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Paleoecological Inferences from a Faunal Analysis of CA-SFr-07

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CA-SFr-07 (also variously known as No. 387, Crocker Mound, Bay Shore Mound and Johnson Landing) is a prehistoric shell midden (now largely destroyed) in the San Francisco Bay area. N. C. Nelson excavated the midden in 1910. Nelson's (1910) field notes reveal that CA-SFr-07 was situated "on the first cove north of the S. F. and San Mateo County Line" and was the "largest of the 10-12 mounds located in the vicinity of Hunter's point."

An assemblage of 4130 invertebrate and vertebrate remains (805 of which are maximally identifiable) collected by Nelson are the subject of this report. Exact proveniences and associations of cultural and biological materials from CA-SFr-07 have not been recorded.

The great majority of the faunal remains were collected from 3 to 6-ft. depths below the ground surface. Some fairly complete cranial materials were recovered from 6 to 9-ft. depths. Due to the nature of the retrieval methods employed in collecting the faunal materials, detection of possible changes in dietary preferences through time and a rigorous assessment of (unbiased) taxonomic and body part representations are not possible. The retrieval of fish remains was no doubt severely biased by this collection technique. Therefore, I have chosen to emphasize the diversity of food resources and habitat zones exploited by the inhabitants of CA-SFr-07 as evidenced by the faunal remains.

Howard (1929) has admirably presented data on the organisms indicative of eight habitats represented in the Upper Sonoran life zone of the San Francisco Bay region. The eight habitats (associational areas) listed by Howard are: (1) open water (estuarine), (2) sandy beach, (3) salt marsh, (4) tule marsh, (5) willow, (6) live oak, (7) grassland, and (8) chaparral. It should be noted here that, in general, organisms with relatively narrow environmental tolerances were used in Howard's compilation. Thus, cosmopolitan species do not overly distort the environmental reconstruction so as to include habitats with very little faunal basis. However, one must realize that faunal remains are but very abstract representations of habitat unless large samples are available. The identified taxa from CA-SFr-07 mentioned in Howard's categories (along with a few included by the author, e.g., sturgeon in open water/estuarine) are shown below (Table 1). The minimum number of individuals (MNI) and number of identified specimens (NISP) are noted for each taxon.

The diversity of taxa identified from the CA-SFr-07 assemblage reveals that a wide variety of organisms were sought after and used as food by the people responsible for the

Table 1
ENVIRONMENTAL AFFINITIES OF CA-SFr-07 TAXA

TAXON	MNI	NISP
Open water (estuarine)		
<i>Balanus</i> sp. (barnacle)	11	11
<i>Clinocardium nuttalli</i> (cockle)	4	4
<i>Collisella</i> sp. (limpet)	1	1
<i>Haliotis</i> sp. (abalone)	1	2
<i>Macoma nasuta</i> (bent-nosed clam)	1	8
<i>Mytilus californianus</i> (California mussel)	5	8
<i>Mytilus edulis</i> (bay mussel)	2	6
<i>Nucella lamellosa</i> (marine snail)	8	9
<i>Ostrea lurida</i> (west coast oyster)	22	31
<i>Tresus</i> sp. (clam)	7	9
<i>Myliobatis californica</i> (bat ray)	3	34
<i>Acipenser transmontanus</i> (white sturgeon)	1	52
Teleostei gen. et sp. indet.	1	1
<i>Pelecanus</i> sp. (pelican)	1	1
<i>Phalacrocorax</i> sp. (cormorant)	3	4
<i>Gavia</i> sp. (loon)	1	1
<i>Zalophus californianus</i> (California sea lion)	2	11
<i>Callorhinus ursinus</i> (northern fur seal)	1	3
<i>Enhydra lutris</i> (sea otter)	25	303
<i>Phoca vitulina</i> (harbor seal)	2	3
<i>Phocaena vomerina</i> (bay porpoise)	1	1
Open water (estuarine)/Salt marsh/Tule marsh		
<i>Aythya</i> sp. (scaup duck)	12	21
<i>Branta</i> sp. indet. (goose or brant)	5	15
<i>Branta canadensis</i> (Canada goose)	8	14
<i>Branta nigricans</i> (black sea brant)	8	13
<i>Mareca</i> sp. (baldpate)	1	1
<i>Melanitta</i> sp. indet. (scoter)	6	16
<i>Melanitta deglandi</i> (white-winged scoter)	16	35
Tule marsh		
<i>Cervus</i> sp. (elk)	3	29
Live oak/Grassland		
<i>Thomomys umbrinus</i> (southern pocket gopher)	8	14
<i>Mephitis mephitis</i> (striped skunk)	1	1
<i>Canis</i> sp. (if <i>Canis latrans</i> , the coyote)	1	2
Live oak/Chaparral		
<i>Odocoileus</i> sp. (mule or black-tailed deer)	6	186
Chaparral		
Galliformes gen. et sp. indet. (if <i>Lophortyx californica</i> , the California quail)	1	1
<i>Sylvilagus bachmani</i> (brush rabbit)	2	10
Taxa excluded due to cosmopolitan nature of distribution:		
pulmonate stylommatophoran (land snail)	9	20
<i>Procyon lotor</i> (raccoon)	1	9
<i>Taxidea taxus</i> (badger)	2	5

