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FLORA, FAUNA, AND FOOD

Changing Dietary Patterns at the Spanish Royal Presidio of Monterey, 1770-1848

EMILY M. SMITH, JENNIFER A. LUCIDO, AND SCOTT E. LYDON

Introduction

Founded on June 3, 1770, *El Real Presidio de San Carlos de Monte Rey*, or the Royal Presidio of Monterey, was the northernmost military garrison on the frontier until the establishment of San Francisco in 1776. In addition to its military role, the Presidio functioned as a trading center, or custom house, that both received and distributed goods from Viceroyalty of New Spain (present-day Mexico; Perissinotto 1998: 16). As Spanish California's first capital (est. 1777), the Presidio of Monterey set the stage for the political economy that defined the development of the province.

Archaeological investigations of the site provide an invaluable source of data for interpreting the daily lifestyles of the settlers at Monterey. During the fall of 2006 and summers of 2007 and 2008, Dr. Rubén G. Mendoza (2012: 4-5) and his crew of California State University, Monterey Bay (CSUMB) archaeology students undertook a three-phase investigation of the Royal Presidio Chapel (RPC) of 1794 commissioned by the RPC Conservation Program of the Diocese of Monterey (Lucido 2013: 60, 2015: 152). Phase 1 (2006-2007) consisted of subsurface archaeological testing. Phase 2 (2007) entailed extensive trenching activities around the perimeter of the RPC (see Figure 1).

Phase 3 (2008) resulted in the discovery of the Serra Chapel of 1772. This interdisciplinary study examines the recovered faunal (animal) and floral (plant) remains from the Phase 2 trenching operation. More specifically, this study explores the dietary patterns and evolving political economy at the Presidio.

Previous Zooarchaeological Studies of the Monterey Presidio

The animal bone specimens were first researched in a 2013 zooarchaeological (faunal) study by Jennifer A. Lucido (co-author).

About the Authors

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(About the Authors continued on p. 167)



Lucido examined faunal remains to assess butchery practices and dietary patterns for the soldiers, settlers, and laborers residing at the Presidio from circa 1770 to 1848 (2013: 60, 2015: 157). The fauna consisted of cattle (*Bos taurus*), pig (*Sus scrofa*), sheep (*Ovis aries*), goat (*Capra a. hircus*), and chicken (*Gallus gallus*; Lucido 2013: 58, 2015: 157). Most cattle-related faunal remains were recovered from six trenches during Phase 2 of the archaeological investigation at the Presidio: Trenches 3a, 4a-b, 6, 8a/c, 9, and 26 (Lucido 2013: 60, 2015: 157). Of these trenches, 3a, 4a-b, 6, and 9 recovered kitchen middens from 1770 through 1810 (Lucido 2013: 60, 2015: 157).

From approximately 1000 skeletal elements recovered, Lucido identified 82 specimens with distinctive cuts (Lucido 2012: 84-89, 2013: 66; 2015: 158). Rib bone elements constituted the majority, or 52% (Lucido 2013: 66). The second largest body of skeletal elements included appendicular or long bones (femoral, humeral, and metapodials) at 21% (Lucido 2013: 66, 2015: 158). The third largest selection, or 14%, consisted of indeterminate fragmented ribs and/or thoracic vertebrae (Lucido 2013: 66, 2015: 158). The remaining elements in the sample comprised of the humerus, femur, and metatarsal elements (Lucido 2013: 66, 2015: 158). Lucido acknowledged that the proportions represented in the overall sample were skewed because fragmented ribs or thoracic vertebrae could not always be distinguished (2013: 66, 2015: 158).

The cutmarks were organized into seven types identified in other faunal studies: 1) chop marks at 33% of the overall sample, and 2) fine cuts at 30% of the overall sample (Lucido 2013: 66, 2015: 158). The remaining types consisted of 3) dismemberment marks, 4) scrape marks, 5) clean cuts, 6) clean cuts with other markings, and 7) combinations of those types noted (Lucido 2013: 66, 2015: 158). Lucido compared these with the faunal remains from the Presidio

