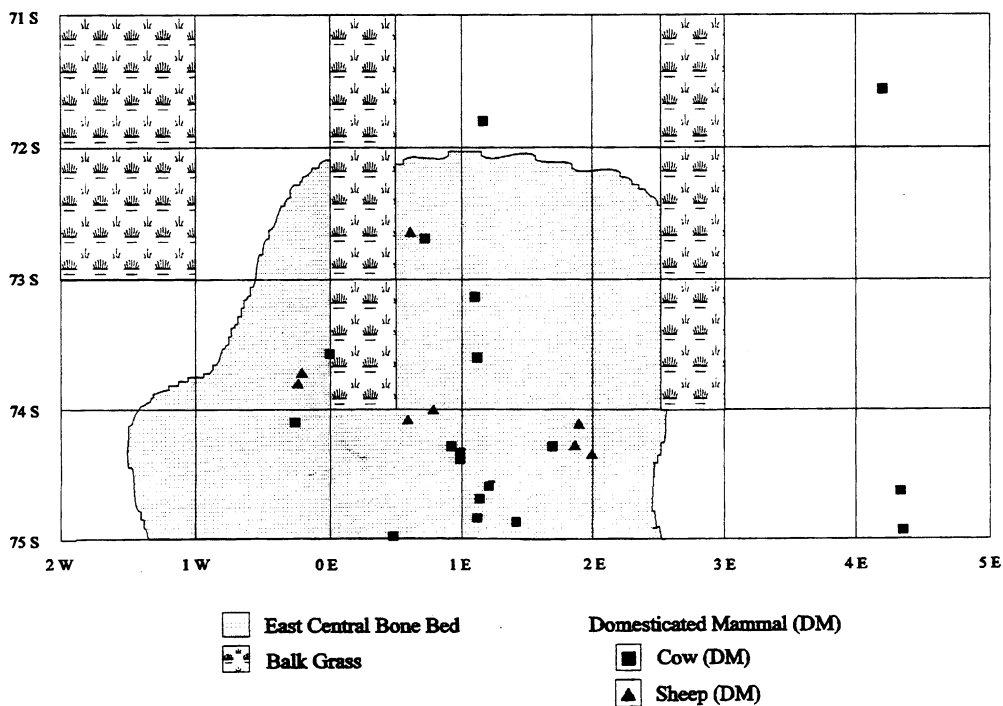


Figure 17.3 *Spatial Distribution of Marine Mammal Elements in Level 1, East Central Bone Bed*

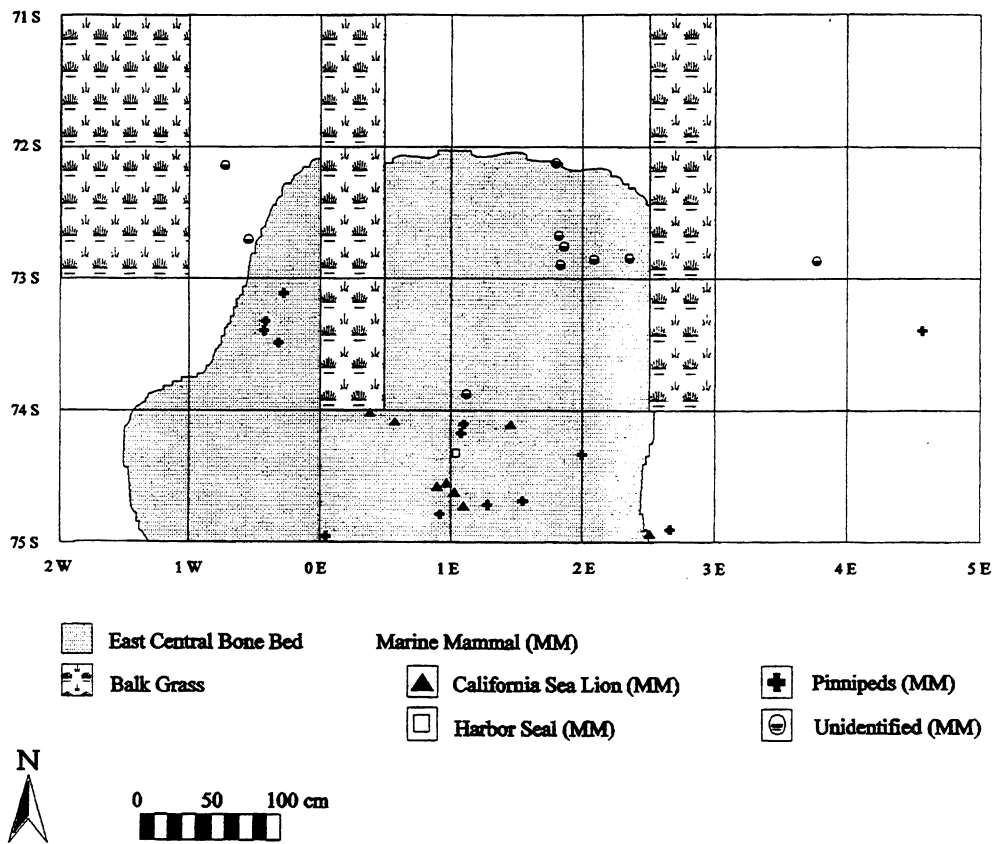
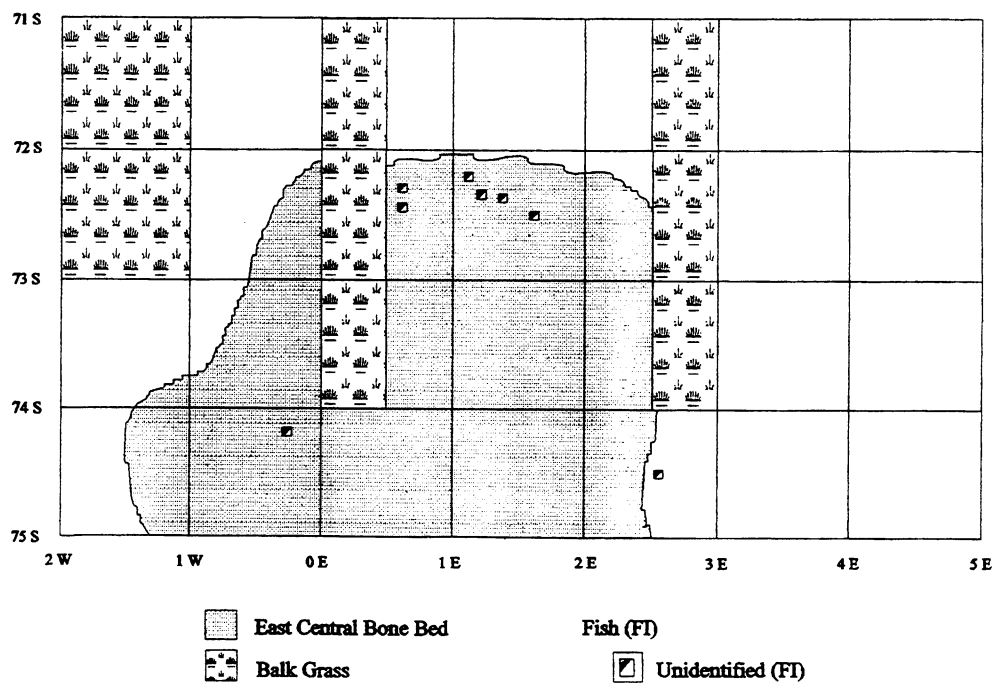


Figure 17.4 *Spatial Distribution of Fish Elements in Level 1, East Central Bone Bed*



marine mammal elements in 73S, 1E and 73S, 2E. The close association and linear patterning of the fish bones suggest they were discarded from a container in a discrete dumping episode, possibly representing the refuse from an individual meal.

c) Birds (Level 1). No bird bones are found.

d) Shellfish (Level 1). The spatial organization of abalones (figure 17.5), mussels (figure 17.6), clams (figure 17.6), and, to a lesser extent, turban shells (figure 17.6) differs from that of the mammal and fish bones. The shellfish tend to be randomly distributed across the bone bed and are found in areas (75S, 1W and 74S, 0E) where few animal bones are found. For example, abalone shells, because of their large size and distinctive color, are the most commonly mapped shellfish. Almost ubiquitous in the bone bed deposit, they are dispersed both within and outside the separate clusters of marine mammal and artiodactyl remains. The spatial pattern of the shellfish suggests that they were not dumped together in batches but rather were tossed individually into the refuse dump or were discarded from containers that included other food remains, such as mammal and fish bones. The common distribution of the shellfish across the deposit, both associated with the remains of other foods and in separate locations by themselves, indicates they were probably a familiar supplement in most meals consumed by the household(s) using the East Central Bone Bed.

e) Worked Bone (Level 1). The worked bone artifacts (figure 17.7) tend not to be associated with the bone bed. Only one of the five specimens is located in the refuse dump (73S, 1E), the remainder are located to the north and east of the deposit.

f) Ceramics (Level 1). Only five ceramic sherds (figure 17.8) occur in Level 1. Three are in the bone bed, and two are directly adjacent to it in 75S, 3E and 72S, 2E. The ceramics in the refuse dump are not in close association with the major aggregates of mammal or fish bones, nor shellfish remains.

g) Glass Sherds (Level 1). Three glass sherds are found in the bone bed deposit (figure 17.9). One bottle glass sherd is associated with the cluster of California sea lion bones and abalone shells in the eastern half of 75S, 0E. The worked glass specimen in 75S, 1W is situated near isolated deer, fish, and shellfish specimens, while the window glass in 75S, 2E may be associated with one of the ceramic sherds.

h) Metal (Level 1). The spatial patterning of 6 nails and 4 spikes (figure 17.10) indicates that most are not associated with the bone bed but rather with the eastern units of the trench and areal excavations. Other metal objects (figure 17.11), a copper piece, an iron rod, a bracket, a hook, and a round metal disk (appendix 17.1), are also found in the eastern units of the trench and area excavations as well as in the bone bed.

i) Beads (Level 1). No beads are reported.

j) Lithics (Level 1). The flaked stone artifacts tend not to be associated with the bone bed. Only one of three chert flakes is located in the refuse dump (figure 17.12), while none of the four flaked stone tools (figure 17.12) are found in the bone bed. Two edge-modified flakes and one projectile point are located in the eastern units of the trench near the spikes, nails, and a ceramic sherd. Cobbles (figure 17.13) exhibit a relatively random distribution across the entire trench and area excavations. The fire-cracked rock (figure 17.14) and ground stone "other" artifacts (figure 17.15) are associated primarily with the bone bed and tend to follow a spatial pattern similar to the mammal bones and shellfish. The greatest density of fire-cracked rocks occurs in 75S, 0E and 75S, 1E where many of the mammal bones and shellfish are found. However, no fire-cracked rocks and only one ground stone "other" artifact are found in 74S, 1W and 73S, 0E where mammal remains and abalone shells are common constituents. Finally, ground stone tools (figure 17.16) are found primarily in the nw quad of 75S, 0E and in 75S, 1W, adjacent but separate from the mammal bone clusters and abalone shells in the eastern half of 75S, 0E and all of 75S, 1E. Since the ground stone tools (2 manos, 4 slab millstones, and 2 pestle fragments) are located near the extensive aggregate of fire-cracked rocks in 75S, 0E, they may have been discarded together into the bone bed.

EAST CENTRAL BONE BED: LEVEL 2

a) Mammal (Level 2). Deer (figure 17.17), cattle and sheep (figure 17.18), and marine mammal bones (figure 17.19) continue to be concentrated in the bone bed in 75S, 0E and 75S, 1E. The spatial distribution of bone elements from the same species exhibits patterns similar to those in Level 1. Deer elements (3 humeri, 3 lumbar vertebrae, 1 occipital, 2 femurs, 1 acetabulum, 1 axis, 1 maxilla, 1 scaphoid, 1 ilium) are found in the ne quad of 75S, 0E and the north half of 75S, 1E, near a cluster of deer bones in Level 1. Five cattle elements (2 vertebrae, 1 scapula, 1 tibia, 1 femur) are clustered in the sw quad of 75S, 1E and along the north half of the border of 75S, 0E and 75S, 1E, not far from the concentrations of cattle remains in Level 1. One sheep element is found in the ne quad of 75S, 1E directly below the cluster of sheep bones in Level 1. One California sea lion astragalus in the sw quad of 75S, 1E may be related to the sea lion bone cluster in Level 1 along the boundary of 75S, 1E and 75S, 0E; and a California sea lion phalanx and tooth in the ne quad of 75S, 0E may be associated with the small cluster of sea lion bones in Level 1 on the boundary of 75S, 0E and 74S, 0E.

That some elements from the same species are spatially related between both levels of the bone bed indicates they were probably discarded in the same dumping events. Some of the elements probably come from the same individual. This observation suggests that

Figure 17.5 *Spatial Distribution of Abalone Shells in Level 1, East Central Bone Bed*

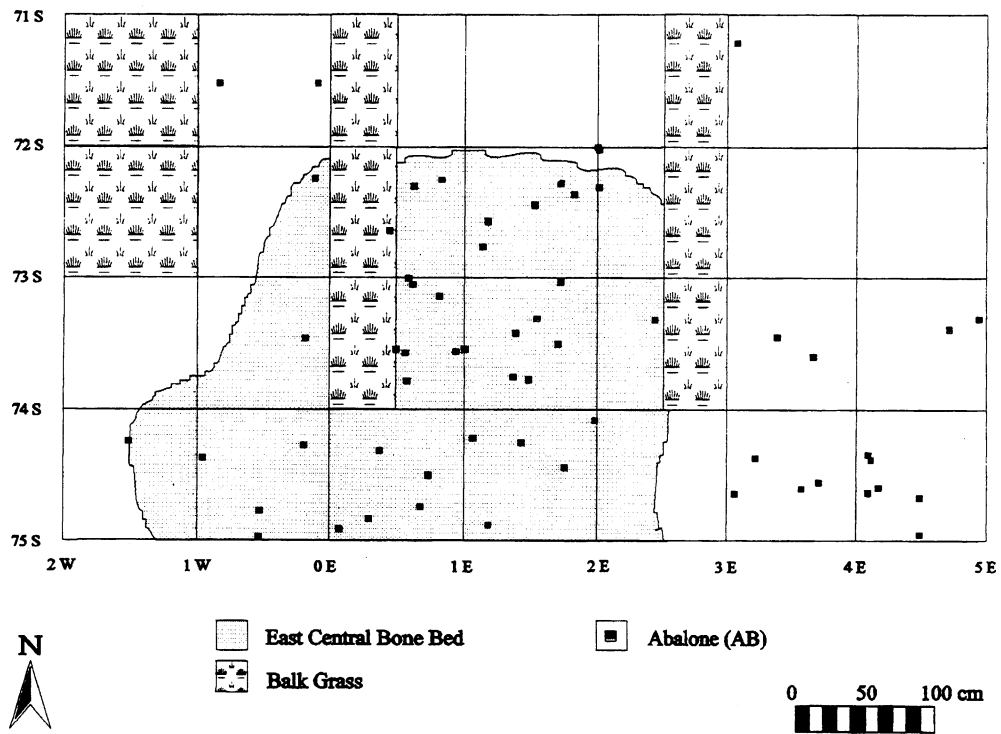


Figure 17.6 *Spatial Distribution of Mussel, Clam, and Turban Snail Shells in Level 1, East Central Bone Bed*

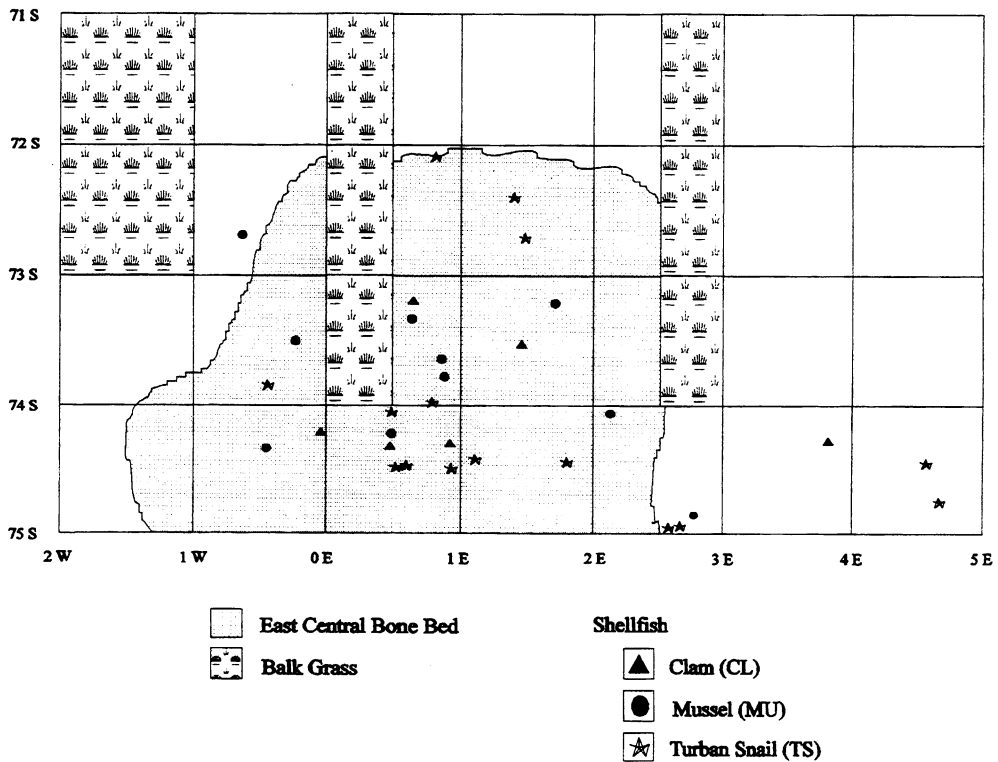


Figure 17.7 *Spatial Distribution of Worked Bone Artifacts in Level 1, East Central Bone Bed*

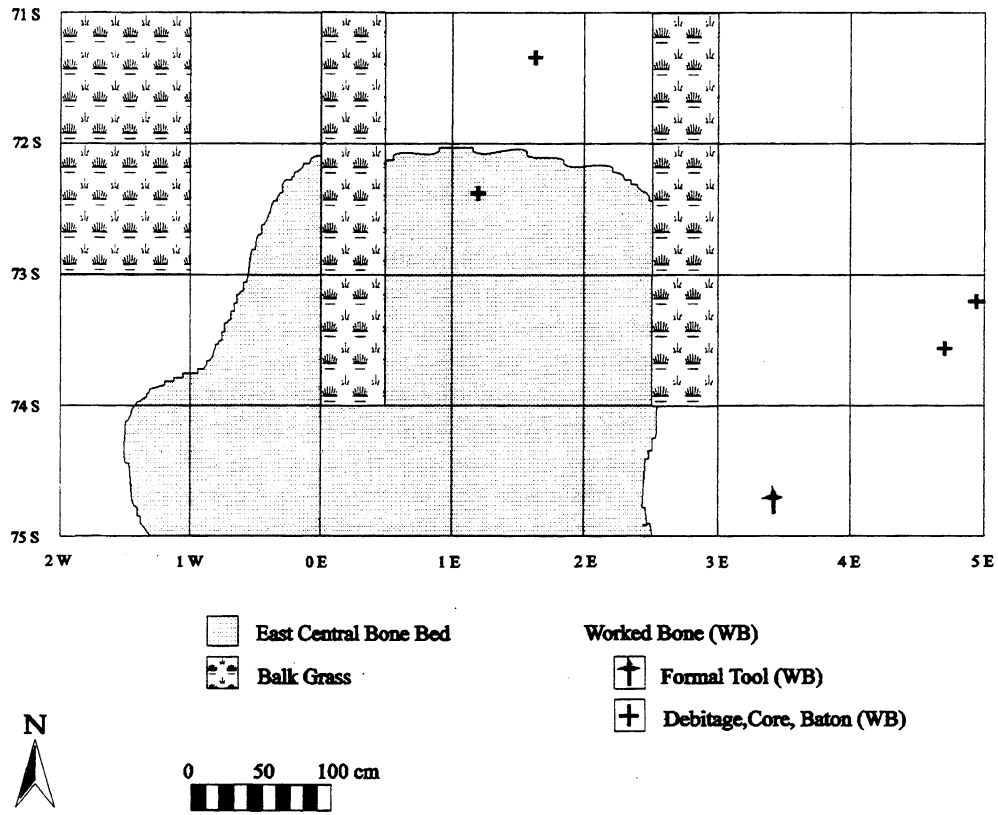


Figure 17.8 *Spatial Distribution of Ceramic Pieces in Level 1, East Central Bone Bed*

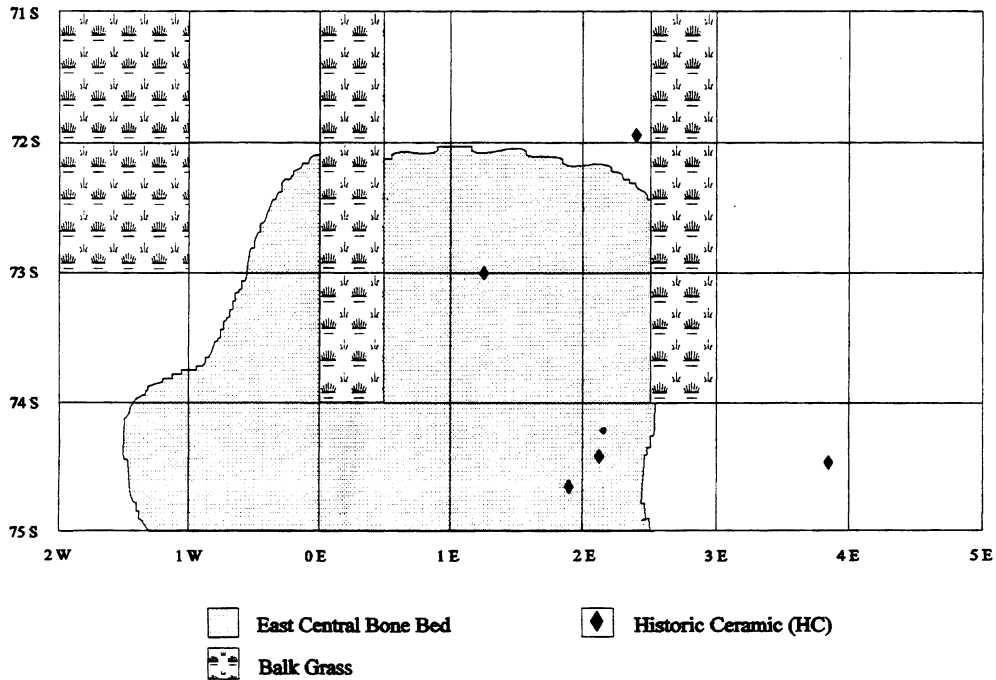


Figure 17.9 *Spatial Distribution of Glass Sherds in Level 1, East Central Bone Bed*

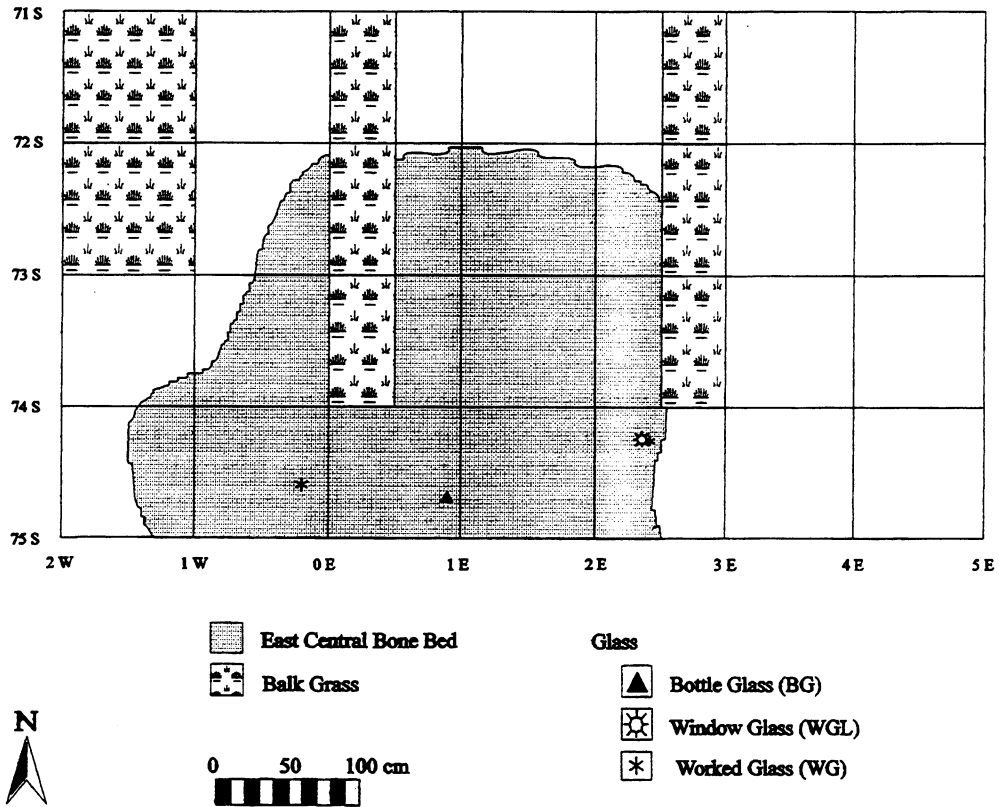


Figure 17.10 *Spatial Distribution of Nails and Spikes in Level 1, East Central Bone Bed*

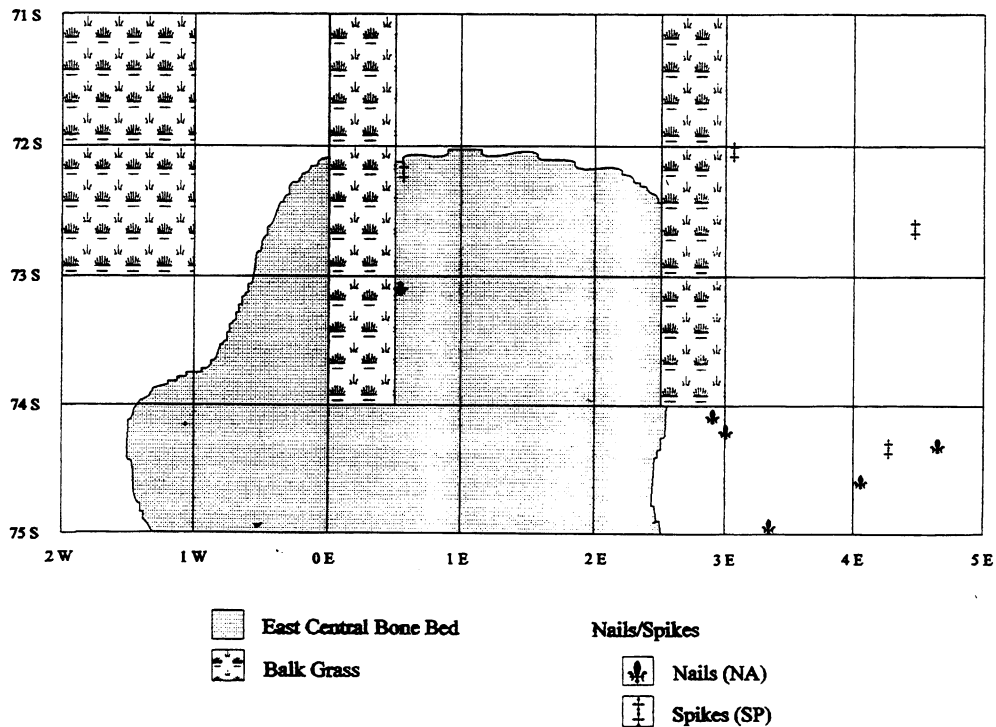


Figure 17.11 Spatial Distribution of Other Metal Artifacts in Level 1, East Central Bone Bed

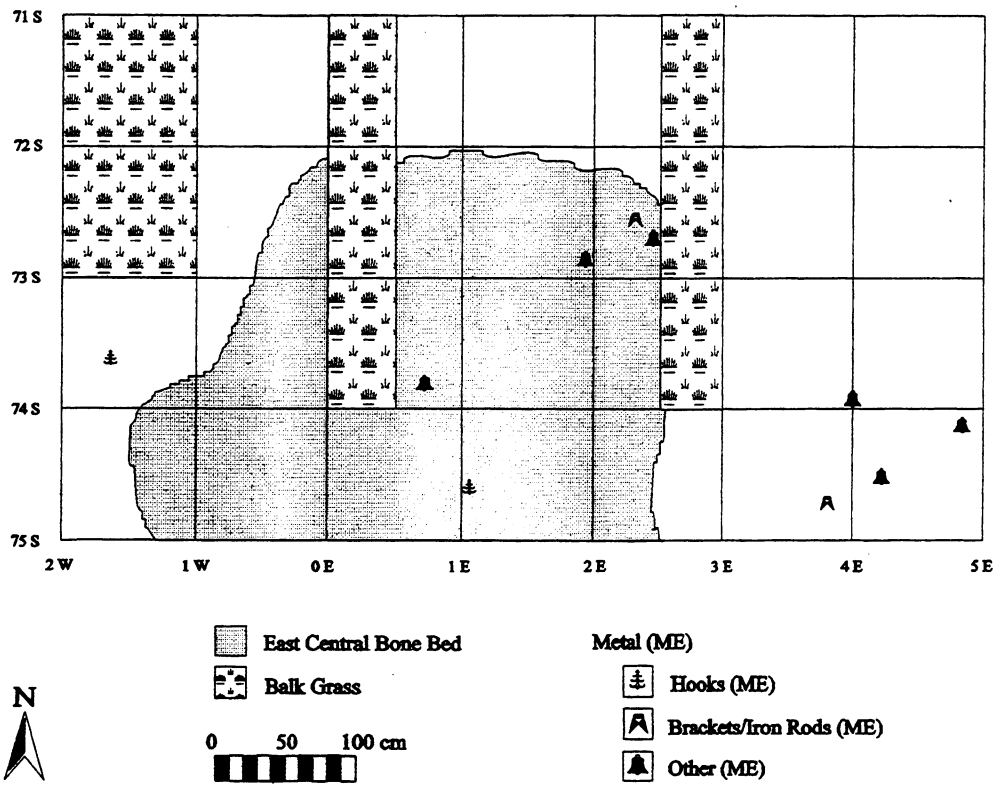


Figure 17.12 Spatial Distribution of Chipped Stone Artifacts in Level 1, East Central Bone Bed

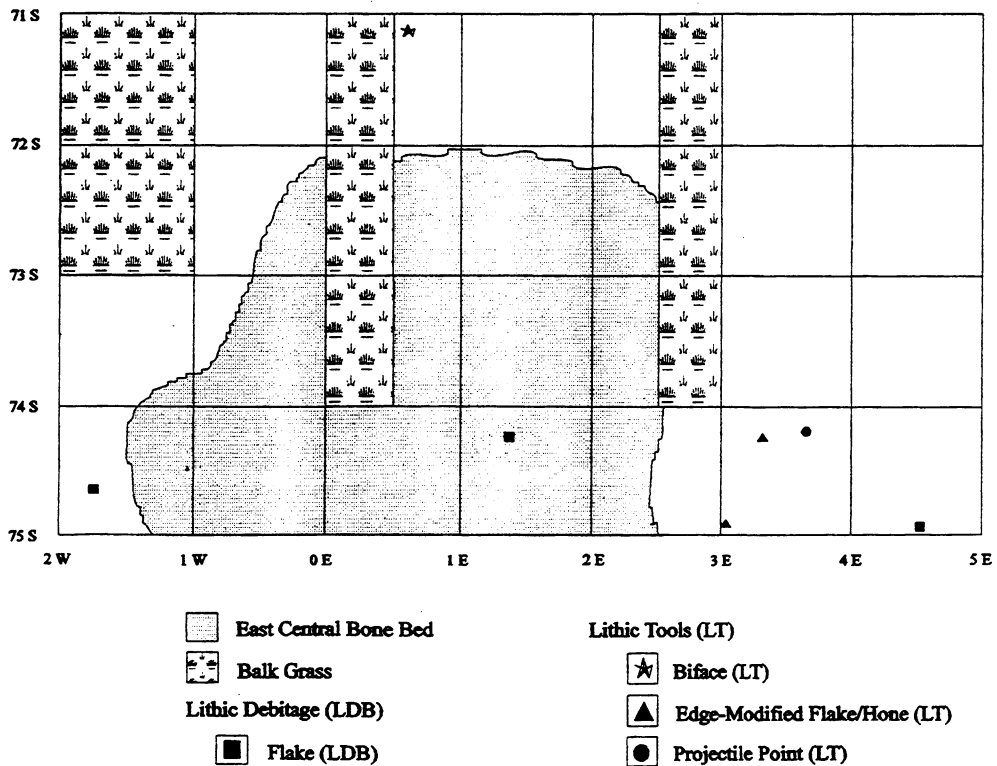


Figure 17.13 *Spatial Distribution of Cobbles in Level 1, East Central Bone Bed*

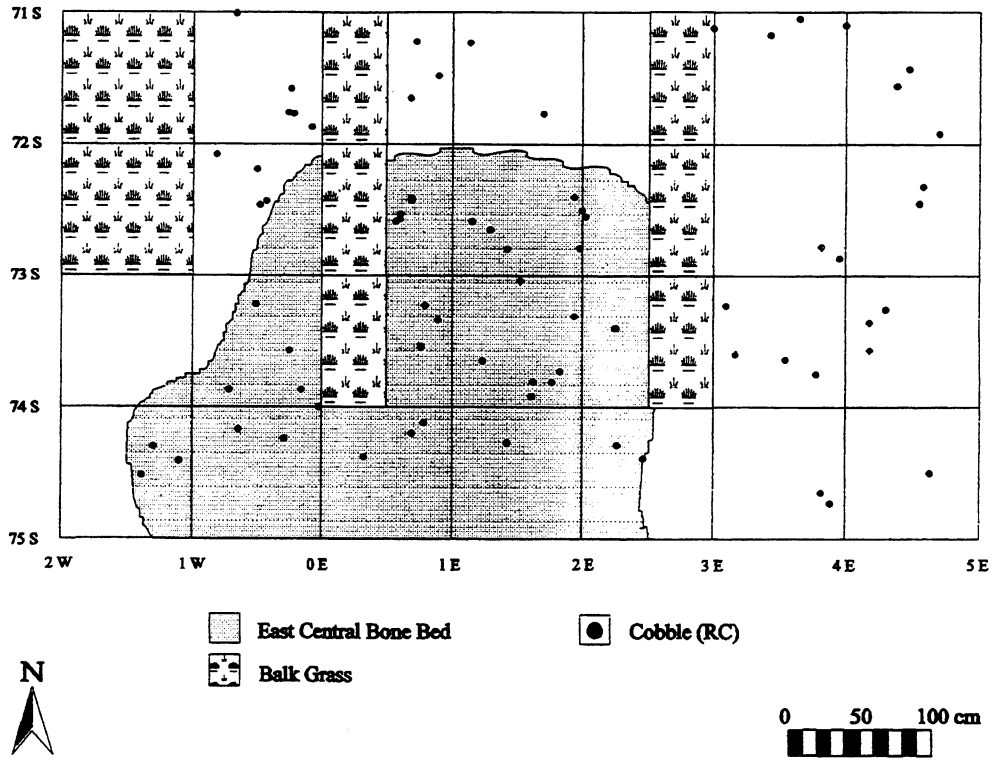


Figure 17.14 *Spatial Distribution of Fire-Cracked Rocks in Level 1, East Central Bone Bed*