accumulation of the midden. The CA-SFr-07 remains indicate that sea otter (*Enhydra*) and deer (*Odocoileus*) were dominant mammalian

components of the prehistoric inhabitants' diet. This finding is in agreement with the analysis of remains from the West Berkeley

shellmound (CA-Ala-307) situated across the San Francisco Bay from CA-SFr-07 (Busby 1975). Members of the Family Anatidae (ducks and geese) comprise the vast majority of avian remains. Other workers (Howard 1929; Brooks 1975) have arrived at similar results for other San Francisco Bay area shellmounds. Invertebrate and fish remains are too few to provide substantive relative abundance information. However, many of the piscean and molluscan taxa are commonly present in other bay area sites (Gifford 1916; Follett 1975; Greengo 1975). Mussels, oysters, and clams were no doubt important staple food items.

The presence of the remains of many different animals in the midden is indicative of the many environments in and around the site area. Originally, the mound bordered on the northern edge of a (perhaps estuarine) lagoon. As Bickel (1978) has observed, "estuaries are very productive ecosystems. Marshes are places where humans can harvest some of that productivity, in the form of fish, shellfish, birds, and land mammals which live or feed in or near the marsh, as well as the marsh plants themselves." Unfortunately, plant species have not been preserved (or at least collected) from CA-SFr-07. The environmental tolerances of organisms enable the partial reconstruction of ecosystems utilized by the inhabitants of CA-SFr-07.

The habitat specificities of CA-SFr-07 taxa indicate that both distant and nearby communities were sampled in food procurement strategies. For example, *Tresus* (a large bivalve mollusc) is found more often in typical marine environments than in bay or estuarine habitats. Similarly, one species of mussel (*Mytilus californianus*) is not generally tolerant of the higher sedimentation rates of the bay and usually lives byssally attached to hard substrates such as the rocky shoreline along some parts of the western (ocean) edge of the San Francisco Peninsula (Packard

1918). The other invertebrate taxa (except the land snail) would be at home in either bay or oceanic localities. Most of the molluscs would be easily obtainable in near-shore environments.

The two identified species of fish present at CA-SFr-07 are common denizens of the San Francisco Bay. Follett (1975) has presented evidence that nets may have been used to capture sturgeon and rays. The sturgeon from CA-SFr-07 were fairly small judging by the size of the largest chondrosteian vertebrae present. As with many other fish, young sturgeon are better tasting than larger individuals of the same species. Gifford (1940) has noted the prehistoric use in California of *Myliobatis* "stingers" (caudal spines) as awl-like implements. Two *Myliobatis* caudal spines (with no signs of modification) are present in the CA-SFr-07 assemblage.

The presence of *Procyon lotor* at CA-SFr-07 indicates visitation of habitats with available water sources such as "streamside forest, wet meadow, swamp, open water and shore" according to Jones (1964). The anamid genera *Aythya*, *Branta*, *Mareca*, and *Melanitta* are each represented in the CA-SFr-07 sample. According to Howard (1929), ducks and geese indicate winter exploitation of the near-shore environments. A more elaborate presentation of the CA-SFr-07 fauna, including complete body part representation of the identified taxa, has been made elsewhere (McCrossin 1981).

The faunal remains, not surprisingly, indicate a relative dependence upon aquatic or aquatic-associated food sources. These aquatic staples (molluscs, sturgeon, Anatidae, *Enhydra*) were apparently secondarily augmented with contributions from terrestrial organisms. The evidence from CA-SFr-07 helps to substantiate the belief that inhabitants of the San Francisco Bay area in prehistory (at least those involved in shell midden accumulation) probably were oriented toward aquatic food

procurement strategies during part of their annual activities. However, dietary reconstruction is probably inadequately undertaken without an appreciation of botanic food sources. The presence of grinding implements in Nelson's (1910) artifact field catalogue is clear evidence that plants (perhaps acorns) were utilized as a food source. The extent of plant consumption by CA-SFr-07 inhabitants is as yet unknown.

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