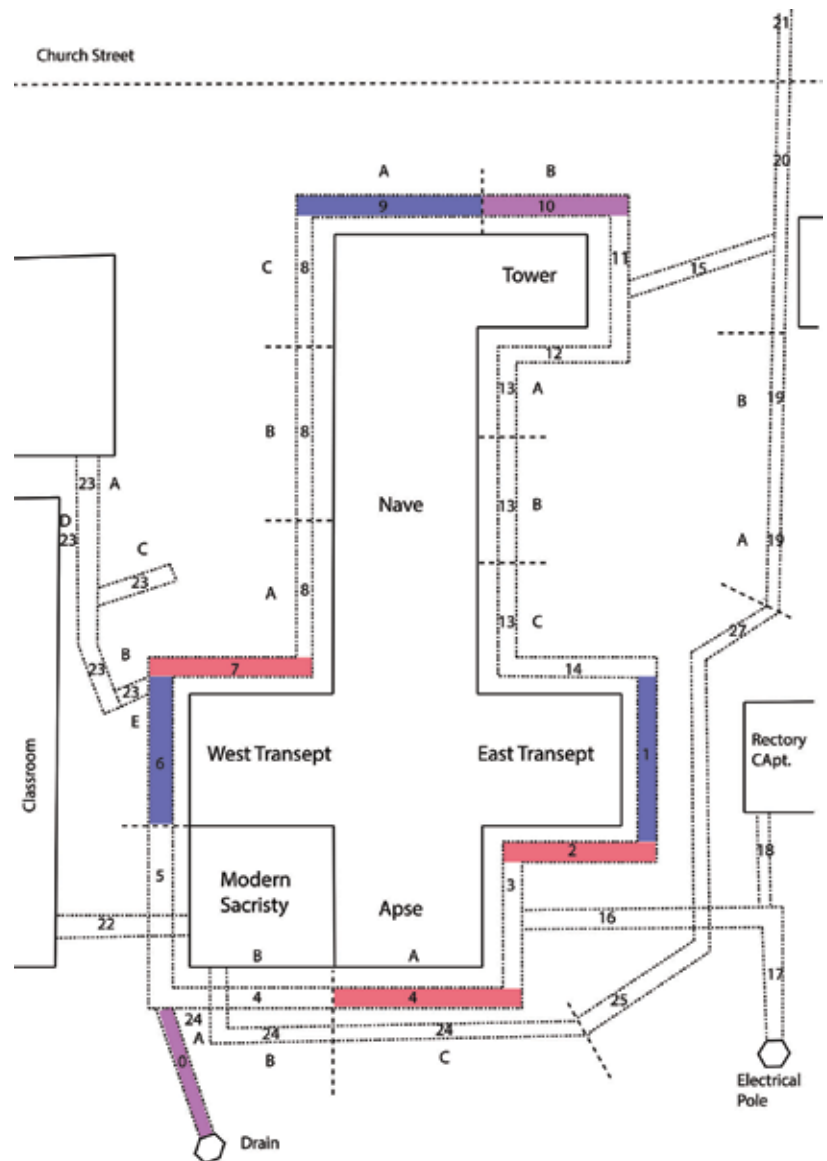


Figure 1. This figure has been recreated from the Royal Presidio of Monterey field notebook of Dr. Rubén Mendoza as documented on June 28, 2007. The diagram depicts the numbered trenches as dashed lines circumscribing the perimeter of the Royal Presidio Chapel of Monterey. It should be noted that only 14 trenches of the 31 trenches skirt the perimeter while the remaining 17 trenches (not depicted) were situated beyond the immediate vicinity of the Chapel. Trenches highlighted in blue are samples for the faunal study and trenches highlighted in red are samples for the pollen assay. Trenches highlighted in purple are samples for both faunal and pollen. Highlighting added by authors (Mendoza 2007; illustration redrawn by Jennifer A. Lucido, 2014).

and determined that some bones displayed specific clustering of cutmark types related to meat consumption and butchery practices (Lucido 2013: 67, 2015: 158). For example, rib bone elements consisted primarily of chop and fine cutmarks thereby indicating a dietary preference for torso-related meat cuts (Lucido 2013: 67, 2015: 159).

Methods

The zooarchaeological part of the study was completed in the CSUMB Archaeology Laboratory by Emily M. Smith (co-author). Smith analyzed faunal remains from Unit 0 and Trenches 1, 6, 9, and 10. The pollen assay and census count component of the study was undertaken by Scott E. Lydon (co-author) in the Biogeography Lab at the University of California, Los Angeles (UCLA). Lydon tested the soil samples from Unit 0 and Trenches 2, 4a, 7, and 10. Both studies were based on the specimens recovered from the Phase 2 trenching operation of the Monterey Presidio, with the objective to understand diet on the basis of species identification and consumption patterns.

Zooarchaeological Analysis

Analysis of the Presidio faunal specimen collection was organized as follows: (1) location of excavated unit, (2) identification of bone type or element, (3) separation of species to (vertebrate or invertebrates), (4) separation of vertebrate animals by taxonomy or size, (5) identification of species, (6) analysis of data patterns, and (7) interpretation of the trends. Methods also consisted of weighing of fragmentary bones and organization based on size and location of element on vertebrate body.

The majority of the samples from Unit 0 and Trenches 1, 6, 9, and 10 were fragmentary pieces. Therefore,



Figure 2. View of east trenches around the Royal Presidio Chapel. Photo courtesy Rubén G. Mendoza, 2007.



Figure 3. View of west transect at the juncture of Trench 6 and 7. Photo courtesy Rubén G. Mendoza, 2007.

the primary focus of the faunal analysis was on readily identifiable bone arranged by type and animal, and then incorporated into the number of identified specimens (Domingues-Rodrigo 2012; Marshall 1993). The unidentifiable bones were weighed and separated by size, then examined for possible identification of mammal type (Marshall 1993). The vertebrate fish and bird bones were calculated separately because of their low bone densities (Huelsbeck 1991). The majority of the marine shells are fragmentary and therefore weighing of complete or fragmentary shell produced data for the marine animal remains. Each trench's collections were weighed separately to determine frequency variation of certain species throughout the site.

Comparative analysis of faunal anatomy was utilized to identify animal bones in the Presidio collection. Modern cattle specimen in the CSUMB Archaeology Laboratory were compared against historical remains for identification of bone elements and siding. Photographs from comparative anatomy books were used to identify the species of animal remains (see Adams and Crabtree 2011; Hillson 1992). The identification process was limited due to a lack of access to multiple species modern-comparative collections, as well as the high levels of fragmentation of the historical remains.

Pollen Assay Chemical Processing & Census

Standard palynological processing protocols were followed during the pollen assay (see Faegri and Iversen 1989). Of the eighteen soil samples from Phase 2 archaeological investigations sent to the UCLA Biogeography Lab, a total of 9 were included in the assay. These nine samples were selected because each one emanates from a location surrounding the Chapel's perimeter. Three samples were assessed from Unit 0; one from Trench 2; one from Trench 4a; three from Trench 7; and one from Trench 10. Each soil sample was subjected to a series of acid-base washes (e.g. hydrochloric acid; potassium hydroxide; hydrofluoric acid; etc.) to fully digest the soil—leaving, primarily, only the pollen in each sample intact (Faegri and Iversen 1989). After the chemical washes were complete, the remaining samples were transferred to archive vials and silicone oil applied to preserve and suspend the pollen. Subsequently, microscope slides for each sample were made (see Figure 4). Slides were visually inspected using both 200x and 400x magnification—adhering to standard microscopy procedures (Faegri and Iversen 1989).

The specific purpose of the assay was to identify pollen grains that were cultivated before, during, and after settlement of the Presidio. A list of potentially-present agricultural grains was provided by Dr. Mendoza (April 2017, personal communication with authors)

that assisted in the identification of pollen and the subsequent census counting. According to historical records, *Triticum* (wheat), *Theobroma cacao* (cocoa), *Phaseolus vulgaris* (bean), and *Capsicum annuum* (sweet and chili pepper) were harvested in Alta California during the mission era (April 2017, personal communication with authors). These species, among other known agricultural species and vegetation presently situated near the site (e.g. *Pinus*, *Quercus*), were the pollen types identified during the microscopic census.



Figure 4. Prepping of microscope slides for each sample. Photo by Scott E. Lydon, 2017.

Additionally, all the microscopic samples displayed numerous amounts of charcoal that were tallied during this process. Census counting ceased after a total of ~300 charcoal fragments and pollen grains (combined) were identified for each sample. Thus, in total ~2,700 pollen grains and/or charcoal fragments were visually identified. After the census was complete, the software C2 was used to generate the assay's pollen diagram. Figure 14 (see Findings: Pollen Assay) demonstrates the sum total of each agricultural species present and the abundance of charcoal within a given soil sample.