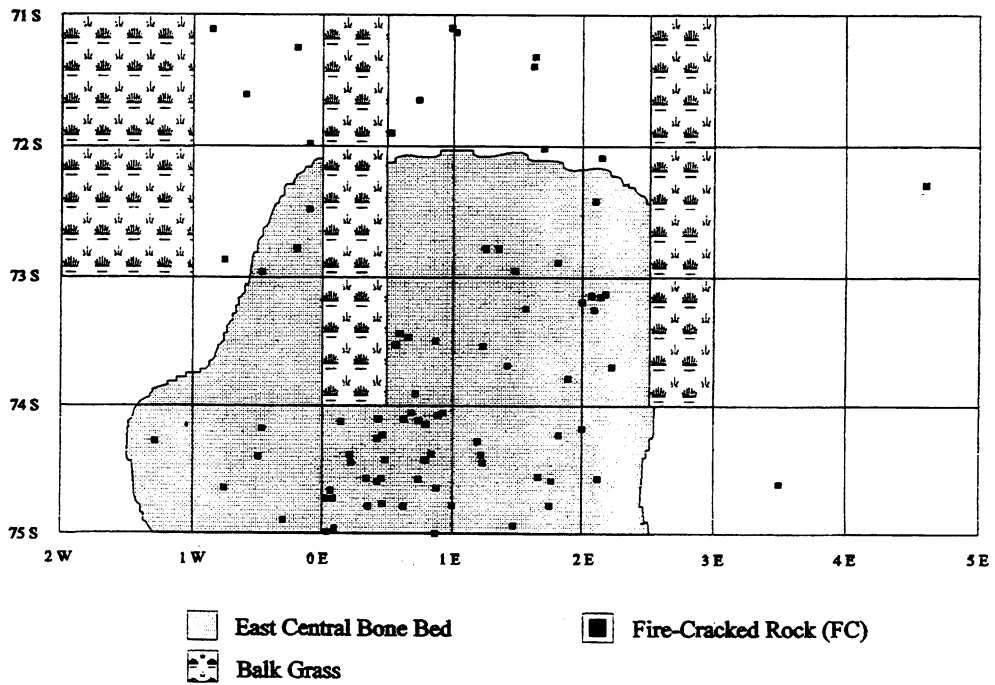


Figure 17.15 Spatial Distribution of Ground Stone "Other" Artifacts in Level 1, East Central Bone Bed

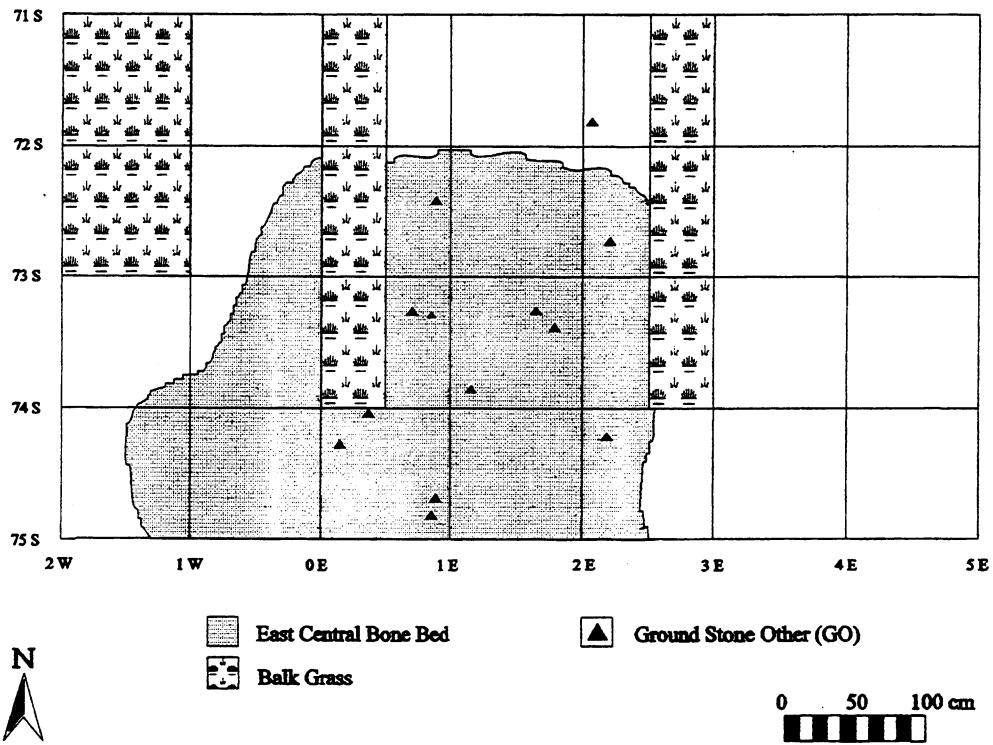


Figure 17.16 Spatial Distribution of Ground Stone Tools in Level 1, East Central Bone Bed

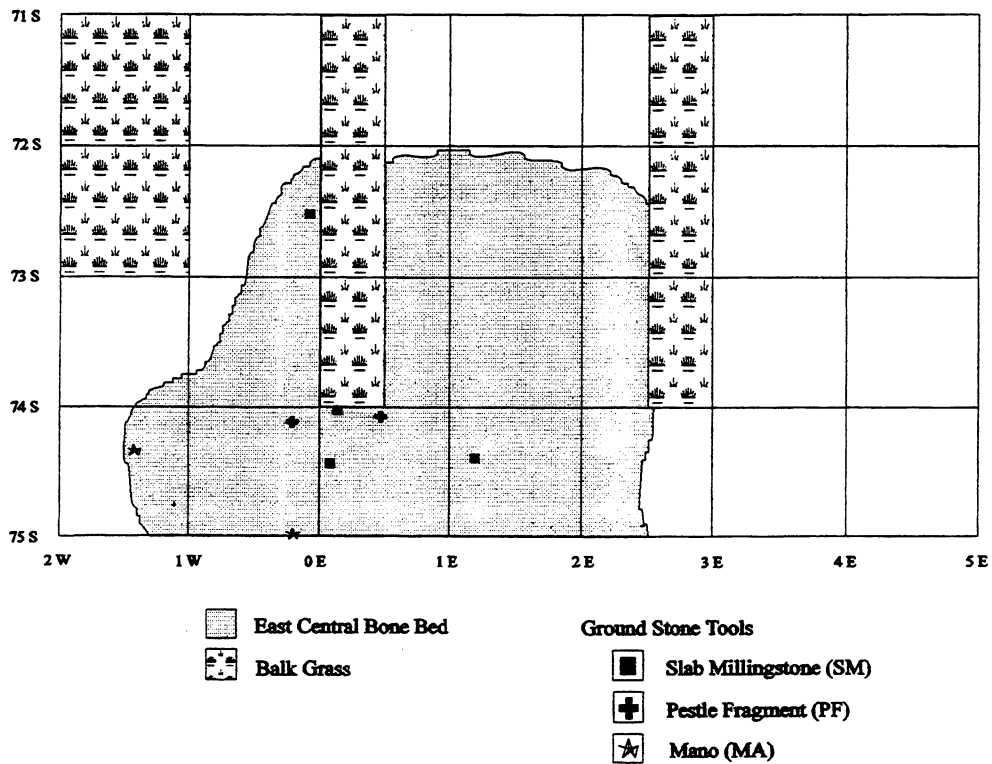


Figure 17.17 *Spatial Distribution of Deer Elements in Level 2, East Central Bone Bed*

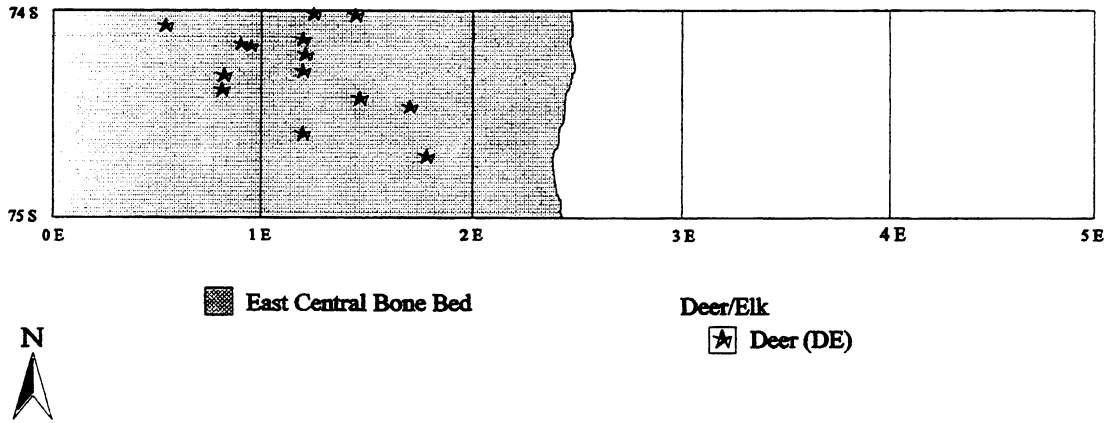


Figure 17.18 *Spatial Distribution of Domesticated Mammal Elements in Level 2, East Central Bone Bed*

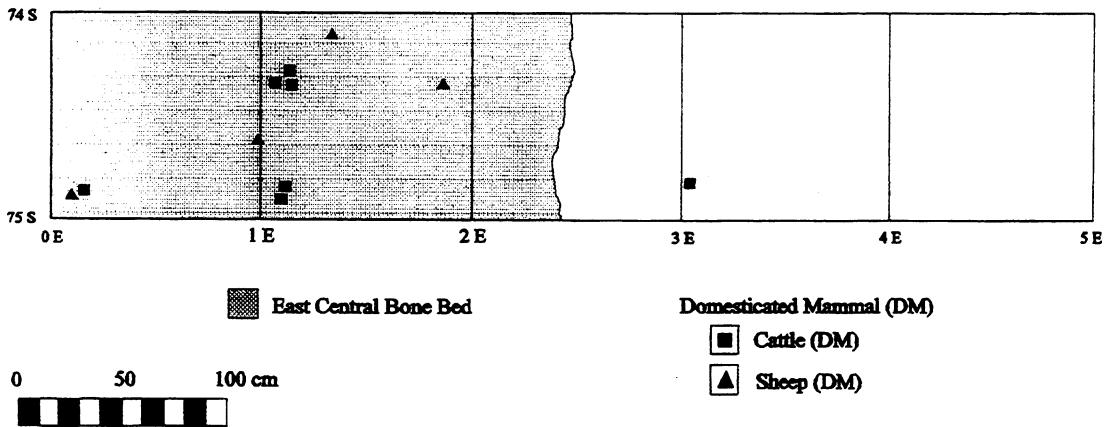
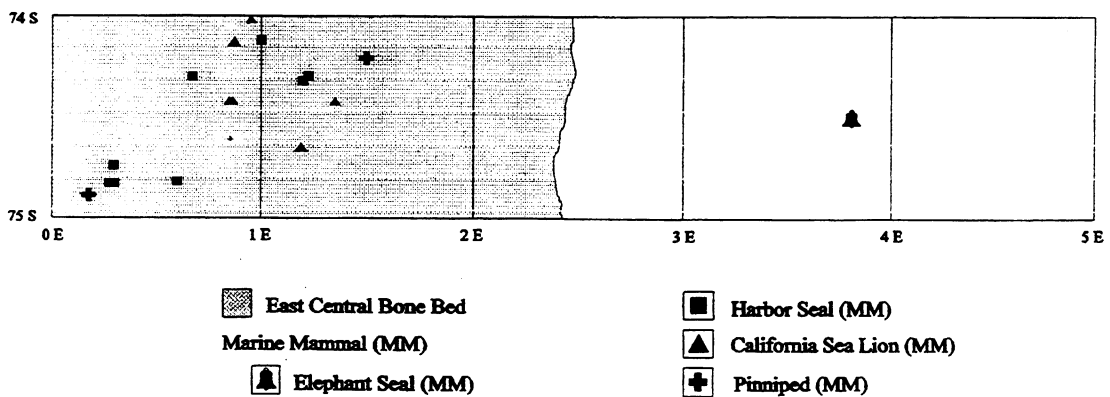


Figure 17.19 *Spatial Distribution of Marine Mammal Elements in Level 2, East Central Bone Bed*



the two levels of the bone bed defined by us during the excavation do not represent separate occupation episodes or discard events. Mammal remains were probably dumped from containers into small piles whereby bones from the same species, as well as other food remains consumed in the same meals, were stacked on top of one another.

There is some evidence, however, for dumping events confined to only one level of the bone bed. For example, a small cluster of harbor seal bones is found in the sw quad of 75S, 0E, and clusters of deer bones are distributed in the ne quad of 75S, 0E and the nw quad of 75S, 1E. These cases may represent dumping events confined primarily to the lower stratum of the bone bed.

b) Fish (Level 2). One lingcod element (figure 17.20) is mapped in 75S, 0E. It is not spatially related to the majority of the fish elements in Level 1.

c) Birds (Level 2). No bird remains are mapped.

d) Shellfish (Level 2). The concentration of abalone (figure 17.21), mussel (figure 17.22), clam (figure 17.22), and turban (figure 17.22) shells primarily in 75S, 0E and 75S, 1E follows a spatial pattern similar to the shells in Level 1 of these two units. One discrete cluster of turbans is observed in the ne quad of 75S, 0E. The remainder of the shellfish remains exhibit a relatively random distribution, an interpretation that is strengthened when the composite spatial organization of the shellfish are considered together for both levels of the bone bed deposit.

e) Worked Bone (Level 2). Two bone flakes from a California condor ulna and a whale lie in 75S, 0E and one incised bird bone tube is located east of the bone bed boundary in 75S 2E (figure 17.23). This pattern contrasts with the worked bone artifacts in Level 1 that are found primarily outside the refuse dump.

f) Ceramics (Level 2). Two ceramic sherds are found in 75S, 0E (figure 17.23). There is no spatial association between these artifacts and the ceramic sherds in Level 1.

g) Glass Sherds (Level 2). Both artifacts (figure 17.23) are found in the bone bed of 75S, 0E. The window glass and bottle glass sherds are spatially related to the bottle glass found in Level 1 of 75S, 0E. Interestingly, window glass and bottle glass sherds in both levels are found only in 75S, 0E and 75S, 1E of the refuse dump, in addition to one window glass sherd in Level 1 of 75S, 2E.

h) Metal (Level 2). As in Level 1, the spatial patterning of nails (figure 17.24) is clearly not associated with the bone bed. Nails are concentrated to the east of the refuse dump in the eastern half of 75S, 2E, all of 75S, 3E, and the se quad of 75S, 4E. Other metal objects (figure 17.25) are found in the refuse dump and adjacent deposits. A button hook and flat iron fragments are in 75S, 0E; a large fragment of a copper bowl is on the edge of the bone bed in 75S 2E; and three other metal frag-

ments and an iron wire fragment are located outside the refuse dump in 75S, 3E and 75S, 4E.

i) Beads (Level 2). A clam shell disk bead is mapped in the bone bed in 75S, 0E (figure 17.23).

j) Lithics (Level 2). No flaked stone tools are recorded in the plan maps of Level 2. A nutting stone (figure 17.26) is situated in the nw quad of 75S, 0E. Cobbles, in contrast to their spatial pattern in Level 1, are found only in the bone bed, concentrated primarily in a rock cluster in 75S, 1E (figure 17.27). Fire-cracked rocks are amassed again in the refuse dump of 75S, 0E and the western half of 75S, 1E (figure 17.28). The two ground stone "other" artifacts are distributed in the sw quad of 75S, 0E (figure 17.26). Finally, the slab millstone and basin millstone fragments (figure 17.26) are situated in the southern half of 75S, 0E, not far from the main concentration of ground stone tools and fire-cracked rocks in Level 1.

4) *East Central Bone Bed: Summary.* The majority of the artifact and faunal assemblages consist of mammal bones, shellfish, fire-cracked rocks, cobbles, and ground stone artifacts. A diverse range of ceramic, glass, bone, and metal artifacts, as well as bird and fish remains, is present in the bone bed and adjacent deposits, but in fewer numbers. While small quantities of wood charcoal are found in the bone bed, diagnostic seeds and nuts are very rare.

Deer, cattle, sheep, sea lion, and harbor seal are the most common mammal elements in the bone bed and tend to be distributed in bone clusters that link together the two excavation levels of the refuse dump. Cabezon, rock fishes, and lingcod are present, but they tend to be spatially discrete from the mammal bone aggregations. Common murrens dominate the bird assemblage, but none were mapped *in situ*. Shellfish remains are very common constituents of the bone bed. The most prevalent shellfish, based on MNI counts, are small gastropods, while mussel shells and sea urchin remains make up the greatest weight of the shellfish assemblage. The mapping of larger shellfish specimens (abalone, mussel, clam, turbans) indicates a relatively ubiquitous spatial distribution in the bone bed as well as in adjacent deposits. A variety of ceramic, glass, bone, and metal artifacts is present in the bone bed and nearby deposits. The most notable spatial distribution of these artifacts involves nails and spikes that clearly are found outside the bone bed. Other ceramic, glass, bone, and metal artifacts are found in both the refuse dump and adjacent deposits. The majority of the lithic assemblage is composed of fire-cracked rocks, cobbles, and ground stone artifacts. While the cobbles are omnipresent inside and outside the refuse dump, the fire-cracked rocks and ground stone artifacts are concentrated in the bone bed and tend to be associated with some mammal bone clusters.

Figure 17.20 *Spatial Distribution of Fish Elements in Level 2, East Central Bone Bed*

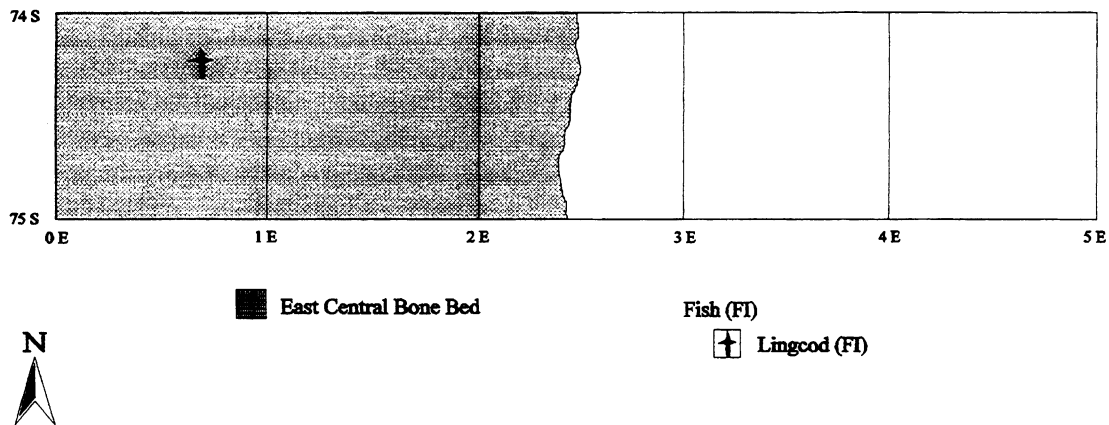


Figure 17.21 *Spatial Distribution of Abalone Shells in Level 2, East Central Bone Bed*

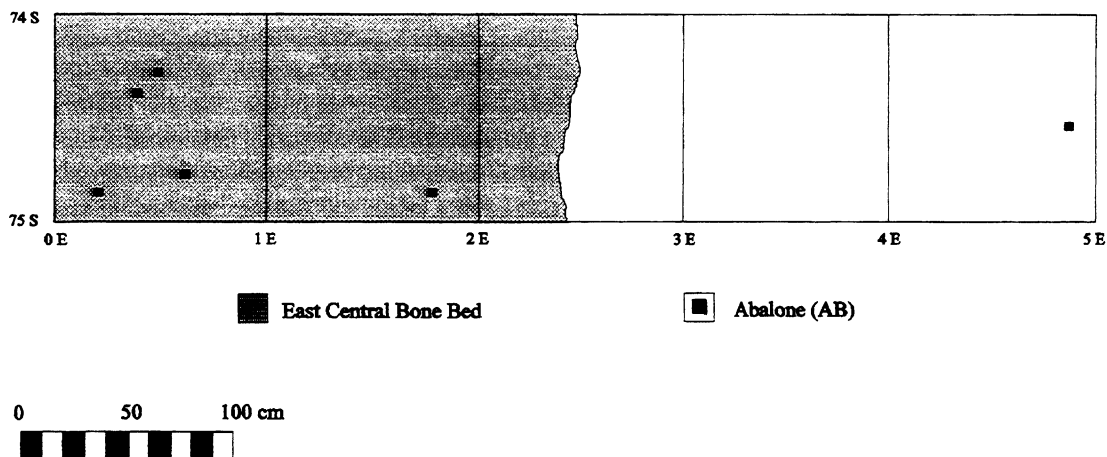


Figure 17.22 *Spatial Distribution of Mussel, Clam, and Turban Shells in Level 2, East Central Bone Bed*

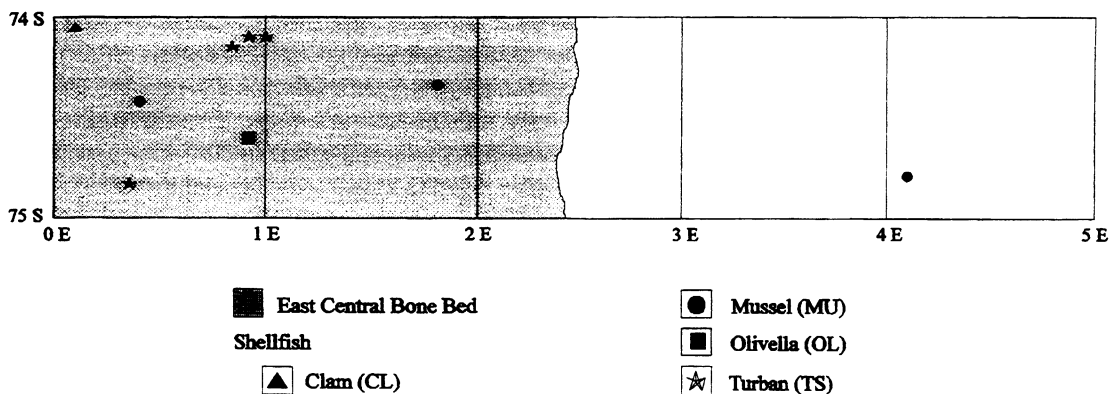


Figure 17.23 Spatial Distribution of Worked Bone Artifacts, Ceramic Pieces, Glass Sherds, and Shell Beads in Level 2, East Central Bone Bed

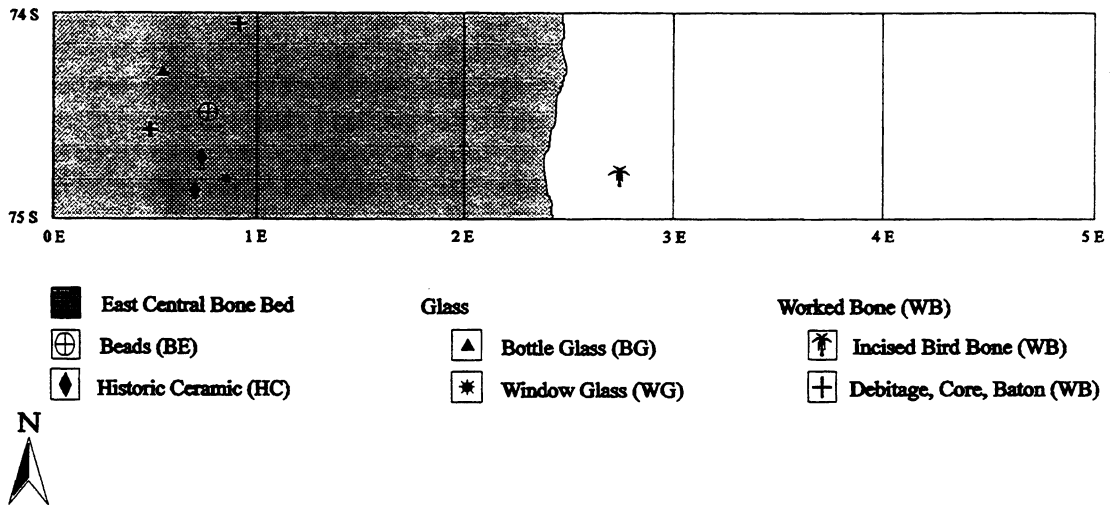


Figure 17.24 Spatial Distribution of Nails in Level 2, East Central Bone Bed

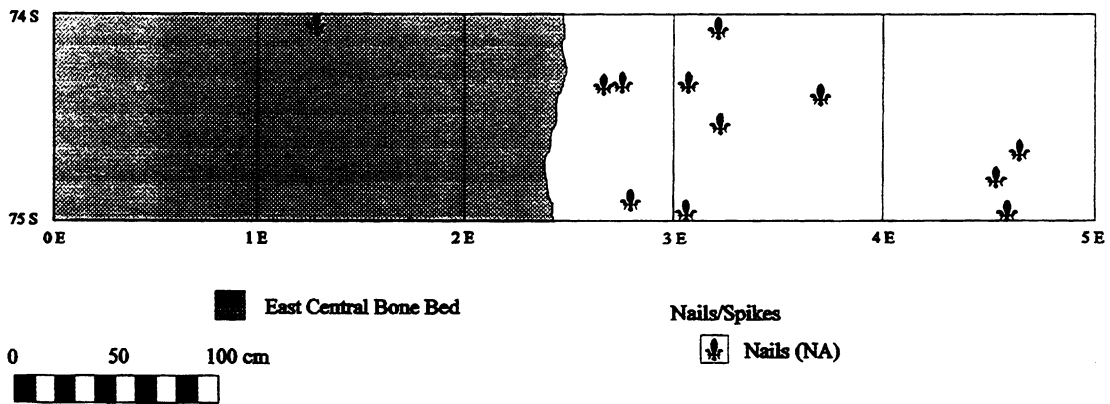


Figure 17.25 Spatial Distribution of Other Metal Artifacts in Level 2, East Central Bone Bed

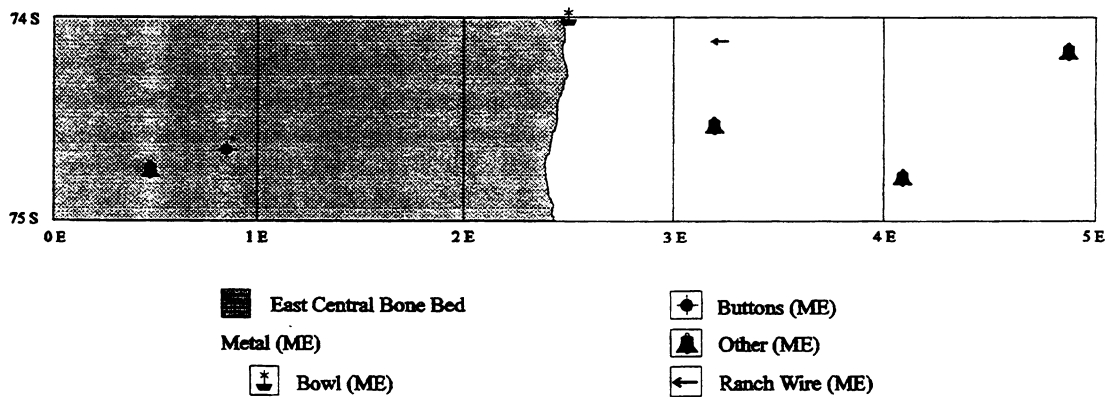


Figure 17.26 *Spatial Distribution of Chipped Stone and Ground Stone Artifacts in Level 2, East Central Bone Bed*

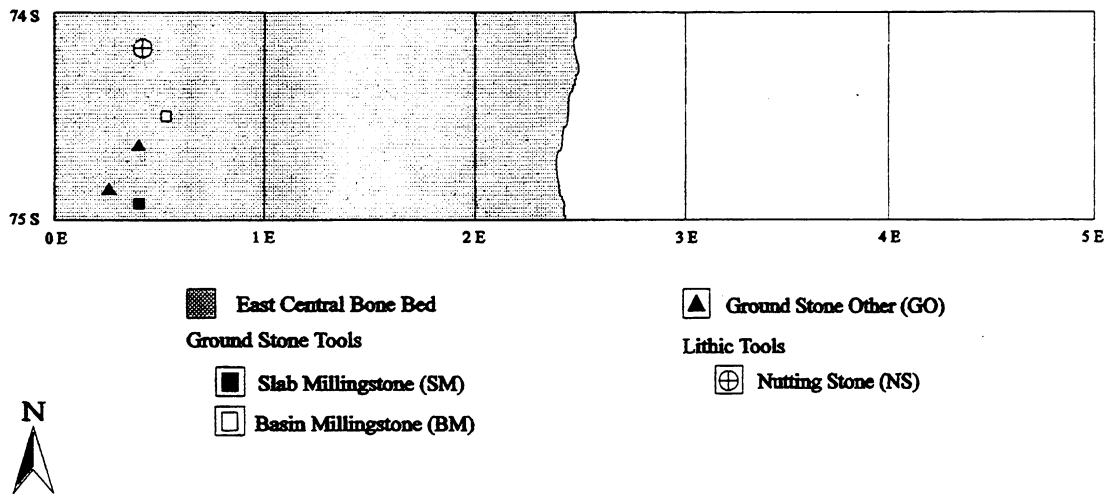


Figure 17.27 *Spatial Distribution of Cobbles in Level 2, East Central Bone Bed*

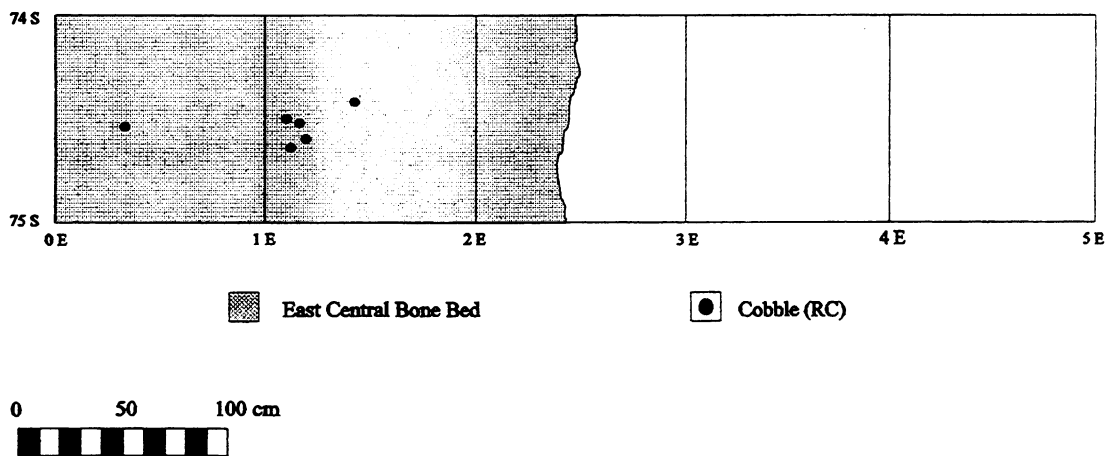
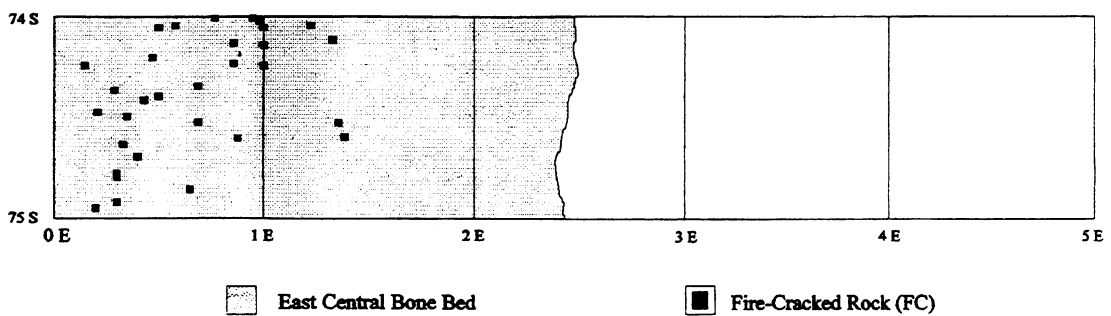


Figure 17.28 *Spatial Distribution of Fire-Cracked Rocks in Level 2, East Central Bone Bed*



SOUTH BONE BED

1) *South Bone Bed: Faunal Remains and Artifacts Recovered from the Trench Excavation.* Table 17.1 presents the counts, percentages, and densities for the faunal and artifact assemblages from the bone bed deposit in 125S, 23W; 125S, 22W; and 125S, 21W.

a) Mammals. Artiodactyls constitute only 30% of the mammal assemblage, with deer (12%), cattle (5%), sheep (2%), and pig (1%) making up the majority of the identifiable species. The density of artiodactyls here is considerably less (156 NISP per cubic meter) than in the East Central Bone Bed (208 NISP per cubic meter). Pinniped elements make up most of the mammal fauna (61%), composed primarily of harbor seals (14%), unidentifiable eared seals (11%), California sea lions (10%), and Steller's sea lions (3%). The density of pinniped remains (312 NISP per cubic meter) is more than twice that of the East Central Bone Bed (152 NISP per cubic meter). Other identifiable mammal bones include Botta's pocket gopher (5%), meadow vole (1%), carnivores (1%), whale (1%), and one bone each of a grizzly bear, porpoise, and jackrabbit.

b) Fish. Cabezon (35%), lingcod (27%), and rock fishes (*Sebastes*) (22%) again dominate the fish assemblage. A greater diversity of other fish remains are present, including surf perches (*Embiotocidae*), Pacific hake, herring or sardine (*Clupeidae*), black or rock prickleback (*Xiphister* sp.), barracuda, and sucker. The density of fish remains (342 NISP per cubic meter) is twice that of the East Central Bone Bed (166 NISP per cubic meter).

c) Birds. As in the East Central Bone Bed, the common murre (53%) dominates the bird assemblage. However, about 30% of the bird remains consist of gull, which is not even represented in the East Central Bone Bed. The next most frequent constituent, Pelican (11%) is followed by one element each of duck, goose, chicken, American coot, and bald eagle. The density of bird bones (180 NISP per cubic meter) is more than three times that of the East Central Bone Bed (52 NISP per cubic meter).

d) Shellfish. The distribution of shellfish types resembles that of the East Central Bone Bed. Slightly greater percentages of other snails (57%) and limpets (17%) are present, while smaller proportions of turban (8%) and mussels (8%) occur. The other shellfish include chiton (6%), horned slipper (2%), barnacle (1%), and the presence of clam, dogwinkle, and periwinkle. Abalone are present in 15% of the specimen bags, while sea urchins are identified in 8%. The density of shellfish remains (1020 MNI per cubic meter) is a little greater than in the East Central Bone Bed (898 MNI per cubic meter).

e) Worked Bone. A much more numerous and varied assemblage of worked bone artifacts is found in the South Bone Bed. Diagnostic bone tools make up 6%

of the assemblage, including 3 incised bird bone tubes, 2 conical points, and 1 each of a bone button, fastener, fishhook, whale bone platter, awl tip, and dart tip. The great majority of the nondiagnostic bone artifacts are worked flakes (86%), followed by worked bone chunks (5%), handles (2.5%), and a whale bone core. The density of worked bone artifacts (350 per cubic meter) is over 7.5 times that of the East Central Bone Bed (46 per cubic meter).

f) Ceramics. Refined earthenwares (primarily handpainted blue and transferprinted blue) again constitute the majority of the ceramic assemblage, along with a few porcelain sherds. The ceramic forms include tea cups (33%), saucers (33%), plates (26%), and one pipe fragment (8%). While fewer plates are represented than in the East Central Bone Bed, the percentage of tea cup pieces is greater. The 35 ceramics from the bone bed deposit, one more than recovered from the East Central Bone Bed, yield a density of 70 sherds per cubic meter. One sherd is worked.

g) Glass Sherds. Window glass makes up a much greater percentage of the 65 glass sherds (89%) in this bone bed, with only 7 identified from bottles (11%) and none from lamps. The density of glass sherds (130 per cubic meter) is almost 1.5 times greater than the East Central Bone Bed (90 per cubic meter). Only one glass piece is worked.

h) Metal. Iron and brass nails (48%) comprise the majority of the metal artifacts, followed by iron wire/plates and unidentified objects (35%), and one piece each of a nail/wire, an iron strap fragment, an iron hook/nail, and a brass button. The density of metal objects is slightly greater for the South Bone Bed than the East Central deposit: 46 and 30 per cubic meter, respectively.

i) Beads. The 23 undecorated glass beads (46/m³) are primarily white (43.5%), blue to bluish-green (13%), brownish-red on green (13%), green (13%), purple (8.7%), and yellow (8.7%) in color. Two clam shell disk beads are also present.

j) Lithics. A greater percentage of the lithic assemblage consists of chipped stone artifacts (36%). Like the East Central Bone Bed, the majority of the lithics are cobbles (38%), fire-cracked rocks (20.7%), and ground stone artifacts (5%), including 2 basin millstone fragments, 1 mano fragment, and 1 pestle fragment. No ground slate artifacts are identified from the refuse dump. The density of lithic specimens (536 per cubic meter) is more than twice that of the East Central Bone Bed (242 per cubic meter). The densities of all categories of lithics are greater in the South Bone Bed, with the exception of ground stone tools and other ground stone artifacts.