Findings

Results include (a) the Number of Identified Specimens (NISP) of terrestrial and marine specimens recovered from Unit 0 and Trenches 1, 6, 9, and 10; (b) the species identification of the vertebrate (vertebral column or back) and invertebrate (no vertebral column or back) samples; and (c) a pollen assay based on soil samples extracted from Unit 0 and Trenches 2, 4a, 7, and 10.

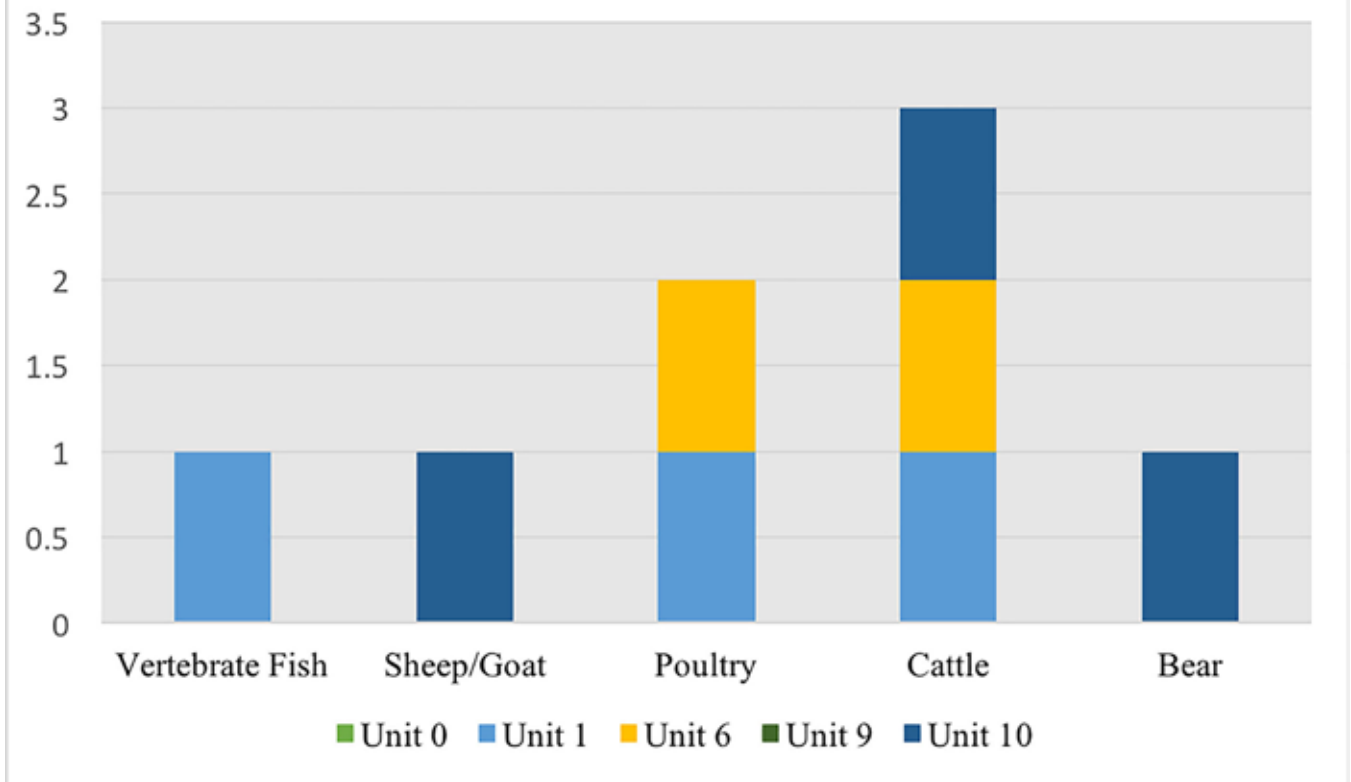
Number of Identified Specimens

The NISP totals the amount of each species that existed at the site (Marshall 1993). This method utilizes recurring elements associated with an individual specimen (Marshall 1993). For example, counting three right radius/ulnas equates to a total of three cattle known to be on this site, though these numbers only represent the number each species identified. The NISP does not give a completely accurate representation of the ratio of species because of the small sample size. Including all of the trenches would allow for additional data and a larger sample, resulting in a more accurate NISP. High

Figure 5. Microscopic image of pollen grain. Photo by Scott E. Lydon, 2017.



Frequencies of Identified Species



fragmentation of the remains also accounts for the low level of identifiability for the NISP. The NISP includes one vertebrate fish, one sheep/goat, two poultry, three cattle, and one bear recovered from Unit 0 and Trenches 1, 6, 9, and 10. These numbers are based on the vertebra bone of fish, one sheep/goat ischium, two right poultry femurs, three distal epiphyses and shafts of cattle radius/ulnas, and one bear phalanx. The shell assemblage is not part of the NISP because all the shells were incomplete (Hammond 2014). As such, the shells were recorded by weight to obtain an accurate estimate.

Vertebrate Sample

Ranching and large-scale agriculture were among the first major Spanish colonial industries introduced into Alta California (Lucido 2013: 61; Walton 2001: 36). Ranching supplied meat, leather, hide, tallow, and other products for use at the missions and the presidios (Lucido 2013: 61). According to the archaeological record at the Presidio, the remains of cattle and pig are most abundant (Lucido 2015: 107-108). Since this study has a small sample size with a majority of the bone categorized as fragmentary, the NISP (see Figure 6), had low numbers.

Figures 6. Number of individual specimen (NISP) for this study include 1 vertebrate fish, 1 sheep/goat, 2 poultry, 3 cattle, and 1 bear. Excavated units for the NISP included duplicate elements or elements identified with specific taxon. These elements were only found in three of the five excavated units. Graph by Emily M. Smith, 2017.



Figure 7 (above, left). Distal epiphysis and shaft of right radius/ulna of a cow with three carpal bones. Spiral fracture on shaft of radius/ulna. Photo by Emily M. Smith, 2017.



Figure 8 (above, right). Fragmentary Sheep/Goat pelvis, ischium portion. Photo by Emily M. Smith, 2017.



Figure 9 (right). Fragment of Sheep/Goat distal femur epiphysis. Photo by Emily M. Smith, 2017.

Cattle (see Figure 7) was the dominate species by weight, frequency, and the highest number in the NISP—thus, served as a main source of food at the Monterey Presidio. This is, in part, attributed to their adaptability to New World environments. By contrast, sheep were less adaptive and represent a lower percentage of faunal remains (Lucido 2013: 61). While sheep/goat demonstrate a low frequency in the NISP, they are still considered a food source. This inference results from both the distal femur fragment (see Figure 8) and the fragmentary ischium (see Figure 9) being bones related to butchery practices (Buitenhuis 2014).

Poultry and fish were also part of the vertebrate species included in the diet of the Presidio inhabitants (Lucido 2015: 107-108). The poultry and fish vertebra (see Figure 10) were separated in the fragmentary section of this study because they have a lower bone density and do not hold as much weight as the mammal remains (Huelsbeck 1991). The two poultry femurs in the NISP give an indication that birds were part of the food supply. Moreover, one of the femurs (see Figure 11) in the sample had a shiny texture on the cuticle of the bone, which could be an indicator of pot polish.

The bear in the NISP cannot be confirmed as food because of the low frequency of bone—one phalanx. Phalanges are bones of the finger (hand) or toe (foot) that mammals and other vertebrates have which are not elements typically associated with consumption (Buitenhuis 2014; Hillson 1992; MedicineNet 2017). Despite this, it is worth noting that, Pedro Fages the *gobernante* or provincial administrator (1770-1774) of Alta California and Presidio of Monterey Comandante, led a bear hunting expedition to help supplement the diet in 1772 (Nuttall 1972: 252, 262; Serra 1955a: 259).

Invertebrate Sample

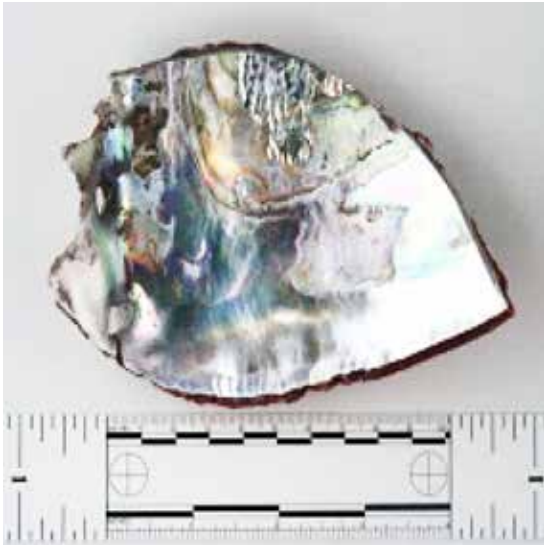
Invertebrate species were also part of the diet during the initial years of settlement. These include, primarily *Haliotis rufescens* (Red Abalone; see Figure 12), as well as *Haliotis cracherodii* (Black Abalone; see Figure 13), mussels, and clams. Based on shell weight measurements, abalone dominated with the most weight and highest frequency of the taxa because it was present in each of the trenches. Red abalone tend to be larger than the size of a human hand, with a red-pink outer shell and a dark mother of pearl inside, which allows for substantial amounts of meat in each harvested shell (NOAA 2016). In contrast, black abalone are a smaller species averaging a size slightly larger than a palm of a hand (NOAA 2016). The color of the outer shell is black and the inside is a lighter mother of pearl (NOAA 2016). Both species are found in the intertidal zone



Figure 10 (above, right). Two unidentified fish vertebra. The vertebrate fish found in excavated units 0, 1, 6, 9, and 10 had unidentifiable specific species at this time. Photo by Emily M. Smith, 2017.

Figure 11 (right). Right poultry femur with a polished texture. Photo by Emily M. Smith, 2017.





of the coastlines along California (NOAA 2016). Black abalone is smaller, and thereby harder to find in situ compared to red abalone.

In 2009, black abalone was added to the list as an endangered species (NOAA 2016). The archaeological record suggests that while humans were consuming black abalone, overexploitation occurred after the Spanish control of California. Snail, mussel, and clam are not considered part of the primary diet because of their low frequency in the assemblage (Hammond 2014). Even so, butchery marks and shucking displays on the mussel and clam shells point to consumption of these shellfish. The snail may have been deposited as an unintentional byproduct of abalone harvesting techniques (Hammond 2014).

Pollen Assay

The most abundant vegetation-pollen types censused by Lydon (2017) were the families Cupressaceae (i.e. junipers, *Juniperus*) and Sequoioideae (e.g. coast redwood, *Sequoia* Endl.). The families Apiaceae (flowering plants) and Poaceae (grasses) also had relatively high pollen counts. The genus *Pinus* was relatively well-represented as well. Such findings indicate that the vegetation mosaic at the time of Presidio settlement—during agricultural cultivation—was dominated by 1) coniferous forests, 2) annual, perennial, and seasonal herbs, and 3) woody shrubs.

During the Mission Era, the vegetation cover adjacent to the site included redwood and pine forests that likely were used for the Presidio's built structures. Assay results also demonstrate that *Triticum* (wheat), *Theobroma cacao* (cocoa), *Phaseolus vulgaris* (bean), and *Capsicum annuum* (sweet and chili pepper) served as staple crops at the Presidio (see Figure 14).

Figure 12 (above, left). One mature red abalone (*Haliotis rufescens*) shell fragment with chop mark. Photo by Emily M. Smith, 2017.

Figure 13 (above, right). Four black abalone (*Haliotis cracherodii*) shell fragments. Photo by Emily M. Smith, 2017.

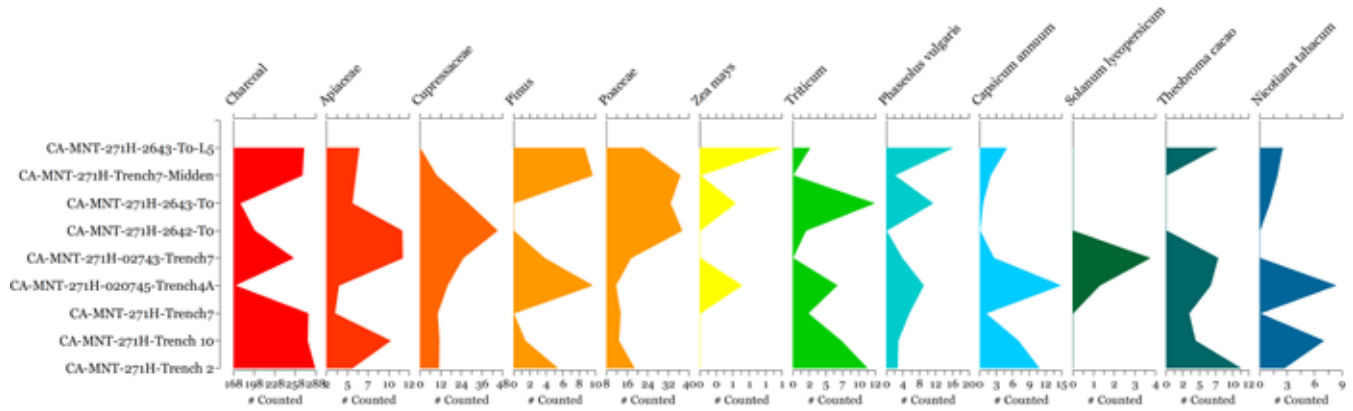


Figure 14. Pollen Diagram according to Sample Units from CA-MNT-271H (Royal Presidio of Monterey) generated using C2. Graph by Scott E. Lydon, 2017