2) *South Bone Bed: Flotation and Constituent Analysis.* We analyzed four sediment samples collected from the bone bed during the 1991 excavation of the

Table 17.3 *Cultural Constituents by Weight and Percentage in the Bone Bed of the South Trench*

	125S, 23W		125S, 22W		125S, 22W		125S, 21W	
	LEVEL 2 (2 liters)		LEVEL 2 (2 liters)		LEVEL 2 (1 liter)		LEVELS 1/2 (2 liters)	
	g	%	g	%	g	%	g	%
charcoal	7.87	8.8	7.01	7.1	4.85	9.7	1.16	3.1
seed	0	0	.07	.07	0	0	.11	.3
wood	.01	0.01	0	0	.08	.2	0	0
fauna	16.49	18.5	17.6	17.8	9.37	18.9	10.6	28.0
chiton	.74	.8	1.91	1.93	.38	.8	1.06	2.8
mussel	37.82	42.4	28.91	29.2	18.80	37.8	13.71	36.2
clam	0	0	0	0	.76	1.5	3.16	8.3
limpet	0	0	.78	.8	0	0	0	0
hs	0	0	0	0	0	0	0	0
snail	1.66	1.9	6.04	6.1	1.01	2.0	1.55	4.1
barnacle	1.25	1.4	2.76	2.8	.41	.8	.84	2.2
abalone	3.67	4.1	4.88	4.9	2.22	4.5	2.33	6.2
su fragment	6.83	7.7	14.71	14.9	4.47	9.0	1.55	4.1
su spine	5.36	6.0	10.58	10.7	3.29	6.6	.81	2.1
shellfish	7.10	8.0	3.25	3.3	1.77	3.6	.93	2.5
worked bone	0	0	0	0	.6	1.2	0	0
ceramic	0	0	.11	.1	0	0	.02	.05
glass sherd	.07	.07	0	0	.13	.3	.04	.1
metal	.01	.01	0	0	1.25	2.5	.14	.4
glass bead	.17	.2	.15	.15	.16	.3	.26	.7
chert if	.12	.1	0	0	0	0	.02	.05
obsidian if	.01	.01	.15	.15	.15	.3	.12	.3
Cultural Materials:								
Total	89.18	100.0	98.91	100.0	49.70	100.0	37.85	100.0
Percent of Entire Sample:								
Cultural	89.18	3.1	98.91	3.4	49.70	3.4	37.85	1.3
Noncultural	2800.82	96.9	2779.09	96.6	1403.30	96.6	2788.15	98.7

Key: hs = horned slipper, su = sea urchin, if = interior flake

g = weight in grams % = percent of cultural materials

South Trench. These include: a two-liter sediment sample from Level 2 in 125S, 23W; a two liter sample from Level 2 in 125S, 22W; a one-liter sample taken from a shell concentration in the nw quad of 125S, 22W; and a two-liter sample from levels 1 and 2 in the nw corner of 125S, 21W. The results of the flotation and constituent analysis are presented in table 17.3.

a) Cultural Materials. The three sediment samples from the bone bed in 125S, 23W and 125S, 22W contain a greater quantity of cultural materials (flora, fauna, artifacts) by weight than any of the East Central Bone Bed samples, with the former ranging from 3.1 to 3.4 percent and the latter 1.5 to 2.2 percent. The quantity of cultural materials decreases significantly in 125S, 21W, in which only 1.3 percent of the total weight of the

sediment sample consists of artifacts, animal bone fragments, shellfish, and floral remains.

b) Floral Remains. Similar to the samples from the East Central Bone Bed, very few charred seeds or nuts are identified in either the light or heavy fraction. Uncharred remains are also sparse, consisting mainly of recent introductions (*Bromus* and *Festuca*). Charcoal wood makes up 3.1 to 9.7 percent of the cultural materials recovered in the sediment samples by weight. The quantity of charcoal from 125S, 21W is much lower than the other units, constituting only 3.1 percent of the cultural remains, compared to 122S, 23W and 122S, 22W where it constitutes 7.1 to 9.7 percent. The amount of charcoal in the latter two units slightly exceeds that recovered in any of the units in the East Central Bone Bed.

c) Mammal, Fish, Bird Bones. Animal bones make up 17.8 to 28 percent of the cultural materials by weight recovered in the sediment samples, a range that is consistent with the East Central Bone Bed. The bone weights of the three samples from 125S, 23W and 125S, 22W are relatively congruent, varying between 17.8 and 18.9 percent of all cultural materials. The quantity of bone from these units falls into the lower range of bone weights recorded for the East Central Bone Bed. The sample from 125S, 21W contains a greater mass of bones (28%), putting it into the upper range of the bone weights from the East Central Bone Bed.

d) Shellfish. Almost identical to the East Central Bone Bed, shellfish comprise the great bulk of the cultural remains recovered in sediment samples, varying between 66.6 to 74.6 percent by weight. The smallest percentages of shellfish are from 125S, 21W and one sample in 125S, 22W, while the greatest percentages are from 125S, 23W and the other sample from 125S, 22W. Interestingly, the sediments sampled from the shell concentration identified by field workers during the excavation of 125S, 22W contain the lowest percentage of shellfish by weight. The quantification of the shellfish taxa using shell weight differs from that based on MNI counts (see table 17.1). Mussel umbos and fragments, again the most common constituents, make up between 29.2 and 42.4 percent of the cultural materials by weight. Sea urchin spines and fragments are the next most common constituents in 125S, 23W and 125S, 22W, comprising 13.7 to 25.6 percent of the cultural materials by weight. However, sea urchin remains constitute only 6.2% of the cultural materials in 125S, 21W. Abalone, the next most common shellfish type, ranges between 4.1 to 6.2 percent of the cultural materials across the South Bone Bed. Other common constituents include snails (1.9 to 6.1%), chitons (.8 to 2.8%), and barnacles (.8 to 2.8%), while limpets and clams exhibit sporadic occurrences across this deposit.

e) Artifacts. While artifacts constitute only a small percentage of the cultural materials found in the South Bone Bed sediments, the overall artifact frequency is greater here than in the East Central Bone Bed samples. For example, one to two glass beads are found in each of the sediment samples from the South Bone Bed. Minute fragments of obsidian interior flakes are ubiquitous in all the sediment samples. Small slivers of glass fragments and metal remains are found in three of the four sediment samples from 125S, 23W; 125S, 22W; and 125S, 21W. Tiny ceramic pieces and chert interior flakes are observed in two of the four sediment samples, while a relatively large quantity of worked bone (1.2%) is found in one sediment sample from 125S, 22W.

3) *South Bone Bed: Spatial Analysis.* The spatial relationship of material remains is considered for the

upper two levels of the South Bone Bed defined during its excavation in 1991 and 1992. The third and fourth levels are not analyzed here. We decided to exclude their detailed description because they are limited primarily to two 1 by 1 m units (125S, 23W; 125S, 22W) and the spatial pattern of material remains is largely redundant in the upper two levels. It will suffice to say that the spatial associations described for the upper two levels of the bone bed are found also in the lower two levels.

The first level is a broad exposure of a 27.25 sq m area, including the 7 sq m South Trench excavated in 1991 and the 20.25 sq m South Excavation Area unearthed in 1992. As described in chapter 3, the area excavation includes not only the South Bone Bed, but a portion of a second bone bed (identified as the Abalone Dump), a linear clay feature, an expanse of rock rubble, and a row of small wooden posts. The elevation of the upper surface of Level 1 varies from about 24.2 to 23.3 m asl. Appendix 17.3 presents the following information for each artifact and faunal specimen mapped in Level 1: the catalog number (when collected), item code (keyed into the plan maps), artifact/faunal identification, unit, size (length/width), and three dimensional provenience.

The second level of the South Bone Bed includes materials from units 125S, 23W; 125S, 22W; and 125S, 21W that were excavated and mapped in the South Trench during the 1991 field season. The elevation of the upper surface ranges from 23.48 to 23.22 m asl. Appendix 17.4 presents the catalog number, item code, artifact/faunal identification, unit, size, and three dimensional provenience for each artifact and faunal specimen mapped in Level 2.

SOUTH BONE BED: LEVEL 1

a) Mammal (Level 1). Deer and elk bones (figure 17.29), cattle, sheep, and pig remains (figure 17.30), and marine mammal bones, including California sea lions, harbor seal, Steller's sea lion, and sea otter elements (figure 17.31) are characterized by a spatial organization similar to that described for the East Central Bone Bed. Elements from the same species tend to be associated together in the South Bone Bed, and some of these bone clusters overlap with those of other species, suggesting that they may have been discarded from one or more containers during related dumping episodes.

Deer elements are distributed in two clusters in the South Bone Bed, near the nw corner of 125S, 23W and in 125S, 22W. The deer elements include 1 humerus, 1 ilium, 1 lumbar vertebra, 1 radius, 1 scapula, 1 astragalus, and 1 vertebra (appendix 17.3). Cattle bones are clustered in the NE corner of 125S, 22W, in a north/south linear distribution along the eastern half of 125S, 23W and 124S, 23W, and along the southern boundary of 124S, 24W. The eleven cattle elements include five teeth, one 1st phalanx, two 2nd phalanges, one humerus,

Figure 17.29 Spatial Distribution of Deer and Elk Elements in Level 1, South Bone Bed

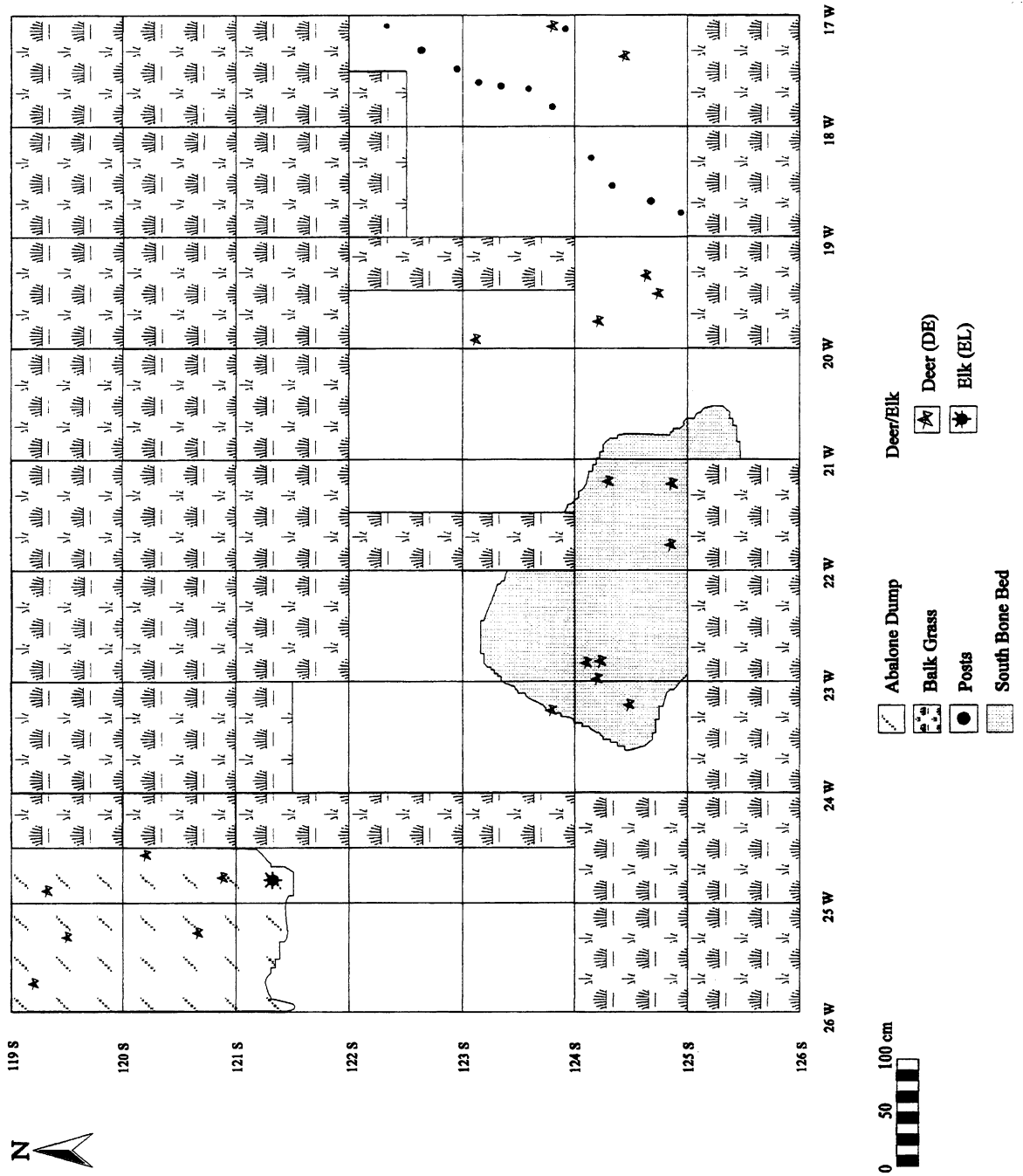


Figure 17.30 Spatial Distribution of Domesticated Mammal Elements in Level 1, South Bone Bed

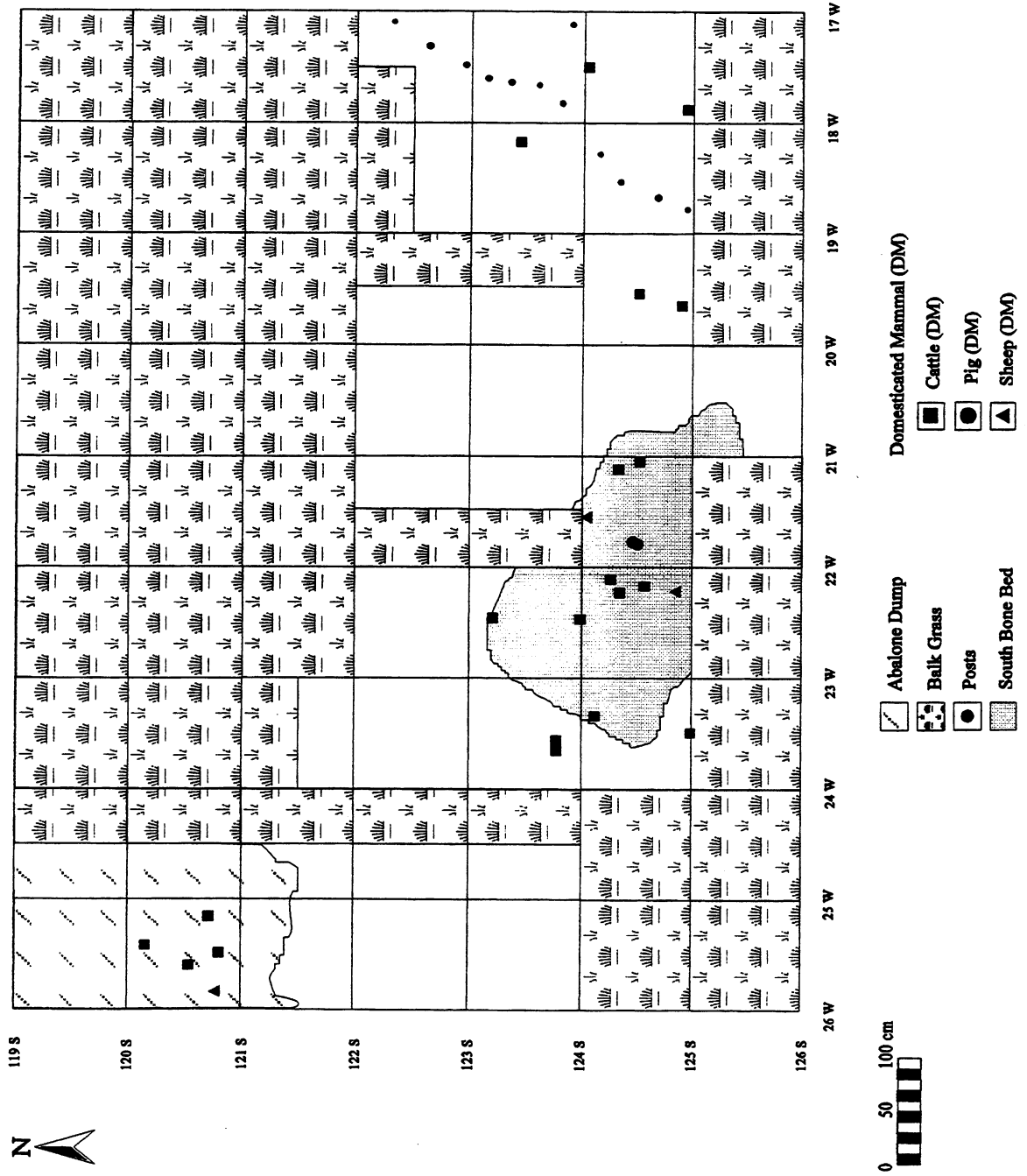
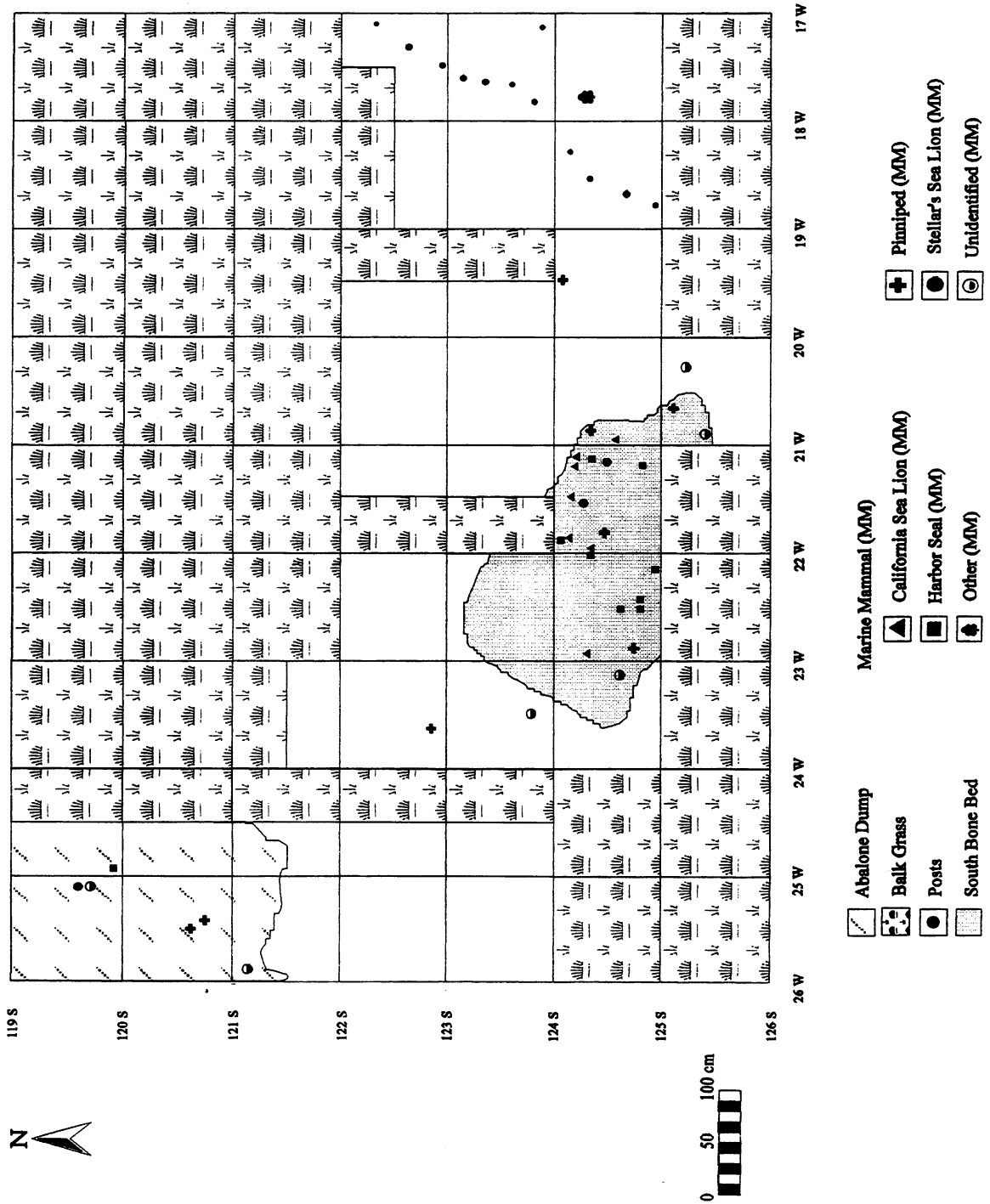


Figure 17.31 Spatial Distribution of Marine Mammal Elements in Level 1, South Bone Bed



and two thoracic vertebrae (appendix 17.3). A pig ulna and radius are found together in 125S, 22W, while a sheep cervical vertebra and metacarpal are separated by more than a meter in units 125S, 22W and 125S, 23W.

Marine mammal remains in the South Bone Bed include four harbor seal elements (2 temporal, 1 humerus, and 1 lumbar vertebra) aggregated in the southern half of 125S, 23W; six California sea lion bones (1 ulna, 1 lumbar vertebra, 1 axis, 1 metacarpal, 1 scapula, and 1 fibula) dispersed along the northern half of 125S, 22W and the boundary of 125S, 22W and 21W; and two Steller's sea lion elements (1 humerus and 1 calcaneum) in 125S, 22W.

Similar to the East Central Bone Bed, the deer, sea lion, seal, and to a lesser extent, cattle remains are characterized by a diverse range of animal parts but few redundant elements. This pattern suggests that only a few individuals are present. The South Bone Bed may include refuse from the consumption of individual meals that was discarded in discrete dumping events. Furthermore, some of the cattle, deer, and marine mammal elements appear to have been deposited together, especially along the eastern half of 125S, 22W. This suggests that some animal dishes were prepared, consumed and deposited by households in a related sequence of events.

The Abalone Dump exhibits similar spatial patterns to the East Central and South bone beds. Whereas six deer bones (1 rib, 1 tibia, 1 tooth, 1 femur, 1 maxilla, and 1 ulna) and an elk mandible are dispersed across the refuse area, four cattle bones (1 each of a 1st, 2nd, and 3rd phalange and 1 metatarsal) are clustered in 121S, 26W (appendix 17.3). Two discrete clusters of unidentified marine mammal bones are found along the eastern border of 120S, 26W and the southern half of 121S, 26W. The spatial overlap of terrestrial game, domesticated animals, and marine mammals occurs in 121S, 26.

The final spatial pattern evident in figures 17.29, 17.30, and 17.31 is the disbursement of deer, cattle, and marine mammal bones to the east of the South Bone Bed, primarily in units 125S, 20E; 125S, 18W; and 124S, 18W. The faunal specimens, clustered in small groups of two or three bones or as isolated elements, are found on both sides of the line of wooden posts. Few mammal remains are found to the north of the South Bone Bed or in the rock rubble area.

b) Fish (Level 1). The two fish elements (figure 17.32) exhibit a different spatial pattern than those in the East Central Area in that they are associated with other mammal remains. The cabezon vertebra in the nw quad of 125S, 23W is associated with a cluster of deer bones and a California sea lion element. The lingcod angular element in the se quad of 125S, 22W is found with deer and harbor seal remains. No fish remains are mapped in the Abalone Dump or along the row of posts.

c) Birds (Level 1). Five bird bones, consisting of a common murre element, a pelican humerus, 2 gull ulnas, and 1 gull humerus, are distributed in the NW quad and central section of 125S, 22W (figure 17.33). Isolated, unidentified bird bones are found along the southeast edge of the South Bone Bed in 126S, 21W; in the Abalone Dump (121S, 25W); and east of the South Bone Bed in 123S, 20W. The concentration of bird bones in the middle of the South Bone Bed suggests they were deposited in one or two related dumping episodes. No comparison can be made with the East Central Bone Bed, since no bird bones were mapped.

d) Shellfish (Level 1). Abalone shells are distributed in three minor concentrations in the South Bone Bed: along the SW corner of 125S, 21W; the border of 124S, 23W and 124S, 22W; and the southern border of 124S, 24W (figure 17.34). In addition, abalone shells are pervasive across the Abalone Dump and scattered to the north and east of the South Bone Bed on both sides of the row of wooden posts. The few other shellfish remains shown in figure 17.35 (mussel, clam, and turban) are mostly isolated specimens found in the South Bone Bed or to the north and east of this refuse deposit.

e) Worked Bone (Level 1). Only one worked bone specimen, an incised bird bone tube, is mapped on the border of the South Bone Bed (figure 17.36). The remaining worked bone pieces, a whale bone harpoon shaft and four flakes, are found in the Abalone Dump.

f) Ceramics (Level 1). Only three ceramic sherds are mapped in Level 1 (figure 17.36): one in the South Bone Bed (125S, 23W), and two to the north in units 123S, 23W and 123S, 22W. No ceramics are mapped in the Abalone Dump or along the line of wooden posts.

g) Glass Sherds (Level 1). One piece of window glass is found in the Abalone Dump (121S, 26W), and another to the north of the South Bone Bed (123S, 21W). No glass fragments are mapped in the South Bone Bed proper (figure 17.36).

h) Metal (Level 1). Unlike the East Central Area, most of the nails (figure 17.37) are located in the South Bone Bed, clustered along the SW boundary primarily in 125S, 24W. A spike is found along the southern boundary of the Abalone Dump in 122S, 25W, and an isolated nail is mapped to the east of the South Bone Bed in 125S, 20W. Other metal artifacts (figure 17.38), including a metal fragment, a hook, and a button, are found in the South Bone Bed in 125S, 24W; 125S, 23W; and 125S, 22W, respectively. Two metal fragments are located in the Abalone Dump, another in the rock rubble of 124S, 26W, and an iron strap and hook to the east of the South Bone Bed in 125S, 21W and 125S, 20W, respectively.

i) Beads (Level 1). One shell bead (figure 17.36) is located to the east of the South Bone Bed in 125S, 20W.

j) Lithics (Level 1). In contrast to the East Central Bone Bed, the flaked stone debitage and tools (figure

Figure 17.32 Spatial Distribution of Fish Elements in Level 1, South Bone Bed

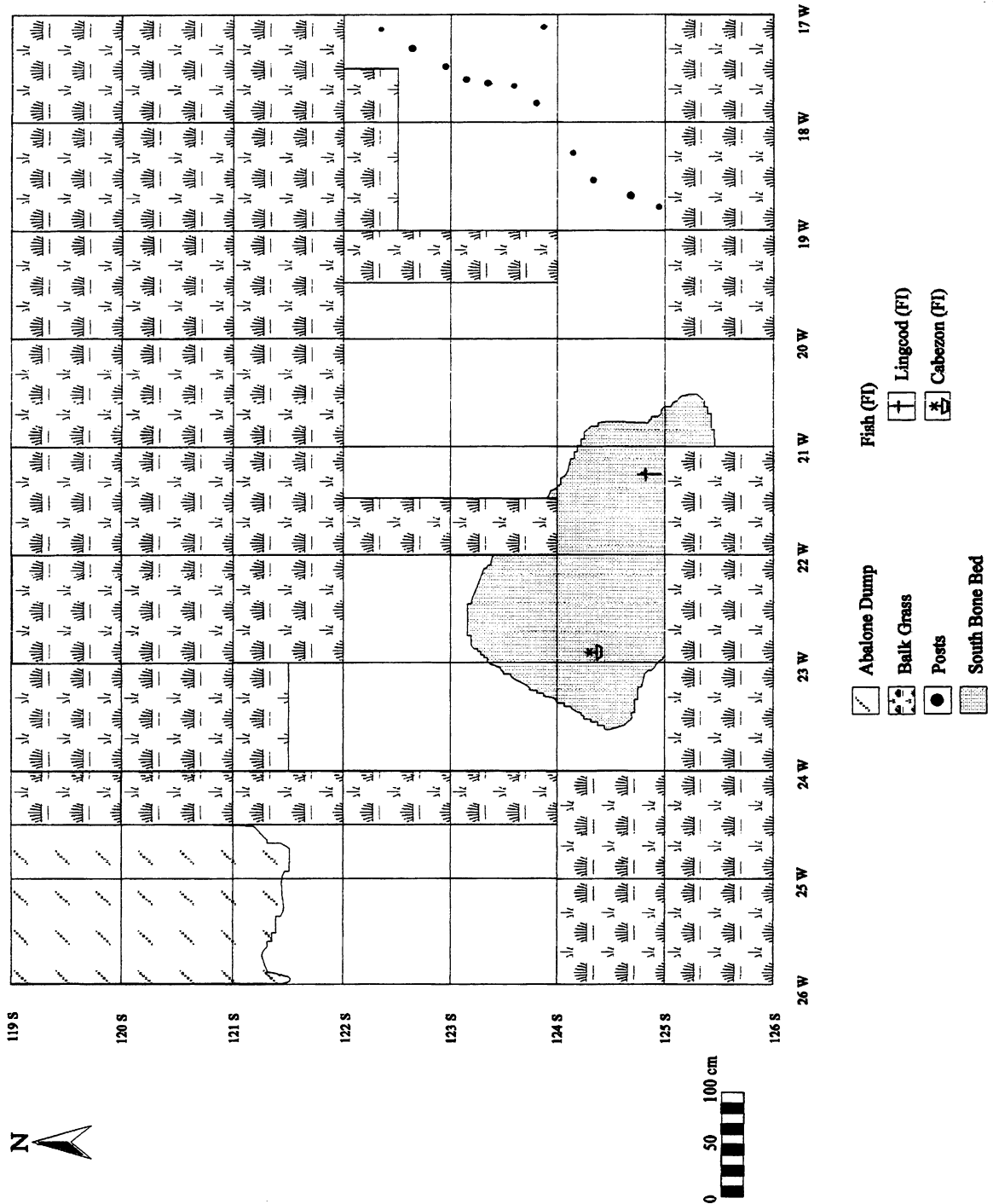


Figure 17.33 Spatial Distribution of Bird Elements in Level 1, South Bone Bed

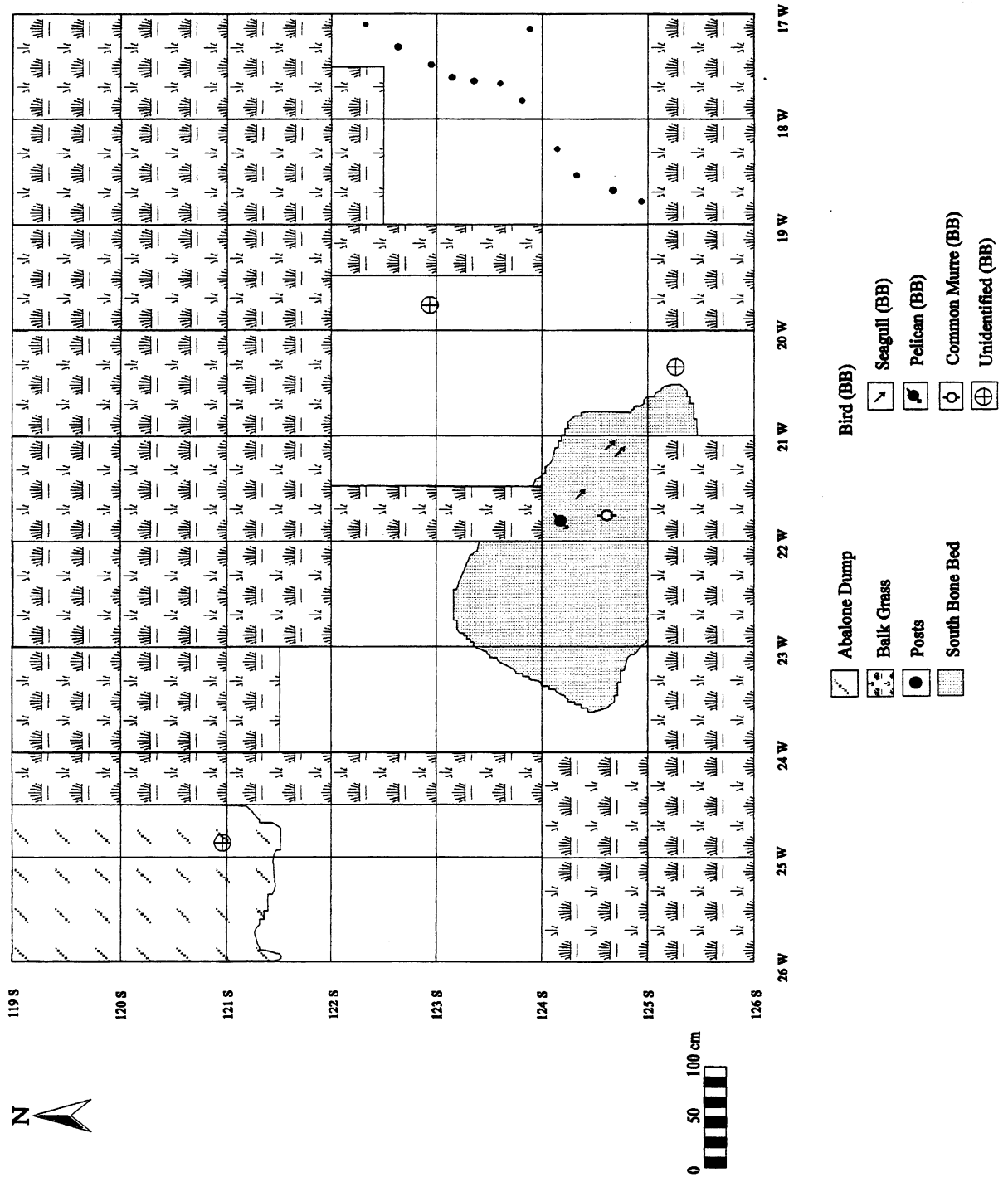


Figure 17.34 Spatial Distribution of Abalone Shells in Level 1, South Bone Bed

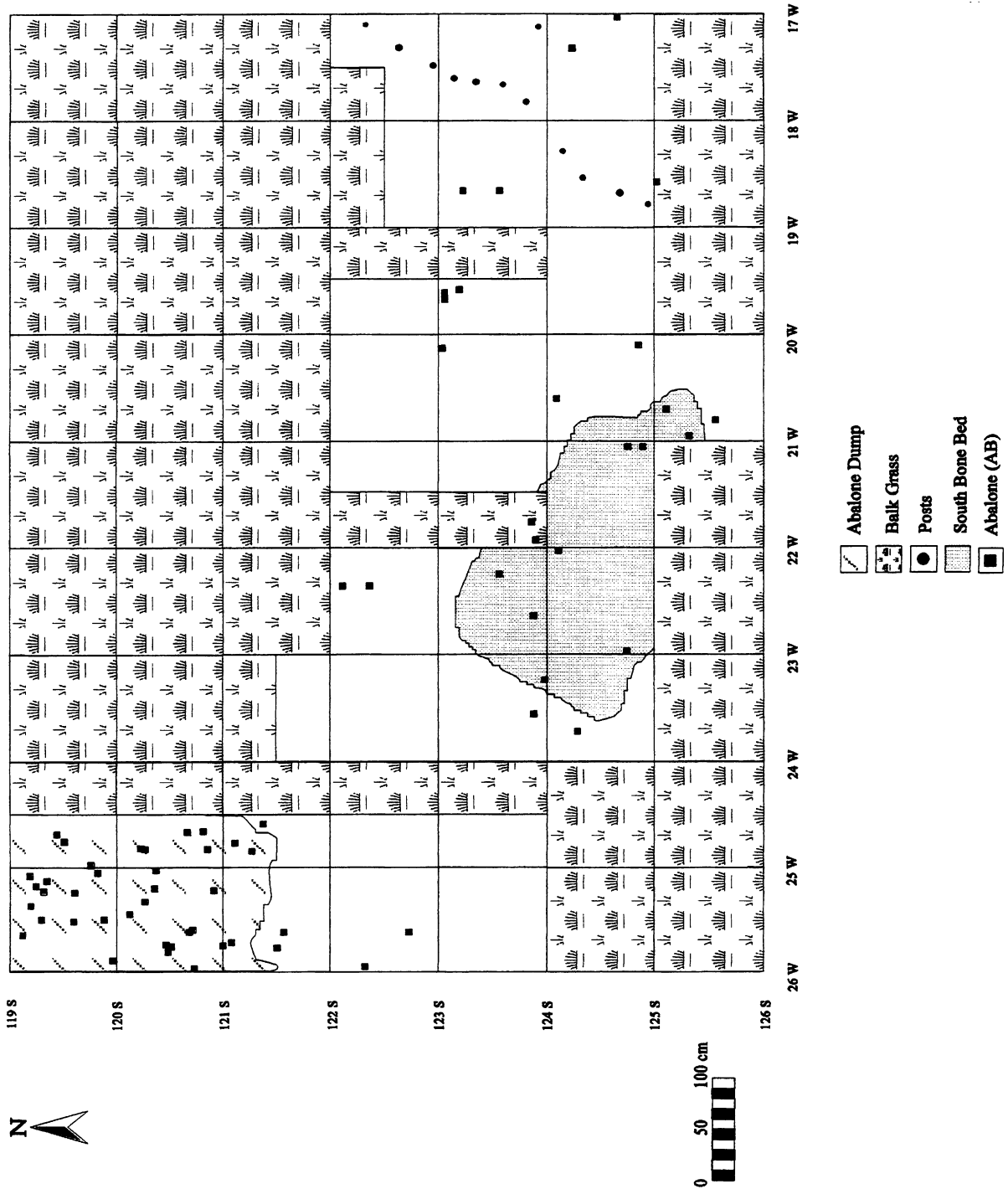


Figure 17.35 Spatial Distribution of Mussel, Clam, and Turban Shells in Level 1, South Bone Bed

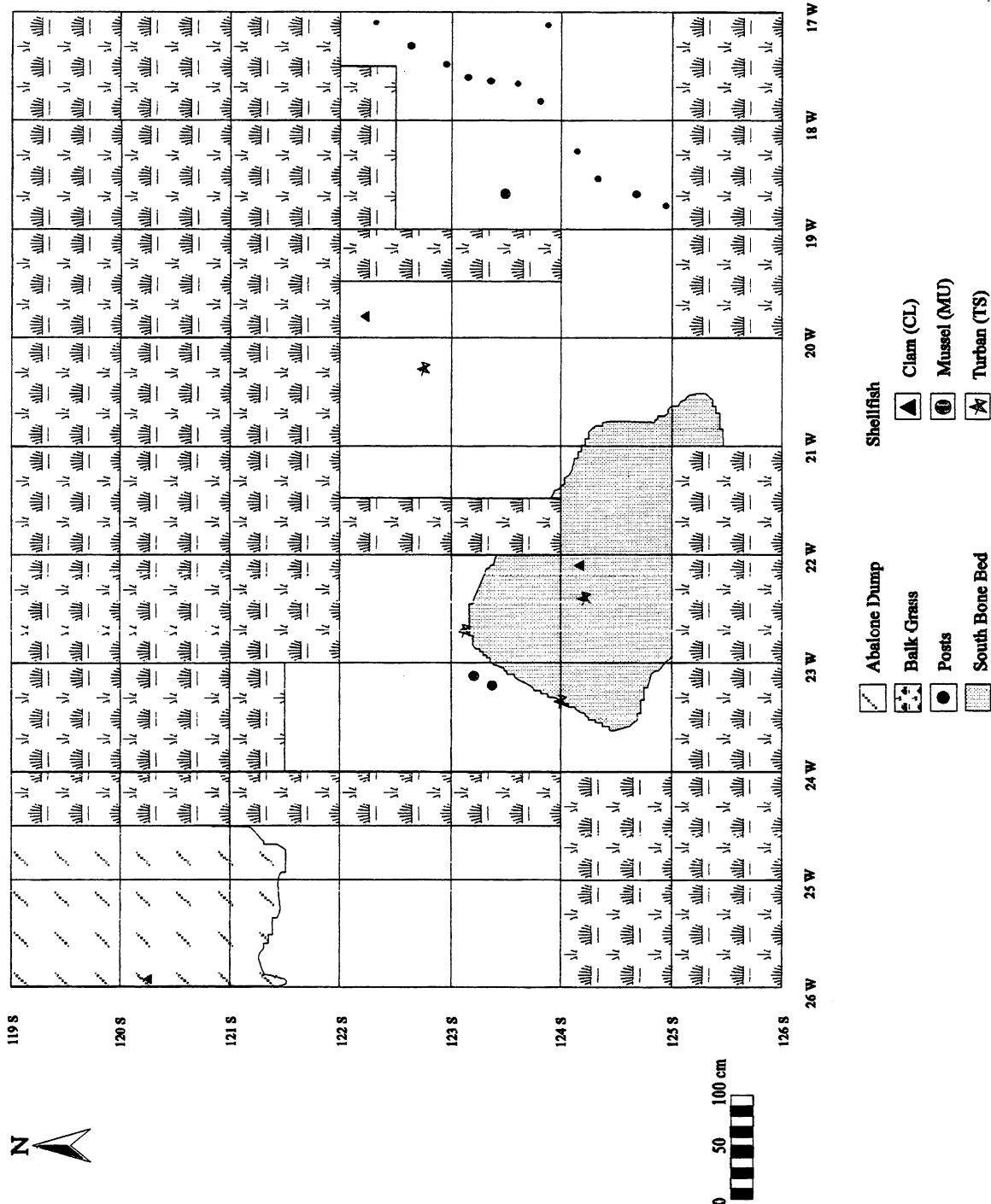


Figure 17.36 Spatial Distribution of Worked Bone Artifacts, Ceramic Pieces, Glass Sherds, and Shell Beads in Level 1, South Bone Bed

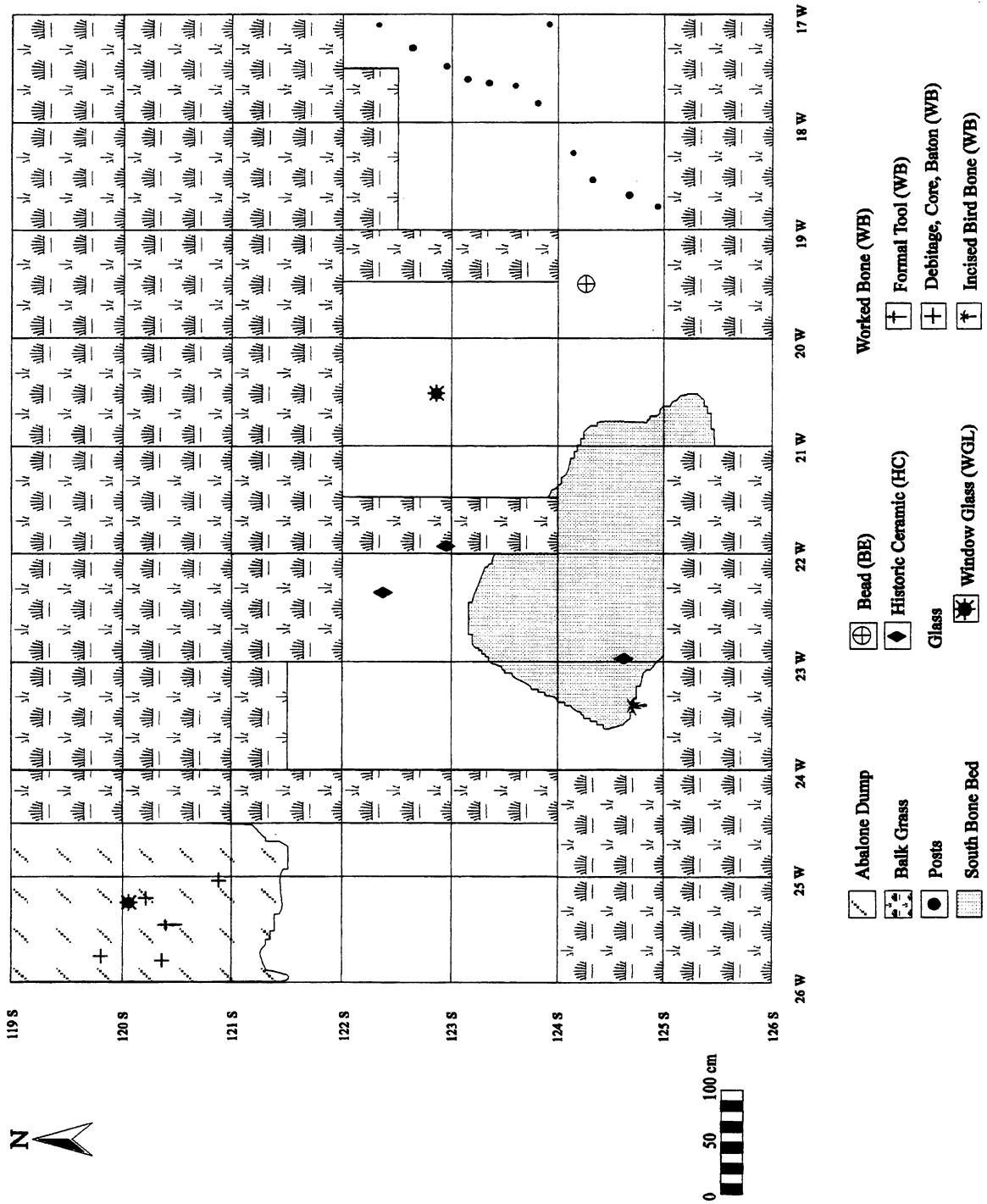


Figure 17.37 Spatial Distribution of Nails and Spikes in Level 1, South Bone Bed

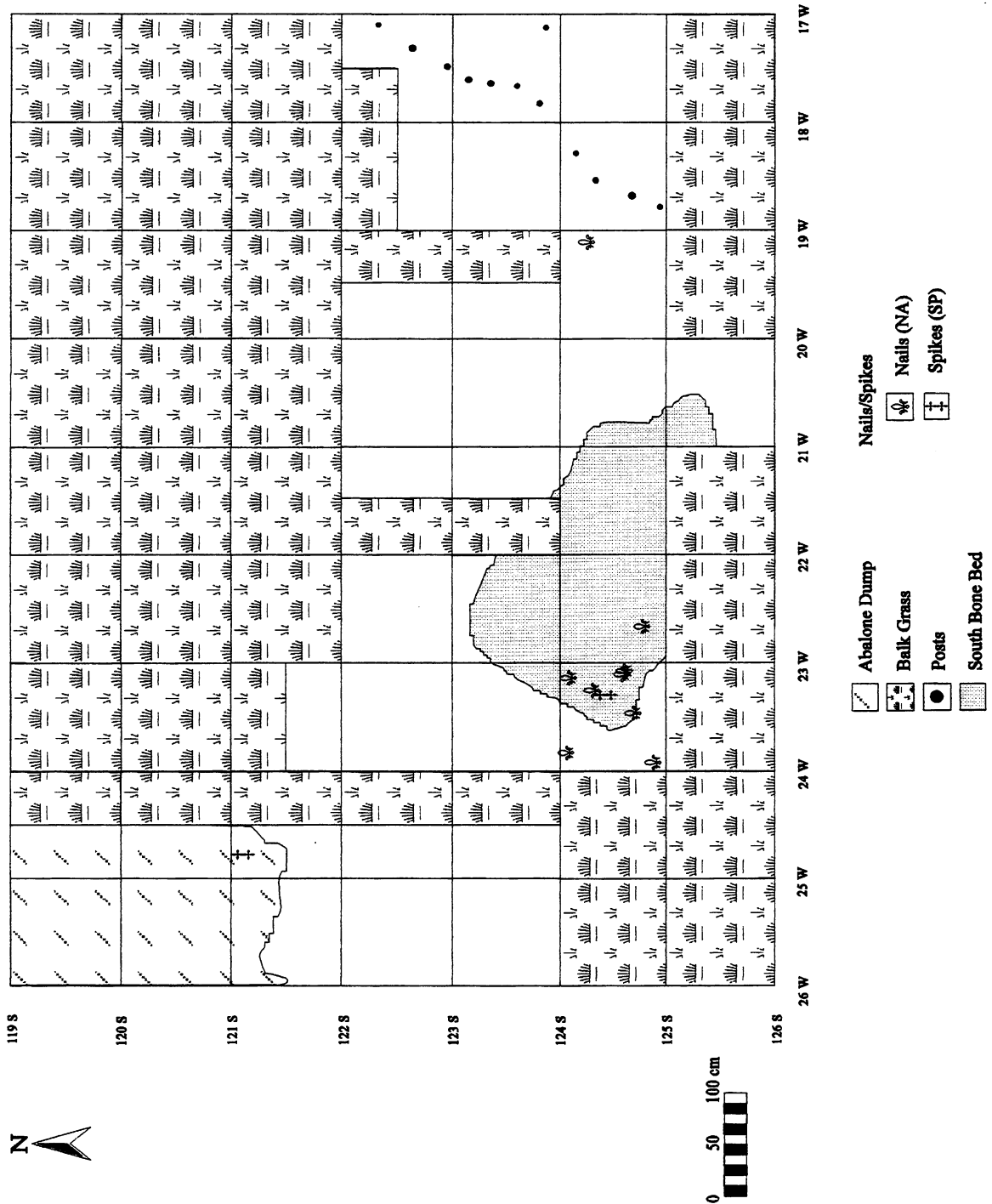
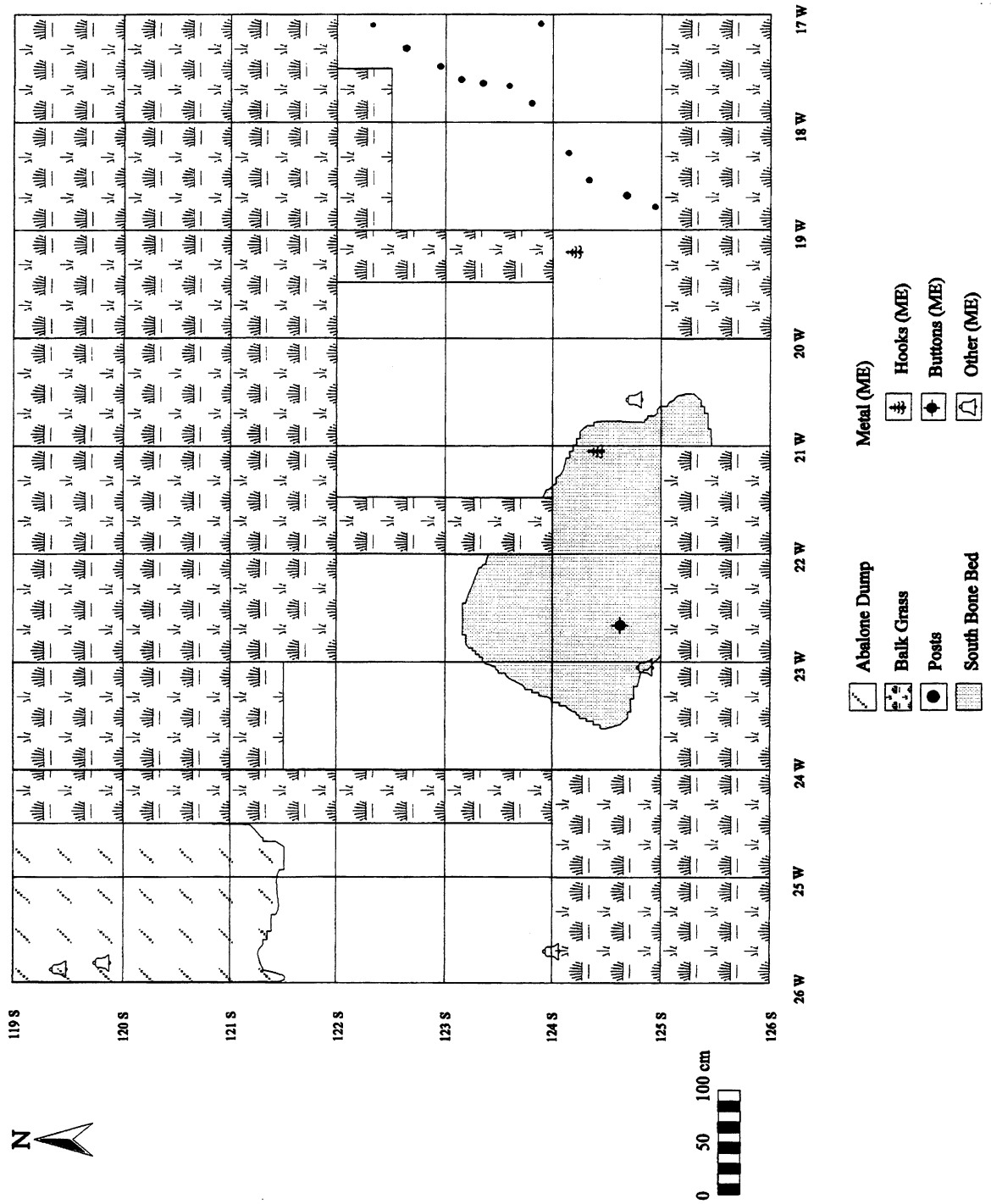


Figure 17.38 Spatial Distribution of Other Metal Artifacts in Level 1, South Bone Bed



17.39) tend to be associated with or near the bone bed deposits. One piece of chert shatter and one obsidian edge-modified flake are located in the South Bone Bed. Another chert shatter artifact, obsidian projectile point, and chert core fragment are located along the sw boundary of the refuse dump in 125S, 24W. Two chert cores are found in the Abalone Dump (121S, 26W) and rock rubble area (124S, 26W), respectively. An obsidian flake is located north of the South Bone Bed in 125S, 22W.

Cobbles (figure 17.40) are found primarily in the South Bone Bed in several clusters and across most of the Abalone Dump. They are also scattered to the north and east of the South Bone Bed. Interestingly, none are mapped in the rock rubble (124S, 26W; 124S, 25W; 123S, 26W; and 124S, 25W).

The fire-cracked rocks (figure 17.41) are concentrated in great numbers in the South Bone Bed in 125S, 24W; 125S, 23W; 125S, 22W, and the west half of 125S, 21W. There is a direct association between the fire-cracked rocks and the clusters of deer, domesticated animal, and marine mammal bones described above. Fire-cracked rocks also occur in the rock rubble west of the South Bone Bed and east of the refuse dump near the row of wooden posts. Significantly, few fire-cracked rocks are mapped in the Abalone Dump.

Ground stone "other" artifacts (figure 17.42) are found primarily in the South Bone Bed in 125S, 22W and 124S, 22W; along the southwestern edge of the bone bed in 125S, 24W; and to the north of the bone bed in 124S, 21W and 123S, 21W. Two ground stone other artifacts are also located in the rock rubble of 124S, 26W and 123S, 26W. The two ground stone tools—a basin millstone fragment and a pestle fragment—are found along the southwestern edge of the South Bone Bed (figure 17.42). They are both on the edge of the massive concentration of fire-cracked rocks that make up much of this bone bed.

SOUTH BONE BED: LEVEL 2

a) Mammal (Level 2). Similar to the East Central Bone Bed, the deer (figure 17.43), cattle (figure 17.44), and marine mammal remains (figure 17.45) in both levels 1 and 2 of the South Bone Bed appear to be associated with one another. Several of the deer elements in Level 2 can be linked to the deer concentrations in Level 1 in the NW quad of 125S, 23W and the southern half of 125S, 22W. The 6 deer elements illustrated in figure 17.43 include 1 radius, 2 humeri, 1 mandible fragment, 1 thoracic vertebra, and a tibia (appendix 17.4). While the cow phalanx in 125S, 23W does not appear to be linked spatially to the cattle remains of Level 1, the lumbar vertebra in 125S, 22W appears to be part of the large, linear distribution of cattle remains in Level 1.

Several of the California sea lion elements in Level 2 may be associated with the group of sea lion bones in

Level 1 in the north half of 125S, 22W. A diverse range of California sea lion elements are illustrated in figure 17.45, including 2 thoracic vertebrae, metatarsal (4th and 5th), 2 teeth, 2 phalanges, a humerus, 1 atlas, 1 pubis, and a lumbar vertebra (appendix 17.4). The distribution of harbor seal elements (1 thoracic vertebra, 2 ribs, and 1 humerus) in 125S, 22W and the west half of 125S, 21W may be related to the 3 seal elements in Level 1 of 125S, 22W.

As in the East Central Bone Bed, the spatial relationship of mammal remains in the upper and lower surfaces of the bone bed suggests that they may have been deposited together in a few related dumping episodes. Thus, it is best to view the excavation levels as arbitrary units defined in the field that do not segregate discrete dumping or occupation episodes. Level 2 also exhibits evidence of spatial clusters of mixed species. The SW quad of 125S, 22W consists of harbor seal, California sea lion, and Steller's sea lion remains. The remains of these marine mammals are also found along the southern boundary of 125S, 22W and 125S, 21W. These mixed groups suggest that some dumping episodes probably involved the discard of parts of different animals.

b) Fish (Level 2). One lingcod angular bone and an unidentified fish bone are found in 125S, 22W (figure 17.46). The former may be associated with the lingcod specimen in Level 1.

c) Bird (Level 2). Most of the bird elements in Level 2 (figure 17.47) appear to be part of the broader spatial distribution of sea bird remains in Level 1. The two gull ulna pieces in the NE quad of 125S, 22W are associated with the gull specimens in Level 1. Two pelican humeri fragments in the northern half of 125S, 22W seem to be related to the pelican element in Level 1. Similarly, the manubrium bone of a common murre found in the sw quad of 125S, 22W may be linked to the common murre piece in Level 1. The bald eagle humerus in 125S, 22W is associated with both the pelican and gull remains. Finally, two pelican (1 tibiotarsus and 1 furcula) elements and a common murre (*carpometacarpus*) bone are found in 125S, 23W where no bird remains are illustrated in Level 1.

d) Shellfish (Level 2). Unlike the mammal, fish, and bird remains, the few shellfish remains in Level 2 of the South Bone Bed do not tend to be spatially linked to shellfish remains in Level 1. The abalone, mussel, clam, and turban (figure 17.48) shells exhibit a relatively random distribution, especially when the composite spatial organization of the shellfish are considered together for both levels.

e) Worked Bone (Level 2). One whale bone platter, 1 whale bone core, 1 possible core, 1 worked long bone shaft, and a flake comprise a cluster of worked bone artifacts in 125S, 22W (figure 17.49). This group of worked bone artifacts is comparable to the cluster of 4

Figure 17.39 Spatial Distribution of Chipped Stone Artifacts in Level 1, South Bone Bed

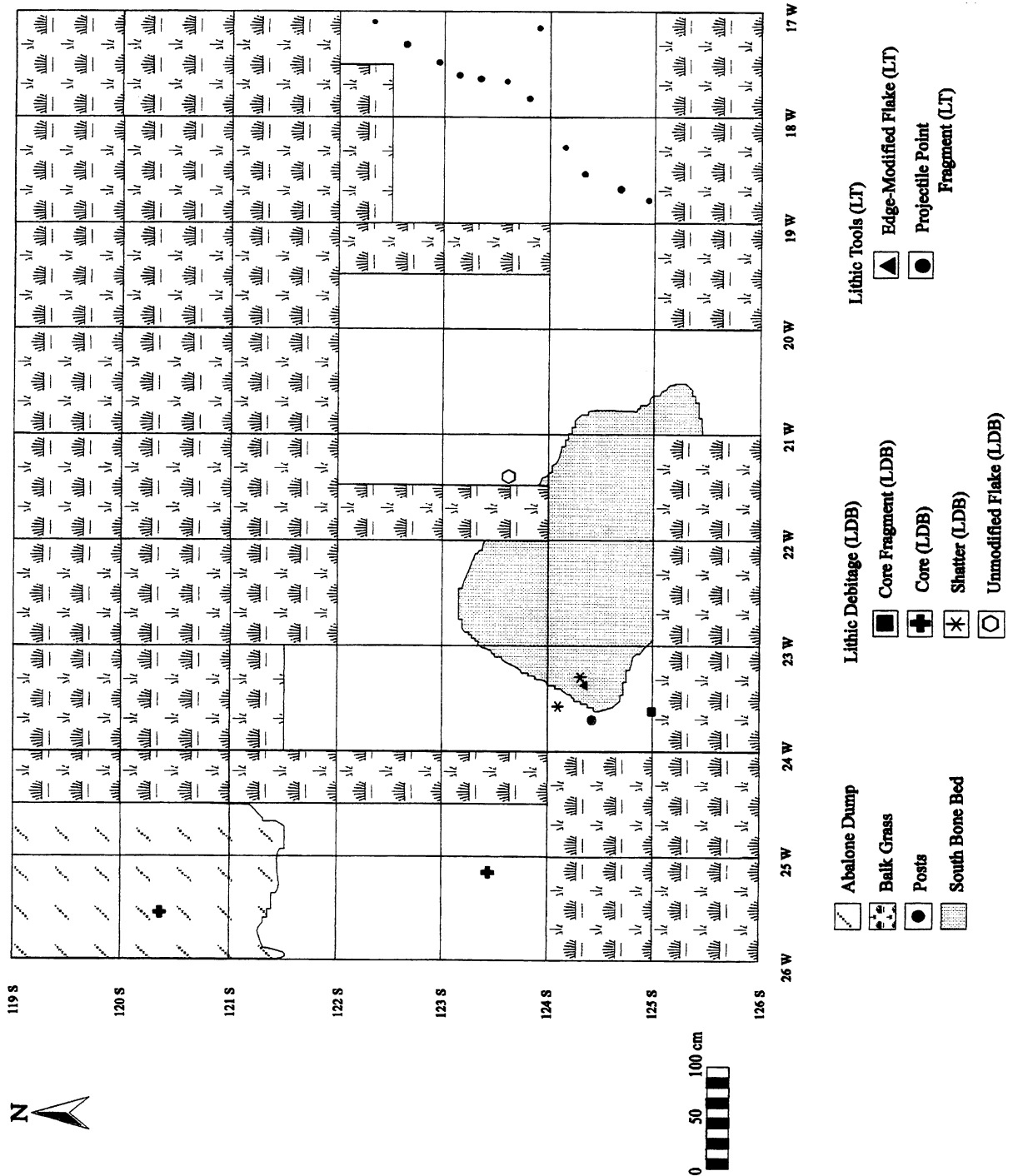


Figure 17.40 Spatial Distribution of Cobbles in Level 1, South Bone Bed

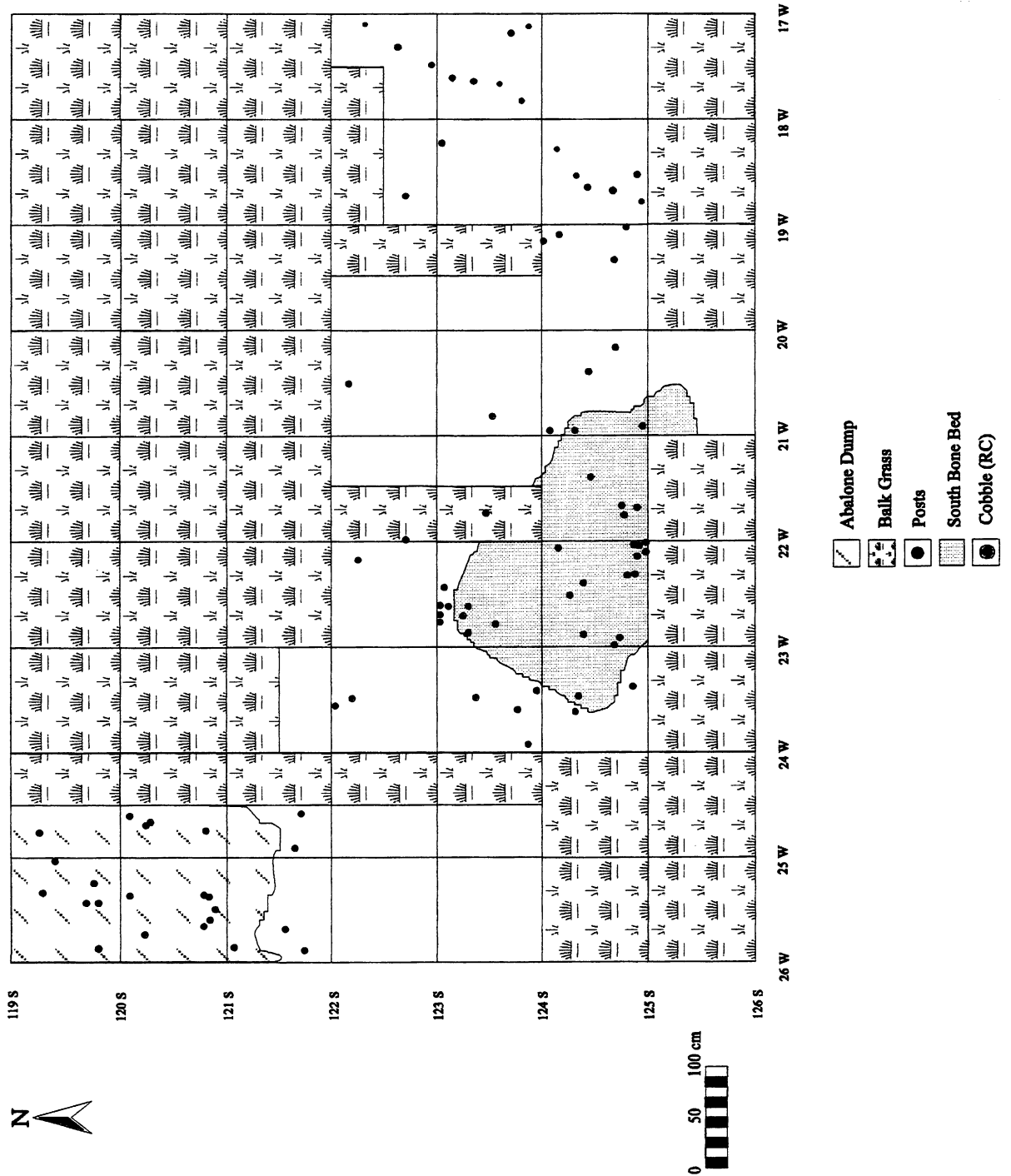


Figure 17.41 Spatial Distribution of Fire-Cracked Rocks in Level 1, South Bone Bed

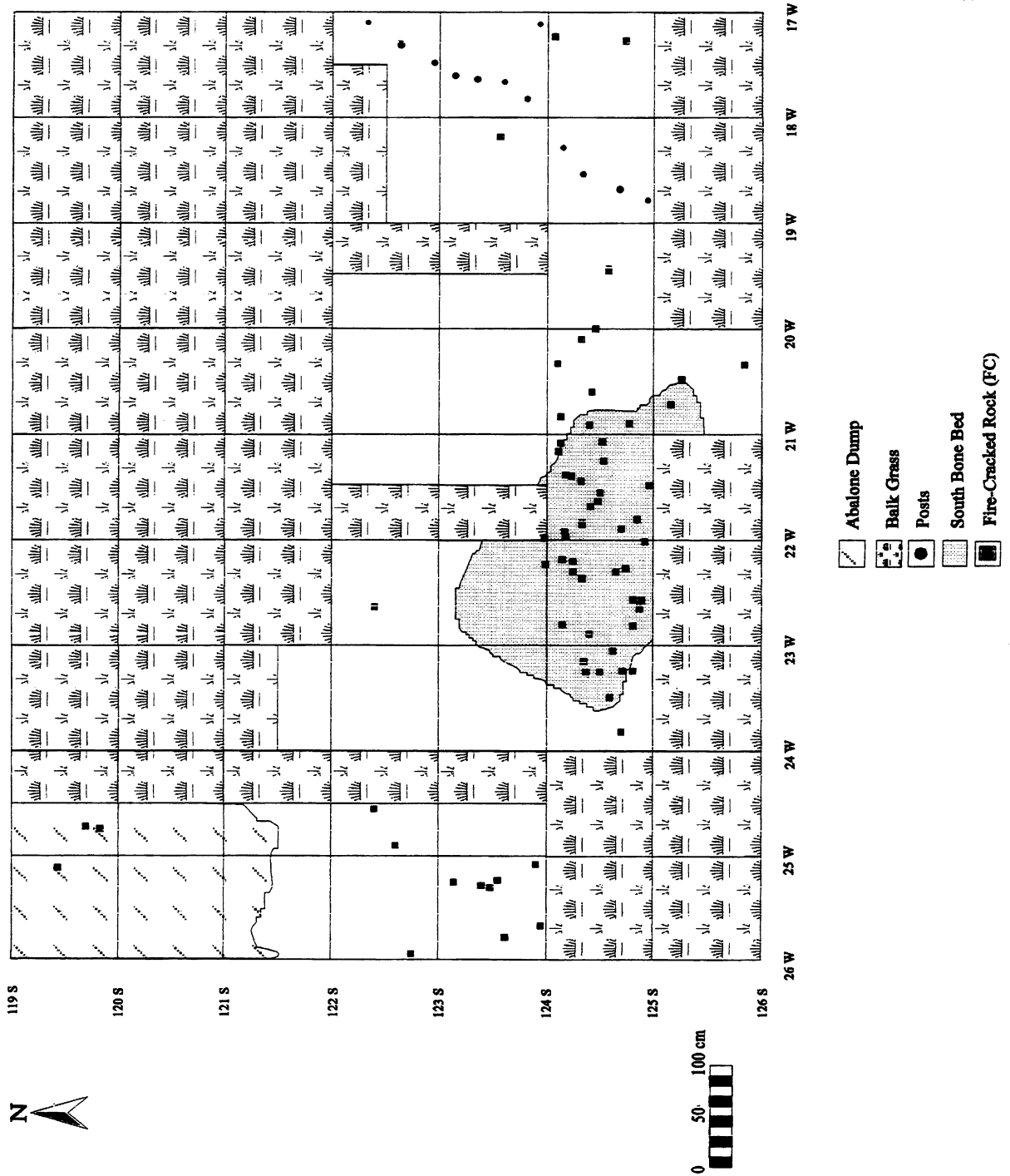


Figure 17.42 Spatial Distribution of Ground Stone Artifacts in Level 1, South Bone Bed