Additional crops cultivated at the site include: *Nicotiana tabacum* (tobacco); *Solanum lycopersicum* (tomato); and *Zea mays* (corn). Of the agricultural pollen identified, the most abundant were wheat and bean, with particularly high frequencies in Unit 0, Level 5. Trenches 4 and 7 also display relatively high numbers of pepper, tomato, and tobacco pollen—suggesting that these crops were possibly cultivated near the south-east exterior of the Chapel. Wheat, cocoa, and tobacco were also abundant in Trenches 2 and 10 respectively.

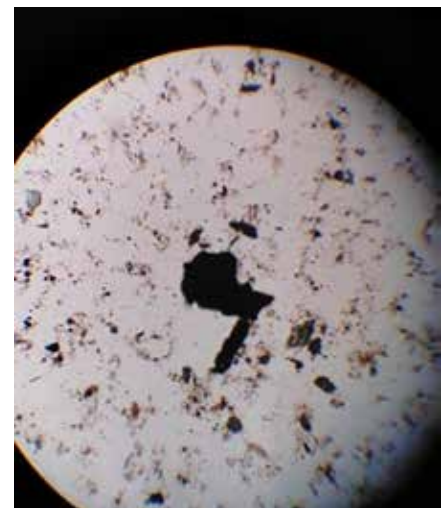
Microscopic-charcoal counts show that widespread fire impacted the Presidio. It is unclear, however, whether this charcoal record results from fires that occurred in 1789, 1792, or 1818—or from daily-cooking practices (see Howard 1978). According to Mendoza (April 2017, personal communication with authors), Unit 0, Level 5 has a relative age corresponding to the Privateer Bouchard’s raid on Monterey in 1818.

Given the devastating effects of Bouchard’s attack and the aberrantly high charcoal numbers censused, it is reasonable to postulate that the 1818 raid is responsible for the majority of this pollen assay’s charcoal record. This hypothesis may serve as the basis for future research pertaining to the fire history of the Presidio (e.g. by outsider attacks, cooking practices, accidents), and can be tested by radiocarbon dating methods then compared against documentary accounts of fires at the location.

Discussion

Identifying the faunal species and pollen samples from the collections of the Presidio illuminates the diet of the settlers and can be used to draw conclusions about the political economy of the Presidio and Mission San Carlos Borromeo more broadly. Given that the colonists in Monterey were the first to settle that far north in Alta California, they had not yet established *ranchos* for breeding and sustaining livestock to support the both Presidio and Mission of

Figure 15. Microscopic image of charcoal. Photo by Scott E. Lydon, 2017.



San Carlos. Therefore, these sites relied on previously established Spanish colonial settlements in southern California for access to domesticated animals.

The scarcity of cattle in 1771-1773 necessitated the urgency for breeding over consumption (Archibald 1978: 78). On August 18, 1772, Father Junípero Serra, the Father President and founder of the Mission and Presidio of San Carlos Borromeo de Monterey, noted in a letter to Father Francisco Palou that “the milk from the cows and the vegetables from the [Mission San Carlos] garden have been very big factors in keeping these foundations going; but these two sources of food are becoming scarce” (1955a: 265). As of May 21, 1773, Mission San Carlos was allotted “nine full grown cows and a bull for breeding, two heifers, and six little calves, which makes a total of eighteen head... [and] a few pigs...” (Serra 1995a: 351). In Fages’ 1773 report, he notes that the Presidio managed three pig styes “facing the open country” and a fourth, larger pig sty at a distance of 40 *varas* (Geiger 1967: 331). Also at this distance are two corrals 50 *varas* in circumference for cows and mules (Geiger 1967: 331). Other secondary sources indicate only 47 cattle, 28 pigs, 12 mules, and 9 horses in 1773 at Mission San Carlos (Engelhardt 1934: 245). Consequently, the early economic status of the Presidio did not permit the waste of cattle meat or other livestock. This is supported by spiral fractures in the shafts of many of the cattle bones, which indicate the consumption of bone marrow (Christenson 1996).

As previously noted, the two poultry (chicken) femurs in the NISP also represent part of the diet at the Presidio. However, during the founding years, consumption of chickens was allegedly limited to a select number of individuals according to a grievance filed by Corporal Miguel Periqués. Periqués was a Catalanian Volunteer from Spain assigned to Monterey from 1770 to 1774 (Sanchez 1990: 32–57). In a circa 1773 letter written by Serra and sent to Captain Agustín Callis of *Compañía Franca de Voluntarios de Cataluña* (Free Company of Volunteers of Catalonia; Sanchez 1990: 3-12), Periqués lamented the following complaint against Fages:

[A]t that time there were plenty of chickens, belonging to the King. But Don Pedro always maintained that the chickens were his; and so he ate them all himself, one by one. Never was it known that a chicken was killed for the sick; the only exception was the killing of two roosters: one for the Sergeant of the leather-jacket soldiers, and the other for Pablo [Serra 1955a: 403].

The apparent hoarding of chickens by Fages forced the soldiers to rely on locally available sources of meat. In the same grievance, Periqués recounted that:

Believe it or not, we were in such dire straits that we ate vipers, rats, snakes, sea skates, coyotes, crows—any animal whatever except only black beetles. And of what grew in the fields, we ate everything raw which we knew positively would not harm us, worse than so many horses, until most of the men became poisoned. And I was one of the number. [Serra 1955a: 405]

Given the circumstances, the Presidio soldiers and settlers necessarily depended on marine sources from the Monterey and Carmel Bays to help supplement their diet. Fages rendered one of the earliest written descriptions of bounties of the Monterey Bay during two Spanish expeditions to the Monterey Bay in 1769 and 1770 (Fages 1937: 83). Fages observed that:

In the sea [Monterey Bay] there are seen from time to time a few whales and seals, and there are many sardines of all sizes, especially in the months of June, July and August, when they are pursued by those great beasts. There are not lacking other fish of the species already mentioned [Fages 1937: 83].