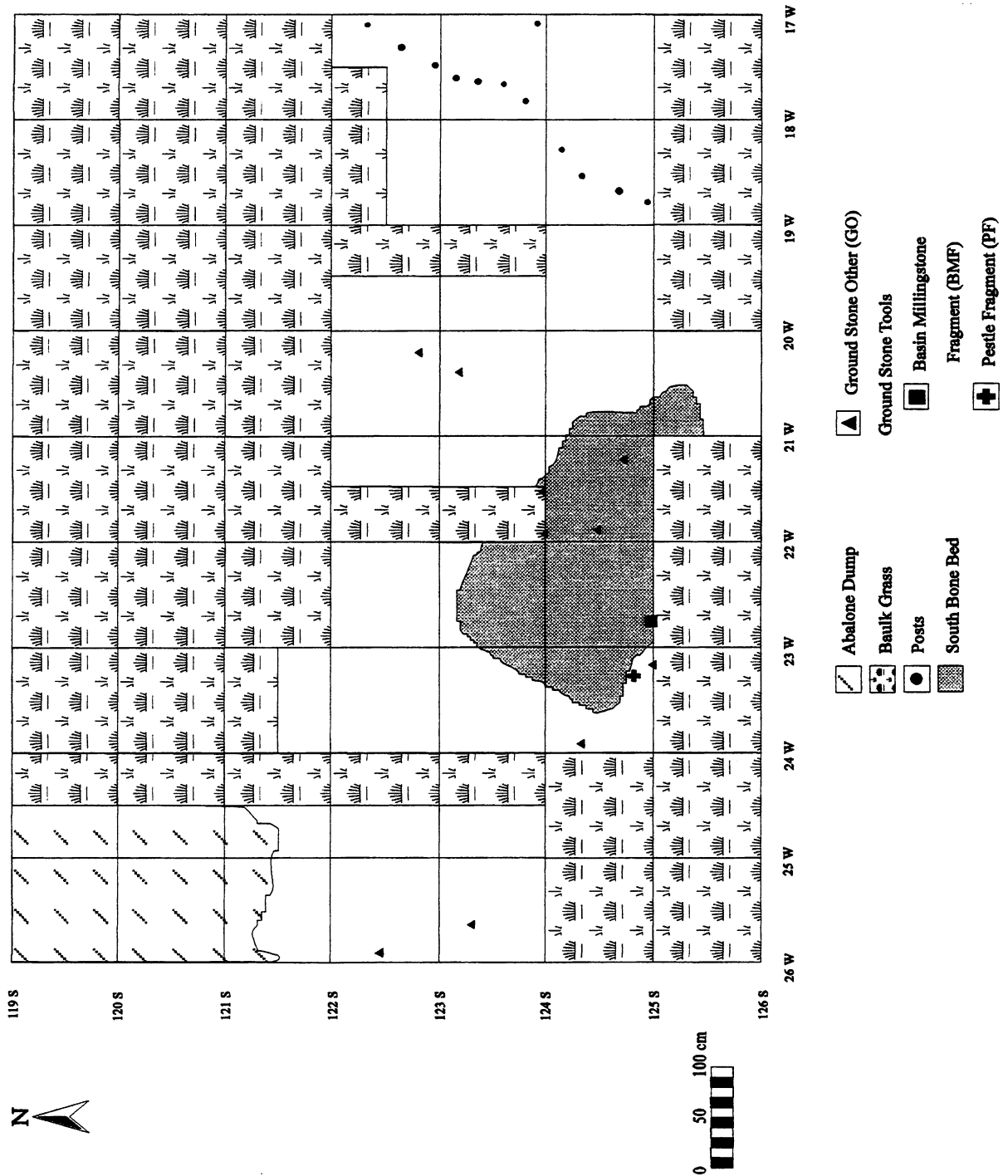


Figure 17.43 *Spatial Distribution of Deer Elements in Level 2, South Bone Bed*

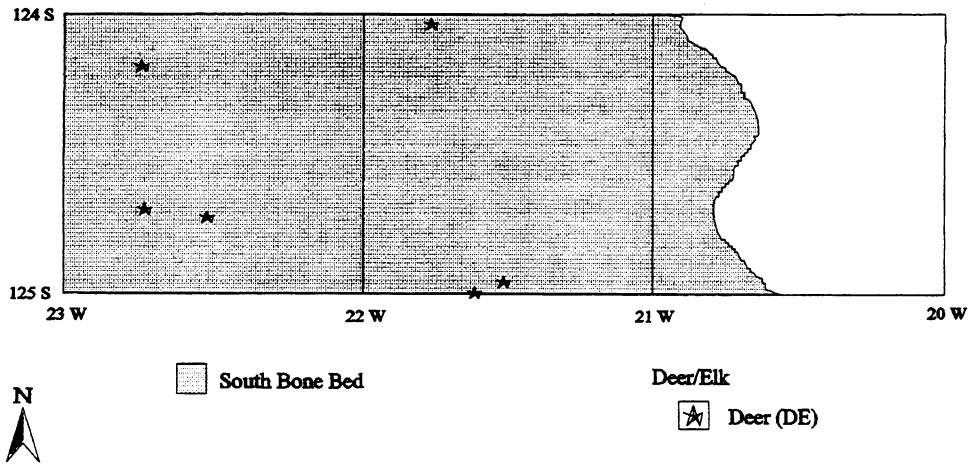


Figure 17.44 *Spatial Distribution of Domesticated Mammal Elements in Level 2, South Bone Bed*

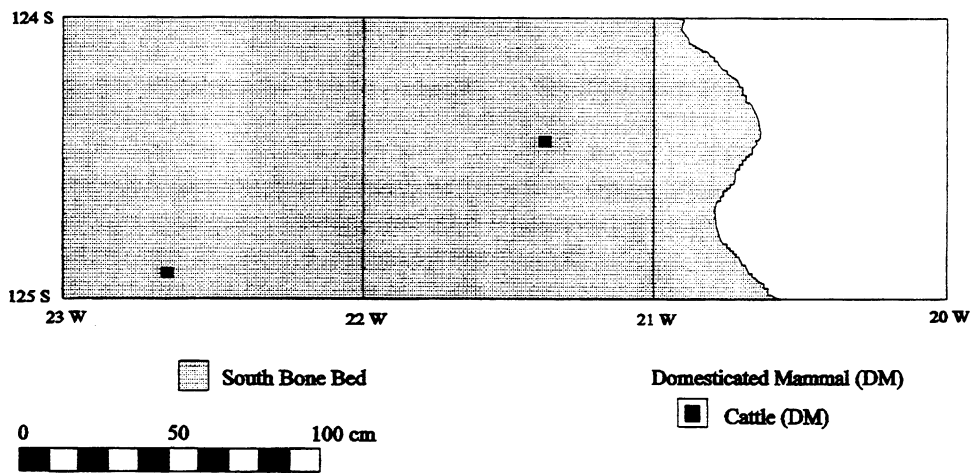


Figure 17.45 *Spatial Distribution of Marine Mammal Elements in Level 2, South Bone Bed*

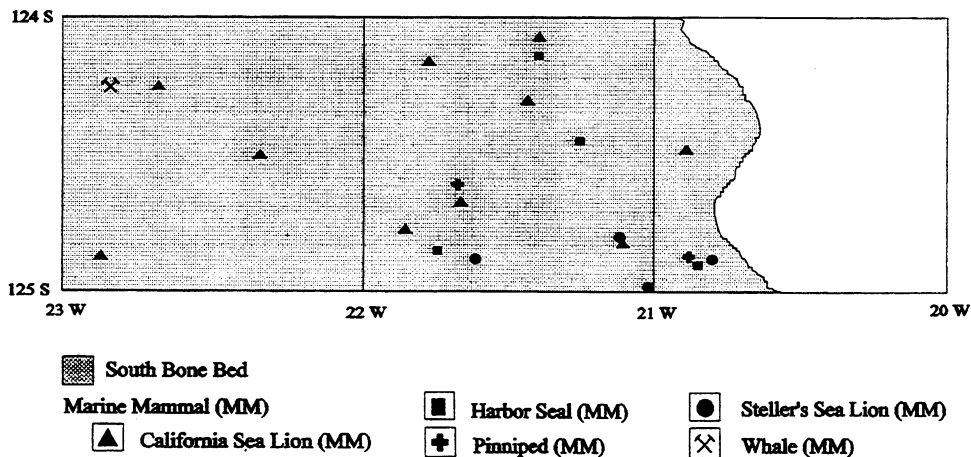


Figure 17.46 Spatial Distribution of Fish Elements in Level 2, South Bone Bed

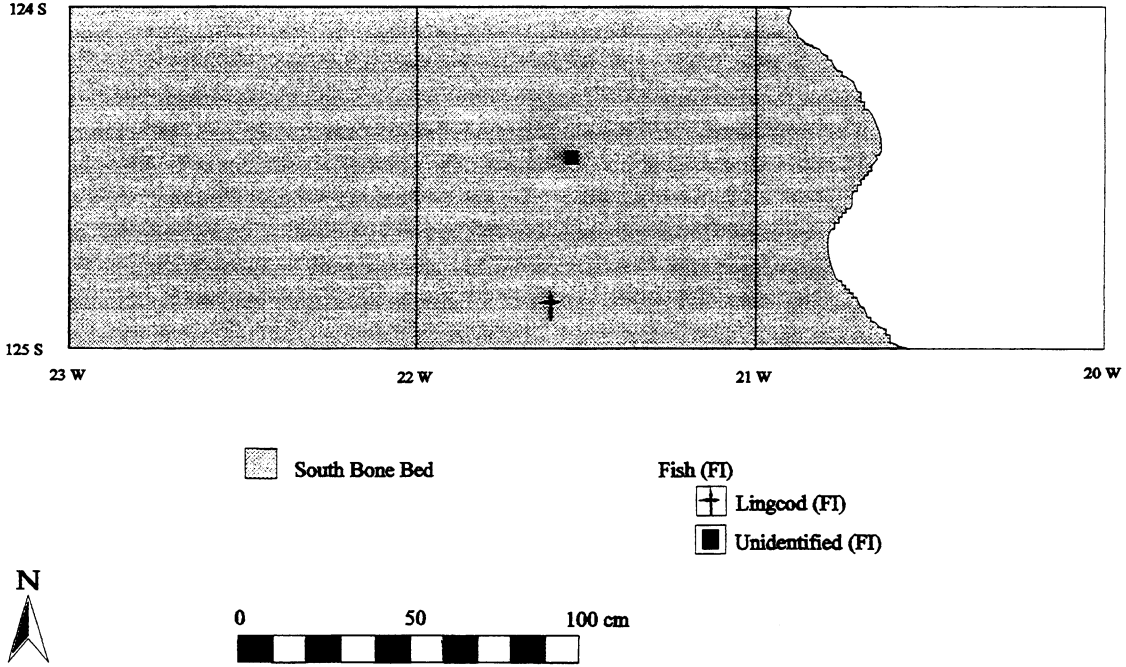
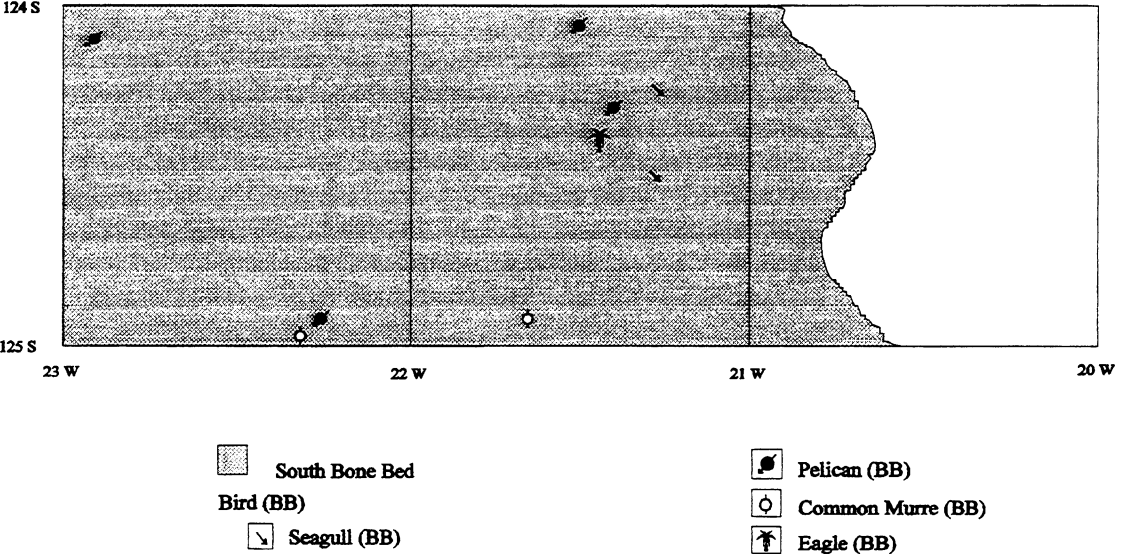


Figure 17.47 Spatial Distribution of Bird Elements in Level 2, South Bone Bed



flakes and 1 tool in Level 1 of the Abalone Dump.

f) **Ceramics (Level 2).** Unlike Level 1, a cluster of 4 ceramic sherds is located in the bone bed in the southern half of 125S, 22W (figure 17.50). They are found in the same location as the worked bone artifacts.

g) **Glass Sherds (Level 2).** No glass sherds are mapped.

h) **Metal (Level 2).** A nail and an unidentified metal piece (figure 17.51) are found in 125S, 23W and 125S, 22W, respectively. The nail may be on the outer edge of the cluster of nails identified in Level 1 of 125S, 24W.

i) **Beads (Level 2).** No beads are mapped.

j) **Lithics (Level 2).** Two obsidian flakes are located in 125S, 22W (figure 17.52). Large numbers of both cobbles (figure 17.53) and fire-cracked rocks (figure 17.54) are distributed across Level 2 of the South Bone Bed. When the composite spatial organization of fire-cracked rocks is considered for both levels of the bone bed, it is clear that a substantial mass of fire-altered rocks were deposited in 125S, 23W; 125S, 22W; and the west side of 125S, 21W. Again, the fire-cracked rocks are associated directly with the clusters of mammal and bird bones. Four ground stone other artifacts (figure 17.55) and 2 millingstone fragments (figure 17.55) are also found in Level 2. The latter may be associated with the 2 ground stone artifacts in Level 1 of 125S, 23W and 125S, 24W.

4) **South Bone Bed: Summary.** Similar to the East Central Bone Bed, the artifact and faunal assemblages consist primarily of mammal bones, fire-cracked rocks, cobbles, and ground stone artifacts. However, the ceramic, glass, bone, metal, and chipped stone artifacts are more diverse and numerous in the South Bone Bed, and a greater density and range of fish and bird specimens also occur here. Wood charcoal is found throughout the refuse dump, but few charred seeds or nuts are present.

Pinnipeds, especially sea lion and seal remains, are the most common mammal elements in this bone bed. Deer, cattle, sheep and pig are present, but in lower densities than in the East Central Bone Bed. The mammal remains are distributed in bone clusters that link related taxa in both excavation levels together. The diverse but low frequency of redundant elements indicates that a few butchered individuals are probably represented in the bone bed. Cabezon, lingcod and rock fishes are the most common fish taxa, and isolated elements are associated with mammal bone clusters. Common murre again dominate bird taxa, but a large number of gulls (absent in the East Central Bone Bed) are also present. Similar to the East Central Bone Bed, the most prevalent shellfish taxa, based on MNI counts, are small gastropods. Mussels make up the greatest mass of shell by weight. Abalone are distributed in several clusters, while the remainder of the mapped shellfish

remains exhibit a relatively random spatial pattern.

In contrast to the East Central Bone Bed, the South Bone Bed contains a greater density and diversity of worked bone artifacts, a greater percentage of glass sherds from broken window panes, more nails located in or near the bone bed, and a greater number of chipped stone artifacts. While the East Central Bone Bed contains a slightly higher density of ground stone artifacts, the South Bone Bed is characterized by more cooking stones (fire-cracked rocks, cobbles, and ground stone other). The density and spatial patterns of beads and ceramics are similar for both the East Central and South bone beds. Cobbles are very common in the South Area and distributed inside and outside the bone bed deposits. Fire-cracked rocks, concentrated in the South Bone Bed, are associated with the bone clusters. The ground stone artifacts are situated in or on the edge of the massive concentration of fire-cracked rocks in the South Bone Bed.

INTERPRETING THE BONE BED DEPOSITS

We believe that the East Central and South bone beds were created by people who were cleaning refuse from their kitchen areas in nearby living quarters and related residential space. Both refuse deposits are characterized by the same basic structure—dense masses of fire-cracked rocks, cobbles, and ground stones associated with the remains of wild game, domesticated artiodactyls, marine mammals, fish, birds, and shellfish. The spatial organization of the fire-cracked rocks and mammal remains in the East Central Bone Bed suggests that residents tossed food refuse into the trash deposit from containers while standing on the south side of the bone bed. Trash may have been generated in residences located a short distance to the south, from which it was carried directly to the refuse area for disposal. It is also possible that a barrier existed around the northern edge of the bone bed (structural remains of an abandoned house?), curtailing the dumping of trash from a northerly direction. The toss pattern in the South Bone Bed is less clear, with materials apparently having been pitched from several different directions.

We identify three kinds of domestic practices that generated the majority of the trash in the bone beds. They are: a) the processing, cooking, and consumption of meat dishes, b) the production and maintenance of craft goods, and c) the recycling and use of ceramic and glass objects. The following discussion encompasses each domestic practice and compares it to relevant household tasks of the late prehistoric and early historic Alutiiq and Kashaya Pomo peoples.

a) *Processing, Cooking, and Disposal of Meat Dishes.* As sophisticated maritime peoples, the Alutiiq on Kodiak Island focused their culinary skills primarily on the preparation of marine mammals (whales, pinnipeds),

Figure 17.48 *Spatial Distribution of Abalone, Mussel, Clam, and Turban Shells in Level 2, South Bone Bed*

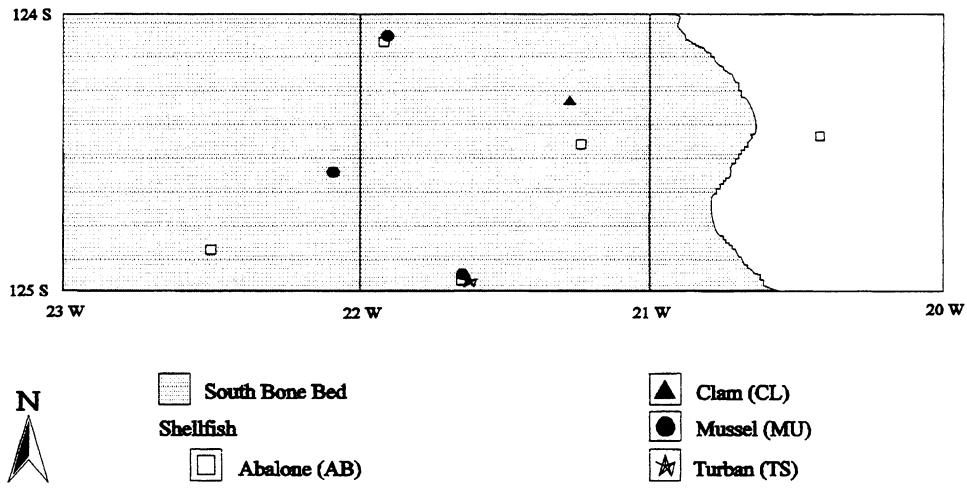


Figure 17.49 *Spatial Distribution of Worked Bone Artifacts in Level 2, South Bone Bed*

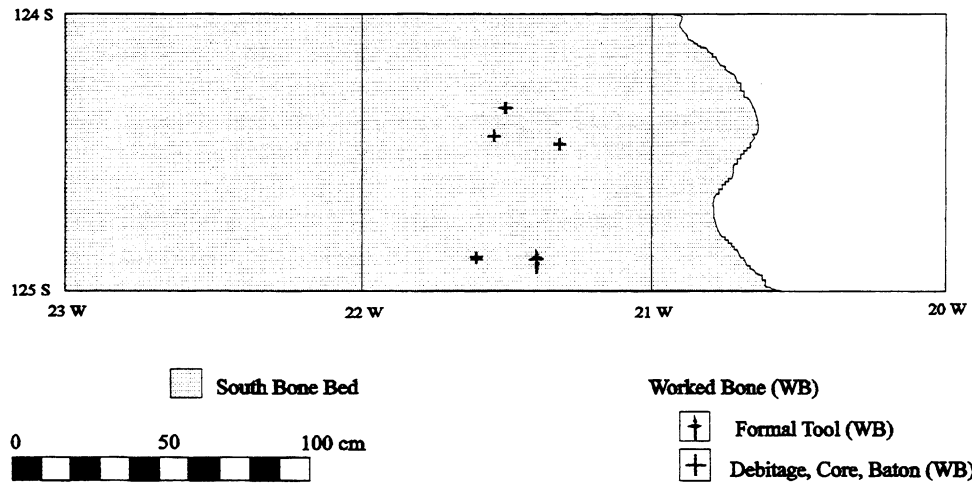


Figure 17.50 *Spatial Distribution of Ceramic Pieces in Level 2, South Bone Bed*

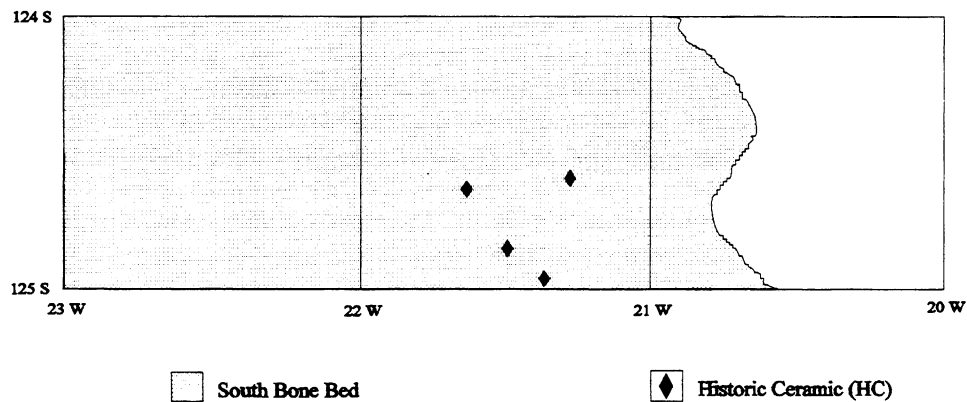


Figure 17.51 *Spatial Distribution of Metal Artifacts in Level 2, South Bone Bed*

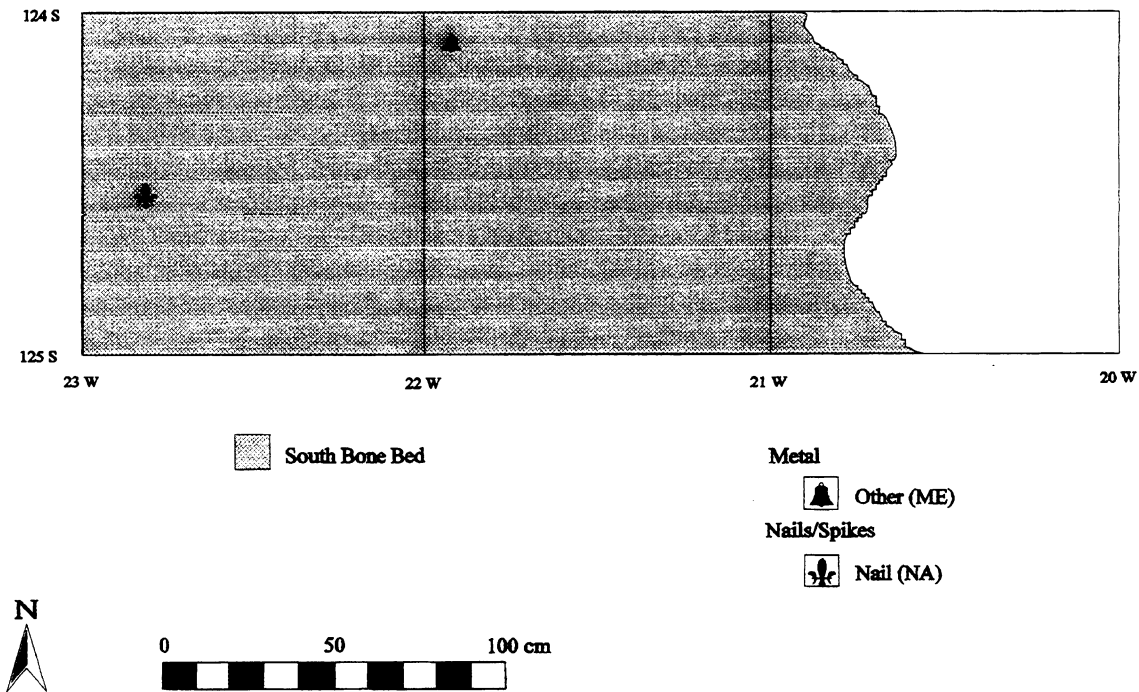


Figure 17.52 *Spatial Distribution of Chipped Stone Artifacts in Level 2, South Bone Bed*

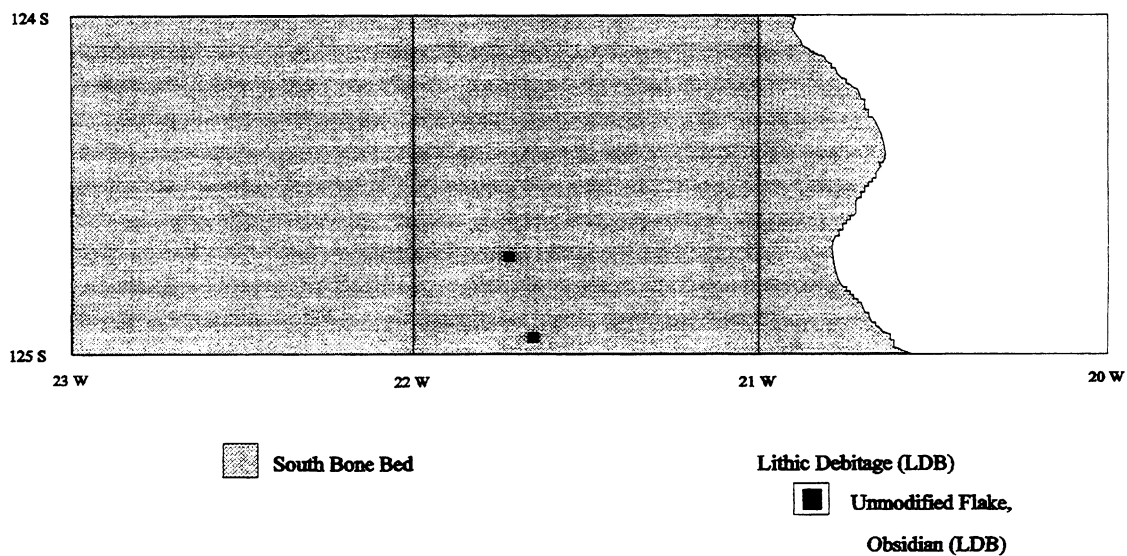


Figure 17.53 Spatial Distribution of Cobbles in Level 2, South Bone Bed

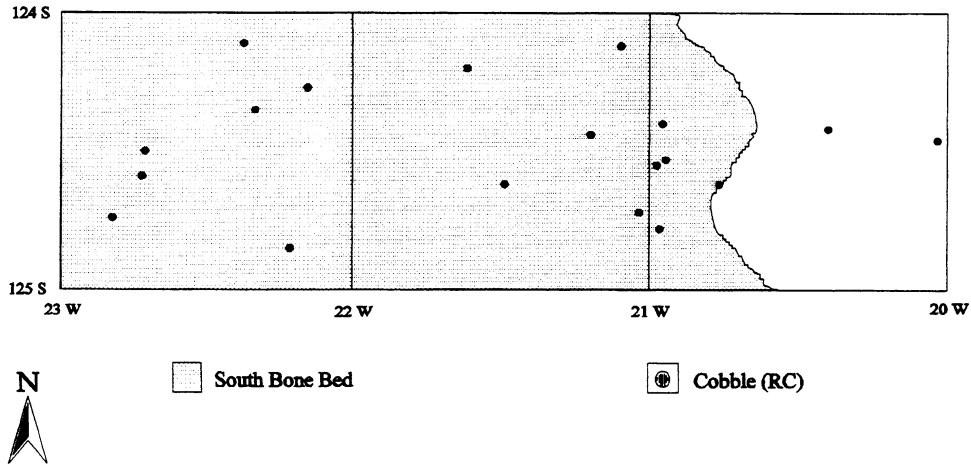


Figure 17.54 Spatial Distribution of Fire-Cracked Rocks in Level 2, South Bone Bed

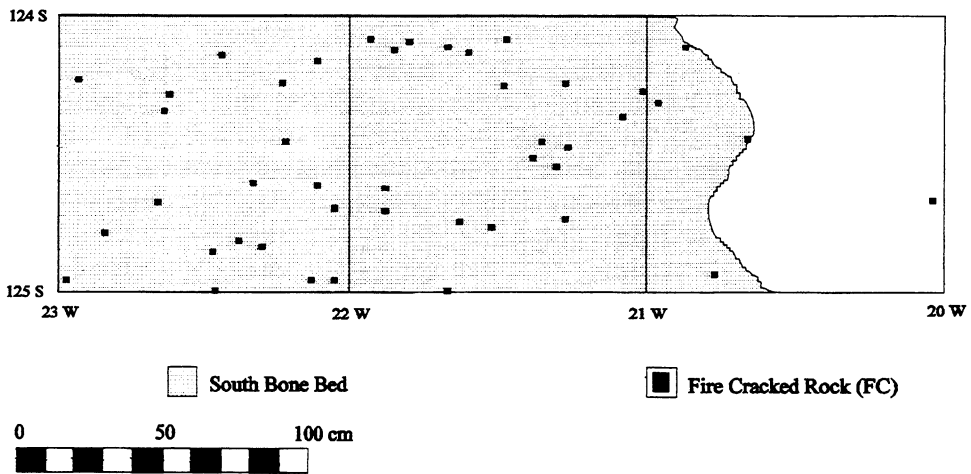
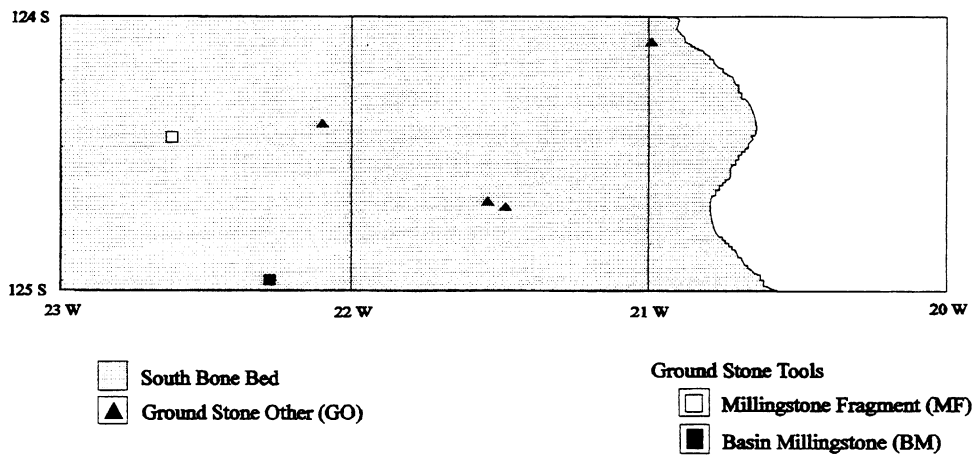


Figure 17.55 Spatial Distribution of Ground Stone Artifacts in Level 2, South Bone Bed



pelagic (cod, halibut) and anadromous fish (salmon), seabirds, and shellfish (see Clark 1974:70-74, 1984:187-90; Haggarty et al. 1991:82-92; Lisiansky 1814:191-95 [1805]). While they traded for caribou, mountain goat, and deer skins with neighbors on the mainland (Clark 1974:47; Haggarty et al. 1991:89), terrestrial mammals hunted on Kodiak Island in late prehistoric and early historic times were limited primarily to bear, fox, ermine, river otter, and ground squirrel (Clark 1974:70, 1984:186; Heizer 1956:4; Lisiansky 1814:191 [1805]). The Kashaya Pomo exploited a wide range of meats from the land and shore, including deer, elk, rabbit, terrestrial birds (quail), fish (coastal, anadromous, and freshwater), and shellfish (see Barrett 1952; Oswalt 1964; Gifford 1967). There is some debate among ethnographers whether or not the Kashaya Pomo hunted sea mammals at the time of Russian contact (see Gifford 1967:16-18; Loeb 1926:169). But in any case, pinnipeds, cetaceans, and pelagic fish apparently did not play a major role in their traditional diet.

Despite their somewhat different menus, the Alutii and Kashaya Pomo employed similar methods in the preparation of many meat dishes. Early Russian observations reported that the Alutii consumed some of their foods raw (especially whale blubber, fish or shellfish) or fermented in berry juices (Bolotov 1977:85 [1794-1799]; Davydov 1977:174-75 [1802-1803]; Lisiansky 1814:195 [1805], Merck 1980:106 [1790]). Kostromitinov (1974:8 [1830-1838]) made similar observations for the Kashaya who consumed some meats and fishes raw. Powers (1976:189) noted consumption of raw salmon and smelt in the early 1870s. Fish, especially salmon, were split and dried by both groups for winter use (Barrett 1952:104; Davydov 1977:173-75 [1802-1803]; Mobley et al. 1990:75).

Several different methods were employed by the Alutii to boil sea lion and fish. Meats were placed in ceramic vessels near or directly over the fire (Lisiansky 1814:195 [1805]; Merck 1980:106 [1790]). The production of ceramics by these people has sparked considerable interest among North Pacific scholars (de Laguna 1939; Dumond and Scott 1991:99; Heizer 1949). Ceramic production and use appears to have been limited primarily to southwestern Kodiak Island in late prehistoric and early historic times (Clark 1974:115-27). Some early observers suggested that the ceramic cooking pots were replaced by metal vessels soon after contact with the Russians (see Bolotov 1977:85 [1794-1799]), Davydov 1977:187 [1802-1803]). However, Aron Crowell's (1994:176, 188-89) recent investigation of the early Russian settlement at Three Saints Bay uncovered several ceramic cooking pots in a worker barracks occupied by Russian workers and possibly Unangas or Alutii women. In addition, meats were boiled in watertight baskets by the addition of red-hot cooking stones

(Bolotov 1977:85 [1794-1799]), a method also commonly employed by the Kashaya Pomo and Coast Miwok to boil meats in soups, gruels, and mushes (Barrett 1952:60,71; Lutke 1989:276 [1818]). Neither the Kashaya nor the Coast Miwok had an indigenous ceramic tradition.

Meats were also broiled or barbecued by both the Alutii and Kashaya Pomo on sticks placed over the fire (Kniffen 1939:386; Lisiansky 1814:195 [1805]; Oswalt 1964:301-303). The Kashaya placed meats directly on coals or embers as well (Gifford 1967:16; Kostromitinov 1974:8 [1830-1838]; LaPlace 1986 [1839]; Oswalt 1964:301-303). In his excavation report on Alutii dwellings in the Russian-American Company outpost of Kurilrossiia on the Kurile Islands, Shubin (1990:434) suggests that outdoor hearths were used in good weather to cook foods.

While many of the Alutii and Kashaya Pomo methods for preparing and cooking meat dishes overlapped, we believe that the East Central and South bone beds were generated largely from debris cleaned out of specially prepared earth ovens. Furthermore, we believe this specific kind of earth oven was an indigenous culinary practice of the Kashaya Pomo and Coast Miwok who used a distinctive hot rocks method to slowly bake and steam mammal, fish, and mollusk meats. After a brief ethnographic description of the hot rocks baking method, we consider the evidence in the archaeological record and then offer three lines of evidence that support our interpretation.

As described by Barrett (1952:61), Gifford (1967:19), and Holmes (1975:22), earth ovens of the Pomo were small bowl-shaped pits, usually about 30 cm deep, in which fist-sized or larger cooking rocks were heated in a hot fire. The pits were then cleaned of their contents (ash, coals, and rocks), lined again with the same fire-heated rocks, and covered by a protective layer of vegetable matter, usually some type of local foliage. Various kinds of foods (acorn breads, mammal and fish meats, mollusks, etc.) were then placed on the vegetable covering. Another layer of vegetable matter was laid down, followed by another layer of red-hot rocks. Alternating tiers of vegetable matter, food, vegetable matter, and hot rocks were then stacked in the oven until it was full. A layer of 5 to 15 cm of dirt was finally laid over the contents of the pit. A fire was then built on the oven to sustain a constant temperature, and the food allowed to cook for five to eight hours or sometimes overnight. Isabel Kelly describes similar kinds of earth ovens for the neighboring Coast Miwok (see Mannion and Mannion 1970).

Archaeological investigations indicate the long-term use of the hot rocks method in northern California, especially to the south of Fort Ross in the Point Reyes and Tomales Bay areas where broadscale areal excava-

tions of coastal shell middens were conducted in the 1940s, 1950s, and 1960s. Beardsley (1954:30) and King and Upson (1970:131) describe earth ovens associated with fire-cracked rocks and faunal remains that date from sometime before A.D. 1 at the McClure site (MRN-266) and to the late 1500s at MRN-216. Beardsley describes isolated basin-shaped features of baked earth that show little direct evidence of fire. He suggests the basins were built for steaming clams in kelp with hot rocks (Beardsley 1954:30).

Several lines of evidence suggest that the major constituents of the bone beds are secondary refuse deposited from Kashaya/Miwok-style earth ovens. First, the extensive assemblage of fire-cracked rocks that measures between 5 to 15 cm in diameter would be produced from this cooking method. The significant association of the fire-cracked rock and mammal bones, most noticeable in the South Bone Bed, suggests that these ovens were used in cooking large quantities of meat. The spatial patterning of the rocks and faunal remains indicates that they were tossed out together, presumably after cleaning the cooking areas. Fire-cracked rocks and fire-altered ground stone other artifacts, possibly recycled ground stone tools used as cooking stones (see chapter 9), are a significant component of late prehistoric and early historic Kashaya Pomo villages in the Fort Ross Region (see Lightfoot, Wake, and Schiff 1991).

Fire-altered rocks and burned slate rubble, often in dense concentrations or piles, are also common constituents on Alutiiq sites on Kodiak Island. However, most archaeologists interpret these as the remains of heated and cracked stone rubble from sweat baths associated with Alutiiq houses. The stone rubble is segregated into distinct lenses and piles (Clark 1974:140-41; Heizer 1956:23; Jordan and Knecht 1988:273). We have found no evidence that the Alutiiq commonly used the rock-tiered earth ovens for cooking meats in late prehistoric (Koniag phase) or historic times on Kodiak Island. In the earlier Kachemak phase, cobble-filled hearths and clay-lined basins with flat cobbles pressed into the clay have been reported (Donald Clark, Aron Crowell, and Richard Knecht, personal communications). Interestingly, these possible cooking features disappear on Kodiak Island sites dating to the last 500 years. Clay-lined pits are found in late prehistoric and historic villages on Kodiak Island, but they appear to have been used for storage and/or the fermentation of fish (Richard Knecht, personal communication).

Some of the fire-cracked rocks in the bone bed deposits may be cooking stones used to boil foods in waterproof baskets (see Clark 1974:140-41). Among the Kashaya, the stone boiling method was employed primarily to cook vegetable dishes (acorn mush) that might be flavored with meat. Yet the quantity of fire-

cracked rocks in the East Central and South bone beds is greater than expected from stone boiling alone, and the size of many of the fire-altered rocks recovered in the deposit tends to be larger than those commonly used by either Alutiiq or Kashaya stone boiling chefs. Among the Kodiak Island Alutiiq, some cooking stones may have been as small as golf-balls (Crowell 1994:226), although most were about fist sized (Donald Clark, Richard Knecht, personal communications).

The second line of evidence for the deposits representing cleaned out ovens is that the majority of the mammal remains exhibit little evidence of burning. In the East Central Bone Bed, only 13 of 762 mammal bones (including 563 identified only as mammal and 199 identified to more specific taxa) or 1.7% of the total mammal assemblage display evidence of burning or charring. In the South Bone Bed, 23 of the 1236 mammal bones (979 identified only as mammal and 257 identified to more specific taxa) or 1.9% of the total mammal assemblage are burned. The paucity of burned bones indicates either that meat was filleted from the bone prior to roasting or that cooking was done in such a way that meats did not come in direct contact with fire. Furthermore, the unburned remains indicate that bone was not used as fuel or thrown into an open fire as refuse, as was observed in the excavation of the *artel* on the Farallon Islands (Riddell 1955). By relying on hot rocks as their source of heat, the earth ovens did not employ open flames or embers to bake meats.

The presence of small quantities of wood charcoal in the bone beds is consistent with the earth oven interpretation. The Kashaya heated the oven rocks in an initial fire, and the charcoal from this fire was then dumped elsewhere. The contents from the oven were apparently served, consumed, and discarded in a separate place from the main charcoal dump. Although charcoal makes up between 3.1 to 9.7 percent of the cultural constituents in the two trash dumps by weight, it constitutes, at most, less than .1 of a percent of the mass of the bone bed sediments. This small quantity of charcoal may have been left in the oven from the initial fire and/or represents burned residue that was still clinging to the oven rocks.

The third line of evidence for earth oven cooking is the common presence of shellfish in the bone beds, especially the unexpectedly large number of small snails. The Alutiiq on Kodiak Island harvested many of the same kinds of shellfish as the Kashaya in northern California, including sea urchins, periwinkles, clams, mussels, chitons, and barnacles (Clark 1974:74, 1984:190). The one major exception to the traditional Alutiiq menu is red abalone (*Haliotis rufescens*), a common constituent of the bone bed deposits. Shellfish make up 64.5 to 77.5 percent of the weight of the cultural remains in the East Central and South bone beds, or almost 2 percent of the total constituents of some sediment samples. The coast

Pomo and Miwok commonly baked many of the larger species of shellfish, including abalones, chitons, and mussels in earth ovens as well as in hot ash or under leaves and hot rocks (Gifford 1967:20-21; Kniffen 1939:387; Lutke 1989:276 [1818]; Oswalt 1964:301; Stewart 1943:60-61).

While mussels make up the greatest mass of the shellfish remains in the sediment samples by weight, the most common shellfish represented by MNI counts are a varied assortment of other small snails (table 17.1). Some of these small snails were probably riders attached to other mollusks. Yet the quantity of small shells is greater than expected for mollusk riders alone, based on Jones and Richman's (1995:46-49) recent investigation of mussel harvesting methods. While some of these small snails may have been collected by NAVS residents, we believe most were additional riders attached to seaweed, sea grass, or kelp that was cooked in earth ovens. Various species of *Porphyra* (*P. perforata* or *P. laciniata*) and at least two species of kelp (*Macrocystis pyrifera*, *Postelsia palmaeformis*) were gathered from rocks at low tide and eaten as a delicacy by the coastal Pomo in a raw state or cooked (Barrett 1952:94-95; Kennedy 1955:108; Loeb 1926:192; Stewart 1943:61). Seaweed and kelp were also harvested by the Alutiit on Kodiak Island (Gideon 1977:100 [1804-1807]; Haggarty et al. 1991:90-92), although Clark (1974:74) notes that the evidence is not well documented. We suspect that delectable marine plants, particularly the palm-shaped leaves of *Postelsia palmaeformis*, served two purposes in earth ovens. They were both a source of food, and the vegetable covering that separated the meat dishes from the hot rocks.

The contents of the earth ovens provide four insights into the households using the bone beds for refuse disposal. First, some foods were readily accessible to the NAVS residents associated with the East Central and South bone beds, while other meats may have been rationed out to or exchanged with individuals and households. The most accessible foods were shellfish that could have been harvested by almost anyone in local intertidal waters, as well as the various types of rock fishes that could have been captured from nearby shorelines using hook and lines that were part of the traditional fishing equipment of both the Alutiit and Pomo peoples (e.g., Clark 1974:59-60; Kniffen 1939:387; Loeb 1926:168). The ubiquitous distribution of shellfish in the bone beds suggests that they were cooked in earth ovens with other foods as well as prepared individually, possibly as separate meals or as snack foods collected during low tides. The spatial distribution of the fish elements, though few in number, indicates they may have been cooked with other foods or prepared as separate meals as well.

Wake's analysis of mammal remains in chapter 12 (also Wake 1995:217-26) from the entire East Central and

South Trench deposits suggests a relatively even occurrence of deer and harbor seal body parts. While relatively few harbor seal elements were mapped *in situ*, the plan maps of the bone bed deposits show a diverse range of deer parts from a few individuals in bone clusters. These data suggest that whole animals were procured and butchered by the residents who used the East Central and South areas as refuse dumps. They were probably harvesting the animals themselves, or obtaining whole animals from the interior through their Native Californian kin ties.

In contrast to the deer and seal elements, Wake (chapter 12) found an uneven distribution of California sea lion remains throughout the trench units, in both bone bed and non-bone bed deposits. In the East Central and South trenches only five of the nine element categories are represented. However, when only the bone bed deposits are considered, especially those elements mapped *in situ*, a relatively diverse range of bone parts are represented. These include teeth, arm and leg bones, pelvis, vertebrae, and flipper elements. The data from only the East Central and South bone beds suggest that a few whole individuals were butchered and cooked by nearby residents.

Wake (chapter 12) notes that an uneven representation of cattle and sheep elements are found in the combined deposits in the East Central and South trenches. This observation holds for the bone bed deposits as well. Cattle elements mapped in the East Central Bone Bed are represented primarily by vertebrae and long bones and in the South Bone Bed by toes, teeth, vertebrae, and long bones. Sheep consist mostly of head, scapula, vertebrae, and metacarpal bones in the East Central Bone Bed and vertebrae and metacarpal bones in the South Bone Bed. In these bone bed deposits, the limited kinds of elements from animals raised at Fort Ross suggests that individual meat packages were either procured as rations from the Russian-American Company, purchased from the Company store, or obtained through exchange with other members of the greater Fort Ross community.

It is also possible, as Wake thoughtfully presents in chapter 12, that the differential occurrence of body parts in the bone bed such as pinniped flippers may relate to dietary preferences of one or more ethnic groups.

The second insight is that terrestrial game, domesticated mammals, and marine mammals were prepared, cooked, and consumed in similar ways. That deer were cooked in conventional Kashaya/Coast Miwok earth ovens is not surprising since the Alutiit probably had little prior experience with the preparation of venison on Kodiak Island, except that obtained through off-island trade. Cut marks on the bones from steel tools indicate that both dismemberment and filleting of deer meat took place. Furthermore, the deer bones exhibit evidence of

marrow extraction, including proximal or distal impact points and flake scars, a characteristic consumption pattern of the Kashaya.

That domesticated artiodactyls, such as cattle and sheep, were cooked in the same manner as black-tailed deer makes perfectly good sense from a Kashaya perspective. The cattle elements exhibit the same kinds of evidence for dismemberment and marrow extraction as the deer bones. While the Kashaya had little experience with domesticated mammals prior to the establishment of Fort Ross, they probably would have treated them like any other large terrestrial mammal food. It does not appear that Alutiit meat roasting or boiling methods were commonly employed, even though they had prior experience with domesticated meats, having grown up in Russian outposts where beef was consumed.

What is somewhat unexpected is that marine mammals were treated in the same manner as terrestrial game. Both appear to have been cooked together in earth ovens and both show similar dismemberment patterns and filleting marks. The Alutiit were sophisticated sea mammal hunters and well versed in their traditional methods of preparing and cooking seals and sea lions. In contrast, the Kashaya Pomo hunted these animals rarely and consumed little of their flesh compared to terrestrial game. Yet Kashaya conventions appear to have been used in the processing of the marine mammals, as opposed to treating them separately and preparing them in a fashion more consistent with Kodiak Island conventions, such as boiling or barbecuing the meat. Other food refuse in the bone beds, such as sea urchins and sea birds, not commonly consumed by the Kashaya but actively harvested by the Alutiit in their homeland, also appear to have been cooked in earth ovens according to Kashaya practices.

The third observation involves the sparse evidence for the processing or consumption of terrestrial plant foods in the refuse dump. While their rarity may relate to taphonomic problems, it seems likely that charred acorn, seed, or grain remains would preserve in the bone beds. The chemical tests reported by Price in chapter 4 indicate that the neutral to slightly alkaline sediments should provide an excellent context to recover charred floral remains. We believe that either the refuse from processing terrestrial plants was disposed of elsewhere, or that the activities that contributed to the bone beds did not include much plant processing. A small assemblage of ground stone tools, including pestles, handstones, and millstone slabs, were recovered from both bone beds, suggesting that the households associated with the refuse areas did process nuts, seeds, and/or grains. On the other hand, it is also possible that some of these ground stone implements may have been recycled from elsewhere solely for use as cooking stones in the underground ovens.

The final insight is that the food refuse and artifacts in the bone beds may be the product of special feasts and community wide ceremonies hosted by NAVS households. We suspect that a winter cycle of feasts and ceremonies may have been initiated with the homecoming of the Native Alaskan men at the conclusion of the hunting season. The Ross hunters were frequently absent from NAVS on hunting trips from spring to fall (see Khlebnikov 1976:108,131; Golovnin 1979:162 [1818]). While Native Californian women and children who remained at NAVS may have served communal meals among themselves, the chronic food shortages reported for these Ross denizens (see chapter 1) suggest that feasting was not common (or even possible) until the late fall or winter. At this time, the NAVS households would probably have celebrated the hunters' return with their share of meat and (hopefully) some credit at the Company store by sponsoring feasts and ceremonies.

Among both the Alutiit and Kashaya Pomo, the annual cycle of ceremonies included lavish feasts along with dancing, visiting, gift exchanges, gambling, shamanistic healing, sweat baths, and religious observances. Pomo households contributed to a common supply of food that was distributed by leaders (headmen) at village-financed ceremonies, or individual families sponsored ceremonies to celebrate good tidings, such as the recovery of a sick person (Barrett 1952:64). Some of the many feasts and ceremonies throughout the year included various harvest and winter celebrations and commemorations (Barrett 1952:51-59; Kostromitinov 1974:10 [1830-1838]; Powers 1976:193-94; Kniffen 1939:385-86)

Among the Alutiit, individual households and related families tended to underwrite ceremonies as public displays of wealth and status, especially to enhance the prestige of their leaders (Crowell 1992:19-20). On Kodiak Island, they observed their most important ceremonies during the early winter months beginning in November or early December when magical rites and rituals were performed to insure hunting success for the following year. Winter ceremonies were commonly hosted by *toions* until the 1880s when sea otter hunting, no longer a viable enterprise, was replaced by the cash wage cannery economy (Crowell 1992:30). Preparation for the ceremonies involved building up household surplus from which feasts were supported until food stores ran out sometime in late winter or early spring (Bolotov 1977:85 [1794-1799]; Clark 1974:76, 1984:193; Crowell 1992; Davydov 1977:173,183 [1802-1803]; Gideon 1977:93 [1804-1807]; Jordan 1994:151-53; Lisiansky 1814:209-10 [1805]).

The feasting interpretation explains several unique characteristics of the bone beds, including the large amounts of mammal, fish, and shellfish foods cooked in earth ovens, the rapid deposition of trash in related dumping episodes, and the subsequent capping of the

refuse deposits with sediments. In addition, the presence of California condor and bald eagle remains in the East Central Bone Bed and South Bone Bed, respectively, are suggestive of magical rituals practiced by North Pacific peoples (Okladnikova 1983). Russian observers noted that eagle feathers were prominent elaborations of dancers' costumes on Kodiak Island (Davydov 1977:111 [1802-1803]; Lisiansky 1814:184 [1805]).

b) *Production and Maintenance of Native Craft Goods.* Household production of traditional crafts is differentially represented in the two bone beds. The South Bone Bed contains evidence of all stages of bone tool manufacture. Davydov (1977:187 [1802-1803]) observed bone tool production on Kodiak Island that corresponds closely with the kinds of activities that probably contributed to the bone debitage in the South Bone Bed. Wake's (1995, chapter 11) careful analysis suggests that most of this debitage resulted from the production of diagnostic Alutiiq and Unangan points and fish hooks used in marine mammal hunting kits and fishing gear. In addition, Wake describes bone tubes that were incised using Native Californian designs. In contrast, the East Central Bone Bed is associated with minimal evidence of bone tool production, yielding only 1 worked bird ulna, 7 flakes, 13 amorphous bone chunks, and 2 worked antler pieces.

The evidence for ground slate tool production in either bone bed deposit is nonexistent. Ground slate artifacts make up significant components of late prehistoric and early historic Alutiiq archaeological assemblages on Kodiak Island. These include ulu blades, adzes, oil lamps, various kinds of knives and scrapers, and slate debitage (see Clark 1974; Heizer 1956; Knecht and Jordan 1985; Jordan and Knecht 1988; Mobley et al. 1990). Ground slate artifacts are extremely rare in precontact Kashaya Pomo assemblages. As Mills details in chapter 10, only 11 ground slate objects have been recovered from NAVS, including 7 in the East Central Area; only 1 artifact, a polished tabular fragment, was found in the bone bed proper. A single artifact, a ground slate rod, was found in the South Area, and none were unearthed in the South Bone Bed proper.

Chipped stone tools were used by the households who contributed to the bone beds. Chipped stone tools are a relatively minor component of late prehistoric and early historic archaeological assemblages on Kodiak Island (Clark 1974; Jordan and Knecht 1988:268; Knecht and Jordan 1985:29), but represent a major component of all Kashaya Pomo assemblages (both prehistoric and historic) in the Fort Ross Region (see Lightfoot, Wake, and Schiff 1991). The density of chipped stone debitage is more than six times greater in the South Bone Bed than the East Central deposit (table 17.1). However, as reported in chapter 16, the hydration dating of 21

obsidian artifacts in the four levels of the South Bone Bed resulted exclusively in prehistoric readings. Only one of the three obsidian flakes submitted for hydration analysis from Level 1 of the East Central Bone Bed yielded a historic date. We find little evidence of historic period chipped stone tool manufacture in either bone bed with the exception of some minor maintenance and retouch. Most of the obsidian artifacts are interpreted as scavenged prehistoric artifacts that were recycled as tools and flakes by NAVS residents. The few formal tools, such as notched projectile points, that are historic in age were probably manufactured elsewhere, while the late prehistoric points were either curated by Kashaya families or picked up from prehistoric archaeological deposits. Flakes were probably scavenged from nearby sites for expedient reuse by NAVS households.

Finally, there is some reason to believe that *kamleikas* and birdskin parkas were produced at NAVS. In his 1818 visit to Port Rumiantsev, Lutke (1989:278) met a Native Californian woman who had learned to sew whale gut *kamleikas* in an interethnic household at the Ross settlement (probably NAVS). *Kamleikas* are waterproof pullovers that the Alutiiq produced from the intestines and throats of whales, seals, and bears, or from the skin of whale tongues or livers (Davydov 1977:152 [1802-1803]; Gideon 1977:100-101 [1804-1807]; Merck 1980:102 [1790]). Eight *kamleikas* could be cut and sewn from a single whale tongue. *Kamleikas* were an indispensable component of the *baidarka* equipment used for hunting marine mammals in rough seas, as they provided the waterproof outer covering that sealed the hunter into his boat (Davydov 1977:152 [1802-1803]).

Birdskin parkas were made from murre, puffins, and cormorants by Alutiiq women on Kodiak Island. The fat clung to the skins; after being smeared with fermented eggs, it was scraped off, and the skins squeezed dry (Davydov 1977:150-51 [1802-1803]). The feathers were left in the skin, and during inclement weather they were worn outside to keep water off the coat. Cormorant neck feathers were the most highly regarded for making parkas, followed by puffins and murre. It took between 35 to 40 birds to make a large parka. The high value of the birdskin coats is evident when Gideon (1977:101 [1804-1807]) reported that the Russian-American Company required old men and boys on Kodiak Island to hunt enough sea birds to produce seven parkas, which were then sewn into coats for the Company by Alutiiq women.

The large numbers of seal, common murre, and gull elements in the South Bone Bed, and the common occurrence of seals and murre in the East Central Bone Bed, are interpreted primarily as food refuse, but some body parts also may have been used to produce *kamleikas* and birdskin parkas. In addition, the California and Steller's sea lion remains in both bone beds may have contributed skins for the repair and construction of

baidarkas and *baidaras*. On Kodiak Island, the sewing and repair of the outer shell of these boats were completed by women in spring before the annual Company sea otter hunts (Gideon 1977:100 [1804-1807]). The conical bone points and awl tip found in the South Bone Bed could be part of the sewing kit used in making and repairing clothing and skin boats.

Some of the sea birds and sea lions that ended up in the bone bed may have been hunted at the Farallon Islands *artel* by Native Alaskan men and Native Californian women who were stationed there (see Corney 1896:74A, Riddell 1955; Khlebnikov 1976:122-23; Bancroft 1886:633). Meat from the Farallon Islands was shipped to Fort Ross for consumption by the Ross workers, and the skins were used for the manufacture of clothing and skin boats (Golovnin 1979:154 [1818]). Lisiansky (1814:205 [1805]) and Gideon (1977:100-101 [1804-1807]) described how seabirds were netted for food and parkas on cliffs and rocks along Kodiak Island, and we presume similar methods were employed on the Farallon Islands and the broader Fort Ross Region.

c) *Recycling of Ceramic and Glass Objects*. The ceramic and glass assemblages from both the East Central and South bone beds are characterized by small, fragmentary pieces from multiple vessels or window panes. The households contributing to these deposits were not discarding whole ceramic or glass objects into the trash. This pattern suggests that vessels or panes broken by NAVS families were recycled for other purposes, and/or that they were scavenging ceramic and glass fragments from other Fort Ross locations to reuse as sources of raw material.

Although the majority of the ceramic forms are identified as plates and saucers in the East Bone Bed and tea cups, saucers, and plates in the South Bone Bed, we question whether they served these functions in the residences associated with the refuse dumps. They appear to be isolated pieces that were selected for modification into tools or ornaments. One of the ceramic sherds (from the South's deposit) exhibits evidence of being worked or modified. Some of the glass fragments exhibit evidence of use, and a projectile point of glass was recovered in the East Central Bone Bed. The discovery of microdebitage (tiny slivers) of ceramics and glass in flotation samples of bone bed deposits lends additional support for the working of these objects in NAVS households.

A significant difference between the two bone beds is the large percentage of window glass in the South Bone Bed. When considered in combination with the cluster of nails found in Level 1 of 125S, 24W, it may indicate trash from an architectural feature. In contrast, the spatial pattern of nails and spikes along the outer edge of the East Central Bone Bed indicates they may be

associated with the East Central Pit Feature, possibly outlining the edges of the earlier house structure. Since the window glass fragments in the East Central Area are not spatially related to the nails and spikes, we suggest that window panes may not have been associated with the earlier subterranean structure or that the fragments were collected and recycled as a source of raw material.

PIT FEATURES

In this section current information on the three pit features is synthesized. First, the possible use of the FRBS Pit Feature as a furnace and stone stove in a wooden bathhouse is discussed. Since the feature was swept clean prior to abandonment, little is known about its floor contents. We then consider the NAVS pit features, and undertake a spatial analysis of the floor contents of the East Central Pit Feature. Unfortunately, the small areal exposure of the South Pit Feature precludes a similar analysis. We conclude with several observations of NAVS structures by considering the trash disposal practices of the Alutiit and Kashaya Pomo in and around residential spaces.

FRBS PIT FEATURE

A full description of the FRBS Pit Feature is presented in chapter 2. A 2-by-1.5 m exposure of the feature took place in 1989. While archaeological dating of the feature is somewhat ambiguous (see chapter 16), eyewitness accounts suggest the feature was used at least during the years of 1822 to 1833. The feature consists of a concavely shaped, clay-lined pit at least 2-by-1.5 m in size in which a stone bench was constructed. The clay surface had been thermally altered, indicating that the entire pit had been fired at a very high temperature. The dimensions of the pit and the large stone bench are unlike any Russian, Alutiit, or Kashaya Pomo residential structures mentioned in the sources above. It does match very closely the stone bench of the bathhouse described by Mariano Payeras in 1822 near the mouth of Fort Ross Creek.

When I mention the bathhouse, be aware that I believe they are like those used by our Indians. Inside the bathhouse, they have built a rectangular stove of stone, like those in which they bake bread. Above are two high rooms which have iron grates. On these are set stones like those the Indians use to cook their acorn gruel. These stones are heated until they become red hot. In this state, they sprinkle them with water until the steam rises through the upper openings of the two mentioned rooms. They enter naked and soon begin to sweat oceans. Those that are situated on tiered benches to the side of the oven, amuse themselves with colorful stories (Payeras 1979:2-3 [1822]).

Wrangel (1969:207 [1833]) and Bancroft (1886:630) also mention the same bathhouse along Fort Ross Creek.

Shubin (1990:432-33) unearthed a similar stone bench in the excavation of a Russian bathhouse in the Russian-American Company outpost on the Kurile Islands. He notes that a fire box was built into the stone stove that contained ash and charcoal. We suggest that the Fort Ross bathhouse was constructed using a somewhat different design, whereby a sweltering fire was built around the stone bench within the clay lined pit. The fire was probably allowed to die down to embers, keeping the stone bench red hot. Water could then be sprinkled on the stone bench to produce steam, as indicated by the fire-cracked appearance of rocks associated with the stone bench. The Fort Ross bathhouse probably had a wooden structure with benches built into the side of the hill, similar to the one described by Shubin, in which the pit furnace and stone stove were constructed. The pit feature was probably regularly maintained by cleaning out ash and charcoal. It appears to have been swept clean prior to abandonment, as only a fine film of charcoal was observed on the floor during excavation.

NAVS PIT FEATURES

Detailed descriptions of the East Central and South pit features are presented in chapter 3. The former was unearthed in a 1-by-5 m trench exposure in 1991, while the latter was exposed only in a 25 cm wide exposure when the South Trench wall was profiled in 1992. No hearths or other internal features are reported for either structure. The exact dimensions of both features are unknown, but the East Central structure was at least 5 m in length and the South pit, 3.4 m in diameter. The East Central structure was shallow in depth, dug only about .3 m below the former ground surface as described in chapter 3. It is not clear how deep the South Pit Feature was excavated below the historic ground surface. Both features were used prior to or during the 1820s and 1830s (see chapter 16).

The materials mapped *in situ* in the East Central Pit Feature were not recovered on a prepared floor surface, suggesting that either a packed dirt surface or wooden boards were used. Two intact redwood posts were recovered in 75S, 4E; although we think they were part of a fence constructed later in the American Period (post 1846). The elevation of the bottom surface of the East Central Pit Feature ranges from 25.48 to 25.26 m asl. Appendix 17.5 lists the following information for each artifact and faunal specimen mapped on the floor of the East Central Pit Feature: catalog number, item code (keyed into the plan map), artifact/faunal identification, unit, size (length/width), and three dimensional provenience. Materials mapped *in situ* include:

a) Mammals. Mammal bones (figure 17.56) include a deer ilium on the border of 75S, 1E and 75S, 2E; and an unidentified element of an eared seal in 75S, 4E.

b) Fish. No fish remains were mapped.

c) Bird. No bird remains were mapped.

d) Shellfish. No shellfish remains were mapped.

e) Worked Bone. One worked bone flake (figure 17.57) is found in 75S, 2E.

f) Ceramic. One sherd (figure 17.57) is located in 75S, 1E.

g) Glass Sherds. Two bottle glass sherds and two window glass sherds are distributed across 75S, 1E, and one worked glass sherd is on the floor in 75S, 3E (figure 17.57).

h) Metal. Four nails and one spike are situated on the surface of the pit feature in 75S, 2E; 75S, 3E; and 75S, 4E (figure 17.58).

i) Bead. One glass bead (figure 17.57) is found in the sw quad of 75S, 1E.

j) Lithics. One sandstone flake and a nutting stone are found in 75S, 1E (figure 17.57).

INTERPRETING THE NAVS PIT FEATURES

It is not clear how the NAVS houses were constructed or what they looked like above the ground surface. They may have resembled small wooden cabins or Russian-style log houses, as suggested by eyewitness accounts in chapter 1. They may have been shallow, semi-subterranean houses similar to the Alutiiq structures described by Shubin (1990) on the Kurile Islands. However, given the limited archaeological exposure of these structures, we can not rule out a likeness to local Native Californian semi-subterranean houses built during the winter months and described by Corney (1896:33-34 [1814]) and Kostromitinov (1974:8 [1830-1838]).

The scarcity of material remains on the floor of the East Central Pit Feature, especially animal bones and shellfish, suggests it was relatively clean, at least when abandoned. Although only a small area of the South Pit Feature was tested, the plan view and profile of the floor suggest it was relatively sterile as well. We believe these observations are particularly revealing in light of how the Kodiak Island Alutiit and Kashaya Pomo disposed of trash in and around residences.

In Kodiak Island houses, considerable trash accumulated in the large central room that served as a combination living room, kitchen, and workshop, while the adjoining small rooms used as sleeping areas, storage space, and steam baths for one or more families were kept relatively clean (see Clark 1984:191). The discrete segregation of trash in Alutiiq houses on Kodiak Island is described by both Lisiansky and Davydov. Lisiansky (1814:212-14 [1805]) observed the large central rooms being used for dances, for the cleaning and drying of fish, and for building *baidarkas*. He reported that they are "never cleaned, except that now and then some fresh grass is thrown over the floor, to give it a sort of decent appearance." Davydov (1977:154-55 [1802-1803])

Figure 17.56 Spatial Distribution of Mammal Elements from the Floor of the East Central Pit Feature

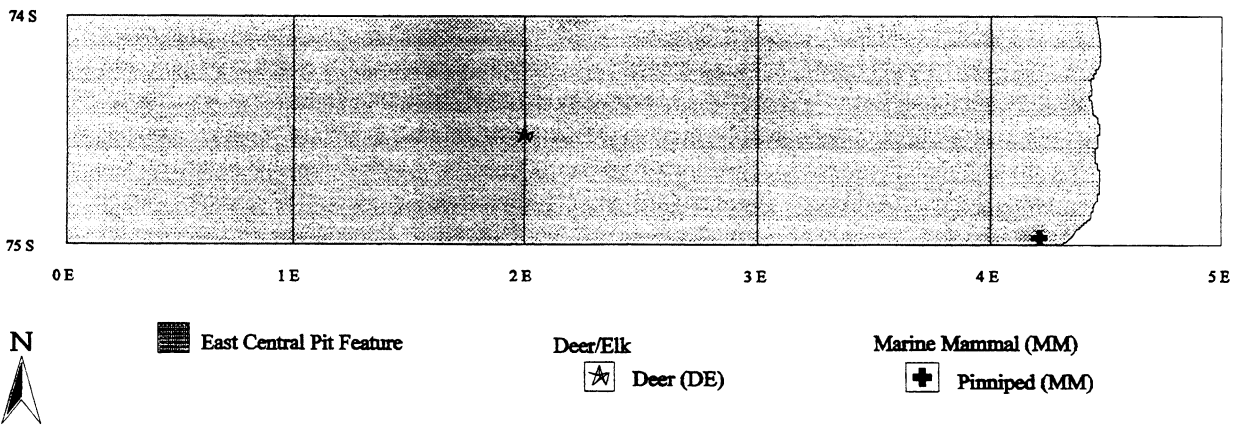


Figure 17.57 Spatial Distribution of Worked Bone Artifacts, Ceramic Pieces, Glass Sherds, Glass Beads, and Lithic Artifacts from the Floor of the East Central Pit Feature

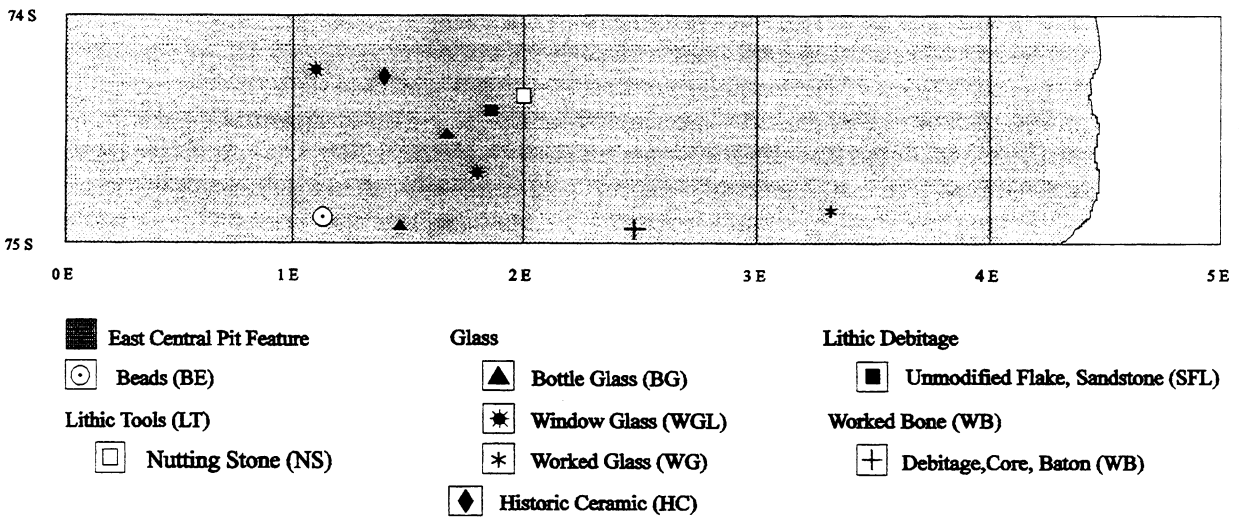
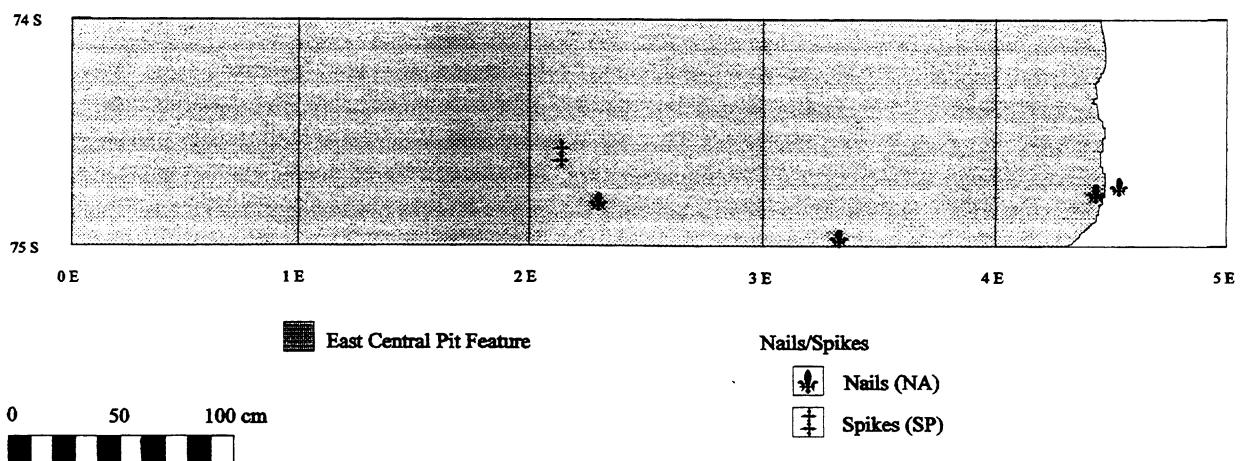


Figure 17.58 Spatial Distribution of Metal Artifacts from the Floor of the East Central Pit Feature



commented that the central room “is always dirty and presents an unpleasant spectacle to a European, for the food waste, fish bones, and shells are very rarely removed.” He further noted that the sleeping areas “are kept clean; they have a board floor if wood is readily accessible, otherwise dried grass or clean bast matting are used.” Davydov (1977:155) concluded his description by noting “what is more revolting than all else is the filth around their huts, for the islanders do not go far away to do anything—and this gives one a very bad impression of their tidiness.”

Excavations of late prehistoric and early historic semi-subterranean houses on Kodiak Island support the above eyewitness accounts. The floors of house structures are often 20 to 30 cm deep, composed of highly compressed matrixes of vegetable matter, food bones, shellfish, matted grasses, hair, artifacts, wood chips, ash, charcoal, fire-cracked rocks, and bits of fur (see Clark 1974:155-56; Heizer 1956:18; Jordan and Knecht 1988:256-62; Knecht and Jordan 1985). These excavations also reveal a common pattern whereby old house floors and their accumulated trash were intentionally covered over by new floors. Jordan and Knecht’s (1988:256-62) work on one Koniag phase house structure at KAR-1 yielded ten different house floors separated by thick deposits of floor debris and sod roofs. Clark’s (1974:155) excavation at the Rolling Bay site unearthed a house structure in which the underlying debris was capped by a clean sand layer which evens up underlying irregularities and overlays rubbly site deposits and midden.

In contrast to the Kodiak Islanders, the Kashaya Pomo apparently observed relatively strict rules in the disposal of trash in and around residential structures. Eyewitness accounts of Pomo and Coast Miwok houses often emphasize the spartan contents, general tidiness, or “orderly fashion” of their dwellings (Schabelski 1993:10 [1822-1823]; Wrangel 1974:3-4 [1833]). Since most of these observations are made of the open thatch-and-pole summer houses, and not the more permanent semi-subterranean bark covered structures used in winter, we recognize that the apparent cleanliness of the camps may reflect the season and brevity of occupation. However, Kostromitinov (1974:8 [1830-1838] who observed both summer and winter residences while Company manager at Fort Ross described the sparse contents of Kashaya houses that included only clothing, bedding, “a bow, arrows, a large pot, and sometimes fishing nets.” A similar perspective on the orderly organization of residential space is depicted in Mikhail Tikhonov’s watercolor of the inside of a Coast Miwok house at Rumiantsev Bay in 1818 (see Wiswell 1979:327).