Serra also documented the abundance of sardines. During the summers of 1774 and 1775, Serra made repeated references to the fishing of sardines at Carmel. On August 24, 1774, Serra wrote Antonio Maria de Bucareli y Ursua, the Viceroy of New Spain, the following account:

The said reaping began July 18 and had to be continued until August 12, because as soon as it began, great schools of sardines appeared near the beach, close to the mission. So the arrangement was that, until noon-time, we harvested wheat, and in the afternoon caught sardines. This lasted fully twenty days without a break. Besides all the fish that was eaten by so many people—and they came, day after day, even from far-off places—besides, also, what we and our people ate fresh, we still have, from what was given us, twenty barrels well filled, salted and cleaned. At first there was more, because after cleaning, from three barrels you only get two.

Some individuals caught as much as ten barrels. Seeing that our supply of barrels and salt was running short, the idea struck us to open the sardines, remove the spines, and put them to dry in the sun, as the gentiles do in the Santa Barbara Channel. And, of what was dried in this way, we give to anyone who asks for them. After two weeks of fish eating, on the Sunday following, leaving the sardines in peace, they went hunting for the nests of seabirds that live in the rocks and feed on fish. They caught a lot of young birds which were, generally speaking, as big as a good-sized chicken. And so they passed Sunday camping on the Carmel beach, divided into countless groups, each with its fire, roasting and eating what they had caught. Two of the Fathers and I went to watch

them, and, as a relaxation, it was as good as seeing a theatre show [Serra 1955b: 145].

The sardine fishing was so extensive that Serra sent Bucareli's secretary, Melchor de Peramas, a barrel full attributed to Mission San Carlos neophyte Juan Evangelista on September 11, 1774 (Archibald 1978: 47; Serra 1955b: 181).

The prevalence of sardines was also reported by Pedro Font in 1776 at the Carmel Beach by Mission San Carlos (Voss 2008: 41-42). Font was a Franciscan friar who accompanied Captain Juan Bautista de Anza on the expedition to the San Francisco peninsula to establish a mission and the Royal Presidio of San Francisco (Voss 2008: 42-43). Shortly after the arrival of the Anza expedition on March 10, 1776 at the Presidio of Monterey, Font visited Mission San Carlos and observed that:

They [Mission San Carlos neophytes] devote themselves to fishing, for at this place many good fish are caught. Besides the sardines, which are very plentiful and at times are caught without any trouble because many are stranded, there are obtained also many good salmon which enter the river to spawn. Since they are fond of fresh water they ascend the streams so far that I am assured that even at the mission of San Antonio some of the fish which ascend the Monterey River have been caught. Of this fish we ate almost every day while we were here. Besides, as many as possible were gathered to dry, being carried by the commander as a delicacy. In short, although the rest of the missions are very good, this one seemed to me the best of all [Font 1930: 420].

The following month on April 10 1776, Font commented in his diary that:

Today there was a great shoal of small sardines on the beach, and they said that they were so abundant that they made the ground black on the edge of the water. The commander went there in the afternoon with the fathers to walk and to see this wonder [Font 1930: 420].

Clearly there were alternative food sources available to the soldiers and settlers during the early years identified not only in the historical record but also reflected in archaeological evidence.

Despite the numerous historical descriptions of sardine and other fish exploitation, specific mention of abalone exploitation in Monterey or Carmel is not documented in Serra's letters or reports (1955a, 1955b, 1955c, and 1995d). Nevertheless, we contend that the presence of abalone in the archaeological record is the result of interactions

with the Rumsen Ohlone (Costanoan) and Esselen of the Monterey Peninsula given their long history of settlement and subsistence strategies related to a maritime environment.

The Esselen established residential bases situated by the coast within a mile of the intertidal zone (Breschini and Haversat 2004: 109; Lucido 2015: 50-51). These locations yielded access to marine resources such as mussels, abalone, and other fish as well access to marine mammals such as sea otters, harbor seals, California and Stellar sea lions, fur seals, etcetera (Breschini and Haversat 2004: 109-110, 119; Jones 1992: 105). In addition to the coastal occupational sites, there are interior foraging sites in the forests and mountains that represent a “Sur Pattern” identified with the Esselen (Breschini and Haversat 2004: 110, 2008: 15-16; Jones 1992: 105; Lucido 2015: 51). These sites are also characterized by terrestrial resources including deer and other small mammals, birds, and reptiles, etcetera (Breschini and Haversat 2004: 117). These sites served primarily as places of vegetation gathering and seed and nut processing (Breschini and Haversat 2004: 110). Monterey archaeologists Breschini and Haversat (2008: 16) hypothesized that during the Middle Archaic Period (2000 B.C. to A.D. 1000), Esselen foraging sites would reflect a greater emphasis of terrestrial resources with the southward movement of Penutian speakers (Rumsen Ohlone) into the Monterey Bay.

In contrast, Rumsen Ohlone sites are characterized as having substantial shell midden and a greater spectrum of archaeological deposits that span various fishing technologies (e.g., whalebone pries and abalone and mussel fishhooks), high quantities of carbon