In our first volume, we noted that late prehistoric and historic Pomo villages were spatially segregated into residential and midden space (Lightfoot, Wake, and Schiff 1991:116-19). The residential areas were rela-

tively clean, containing primarily lithic artifacts, while the midden deposits containing animal bones and shellfish remains were located downslope. Ongoing excavations of architectural structures and midden deposits at the Tomato Patch Site near Fort Ross suggest a similar pattern (see Martinez 1995). Structures appear to have been regularly swept clean of refuse. The upslope residential zone is relatively free of animal bones and shellfish with the refuse concentrated in downslope midden deposits that are over one meter deep. Other excavations of late prehistoric and historic Pomo villages, including the Masut Pomo hamlet of Nightbirds’ Retreat and the Mitom Pomo camp of Three Chop Village (see Layton 1990), indicate that each structure did not accumulate much garbage during its use life, although refuse was occasionally dumped into abandoned houses.

We argue that Pomo/Miwok conceptions of cleanliness and refuse disposal were implemented in some NAVS residences, most likely by Kashaya and Coast Miwok women in interethnic households. While the house structures may have resembled small wooden cabins, shallow modified forms of Alutiiq semi-subterranean houses, or even the winter houses of Native Californians, the day-to-day domestic practices involving the care and maintenance of these places followed the organizational principles of Kashaya Pomo/Coast Miwok. Garbage from residential tasks, such as preparing, cooking, and consuming meat dishes, was swept up and placed in discrete midden areas, such as in bone beds or down the side of the marine terrace. In contrast, major modifications to the NAVS landscape, such as the filling of abandoned houses with rubble and dirt, appears to follow traditional Alutiiq practices of covering old used surfaces with clean new ones. Rather than removing trash to another location, the Kodiak Islanders would simply bury the accumulated deposits and create a new surface. The deposition of the bone beds represents an interesting interplay of Kashaya/Miwok and Alutiiq practices. New surfaces were created when shallow pit structures were abandoned and filled in. The new surfaces were then used for the disposal of residential trash.

THE SPATIAL STRUCTURE OF THE NATIVE ALASKAN NEIGHBORHOOD

As outlined in chapter 3, the surface landscape of NAVS consists of 13 shallow surface depressions or leveled platforms oriented in roughly a north/south line parallel to the eastern edge of the marine terrace. The surface density of artifacts and faunal remains suggests a tripartite division for the site. The north and south areas of the site are characterized by high densities of cultural materials, while the central area is relatively sterile except along the eastern edge of the marine terrace where artifact clusters occur. The surface features and associ-

ated artifact concentrations may represent the remains of NAVS house structures with household refuse deposited around their perimeters.

The tripartite division for NAVS is supported independently by Tschan's geophysical survey data. In chapter 5, he reports barnlike structures and corrals in the north area, probably dating to the later American Period. The central area is relatively empty—the only significant resistance anomalies are distinct lines (probably well trod paths) and a few rectangular and circular features. In Tschan's interpretation, the majority of the early 19th century Village is situated in the south area where he mapped a large rectangular feature with internal divisions, multiple circular structures, and a spider-shaped anomaly.

Subsequent fieldwork in the central and south areas clarifies the above interpretations. Excavations in the East Central and South areas show a positive association between surface features and semi-subterranean house structures. However, the dense concentrations of artifacts and faunal remains associated with surface features may be related primarily to bone bed deposits in the fill of structures. That is, the surface pattern of cultural materials may not relate to household garbage from structures while they were still occupied, but rather later dumping events that took place after houses were abandoned. According to this interpretation, the strong correlation between surface features and artifact concentrations along the terrace edge suggests that many of the structures at NAVS were used as refuse dumps once they were vacated. We predict that many more bone beds will be found in abandoned houses at NAVS.

The South Central Test Unit was placed along the linear distribution of trash at the edge of the terrace between the East Central and South areas. It reveals relatively high densities of mammal, fish, and shellfish remains. Compared to the East Central and South areas (see table 17.1), this test unit contains high concentrations of glass pieces, ceramic sherds, and metal objects, and a moderate density of worked bone artifacts and lithics.

The West Central Trench demonstrates that few mammal, fish, bird, and shellfish remains are found in the central area beyond the terrace edge (table 17.1). The very low numbers of faunal remains may be a function of preservation, however, since the highly acidic sediments in this area of the site would create a poor context for sustaining organic materials (see chapter 4). No worked bone artifacts were recovered. Moderate densities of ceramic and lithic artifacts are found as well as a relatively large number of glass fragments, mostly from window panes.

The spatial model for NAVS is a linear distribution of houses along the terrace edge that opened into an L-shape in the south area. The house structures were probably arranged several rows deep in the south area

and may have included a large barracks building as identified in the geophysical survey. This probably corresponds to the original location of NAVS as sketched in the 1817 map. In the central area, the linear distribution of houses was probably only one or two tiers deep along the terrace edge. Beyond this narrow residential zone, the central area appears to have been largely open, possibly serving as a "communal place" or even village "plaza." The linear distribution of house structures continues into the north area, ending not far from the south Stockade wall. It is possible that several rows of NAVS houses extended north of the central area. Unfortunately, later American Period agricultural buildings and more recent structures, including a store and gas station, complicate any interpretation of the north area.

Refuse disposal was highly structured in the Native Alaskan Neighborhood. Household trash appears to have been dumped into abandoned structures or over the side of the marine terrace. The excavations of the East Central and South areas indicate that most trash was swept from house structures and cleaned up in related extramural space. The dumping of food waste appears to have been restricted in the central "communal place," although the area's acidic sediments may have compromised the recovery of organic remains and biased our interpretation.

FRBS is interpreted mainly as a secondary refuse deposit for materials discarded by NAVS households over the terrace edge. Erosional processes, bioturbation, and downward transport have created an extensive colluvial deposit of artifacts, faunal remains, and sediments along the base of the terrace. Some lithic artifacts were deposited in prehistoric times, while the remaining materials date primarily to the Russian Period of Fort Ross.

The close affinity between the NAVS and FRBS assemblages suggests that they derived largely from the same source. Similar kinds of mammal, bird, fish, and shellfish remains are found, as well as ceramic, metal, glass, and lithic artifact types (see table 17.1). A major difference is the absence or relative scarcity of many small items at FRBS, some of which are quite fragile, such as snails, sea urchin spines, glass beads, and worked bone debitage. Taphonomic processes involving the transport of materials downslope from NAVS may explain this pattern. Small, lightweight materials are less likely to have reached the colluvial toe of FRBS than heavier objects, such as lithics.

The limited number of small objects in the FRBS assemblage can not be attributed to differential preservation or recovery methods. The midden sediments in FRBS units tend to more neutral or mildly alkaline than most NAVS deposits (chapter 4). In considering the recovery of small materials, the Southwest Bench at FRBS served as the control units for FRBS: 60% of the levels were wet screened through 1/16" mesh. In

comparison, only 25% of the NAVS sediments were wet screened through 1/16" mesh. While the Southwest Bench is characterized in general by lower densities of many cultural materials compared to the East Central Area, South Area, and South Central Test Unit, it contains no sea urchin spines or fragments and no *Olivella* shells. Furthermore, the Southwest Bench contains abnormally low densities of identifiable turban and other small snails, worked bone debitage, and glass beads (see table 17.1). In contrast, this bench has the highest lithic density in the Native Alaskan Neighborhood with the exceptions of the South Trench and South Bone Bed at NAVS.

We recognize that some FRBS materials were probably deposited *in situ* by people working and relaxing in the Fort Ross Cove. The colluvial bench overlooks the area where *baidarkas* are reported to have been stored in the Cove. Native Alaskan and Native Californian workers may have used the colluvial bench (especially the East Bench) to undertake tasks involving the care and maintenance of skin boats, fishing gear, and hunting tools. Architectural features may be buried in the East Bench, a possibility that needs to be explored in the future. Another location of activity at FRBS was the bathhouse constructed into the colluvial deposits of the Middle Profile, of which all that remains today is the clay lined furnace and stone bench. Here both Native Californians and Native Alaskans could have soothed and purified their bodies while taking steam baths, followed by a quick dive in the ocean, an important part of the purification and cleansing process (see Barrett 1975:44-45; Davydov 1977:154,158 [1802-1803]; Kostromitinov 1974:8 [1830-1838]; Payeras 1979:2-3 [1822]).

A CONSIDERATION OF THE SPATIAL ORGANIZATION OF THE NATIVE ALASKAN NEIGHBORHOOD

The overall physical setting and spatial organization of the Native Alaskan Neighborhood resembles a Kodiak Island village (see Schiff 1995). The spatial pattern of archaeological sites on Kodiak Island indicates that villages were situated along slight embayments and coves (Clark 1987:124-29). Davydov (1977:155 [1802-1803]) observed that village locations were placed near shores and/or streams to obtain easy access to shellfish and fish. Houses were arranged in a long linear pattern along an expansive beach or coastal strip (Knecht and Jordan 1985:21-23; Jordan 1994:148; Jordan and Knecht 1988:232-36). As Jordan (1994:148) notes many of the subsistence-related tasks took place along the shore; domestic, social, political, and ceremonial activities tended to occur in the central strip of structures; and the dead were buried behind the village. Early eyewitness accounts stress that Alutiiq structures were situated so that houses had clear views of the ocean. Men would

climb the roofs and sit there scanning the sea, especially at sunrise when decisions were made to go to sea or to stay home (Clark 1984:191, Davydov 1977:156 [1802-1803]; Lisiansky 1814:182-84 [1805]).

The linear arrangement of houses along the marine terrace in the Native Alaskan Neighborhood fits some of the spatial conventions of traditional Kodiak Island villages. NAVS is located on a marine terrace in a very exposed location on a small cove overlooking the ocean. Houses were situated so that NAVS residents had a clear view of the Pacific Ocean and of their *baidarkas* stored below in the Fort Ross Cove. Subsistence-related activities involving the skin kayaks were focused on Fort Ross Cove, while domestic, political, and religious practices took place at NAVS proper. Most of the dead were apparently buried at the Fort Ross Cemetery situated to the northwest of the Village on high ground (see Goldstein 1995). While Kodiak Island villages tend to be located on the shoreline with direct access to water, the specific location of NAVS on the elevated marine terrace may have been dictated by the Russians, who wanted to keep a close eye on the Village from the Stockade. Alternatively, the marine terrace may have been viewed as a readily defensible location by both the Russians and native workers (Aron Crowell, personal communication).

In comparison, the location and layout of the Native Alaskan Neighborhood contradicts many of the basic organizational principles of Kashaya Pomo villages in the Fort Ross Region. The archaeological survey reported in Volume 1 indicates that late prehistoric Kashaya Pomo villages are situated primarily on the first and second ridge systems at elevations of several hundred meters above sea level and several kilometers from the coast. Village locations are chosen that provide protection from the fog and wind of the coast, that afford good sources of fresh water, and that are strategically placed to take advantage of both coastal and interior resources (see Lightfoot et al. 1991:112-15). The spatial organization of house structures varies greatly between villages, many with no coherent plan. The houses often tend to be arranged in a roughly semi-circular or circular manner with the large assembly or dance house towards the center (Barrett 1975:45; Kniffen 1939:386).

In the Russian Period (1812-1841), population aggregation took place around the Fort Ross settlement. Some Kashaya Pomo villages were relocated from the ridgetop to the upper marine terrace north of the Stockade (Lightfoot et al. 1991:115-16). However, the same kinds of organizational conventions continued to be reproduced in these new locations. Some historic compounds or villages, such as the CA-SON-670, were placed in secluded locations some distance from the coast that provided protection from fog and wind.

CONCLUSION

The analyses of the bone bed deposits, pit features, and internal spatial organization of the Neighborhood indicate that different kinds of organizational principles and operational strategies were employed by NAVS residents. At the level of the household, it appears that many of the domestic practices followed distinctly Kashaya Pomo/Coast Miwok conventions. Here one can clearly see the multiple influences and practices of the Native Californians, mostly women who cohabited with Native Alaskan men. At a broader scale, when one considers the internal arrangement of space in the greater Neighborhood, Alutiiq ideals appear to have structured the location and layout of residential and work space.

The menu served at NAVS was neither Kashaya/Coast Miwok nor Alutiiq. The Kodiak Islanders experienced the taste of venison, abalone, and new kinds of rock fishes, while the Pomo/Miwok were treated to seal and sea lion steaks and oven-roasted beef. Some foods, such as shellfish and rocky intertidal and subtidal fish, were readily accessible to anyone at NAVS. Wild game and marine mammals, such as venison, harbor seal, and sea lion, appear to have been hunted or obtained as whole meat packages by NAVS residents. Meats raised at Fort Ross, such as beef and mutton, were probably rationed by the Company or obtained through trade in the wider Ross community.

We interpret some of the bone bed refuse as the remains of diverse meat dishes from the land and sea that were prepared and cooked using a "hot rocks" method according to traditional Kashaya Pomo/Coast Miwok conventions. In these earth ovens, terrestrial game, domesticated meats, and marine mammals were treated in a similar manner. Special cuts of meats, such as seal and sea lion flippers, were prepared, but marine mammals were not cooked (boiled or roasted) according to Alutiiq practices. Other domestic refuse was also dumped into the trash deposits, most likely from cleaning up kitchen and related spaces in nearby houses.

The bone beds may represent the discrete remains of special meals and related activities hosted by NAVS households, possibly to celebrate the homecoming of Native Alaskan hunters. Feasts were essential elements of both the Kashaya and Alutiiq ceremonial and celebratory cycles. Little is known about ceremonies at NAVS, but it is possible that the most important gatherings took place in winter months after major sea otter hunts had concluded for the year. While speculative, we feel there is some evidence that Native Alaskans and Native Californians participated together in some of the feasts, dances, and ritual observances. A synergistic development may have been taking place at NAVS, where Kodiak-style winter feasts involving rituals for hunting success and veneration to large birds of prey were being prepared in a uniquely Kashaya Pomo/Coast

Miwok manner.

The organizational principles underlying trash disposal in the Neighborhood followed Pomo/Miwok conventions of cleanliness and order. Native Californians probably swept houses clean on a regular basis and kept nearby extramural space clear of debris. Food waste and artifacts from kitchen areas and related residential space, especially after special feasts, were tossed in refuse dumps in abandoned structures. Other household refuse was discarded over the edge of the marine terrace, creating (in large part) the archaeological deposit at FRBS.

We found relatively little evidence of traditional Kodiak Island household equipment or furniture as summarized by Clark (1974:112-27) at either NAVS or FRBS, including stone lamps; ground slate ulus, adzes, and other accoutrements; bone spoons or ladles; pottery; or hollowed whale vertebrae platters (one was found in the South Bone Bed). Most of the Alutiiq practices observable in household refuse were clearly oriented towards producing and maintaining their sophisticated marine hunting equipment. Some of this work may have included the manufacture of bone tools, the sewing of *kamleikas* and birdskin parkas, and the possible repair of *baidarkas*. Other kinds of materials and tasks represented in the bone beds are either associated with Kashaya Pomo/Coast Miwok practices (cooking, ground stone implements, projectile points) or involve innovative developments, such as the recycling of prehistoric stone implements, historic ceramic sherds, and glass pieces for use as raw materials in the production of tools and ornaments.

New developments were also taking place in landscape modification and garbage disposal at Fort Ross. While traditional Kodiak Island practices of covering refuse in house structures and other "old" surfaces with "new" surfaces (straw, clean sand, etc.) were not observed, we suspect that Native Alaskan conventions were in operation when people filled in abandoned house structures with stone rubble and dirt to create new surfaces. Some of these prepared surfaces were then used as refuse dumps, an enterprise influenced by Pomo/Miwok practices of order and cleanliness.

Alutiiq organizational principles are best observed at the scale of the settlement layout. From a distance, the Neighborhood resembled a historic native village on Kodiak Island. Domiciles that probably included wooden cabins, small shallow Alutiiq structures, and some Russian log houses as described by Tikhmenev (1978:134), were arranged in a linear fashion along the marine terrace. The exposed location of the houses provided an excellent view of the ocean and the skin boats stored along Fort Ross Cove.

The layout of NAVS may deviate from traditional Alutiiq settlements in that it probably contained a central

“communal place,” an open area where dances, feasting, and other ceremonies may have taken place. Kashaya villages did not usually contain central open areas either. However, the backside of Kodiak Island villages often served as an open area where communal gatherings could take place. Most major Alutiiq villages contained a large ceremonial structure known as a *kazhim*. Davydov (1977:107-110 [1802-1803]) indicated that an open space existed around the *kazhim* where outdoor festivals, dances, and feasts could take place. A similar kind of ceremonial structure (assembly house, dance house) was also found in the center of important Kashya Pomo villages. It is possible that the central “communal place” at NAVS, not far from the large rectangular building identified in Tschan’s geophysical survey, may have served a similar purpose.

In conclusion, we believe the Native Alaskan men and Native Californian women in interethnic households organized their lives generally according to separate principles. Day-to-day domestic practices largely followed Kashaya Pomo/Coast Miwok conventions. Since some of these women probably remained at NAVS with children while their Native Alaskan spouses participated in extended hunting expeditions from spring to fall, it is not surprising that their conventions were practiced in the domestic domain. As a result of Pomo/Miwok conventions being largely reproduced in the house, the homes’ interiors probably appeared very differently from the inside of contemporaneous Alutiiq houses on Kodiak Island as described by Knecht and Jordan (1985). The outward appearance of NAVS, beyond the individual house and refuse disposal practices, appears to have followed Native Alaskan principles. A visitor may not have noticed any significant differences between NAVS and historic Alutiiq villages on Kodiak Island until one entered the home. The broader settlement layout and orientation to the sea were clearly the dominion of the Native Alaskans.

Transformations were taking place in the world views of the people involved in mixed households. Synergistic developments can be seen in the addition of new menu items, the production of a greater range of native craft goods, the use of innovative raw materials, the combination of distinctive trash disposal and landscape modification practices, and possible joint participation in ceremonies. But there appears to be little evidence that new ethnic or cultural identities were being forged at NAVS. When exposed to new foods, ceremonies, and craft goods, the Kashaya Pomo/Coast Miwok at NAVS viewed them largely within a Native Californian perspective. Similarly, when exposed to a new physical environment and setting, the Native Alaskans at NAVS employed traditional conventions to organize their new settlement. In fact, one gets the impression that the men and women lived with largely separate frames of reference in the Native Alaskan Neighborhood, each continu-

ing to identify with the culture of their homeland. In each of the domains they commanded, the Native Alaskans and Native Californians largely reproduced or replicated their respective cultural practices in new social contexts.

REFERENCES

- Bancroft, Hubert Howe
1886 *The Works of Hubert Howe Bancroft, History of California*, Vol. 19. The History Company, San Francisco.
- Barrett, Samuel
1908 *The Ethno-Geography of the Pomo and Neighboring Indians*. University of California Publications in American Archaeology and Ethnology, Vol. 6. University of California, Berkeley.
- 1952 *Material Aspects of Pomo Culture*. Bulletin of the Public Museum of the City of Milwaukee Vol. 20, Parts 1 and 2. Milwaukee, Wisconsin.
- 1975 Pomo Buildings. In *Seven Early Accounts of the Pomo Indians and their Culture*, edited by R. F. Heizer, pp. 37-63. Archaeological Research Facility, University of California, Berkeley.
- Beardsley, Richard K.
1954 Temporal and Areal Relationships in Central California Archaeology, Part 1. *Reports of the University of California Archaeological Survey* no. 24. University of California, Berkeley.
- Bolotov, Iosaf
1977 The Konyag (Inhabitants of the Island of Kodiak) by Iosaf [Bolotov] (1794-1799) and by Gideon (1804-1807). Translated and edited by Lydia Black. *Arctic Anthropology* 14(2):79-108.
- Clark, Donald W.
1974 *Koniag Prehistory: Archaeological Investigations at Late Prehistoric Sites on Kodiak Island, Alaska*. Tubinger Monographien zur Urgeschichte. Verlag W. Kohlhammer, Stuttgart.
- 1984 Pacific Eskimo: Historical Ethnography. In *Handbook of North American Indians*, edited by David Damas, Vol. 5, Arctic, pp. 136-48. Smithsonian Institution, Washington DC.
- 1987 On a Misty Day You Can See Back to 1805: Ethnohistory and Historical Archaeology on the Southeastern Side of Kodiak Island, Alaska. *Anthropological Papers of the University of Alaska* 21:105-32.
- Corney, Peter
1896 *Voyages in the Northern Pacific. Narratives of Several Trading Voyages from 1813 to 1818, Between the Northwest Coast of America, the Hawaiian Islands and China, With a Description of the Russian Establishments on the*

- Northwest Coast*. Thomas G. Thrum, Publisher, Honolulu, Hawaii.
- Crowell, Aron
1992 Postcontact Koniag Ceremonialism on Kodiak Island and the Alaska Peninsula: Evidence from the Fischer Collection. *Arctic Anthropology* 29:18-37.
- 1994 World System Archaeology at Three Saints Harbor, An 18th Century Russian Fur Trade Site on Kodiak Island, Alaska. Ph.D. dissertation, Department of Anthropology, University of California, Berkeley.
- Davydov, G. I.
1977 *Two Voyages to Russian America, 1802-1807*. Translated by Colin Bearne. Edited by Richard A. Pierce. Materials for the Study of Alaska History No. 10. Limestone Press, Kingston, Ontario.
- de Laguna, Frederica
1939 A Pottery Vessel from Kodiak Island, Alaska. *American Antiquity* 4:334-43.
- Duhaut-Cilly, Auguste Bernard
1946 *An Episode from the Narrative of Auguste Bernard Duhaut Cilly*. Translation of 1828 account by Charles F. Carter. Silverado Press, Bohemian Grove, California.
- Dumond, Don E., and G. Richard Scott
1991 *The Uyak Site on Kodiak Island: Its Place in Alaska Prehistory*. University of Oregon Anthropological Papers No. 44. Eugene, Oregon.
- Farris, Glenn J.
1989 The Russian Imprint on the Colonization of California. In *Columbian Consequences*, Vol. 1, Archaeological and Historical Perspectives on the Spanish Borderlands West, edited by David Hurst Thomas, pp. 481-97. Smithsonian Institution Press, Washington D.C.
- 1990 Fort Ross, California: Archaeology of the Old *Magazin*. In *Russia in North America: Proceedings of the 2nd International Conference on Russian America*, edited by Richard A. Pierce, pp. 475-505. Limestone Press, Kingston, Ontario.
- Gideon, Hieromonk
1977 The Konyag (The Inhabitants of the Island of Kodiak) by Iosaf [Bolotov] (1794-1799) and By Gideon (1804-1807). Translated and edited by Lydia A. Black. *Arctic Anthropology* 14(2):79-108.
- Gifford, E. W.
1967 Ethnographic Notes on the Southwestern Pomo. *Anthropological Records* 25:1-48.
- Golovnin, Vasilii M.
1979 *Around the World on the Kamchatka 1817-1819*. Translation of the original 1822 edition (Part 1) by Ella L. Wiswell. The Hawaiian Historical Society and The University Press of Hawaii, Honolulu.
- Goldstein, Lynne
1995 Politics, Law, Pragmatics, and Human Burial Excavations: An Example from Northern California. In *Bodies of Evidence*, edited by Anne L. Grauer, pp. 3-17. John Wiley and Sons, New York.
- Haggarty, James C., Christopher B. Wooley, Jon M. Erlandson, and Aron Crowell
1991 *The 1990 Exxon Cultural Resource Program: Site Protection and Maritime Cultural Ecology in Prince William Sound and the Gulf of Alaska*. Exxon Shipping Company and Exxon Company, Anchorage, Alaska.
- Heizer, Robert F.
1949 Pottery from the Southern Eskimo Region. *Proceedings of the American Philosophical Society* 93(1):48-56.
- 1956 Archaeology of the Uyak Site Kodiak Island, Alaska. *Anthropological Records* 17(1):1-97.
- Holmes, W. H.
1975 Pomo Reservation, Mendocino County (1902). In *Seven Early Accounts of the Pomo Indians and their Culture*, edited by Robert F. Heizer, pp. 21-23. Archaeological Research Facility, University of California, Berkeley.
- Jones, Terry L., and Jennifer R. Richman
1995 On Mussels: *Mytilus californianus* as a Prehistoric Resource. *North American Archaeologist* 16:33-58.
- Jordan, Richard H.
1994 Qasqiluteng: Feasting and Ceremonialism among the Traditional Koniag of Kodiak Island, Alaska. In *Anthropology of the North Pacific Rim*, edited by William W. Fitzhugh and Valerie Chaussoronet, pp. 147-73. Smithsonian Institution Press, Washington DC.
- Jordan, Richard H., and Richard A. Knecht
1988 Archaeological Research on Western Kodiak Island, Alaska: The Development of Koniag Culture. In *Aurora: The Late Prehistoric Development of Alaska's Native People*, edited by Robert Shaw, Roger K. Harritt, Don E. Dumond, pp. 225-306. Monograph Series No. 4. Alaska Anthropological Association, Anchorage.
- Kennedy, Mary Jean
1955 Culture Contact and Acculturation of the Southwestern Pomo. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Berkeley.
- Khlebnikov, Kirill
1976 *Colonial Russian America: Kyrill T. Khlebnikov's Reports, 1817-1832*. Translation and editing of original 1861 publication by Basil Dmytryshyn and E. A. P. Crownhart-Vaughan. Oregon Historical Society, Portland.
- King, Thomas F., and Ward F. Upson
1970 Protohistory on Limantour Sandspit: Archaeological Investigations at 4-Mrn-216 and 4-Mrn-298. In *Contributions to the Archaeology of Point Reyes National Seashore: A Compendium in Honor of Adan E. Treganza*, edited by Robert E. Schenk, pp. 115-94. Treganza Museum Papers

- No. 6. San Francisco State College, San Francisco.
- Knecht, Richard A., and Richard A. Jordan
1985 Nunakakhnak: An Historic Koniag Village in Karluk, Kodiak Island, Alaska. *Arctic Anthropology* 22:17-35.
- Kniffen, Fred B.
1939 *Pomo Geography*. University of California Publications in American Archaeology and Ethnology Vol. 36, No. 6. University of California, Berkeley.
- Kostromitinov, P.
1974 Notes on the Indians in Upper California. In *Ethnographic Observations on the Coast Miwok and Pomo by Contre-Admiral F. P. Von Wrangell and P. Kostromitinov of the Russian Colony Ross, 1839*, pp. 7-18. Translation and editing of original 1839 publication by Fred Stross and Robert Heizer. Archaeological Research Facility, University of California, Berkeley.
- LaPlace, Cyrille
1986 Description of a Visit to an Indian Village Adjacent to Fort Ross by Cyrille LaPlace, 1839. Translation and editing of 1854 original French publication by Glenn Farris. Appendix B in Cultural Resource Survey at the Fort Ross Campground, Sonoma County, California, by Glenn Farris, pp. 65-80. On file, Cultural Heritage Section, Archaeology Laboratory, California Department of Parks and Recreation, Sacramento, California.
- Layton, Thomas N.
1990 *Western Pomo Prehistory: Excavations at Albion Head, Nightbirds' Retreat, and Three Chop Village, Mendocino County, California*. Monograph 32. Institute of Archaeology, University of California, Los Angeles.
- Lightfoot, Kent, and Antoinette Martinez
1995 Frontiers and Boundaries in Archaeological Perspective. *Annual Review of Anthropology* 24:471-92.
- Lightfoot, Kent, Thomas Wake, and Ann Schiff
1991 *The Archaeology and Ethnohistory of Fort Ross, California, Vol. 1: Introduction*. Contributions of the University of California Archaeological Research Facility No. 49. Archaeological Research Facility, University of California, Berkeley.
- Lisiansky, Urey
1814 *A Voyage Round the World in 1803, 4, 5, and 6; Performed By Order of his Imperial Majesty, Alexander the First, Emperor of Russia, in the Ship Neva*. John Booth, London.
- Loeb, E. M.
1926 *Pomo Folkways*. University of California Publications in American Archaeology and Ethnology Vol. 19, No. 2. University of California, Berkeley.
- Lutke, Fedor P.
1889 September 4-28, 1818. From the Diary of Fedor P. Lutke during his Circumnavigation Aboard the Sloop *Kamchatka*, 1817-1819: Observations on California. In *The Russian American Colonies: Three Centuries of Russian Eastward Expansion 1798-1867, Vol. 3, A Documentary Record*, edited and translated by Basil Dmytryshyn, E. A. P. Crownhart-Vaughan, and Thomas Vaughan, pp. 257-85. Oregon Historical Society Press, Portland.
- Mannion, Linda, and M. Curtis Mannion
1970 Abstracts from the Kelly Manuscript: Coast Miwok Material Culture. In *Contributions to the Archaeology of Point Reyes National Seashore: A Compendium in Honor of Adan E. Treganza*, edited by Robert E. Schenk, pp. 65-95. Treganza Museum Paper No. 6. San Francisco State College, San Francisco.
- Martinez, Antoinette
1995 Blurred Boundaries of the Nineteenth Century Kashaya Pomo. Paper presented at 29th Annual Meeting of the Society for California Archaeology, Eureka, California.
- Merck, Carl Heinrich
1980 *Siberian and Northwestern America 1788-1792: The Journal of Carl Heinrich Merck, Naturalist with the Russian Scientific Expedition Led by Captains Joseph Billings and Gavriil Sarychev*. Translated by Fritz Jaensch. Edited by Richard A. Pierce. Limestone Press, Kingston, Ontario.
- Mobley, Charles M., J. C. Haggarty, C. J. Utermohle, M. Eldridge, R. E. Reanier, A. Crowell, B. Ream, D. Yesner, J. Erlandson, P. Buck
1990 *The 1989 Exxon Valdez Cultural Resource Program*. Exxon Shipping Company and Exxon Company, Anchorage, Alaska.
- Okladnikova, E. A.
1983 The California Collection of I. G. Voznesensky and the Problems of Ancient Cultural Connections Between Asia and America. *Journal of California and Great Basin Anthropology* 5:224-39.
- Opolovnikov, A., and Y. Opolovnikova
1989 *The Wooden Architecture of Russia: Houses, Fortifications, and Churches*. Henry N. Abrams, New York.
- Oswalt, Robert L.
1964 *Kashaya Texts*. University of California Publications in Linguistics Vol. 36. University of California, Berkeley.
- Payeras, Mariano
1979 (entry for October 11, 1822) Diary of Mariano Payeras, Travels of the Canon Fernandez de San Vincente to Ross. Translated by Michael S. Tucker and Nicholas Del Cioppo. Submitted for distribution at the Conference on Russian America at Sitka, Alaska in 1979. Copy on file, Fort Ross Interpretive Association Library, Fort Ross, California.
- Powers, Stephen
1976 *Tribes of California*. University of California Press, Berkeley. (Originally published in 1877 in Contributions to

North American Ethnology, Vol. 3, Department of the Interior, U.S. Geographical and Geological Survey of the Rocky Mountain Region. Government Printing Office, Washington DC.)

Riddell, Francis

1955 *Archaeological Excavation on the Farallon Islands, California*. Reports of the University of California Archaeological Survey No. 32. University of California, Berkeley.

Schabelski, Achille

1993 Visit of the Russian Warship Apollo to California in 1822-1823. Translated and edited by Glenn Farris. *Southern California Quarterly* 75(1):1-13.

Schiff, Ann M.

1995 Geographic Variation in Native Alaskan Ethnic Boundary Markers. Paper presented at the 29th Annual Meeting of the Society for California Archaeology, Eureka, California.

Shubin, Valery O.

1990 Russian Settlements in the Kurile Islands in the 18th and 19th Centuries. In *Russia in North America: Proceedings of the 2nd International Conference on Russian America*, edited by Richard A. Pierce, pp. 425-50. Limestone Press, Kingston, Ontario.

Stewart, Omer C.

1943 *Notes on Pomo Ethnogeography*. University of California Publications in American Archaeology and Ethnology

Vol. 40, No. 2. University of California, Berkeley.

Tikhmenev, P. A.

1978 *A History of the Russian-American Company*. Translation and editing of original 1861-1863 publications by Richard A. Pierce and A. S. Donnelly. University of Washington Press, Seattle.

Wake, Thomas A.

1995 Mammal Remains from Fort Ross: A Study in Ethnicity and Culture Change. Ph.D. dissertation, Department of Anthropology, University of California, Berkeley.

Wiswell, Ella Lury

1979 *Around the World on the Kamchatka, 1817-1819: V. M. Golovnin*. The Hawaiian Historical Society and The University Press of Hawaii, Honolulu.

Wrangel, F. P. Von

1969 Russia in California, 1833, Report of Governor Wrangel. Translation and editing of original 1833 report by James R. Gibson. *Pacific Northwest Quarterly* 60:205-15.

1974 Some Remarks on the Savages on the Northwest Coast of America. The Indians in Upper California. In *Ethnographic Observations on the Coast Miwok and Pomo by Contre-Admiral F. P. Von Wrangell and P. Kostromitinov of the Russian Colony Ross, 1839*, pp. 1-6. Translation and editing of original 1839 publication by Fred Stross and Robert Heizer. Archaeological Research Facility, University of California, Berkeley.

18

Conclusion

KENT G. LIGHTFOOT, ANN M. SCHIFF,
AND THOMAS A. WAKE

IN THE SECOND VOLUME of *The Archaeology and Ethnohistory of Fort Ross, California* series, a collaborative team of scholars from the California Department of Parks and Recreation and U.C. Berkeley details the investigation of the Native Alaskan Neighborhood. This Neighborhood is one of four ethnic residential areas that made up the Russian mercantile colony of Fort Ross from 1812 to 1841. Native Alaskan sea mammal hunters, primarily Chugach and Kodiak Island Alutiiq men, and Native Californian workers and spouses, mostly Kashaya Pomo, Southern Pomo, and Coastal Miwok women, as well as *kaiur* (convict) laborers, all lived together here. While a few Native Alaskan families lived in the Neighborhood, most households were interethnic in composition, the majority consisting of Kodiak Island men and Kashaya Pomo women. Alutiiq men from the same or nearby homeland villages established households with related groups of Pomo and Miwok women from the "vicinity of Ross," "the Great Bodega (Bay)," and "the Slavianka (Russian) River" (Istomin 1992). According to the eyewitness accounts summarized in chapter 1, some vestiges of traditional Native Alaskan sociopolitical practices occurred in the Neighborhood.

The archaeological remains of the Neighborhood consist of the Native Alaskan Village Site or Village (CA-SON-1897/H) and the Fort Ross Beach Site (CA-SON-1898/H). The former is located directly south of the reconstructed Stockade walls on an uplifted marine terrace, while the latter is situated directly below the Native Alaskan Village Site in the Fort Ross Cove. The Village was the primary residential area for single Native Alaskan men, Native Alaskan families, and interethnic households. The Beach site is a complex midden deposit associated with the nearby Village and with various

mercantile and recreational activities that took place in the Fort Ross Cove.

The purposes of the ongoing archaeological investigation are threefold. The first purpose is to provide the California Department of Parks and Recreation with pertinent information for managing and protecting these two sites as significant archaeological resources in the Fort Ross State Historic Park. The second purpose is to contribute to the active public interpretation program in the Park by emphasizing the critical and demanding roles that native workers played in the day-to-day operation of the Ross Colony. The results presented in this volume will be used to plan and promote a "culture" trail in the Park that will take Park visitors beyond the reconstructed Stockade complex to view the archaeological remains of the Neighborhood where Native Alaskan and Native Californian peoples lived and worked.

The third purpose of the investigation is to address two research objectives of the Fort Ross Archaeological Project that concern incorporating indigenous peoples into a pluralistic, mercantile colony. The first objective is to evaluate the degree to which native workers participated in the broader Russian-American Company world system, and whether increased access to manufactured goods and domesticated foods may have stimulated cultural change among the Native Alaskan and Native Californian laborers. The second research objective examines the implications of interethnic interaction and cohabitation in early pluralistic communities, such as Fort Ross, for the creation and transmission of cultural innovations among peoples from different homelands.

THE RESEARCH PROGRAM

We generated a research program to study the organizational principles, world views, and identity con-

struction of residents in Neighborhood households. The degree to which nonnative foods and manufactured goods were consumed and cultural innovations created and/or adopted may be related, in part, to the identity strategies chosen by individuals and households. Village residents could have negotiated many different identity strategies at Fort Ross: they could have remained faithful to their traditional values and prestige systems; they could have manipulated their "public" identities to assimilate into other cultural groups for perceived social, political, and economic advantages; or they could have created identities that were neither purely Native Alaskan, Native Californian, nor Russian, but something new and different. Our research program examines how organizational principles and identity constructions were actualized in daily practice in the Native Alaskan Neighborhood. This program involves the careful examination of how Village households produced, consumed, and discarded material culture; how they conducted day-to-day domestic chores and recreational activities; and how they created and defined space in and around household complexes. These routinized performances are then compared to and contrasted with what is known of the daily practices of late prehistoric and early historic Alutiiq villages on Kodiak Island and the Kurile Islands and of the Kashaya Pomo settlements in the greater Ross Region.

A field strategy was implemented to delineate the archaeological context and spatial organization of artifacts, faunal and floral remains, architectural features, extramural space, and refuse deposits across the Neighborhood. Fieldwork was initiated in the summers of 1988 and 1989 at the Beach site, where we excavated 29 profile units along a 30 meter erosional surface, a 2-by-.5 meter unit in the East Bench, and a 2-by-3 meter block in the Southwest Bench. Price's geoarchaeological study indicates erosional processes, bioturbation, and downward transportation have created an extensive colluvial deposit of artifacts, faunal remains, and sediments at the base of the marine terrace. A pit feature was unearthed and recorded in the Middle Profile. Other features, as well as materials deposited *in situ*, may still be found in the East Bench.

The investigation of the Native Alaskan Village Site took place in three phases in the summers of 1989, 1991, and 1992. The first phase involved topographic mapping, systematic surface collection, and geophysical survey. Thirty-eight 2-by-2 meter units and five collection crosses were surface collected, providing information on the spatial distribution of artifacts and faunal remains across the surface of the Village site. Both magnetometer and soil resistance surveys were undertaken, although only the latter results are reported in this volume. Tschan's interpretation of the geophysical anomalies suggests a diverse range of features is found in the north, central, and south areas of the Village.

The surface investigation of the Village guided the

second phase of fieldwork involving the excavation of a 1-by-1 meter test unit (South Central Test Unit), a block of three 1-by-1 meter units (West Central Trench), and two trenches consisting of five and seven 1-by-1 meter units (East Central and South trenches, respectively). The third phase of investigation was the areal exposure of cultural features defined in the East Central and South trenches. The East Central Area Excavation exposed units to the north and west of the original trench. In the 23 square meter block comprising the East Central Trench and Area Excavation, we unearthed a pit feature and a bone bed deposit composed of hundreds of fire-cracked rocks, faunal elements, and artifacts. The South Area Excavation involved horizontal excavation to the north, west, and south of the initial trench. The total excavation block of 27.25 square meters revealed two intact bone bed deposits, a pit feature, a line of wooden posts, a linear feature of clay, an extensive layer of rock rubble, and natural bedrock outcrops.

SIGNIFICANT FINDINGS

The organizational principles and daily practices of Village households are evident in how they structured space and conducted routine activities involving the consumption and discard of material culture. Specifically, we summarize significant findings concerning the spatial structure of the Neighborhood, trash disposal patterns, the modification and reuse of the Neighborhood landscape, the widespread scavenging and recycling of manufactured goods, the processing and cooking of meat dishes, and the production and use of native craft goods.

SPATIAL STRUCTURE OF THE NATIVE ALASKAN NEIGHBORHOOD

The Village was linearly organized so that residents could arrange their houses, extramural work areas, and trash dumps along the eastern edge of the marine terrace with a clear unobstructed view of Fort Ross Cove and the Pacific Ocean. Some Villagers resided in a row or two of structures in the north and central areas that paralleled the terrace edge, while in the south area the Village opened up into an L-shape where the majority of residents lived in several rows of houses constructed across the entire width of the site.

The north area, closest to the Stockade walls, is characterized by the most complex archaeological deposits. It contains not only Village site materials but also later (American Period) remains of agricultural buildings, fences, a store, and a gas station. Tschan's interpretation of the geophysical results indicates the location of corrals, barnlike structures, and possibly pipelines and gas tanks. No subsurface investigations were undertaken in the north area.

The central area—beyond one or two rows of houses along the terrace edge—is relatively clean of surface

artifacts and faunal remains, as well as subsurface geophysical anomalies. We believe it was largely open space during the occupation of the Village site and may have served as a communal place or plaza ground. We further speculate that the area may have been used for ceremonies, dances, and assemblies where the entire Village community could gather. Not being characteristic of either Alutiiq settlements on Kodiak Island or nearby Kashaya Pomo villages, this central open space could reflect organizational innovations imposed by the Russian-American Company. Tschan's identification of a large structure directly south of the open area is intriguing, since both the Alutiit and Kashaya constructed large buildings (*kazhim* and assembly or dance houses, respectively) for ceremonial functions.

Most of the evidence of house structures is found in the south area. The geophysical survey and surface investigation show that architectural features were constructed along the southern edge of the central open space and that several tiers of structures were probably built directly south of these.

The eyewitness accounts and illustrations of Khlebnikov, Payeras, Duhaut-Cilly, Belcher, and Voznesenskii, described in chapter 1, indicate that 14 to more than 20 houses once stood on the Village site, and that diverse architectural styles were employed in their construction. Some houses were Russian-style log or plank structures, while others were the "flattened cabins" of the "Kodiaks." We excavated the partial remains of two pit structures that resemble in floor plan and depth the shallow semi-subterranean houses described by Shubin on the Kurile Islands. These pit features are at least 3.4 to 5 meters in length and dug only about .3 meters below the former ground surface. No internal pits, hearths, or other features were found, although only a limited area of each structure was exposed because of the overlying bone bed features. The East Central Pit Feature contains two large redwood posts and the remains of a third. While these posts may be associated with the original structure, we feel they are part of a later American Period fence built across this pit feature. Both pit features were used prior to or during the 1820s and 1830s.

Twelve small redwood posts, eleven of them in a linear configuration, were exposed to the east of the South Pit Feature. We believe these posts are contemporaneous with the NAVS occupation and may represent a fence line that contained a modest garden plot or pen for small animals. Constructing this fence line involved the excavation of a shallow trench along the length of the post line. The posts were then placed in the trench and secured with dirt and rocks. This method of construction is analogous to that used in the Stockade complex, where a trench was first dug, within which the lower sill, wall posts and puncheons were then positioned, secured, and buried.

The archaeological remains of aboveground structures were not clearly defined during our investigation. The linear clay feature unearthed in the South Area Excavation, however, may be part of the foundation of a log or plank building. Furthermore, the rock rubble found in this area may have served as foundation stones and/or facilitated drainage for aboveground structures. Farris (1990) found similar rock rubble in his excavation of the Fur Warehouse in the Fort Ross Stockade.

An important discrepancy between archival documents and our archaeological investigation is the location of the original Native Alaskan settlement as illustrated in the 1817 map. The map places the Village "core" in the central area that is largely devoid of architectural remains. Either the area was subsequently cleaned after early occupation and transformed into an open space, or the original location was mapped incorrectly. Aron Crowell (personal observation, 1996) notes that native dwellings at the Three Saints Bay Colony on Kodiak Island were omitted from some Russian charts, presumably because they were not considered significant cultural features of the landscape. It is very possible that NAVS houses were quickly sketched onto the 1817 map, or inaccurately added at a later time. We suggest the houses portrayed in the 1817 map are located in the south area of Village, and that the distance separating the southern wall of the Stockade from the Village "core" on the map is in error about 20 to 30 meters.

Village household residents created most of the archaeological deposits in FRBS by discarding trash over the edge of the terrace. FRBS served as an "artifact trap" in which materials travelling down the steep slope were caught at the base of the marine terrace. Some lithic flakes and tools were deposited in prehistoric times in the underlying clay stratum, but the majority of the artifact assemblage appears to have been discarded during the Russian Period. Mercantile and recreational activities conducted in the Fort Ross Cove resulted in the deposition of other materials at or near FRBS. As outlined in chapter 1, the Cove was an industrial area where Belcher, Payeras, and Wrangell observed a landing and storage shed for *baidarkas*, a cooperage, a blacksmithy, a tannery, and a carpenter's shop not far from FRBS. Shipbuilding activities that took place near FRBS produced four brigs (*Rumiantsev*, *Buldakov*, *Volga*, and *Kiakhta*) from 1818 to 1824.

The partial remains of the old bathhouse described by Payeras, Wrangell, and Bancroft, and outlined in chapter 1, were found at FRBS. We detected a clay-lined pit that had been thermally altered by extremely hot temperatures, and that contained a stone bench. The flat rocks making up the stone bench are fire-cracked, although the floor of the pit contains only small particles of charcoal. This feature resembles the "stove of stone" described by Payeras in 1822 that served as the bathhouse furnace by producing steam when sprinkled with

water. We suggest that a sweltering fire was built in the concave-shaped clay pit around the stone bench, allowed to burn down to embers, and while keeping the rocks red hot, used as a source of steam for the bathhouse. The furnace was probably cleaned out subsequent to its last use. Payeras noted that the steam rose through iron grates into two "high" rooms where individuals enjoyed the therapeutic cleansing of the steam bath. The two upper rooms were probably part of a wooden structure with benches built into the side of the hill, of which little remains today.

TRASH DISPOSAL PATTERNS

Village residents were highly structured in their disposal of refuse. The partial excavation of two NAVS pit features and the FRBS bathhouse furnace indicates that buildings were periodically swept clean, at least prior to their abandonment. Few artifacts and faunal remains are found on the floors of the three structures. Village household residents also maintained related extramural space in a tidy order. The early 19th century ground surface (yellow-brown sandy loam) exposed along the northeastern edge of the East Central Pit Feature is relatively sterile of cultural materials, indicating it had been kept clean of trash. The area directly east of the South Pit Feature, where a row of small redwood posts was unearthed, contains relatively few artifacts and faunal remains. This paucity of materials is significant since fence lines can serve as barriers in the accumulation of trash, again suggesting that the area had been cleaned periodically. Finally, the central "open" area separating the north and south sections of the Village appears to have been maintained as a "clean zone," where refuse was prohibited or periodically swept clean.

Households disposed of their trash in bone bed deposits located in the Village and/or tossed garbage over the side of the marine terrace, where erosional processes and gravity eventually carried heavier materials into the FRBS archaeological deposits. These bone beds are discrete refuse dumps where thousands of animal bones, shellfish remains, fire-cracked rocks, and artifacts were discarded on newly created surfaces, often in the fill of abandoned house structures. We interpret the bone beds as household dumps to which nearby families would carry trash for disposal. This interpretation is based on the shallow depth, modest size (less than 4 meters in diameter), and large number of refuse dumps that may be distributed across the residential space of NAVS. We unearthed three bone bed deposits in our modest excavation. The toss pattern of faunal remains and artifacts in the East Central Bone Bed suggests that people living directly to the south were dumping materials from containers while standing on the south side of refuse area.

The presence of articulated fish bones, whole abalone shells and sea urchin spines, and clusters of animal bones from the same species indicates that bone beds

were covered with sediments shortly after deposition, and that the refuse dumps were protected from trampling and other post-depositional processes. Bioturbation is minimal in the bone beds, in contrast to the majority of the other archaeological deposits excavated in the Native Alaskan Neighborhood and the greater Ross Region. The features remained intact because the dense accumulation of fire-cracked rock and underlying rock rubble (in the South Bone Bed and Abalone Dump) discouraged, protected, and even sealed these bone beds from intrusions by small burrowing animals.

MODIFICATION AND REUSE OF THE NAVS LANDSCAPE

Although the Native Alaskan Village was occupied for less than thirty years, a number of rebuilding and filling episodes took place that produced an artificially constructed landscape. Residential space in the Village was continually reused and redefined throughout its short occupation.

In the East Central Area, the pit feature was first constructed, used, and then abandoned. It was then filled with sediments and leveled to the old ground surface, where a bone bed deposit was created on a new artificial surface. When the bone bed was no longer used as a trash dump, it appears to have been rapidly covered with sediments. In the South Area, another pit feature was dug, occupied, and forsaken, then filled with sediments making it level with the original clay/bedrock surface. Rock rubble was then dumped on top of this fresh surface, raising the elevation of the ground surface .2 to .5 meters. A linear clay feature was then erected on the rock rubble, possibly as part of the foundation of an aboveground structure. The South Bone Bed was then deposited directly over the remains of the clay feature and rock rubble, and the Abalone Dump was created nearby on the rock rubble substratum. Both bone bed deposits were covered with sediments shortly after their final use as trash repositories. In the South Central Test Unit, a similar pattern of landscape modification was observed where rock rubble was intentionally dumped on the clay/bedrock stratum, raising the ground surface of this area about .1 meters.

MANUFACTURED GOODS

The European/Asian artifacts in the Native Alaskan Neighborhood represent a relatively discrete assemblage that dates almost exclusively to the Russian occupation, primarily during the 1820s and 1830s. The tight dates of the historical materials are relatively unique at Fort Ross, since most other archaeological deposits excavated to date in the Russian Stockade contain a variety of materials dating to the later American Period (post-A.D. 1846), when the buildings were used as a hotel, saloon, dance hall, and storage facilities.

The ceramic assemblage from the Neighborhood consists primarily of refined earthenwares (primarily

handpainted blue, transferprint blue, and handpainted polychrome), as well as some porcelains, stonewares and yellowwares. The ceramics are fragmented into small pieces, of which only a handful can be refit together. The absence of any complete or reconstructible vessels strongly suggests a secondary context for the ceramics. While plates, saucers, teacups and other ceramic forms are represented, it appears that few of the ceramic vessels were used in their primary forms at NAVS or FRBS. The distinct possibility exists that some ceramics were scavenged from other Fort Ross locations (Stockade and Russian Village dumps) to be used as raw material in the production of native artifacts. This interpretation is bolstered by the large number of waterworn and highly eroded ceramics recovered from NAVS. It is also possible that pipestem fragments were recycled by NAVS residents and cut into "preformed" beads. However, direct evidence for the modification of ceramic sherds into bead blanks, pendants, or other ornaments at either NAVS or FRBS, is minimal (about 1% of the NAVS sherds are modified), a point we return to below.

The window and vessel glass artifacts in the Neighborhood are ubiquitous but highly fragmented into many small pieces. The glass sherds are so minute and disjointed that vessel identification is almost impossible. The majority of the "black glass" fragments are probably pieces of case transported bottles that may have contained alcoholic drinks. Few of the vessels appear to have been used as liquid containers in the Neighborhood, but rather they probably were scavenged from the Stockade or Russian Village garbage dumps as sources of raw material in the production of native artifact forms. About 5.2% of the total glass at NAVS and FRBS is modified, most being vessel glass reduced into flakes, scrapers and some projectile points. Window glass fragments exhibit less evidence of intentional modification. Their spatial distribution in the South Bone Bed and directly east of the East Central Bone Bed indicates a close association with other architectural remains. The discrete clusters of pane glass fragments and nails may represent the dismantled remains of glass-windowed structures.

The metal artifact assemblage is dominated by iron and, to a lesser extent, brass nails. Nail wire bits, spikes, and platy iron fragments are also common, followed by relatively rare occurrences of copper strips, pieces of buttons and button hooks, lead foil segments, lead bullet molds and sprues, and a copper bowl fragment. Silliman notes that the metal assemblage is not as diverse as other Russian-American Company assemblages associated with native peoples (e.g., Schiff 1995; Shubin 1990), and many objects such as saws, axes, adzes, shovels, razors, scissors that were listed on inventories of materials shipped to Fort Ross were not recovered. Many of the nails are bent, some intentionally shaped into hooks and other forms or possibly twisted when removed from wooden planks. The bent nails and largely defective

metal items indicate these materials were probably discarded by their primary users as rubbish. Although NAVS residents may have been the principal users and disposers of some metal artifacts, it is very possible that they were recycling metal refuse from other peoples' dumps and/or collecting lost or forgotten items from industrial work areas for reuse in new contexts. Some of the nails (e.g., the brass tacks used in shipbuilding) may have been scavenged from other Ross locations and used in the construction of NAVS structures or as raw material in the production of native artifact forms, such as fish hooks.

While the original users of the ceramic, glass, and metal artifacts at NAVS remain ambiguous, the glass beads were shipped to Ross for the primary consumption of native workers. The beads appear to have been manufactured primarily in Europe, most in Italy (Venice and Murano), some in Bohemia, and none in China. The bulk of the beads are hot-tumbled, drawn, monochrome and polychrome, undecorated embroidery varieties—the least expensive on the market in the early 19th century. Ross notes that the cheap embroidery beads are often lost in domestic contexts where day-to-day activities occur, while more expensive decorated beads tend to be found in ceremonial contexts where wealth displays and/or ritual activities take place. The bead color preference of the NAVS residents is relatively unique for coastal western North America. Most Pacific coast contact sites contain a majority of white and blue beads, especially those dating to the late 18th and early 19th centuries. The bead assemblage at NAVS consists primarily of white/clear/gray, red, green, and black colors. Few blue, purple or yellow/amber beads are found. The distinctive bead assemblage at NAVS probably reflects the combined color preferences of its multiethnic residents, or possibly even the unusual color choices of the local California Indians who lived in the Village.

FOOD PROCUREMENT AND PROCESSING

Native residents consumed a diverse range of meat dishes prepared from marine mammals, terrestrial game, domesticated animals, fish, birds, and shellfish. The mammal assemblage consists primarily of pinnipeds (harbor seals, California sea lions, Steller's sea lions, Otariidae or eared seals) and artiodactyls (black-tailed deer, cows, sheep, pig, and elk). Insectivores, rodents, lagomorphs (rabbit), carnivores (wolf, coyote, dog, bobcat, mountain lion, grizzly bear), and sea otters are present but in low numbers. Wake notes that the scarcity of sea otter remains indicates that its valuable pelt, as well as its meat, were processed during the hunt or elsewhere in the Ross Colony. Porpoise and whale bones that exhibit evidence of butchering were also recovered in low numbers.

The fish assemblage is dominated by cabezon, lingcod, and rockfishes that were probably caught from the rocky shoreline using hook and line. Gobalet

observes that many of these rocky intertidal and subtidal fish are quite large, indicating a size preference in the specimens brought back to the Neighborhood for dinner. Most of the other fish remains are also marine in origin, including surfperch, black or rock prickleback, Pacific hake, requiem sharks (e.g., leopard sharks), buffalo sculpin, rock or kelp greenling, and even barracuda. Freshwater specimens, such as salmon, steelhead trout, minnows, and suckers, are very rare, indicating that the either the residents of the Neighborhood did not fish in the adjacent Fort Ross Creek and undertake fishing expeditions along the nearby South Fork of the Gualala River or Russian River, or that the fish were processed elsewhere.

The bird assemblage is dominated by seabirds, primarily the common murre as well as cormorant, gull, pelican, and a few albatross remains. Waterfowl (duck, goose, loon, and American coot) are also present at NAVS and FRBS but in much lower numbers. A few fragments of bald eagle and California condor were also recovered. Chicken remains are also present in a few of the archaeological deposits. The shellfish assemblage consists mostly of gastropods and bivalves harvested from nearby rocky intertidal habitats. The majority are small gastropods, including other snail (Gastropoda), turban, limpet, periwinkle, dogwinkle, and a few olivella. The NAVS and FRBS archaeological deposits also contain many mussels and fewer numbers of chitons, barnacles, and abalones, while sea urchin spines and fragments are found almost exclusively at NAVS. Estuarine species are infrequent and include a few clam shells.

Despite the flotation of sediment samples and the careful sorting of both light and heavy fractions from many deposits at both NAVS and FRBS, little direct evidence of plant foods was recovered. Although the paucity of charred floral remains may be related to biases in their preservation, the neutral pH of most of the sediments, and the relatively intact deposits of the bone beds suggest otherwise. Most likely the processing and deposition of plant foods were undertaken in other contexts not yet excavated at NAVS or FRBS. The presence of millstones, handstones, and pestles in the bone bed deposits suggests that acorns and other nuts and seeds may have been processed near these refuse dumps.

The butchering evidence and spatial patterning of the mammal remains in the bone bed deposits suggest the marine mammal, terrestrial game, and domesticated animals were processed and cooked in similar ways. Neighborhood residents used steel tools to dismember bones and to fillet meat portions. Special cuts of meat were prepared for some meat dishes, especially flipper elements that were removed from harbor seals and sea lions. Flipper elements are considered a great delicacy among Unangas and Alutiiq peoples. However, the meat of the marine and terrestrial mammals appears to have been treated similarly once the meat packages were

prepared for cooking. Clusters of mostly unburned mammal remains in association with medium- and large-sized “cooking” stones (especially fire-cracked rocks and ground stone “other”), small gastropods, and small quantities of charcoal suggest they may have been slow roasted in underground ovens. Employing the traditional culinary conventions of the Kashaya Pomo, we suggest that several tiers of hot rocks, seaweed, and meats were placed in ovens and cooked for five to eight hours. The contents of the ovens were then consumed and the remaining refuse deposited in the nearby bone beds. Most of the artiodactyl remains exhibit evidence—spiral fractures and opposing impact points produced by bipolar cracking of bones using hammers and anvils—of marrow extraction.

Other foods such as shellfish, birds, and fishes may have also been cooked in the ovens. However, the spatial patterning of the few fish remains mapped *in situ* indicate they may have been cooked separately, while the ubiquitous distribution of abalone and other mollusks suggests they may have been cooked with the mammals and also consumed as separate meals.

NATIVE CRAFTS

Some of the traditional technological practices and material culture of Native Californians and Native Alaskans are observed in the artifact assemblage of the Neighborhood. A diverse range of chipped stone artifacts is found at the Village and the Beach site, including shatter, cores, unmodified flakes (primary cortical, secondary cortical, interior), edge-modified flakes, unifaces, bifaces, and projectile points. Most are manufactured from cherts and obsidians locally available in the southern North Coast Ranges. However, in contrast to the discretely dated European/Asian artifacts, the majority of the chipped stone artifacts may have been originally produced and used in prehistoric times. Archaeological deposits at both sites that date to the 1820s and 1830s, such as the bone beds, include a mix of prehistoric and historic lithics that are dated by obsidian hydration. The large percentage of prehistoric obsidian artifacts found in historic contexts suggests that historic stone tool manufacture was minimal at either site. Lithic production was probably limited to minor maintenance of notched projectile points and bifaces that may date to late prehistoric or historic times.

The association of prehistoric and historic chipped stone artifacts with historic ceramic, metal, and glass artifacts may be interpreted as evidence of “mixed deposits” created by widespread rodent disturbance at Fort Ross. Broadly distributed, low-density lithic scatters dating back 6,000 or more years are commonly found along the marine terraces of the Fort Ross Region. The Native Alaskan Neighborhood appears to have been constructed on top of one or more earlier prehistoric lithic scatters—an observation that may account for the almost ubiquitous distribution of chipped stone artifacts

in the archaeological deposits. However, the co-occurrence of prehistoric and historic materials in the bone beds is more complex. The discovery of prehistoric obsidian artifacts in these intact features suggests that Village residents were scavenging prehistoric lithic remains from nearby archaeological deposits and reusing them as expedient tools and as curated artifacts in historic contexts. Village residents may have been using the nearby scatters as resource zones for selecting flakes and formal tools for use in various domestic activities in and around their homes. The relatively sparse number of primary and secondary flakes and shatter in the bone bed deposits indicates that households were highly selective in choosing which prehistoric remains they recycled, scavenging primarily interior flakes and formal tools for reuse.

In contrast to the ubiquitous distribution of chipped stone artifacts, ground stone artifacts (handstones, pestles, basin millingstones, and slab millingstones), and “cooking” stones (cobbles, fire-cracked rocks, and ground stone “other”) are found primarily in and around the bone beds at the Village site and in the East Profile and East Bench at FRBS. While the handstones, pestles, and millingstones are presumed to have been used for processing plant foods, the medium- and large-sized “cooking” stones are believed to be associated with underground ovens. Some may also be hearth stones, and other small rocks may be “cooking” stones used to boil gruels in watertight baskets. Village residents appear to have recycled exhausted ground stone tools by breaking them up into cooking stones. Many of the ground stone “other” artifacts are broken and fire-altered pieces of millingstones and handstones.

Ground stone tools are rarely found in nearby prehistoric lithic scatters on the marine terrace, and they are not common in the prehistoric clay stratum in FRBS. While direct dating of the ground stone assemblage is not yet possible, the strong association of the ground stone tools and “cooking” rocks in the bone bed deposits as well as in midden deposits in the East Bench and East Profile suggests that most were procured, used, and discarded by early 19th century Village residents, and are not associated with prehistoric use of the Ross area.

Ground slate tools and production debris are minimal in the Neighborhood, in contrast to the widespread use of slate tools in Alutiiq settlements on Kodiak Island until at least the 1840s. Mills describes a total of eleven ground slate artifacts in the vicinity of the Village, including unmodified fragments of slate, broken slate rods, fragments of double-edged slate blades, slate tablets, and a small tabular fragment. The double-edged blades appear to be portions of end-blades, knives, or lances, and at least one specimen resembles an Alutiiq-style whaling lance. The slate rods and tablets appear to have been scavenged from other Ross locations (Stockade complex, Russian Village) and reworked into new tools.

The most conclusive evidence of Native Alaskan material culture in the Neighborhood is the worked bone artifact assemblage consisting of large and small dart points, harpoon arrow points, harpoon shaft (socket) pieces, finger rests, and composite fish hooks that were part of the sophisticated maritime hunting and fishing technology of these North Pacific peoples. Other worked bone implements include buttons, awls, fasteners, and plain and incised bird bone tubes.

The production of bone artifacts at the Village site is amply demonstrated by cores of whale ribs, grizzly bear humerus and radius bones, and elk antlers; hundreds of chopping and carving flakes; amorphous worked bone chunks; and handholds. The workshop debris represents the full sequence of reduction stages in the production of bone tool kits related to marine mammal hunting and fishing.

Village bone workers first prepared and reduced the cores to appropriately sized blanks, and then roughly shaped the blanks by detaching the chopping or planing flakes. This was followed by fine shaping with a knife in which the craftsman removed longer, thinner, narrower, curved carving flakes. The final step involved the removal of handholds and detailed finish work. The bone workers utilized metal tools, probably small to medium knives, in the shaping and finishing of bone artifacts. They relied on knives rather than saws even when employing the score and snap method to shape cores and to remove unwanted bone segments.

Village household residents were probably involved in the processing and stitching of *kamleikas* (waterproof jackets) from pinniped intestines and the construction and repair of skin boats (*baidarkas* and *baidaras*) using seal and sea lion skins. They probably also produced birdskin parkas from the skins and feathers of the common murre, gulls, and cormorants. In addition to Lutke’s (1989:278 [1818]) observation that a Native Californian woman had learned to sew *kamleikas* at Fort Ross, the archaeological evidence of these Native Alaskan crafts at NAVS includes conical bone points and awls. The large numbers of pinniped and seabird remains recovered from the bone beds and other archaeological contexts may be the by-product of *kamleika*, *baidarka*, and birdskin parka production, not just food refuse.

EVALUATING THE TWO RESEARCH OBJECTIVES

We conclude Volume 2 with a discussion of the two research objectives that guided our investigation of the Native Alaskan Neighborhood.

NATIVE WORKERS’ PARTICIPATION IN THE EARLY 19TH CENTURY WORLD SYSTEM

How was the broader world system represented in the material culture of the non-European employees in the Native Alaskan Neighborhood? The results of our investigation indicate that these workers had either

limited access to domesticated foods and European/Asian artifacts and/or minimal interest in the accumulation of these goods. The cattle, sheep, and pig remains in the faunal assemblage probably represent meat that was paid or rationed to Village residents for Company work. The ceramic, glass, and metal assemblages at NAVS and FRBS are conspicuous by the underwhelming number of whole artifacts, the highly fragmented and disjointed nature of most artifact classes, and the virtual absence of reconstructible ceramic and glass vessels and panes.

Non-European laborers in a mercantile colony such as Fort Ross should have had access, in principle, to a diverse range of products from Asia, America, and Europe. By the time Ross was colonized, the Company had established a trade network with American merchants that greatly expanded the range of manufactured goods and luxury foods offered to its employees. As detailed by Farris, Company records indicate that a varied assortment of textile, ceramic, glass, and metal goods were shipped to Fort Ross. It appears, however, that most of the goods (with the exception of the glass trade beads) were not destined for consumption at Ross, but rather were earmarked for trade with Spanish and Mexican settlements to obtain wheat, beef, tallow, and other agricultural products for the Company's North Pacific colonies. The archaeological investigation supports eyewitness accounts that Ross workers were poorly paid, that Company goods were very highly priced in relation to wages, and that most people were substantially in debt to the Company.

We believe that native workers did not obtain most of the manufactured goods deposited at NAVS and FRBS directly from the Company, either as payment or purchase in the Ross store. Most of the European and Asian goods in the Neighborhood were not new and appear to have been reused after being discarded or handed down by other Ross employees. The one major exception is probably the glass bead assemblage. Yet the beads are primarily the inexpensive embroidery varieties. This further suggests that the purchasing power of the native workers at Ross was limited. Our interpretation of the archaeological record suggests that residents of the Neighborhood were the first multi-medium recyclers in California, reusing materials on an unprecedented scale that was many decades ahead of their time. They were scavenging ceramic and glass sherds, reusing bent nails and defective metal objects, reworking ground slate tablets into new forms, procuring prehistoric obsidian flakes and tools from nearby sites and expediently employing them in new contexts, and systematically processing exhausted ground stone tools into "cooking" stones.

It seems clear that the Russian-American Company provided little direct support or assistance to the residents in the Native Alaskan Neighborhood. These workers were almost completely on their own. Similar to the

early years on Kodiak Island, the residents of the Neighborhood were responsible for feeding and clothing themselves and for producing or obtaining from fellow workers and relatives most of their material culture. It is even possible that *kamleikas* and birdskin parkas produced at Ross by *kaiurs* and native women for the Company were then exchanged back to Native Alaskan hunters for payment for work rendered, a transaction commonly employed by the Russian-American Company in other North Pacific colonies.

As noted in Schmidt's letter of 1824 (in Khlebnikov 1990:131-32), women and children at the Village had to support themselves when their spouses were away hunting. Schmidt observed that the Company did not assist them in any way, and that food shortages were common. The situation was dire enough for the Native Alaskan men to request that the hunts be terminated early so that they could return to Ross to support their families. The Native Californian women and children who remained at NAVS during hunts probably supported themselves on stored foods, by gathering shellfish in the adjacent rocky intertidal habitats, and by fishing for cabezon, ling cod, and rockfish with hook and line from the nearby shore.

Our findings indicate that the Native Californians in the Neighborhood probably depended upon frequent assistance from their outlying network of social and kin ties in the greater Ross Region. They may have facilitated the procurement of venison and other foods by scavenging glass, ceramic, and metal objects at Ross for redistribution to the broader Native Californian community. Local demand by Native Californians for European/Asian objects existed. As discussed in Volume 1 (p. 150), tobacco, food, and clothes paid to non-European workers at Ross were gambled away, presumably to Pomo communities who resided in "the woods" some distance from the Russian outpost. There was also demand for other objects, such as glass trade beads, that were directly transferable into local indigenous cultures. However, much of the demand was apparently not for finished manufactured goods (e.g., ceramic vessels, glass bottles) per se, but as sources of raw material used in the production of Native Californian artifact forms. In addition to the evidence of worked glass and ceramic pieces in the Neighborhood, Ballard's (1995:154-55) recent analysis of archaeological materials from "Metini," situated directly north of the Stockade complex, indicates that Native Californians were reworking ceramic sherds into a variety of shapes (triangular, trapezoidal, oval, rectangular, circular, and irregular) for beads, pendants, and other artifact forms. Glass artifacts at Metini were reworked into projectile points, bifaces, preforms, and edge-modified flakes (Ballard 1995:157).

The possible collapse of regional exchange networks in the early 19th century that had long provided coastal Pomo and Miwok with access to obsidian and other

interior resources may have contributed to the growing demand for glass and ceramic materials in the hinterland of Colony Ross. As noted in chapter 16, obsidian trade networks were altered by and even terminated with Spanish, Mexican, and Russian colonization of northern California. The circulation of Annadel and Clear Lake obsidians into the Fort Ross Region decreased dramatically at this time. Napa Valley sources dominate the historic obsidians on Ross survey sites as described in Volume 1, but relatively few are found at either NAVS or FRBS. By recycling materials at Ross, Village residents could replace obsidian from interior sources with glass and prehistoric obsidian scavenged from nearby archaeological deposits and refuse dumps. In addition, by providing recycled goods to nearby indigenous communities, access to whatever obsidian was available from the interior could be secured if needed.

Viewed in this light, Native Californian residents in the Neighborhood served as cultural brokers between the Ross Colony and the outlying Native Californian community. They were probably the major distributors of European/Asian materials whose meaning could be translated directly into the world view of Pomo and Miwok peoples. So long as there was a demand for Ross materials, the Native Californian residents at the Village remained locked into a broader regional exchange network that made them less vulnerable to food and resource shortages at Ross. While a few objects were ground into shape and reused at NAVS and Metini, we suggest that the most desirable ceramic sherds, glass pieces, and metal objects were traded to surrounding communities where they disappeared into the back country. If this interpretation has any validity, then the highly fragmented and disjointed European/Asian goods left behind at Ross are largely rejects in this regional recycle trade.

THE IMPLICATIONS OF INTERETHNIC INTERACTION AND COHABITATION

Did the synergistic interplay of interethnic households in the Native Alaskan Neighborhood promote significant cultural change in the material culture of Native Alaskan and Native Californian residents? The results of our investigation indicate that pluralistic interactions between Russians, Siberians, Native Alaskans, Creoles, and Native Californians at Ross did not stimulate many innovations in the cultural practices of Neighborhood residents. There is, of course, some evidence for cultural change. The menu emphasized large game, domesticated animals, and sea mammals—unlike any traditional Alutiiq or Pomo diet. New raw materials were now employed in the production of native artifact forms. Metal tools were used to butcher meats and to carve and shape bone tools. Kashaya Pomo conventions of cleanliness and trash disposal were combined with the Alutiiq custom of covering trash areas

with new surfaces, practices that produced innovative landscape modifications at the Neighborhood. Evidence outlined in chapter 17 suggests that winter commemorative ceremonies, possibly celebrating the return of Native Alaskan hunters, were jointly sponsored by Native Californians and Native Alaskans.

Most of the changes observed in the Neighborhood do not represent major transformations in the cultural values of either the Native Alaskan or Native Californian peoples. There is little indication that native residents implemented strategies of upward mobility or the construction of new cultural identities. They maintained their respective identities by adhering to traditional values and distinct ideologies as practiced in their homelands. Our investigation suggests that Kashaya Pomo conventions were followed in the domestic practices of some interethnic households, while Alutiiq ideals were employed in the layout of village space. Pomo domestic practices include the preparation and cooking of meat dishes in earth ovens, the regular cleaning of house space and associated extramural locations, the tossing of refuse into discrete dumps, and the primary use of Native Californian material culture (e.g., millingstones, chipped stone artifacts). There is little evidence of Alutiiq domestic equipment or furniture in the household trash. Most Alutiiq practices observable in household refuse are clearly related to the production and maintenance of sophisticated maritime hunting and fishing tool kits.

Beyond the individual house and its maintained extramural space, the broader organizational layout and setting of the Village followed Alutiiq principles. The linear arrangement of the houses along the exposed marine terrace with clear views of the Pacific Ocean and *baidarkas* stored in the Fort Ross Cove are clearly Native Alaskan conventions.

It appears that the Native Californian women and Native Alaskan men who made up the interethnic households at Colony Ross attempted to maintain their own separate identities while making accommodations and some concessions to their respective spouses. This point is best exemplified by the East Central and South bone beds. Both refuse dumps contain the remains of artiodactyl, pinniped, fish, bird, and shellfish meals. The households using both areas prepared special cuts of meats (e.g., flippers) as Native Alaskan delicacies that were then cooked together with other meat dishes in underground ovens according to Kashaya Pomo practices. But even the slow roasting of meats in underground ovens may have been a compromise between spouses. Other methods of Kashaya cooking involving the placement of meat directly on coals were apparently not practiced given the paucity of burned bones. Underground ovens may have been most appropriate for preparing many different meat dishes for ceremonies taking place in the Neighborhood. These ceremonies also