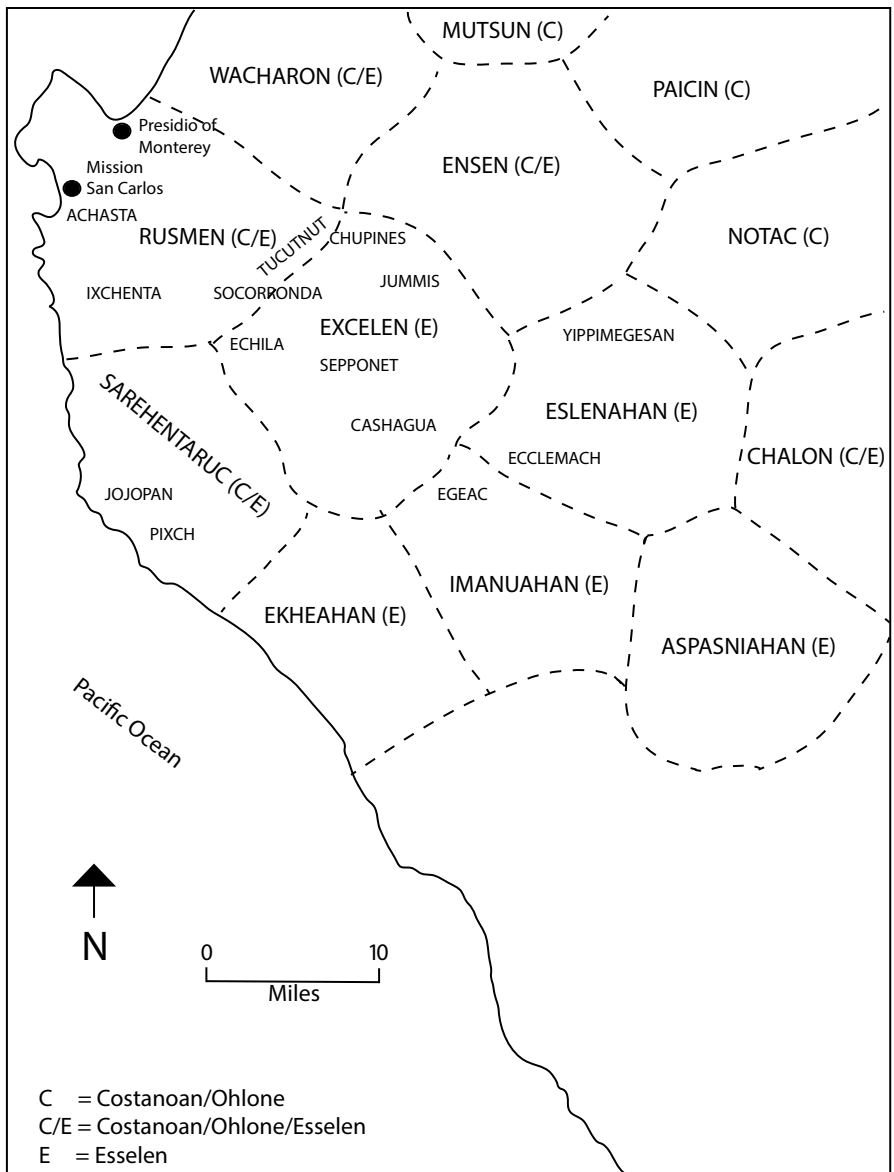


Figure 16. Map of Esselen and Costanoan/Ohlone Districts. Adapted from Schwaderer (2010: Figure 2). Map redrawn by Jennifer A. Lucido, 2015.

and fire altered rock, charcoal fragments, and marine mammal remains (Breschini and Haversat 1986: 8; Jones 1992: 105-107; Lucido 2015: 52). These sites are identified with the “Monterey Pattern” and demonstrate a “specialized peri-coastal food procurement and processing site” strategy (Breschini and Haversat 1986: 1; Jones 1992: 105-107). Monterey Pattern residential bases were typically situated inland (e.g., Carmel Valley) whereas the Esselen Sur Pattern residential sites were primarily situated by the coast (Jones 1992: 106; Lucido 2015: 52). Therefore, the Rumsen transported marine resources from the coast to interior village-communities and nearby sites for processing and consumption (Breschini and Haversat 1986: 8, 11). In contrast, the Esselen gathered, processed, and consumed resources near the origin of the food source, whether marine or terrestrial (Breschini and Haversat 1986: 8, 11).



Figure 17. In the tule swamp--upper lake Pomo by Edward S. Curtis, California, ca. 1924. Courtesy of the Library of Congress.

At the time of the founding of the Presidio, the Rumsen and Esselen engaged in limited religious interaction with the missionaries and presidial company (Lucido 2015: 56). On July 2, 1770, Serra wrote to the Visitador General, Don Joseph de Gálvez the following report:

I received a message today from the heathen who live at a distance from here, brought to me by two good Indians whom I sent out. The heathen say that at present they are fishing, and that within four days they shall come to leave their little boys with me for instruction. They also sent me some fresh deer meat [Temple II and Serra 1932: 279].

In spite of the lack of neophyte conversions, Serra acknowledges the invaluable reliance on the Rumsen and Esselen for Spanish survival in his August 18, 1772 letter to Palou, stating that “Those who are the main supporters of our people are the gentiles. Thanks to them, we live because God so wills it...” (1955a: 265).

Therefore, unless the Spanish settlers had prior knowledge about abalone foraging, it is suspected that such was obtained for the soldiers by native peoples. Either a form of trade or process of learning to forage between the Spanish settlers and the Native Americans could account for both the red and black abalone in the assemblage.

Zooarchaeological research at the Royal Presidio of San Diego undertaken by Paul Chace and Mark Roeder of the Presidio Gateway Search Project identified similar preliminary findings (Buitenhuis 2014: 55). Data from their study suggests that the Kumeyaay “may have contributed substantially to the [San Diego] presidio’s menu through fish exploitation” (Buitenhuis 2014: 55). In addition, shellfish has been recovered at the Presidio of San Diego, of which Chace argues is “a marked signature of indigenous [Kumeyaay] involvement in local maritime resource exploitation” (Buitenhuis 2014: 55).

Findings from the palynology further support the variable impact of interaction and trade networks at Monterey. The pollen assay suggests that long distance seed conveyance occurred with the heartland of New Spain. For example, wheat, beans, and chocolate were delivered to Monterey from San Blas (Mexico) via the packet boat *San Antonio* on June 20, 1771 (Serra 1955a: 227, 235). According to the pollen assay’s findings, wheat, cocoa, and tobacco were possibly cultivated near the north and west portions of the Presidio. It is paramount to note that one must be cautious when assigning proximal locations of crops via pollen data because grains often disperse widely over long distances (e.g. hundreds of miles) by wind, waterways, animals, and particularly in this instance—human activity (MacDonald 2003: 208-209, 228-239). Primary sources confirm, however, that early attempts of planting and harvesting near Mission San Carlos failed to yield successful crops (Serra 1955a: 241). On June 21, 1771, Serra detailed to Father Francisco Palou the unsuccessful plantings:

What we did here—we of the mission—in the way of raising crops came to nothing. We made a little garden nearby, and enclosed it; the Indians did the digging. The whole of it became one seeding bed, as Father Fray Juan had all kinds of seeds. Everything came out fine, but nothing grew to maturity. We were all greatly puzzled. Later we found out that the ground, while showing no signs of it, at times is washed over by the salt water of the bay, and so is fit for nothing but nettles and reeds.

As regards [to] the presidio—Don Pedro had two gardens; one produced plenty of cabbages and other vegetables; the other still more, even a little wheat and barley. But now that we are going to Carmel we hope things well [sic] be different [Serra 1955a: 241].

Clearly the miscalculation of agriculturally viable land was not without consequence. Nearly one year later on August 8, 1772, Serra reports that “With regard to crops nothing worthy of the name

has as yet been achieved. I will tell you why later. We may be able to accomplish something in this regard a little later” (Serra 1955a: 257). The earliest documentation of successful harvesting at Mission San Carlos was in 1772, of which yielded only eight bushels of wheat (Engelhardt 1934: 244). As such, there would have been substantial dependency on imported food from the Naval Department of San Blas.

San Blas functioned as the sole source of external supplies for the missions and presidios of Alta California until 1810 (Archibald 1978: 27; Perissinotto 1998: 18). Each year a list or *memoria* of necessary goods and supplies was sent out to New Spain to be received the following year (Perissinotto 1998: 19). Initially, supply ships were unable to reach the port of Monterey due to unfavorable wind and sea conditions in 1772 (Kemp 2010: 56-57). Such prompted supplementing provisions for Monterey and Missions San Antonio and San Luis Obispo through other means, including fishing for sardines and abalones, but also that of Fages’ 1772 bear hunting expedition in the Valley of the Bears (Engelhardt 1934: 35). Serra writes that “The Officer, seeing that the provisions for the presidio were running low, decided to go with a sufficient number of soldiers to Bear Valley and get meat and salt it for his men” (Serra 1955a: 259). On September 27, 1772, a second voyage to Monterey was attempted, likely arriving in early November (Kemp 2010: 57). However, in 1773, no supply ships were sent to Alta California, thus further exacerbating the scarce provisions (Engelhardt 1934: 41; Geiger 1955:144; Kemp 2010: 59). Palou writes:

The worst kind of a famine that was ever endured in the regions about Monterey visited us. For eight months milk was the manna for all from the comandante and the Fathers down to the least individual; and I shared it with the rest... At this Mission of San Carlos for thirty-seven days we were without a tortilla or as much as a crumb of bread. The meals consisted of a gruel made of garvanzos [sic] or beans ground to flour with which milk was mixed. In the morning a little coffee took the place of chocolate [Engelhardt 1934: 41-42].

It was during this famine that the Rumsen and Esselen were permitted to partake in *paseos* or approved leave in order to hunt, fish, and gather seeds for their own subsistence (Engelhardt 1934: 42; Lightfoot 2005: 61). It was not until May 9, 1774 that the frigate *Santiago la Nueva Galicia* docked in the port of Monterey, delivering much awaited food (Geiger 1955: 144-145).

Despite the early struggles, by 1781 the cattle population of Monterey was stable. In fact, problems with overgrazing and drought at the Presidio impacted native grasses and seeds such that wild game was reduced in Monterey (Lucido 2013: 62; Walton 2001: 36- 37). As

a result, some herds were relocated to the Pueblo de Los Angeles (Lucido 2013: 62).

Problems with Presidio livestock continued during the 1780s and 1790s (Bancroft 1886: 683; Culleton 1950: 143; Walton 2001: 36). Native Californians stole livestock and destroyed Presidio ranches in the Salinas Valley (Culleton 1950: 143; 108 Walton 2001: 36). Serra charged the Presidio of Monterey with the responsibility for the actions of Native Californians given the impact of the Presidio's livestock on native lifeways (Walton 2001: 36). Governor Felipe de Neve retaliated against the actions of these Native Californians and ordered:

that an example be made and reasonable punishment applied [by] seizing the culprits, carrying them to the presidio and shaming them by eight or ten days in the stocks and twenty or twenty-five lashes ... Repeated punishments, however, have not succeeded with the Christian Indians of the last-named mission [Mission San Carlos] who, it was recently found, had killed as many as ten fillies, mares, and colts of the Monterey herd. It is significant that they do no harm of any kind to the cattle or horses of the mission [Beilharz 1971: 159-169; Walton 2001: 36].

In addition to attacks by Native Californians, grizzly bears and wolves preyed on the livestock population in Monterey (Bancroft 1886: 683; Walton 2001: 37). Bears were not only a threat to livestock but also to Presidio agricultural production (Bancroft 1886: 683). Despite these setbacks, the Presidio continued to control cattle, and by 1800, the Presidio managed 1,275 cattle and over 7,000 horses (Hackel 2005: 71; Lucido 2013: 62).

Future Research and Conclusions

Previous studies have looked at the collections of the Monterey Presidio before, but there was limited species identification. This study set out to expand upon the species identification in the kitchen middens of the Presidio. While the documented abundance of cattle bone chronicles the onset of animal husbandry on the Monterey Bay, Spanish colonists struggled with unsustainable and scarce food resources imported from San Blas during the first years of settlement. Therefore, Presidio soldiers and settlers supplemented their diet by consuming marine resources provided by the Rumsen and Esselen. Future studies might relate more to the other presidios and missions in Alta California for a comparison of subsistence patterns during the initial colonization of California. This study serves as a baseline of faunal species identification for future researchers interested in zooarchaeological research at the Monterey Presidio. Future studies

should incorporate all the trenches for a more comprehensive sampling of the Spanish settlers' diet. As recommended for future study of the Presidio of San Diego, additional analysis of the fish and shellfish recovered at the Presidio of Monterey may further identify consumption patterns, seasonality, geographic distribution, and indigenous labor necessary for harvesting marine resources (Buitenhuis 2014: 140).

As the settlement developed, the Presidio depended on importing non-native species for food production from other colonial sites in New Spain. This comprised of not only cattle but also plant species, such as tomato, wheat, bean, and cocoa as indicated by the pollen assay. Together, the process of introducing agriculture and animal husbandry drastically changed the landscape of California (Steward 1937). A more complete picture of Mission-era agriculture can be demonstrated by analyzing the remaining nine soil samples. Pollen preservation for this assay was relatively low. A second pollen study can remedy this by gathering sediment samples from moist soil near the Presidio where anaerobic conditions likely preserved pollen. Furthermore, rarely is charcoal included in the pollen sum (MacDonald et al. 2001; Whitlock and Larsen 2002); however, doing so unveiled a Presidio of Monterey charcoal record that leaves questions regarding the site's fire history for future research. All things considered, it is reasonable to conclude that the preliminary findings presented by the pollen assay elucidate agricultural and dietary patterns of the Presidio during the Mission era. Ultimately, this suite of findings more fully documents a dietary transition central to the evolution of the broader political economy of early California.

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