SEVENTY YEARS OF ARCHAEOLOGICAL RESEARCH ON CALIFORNIA'S FARALLON ISLANDS

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Abstract The Farallon Islands are a cluster of five rugged islands ~32 km off the coast of San Francisco Bay. These small islands total less than 1 km^2 in area and lack surface freshwater, but are home to scores of breeding seabirds and seals and sea lions. Despite their small size, at least three archaeological projects during the past 70 years have been conducted on Southeast Farallon, focusing on the islands' two known archaeological sites (CA-SFR-1 and CA-SFR-24), both primarily related to an early 19^{th} century Russian fur trade *artel* or hunting camp with no evidence of prehistoric human occupation. Little has been published on these expeditions despite their implications for understanding colonialism and culture contact, historical ecology, the history of San Francisco, and other issues. Here, we synthesize the history of archaeological research on the Farallon Islands. We discuss the artifacts and faunal remains recovered from the Farallon projects, the current state of the collections, and how these data articulate with broader California archaeology and the archaeology of small islands more generally.

The California Coast is well known for its offshore islands, which harbor unique biodiversity and ecosystems and were important places of human settlement and cultural developments for over 13,000 years. These include southern California's Channel Islands, which have been a focus of archaeological inquiry for more than a century and contain some of the longest sequences of coastal peoples in the Americas (Erlandson et al. 2011; Kennett 2005; Rick et al. 2005). To the north, a series of islands in the San Francisco Bay also contain evidence of Native American occupations, primarily during the Late Holocene (see DeGeorgey 2016; Luby 1994; Simmons and Carpenter 2009). Situated about 32 km offshore from Point Reyes near the mouth of the San Francisco Bay, the five Farallon Islands are a rugged group of small islands that contain evidence of human occupation during the 19th century (Figure 1). Despite the completion of several research projects since the 1940s, relatively little has been published about the archaeology of the Farallon Islands (Riddell 1955), leaving a gap in our broader understanding of the long-term cultural and environmental history of California's islands.

In this paper, we provide an overview of the history of archaeological research on the Farallon Islands. Our focus is on terrestrial research, but important underwater archaeological surveys have also been conducted in the area (Carrell 1984). Despite the dearth of published works on the islands, at least three excavation projects in the 1940s, 70s, and 90s were conducted on Southeast Farallon Island. Faunal collections from some of this research have been used by biologists to discuss the biogeography and relative abundances of historical fur seal populations on the islands and to help characterize the modern recovery of these populations (Pyle et al. 2001).

The three primary Farallon archaeological projects have focused on the two known archaeological sites from the islands, CA-SFR-1 and CA-SFR-24, components of a Russian hunting *artel* or camp that was associated with the larger occupation of Fort Ross (Lightfoot 2006; Lightfoot et al. 1991; Murley 2005). CA-SFR-1 has been the focus of research and the area where the densest archaeological deposits of bone and artifacts have been noted, with CA-SFR-24 being a nearby area that was thought to be where Russian buildings stood, but preliminary troweling and surface inspection in 1949 did not produce evidence of Russian occupation (Riddell 1949:4). Although no prehistoric occupations are known from the island, Native Californian and Alaskan artifacts have been recovered from CA-SFR-1, confirming, along with ethnohistoric evidence, Native American presence at this site (Lightfoot et al. 1991; Riddell 1955). We discuss the nature of past excavation projects, the archaeological materials recovered, the current status of the archaeological collections, and chart a course for future research on the Farallon Islands.

Environmental and Historical Context

Although precise estimates of the total land area for the Farallon Islands varies slightly, the total land area is small at roughly 211 acres in area or less than 1 km^2. The majority of island land area is from Southeast Farallon, comprised of two islets, West End and Southeast Farallon. The islands are steep and rocky, with wave cut terraces and a high point of 105 m on Southeast Farallon (Schoenherr et al. 1999). The Farallones sit on the edge of the continental shelf, and shoreline reconstructions suggest that the islands were connected to the mainland during low

sea level periods of the Pleistocene, with the islands separating from each other and the mainland during the Early to Middle Holocene, perhaps by 10,000-8000 years ago, but detailed modeling is needed to determine the precise age of separation.

Like much of the California Coast, the Farallon Islands are strongly maritime with relatively cool and mild temperatures with year-round averages in the 50s °F. Ocean conditions around the islands are cold and nutrient rich, fostering incredible marine biodiversity. This includes some of the densest populations of breeding sea birds in the United States, especially Cassin's auklets (*Ptychoramphus aleuticus*), western gulls (*Larus occidentalis*), and common murres (*Uria aalge*), as well as breeding populations of several pinniped (seal and sea lion) species (Ainley and Boekelheide 1990; Ainley and Lewis 1974). Rich and productive kelp forests flank the island shorelines, fostering high finfish abundance and richness. These and other organisms attract large populations of great white sharks (*Carharodon carcharias*), which reside around the island for several months in late summer and early autumn. In contrast to the rich marine biodiversity, terrestrial plants and animals are somewhat limited. Schoenherr et al. (1999) suggested that there are no native land mammals or reptiles on the islands, save a single salamander species (*Aneides lugubris*) that is closely related to nearby mainland coastal populations, which may have colonized the islands via a land bridge during a low sea level stand (Reilly et al. 2015).

The abundance of sea birds and marine mammals on the Farallon Islands were attractive to historic period peoples in San Francisco and surrounding areas. The name Farallon (rocky cliffs or headlands) Islands was likely given by Spanish explorers in the early 17th century. In 1579, Drake named them the islands of St. James taking seals from the Farallones that same

year from the ship *Golden Hind* (Doughty 1971:557). Early visits appear to have been followed by a Boston vessel (*O'Cain*) captained by Jonathan Winship in 1807,who noted "a vast number of both fur and hair seals" (Ogden 1941:50) and proclaiming to be the first group to land on the islands (Doughty 1971:557). Between 1810 and 1813 at least five vessels from Boston hunted seals on the island taking perhaps 150,000 fur seal skins (Doughty 1971:560). Ogden (1941:54-55) notes, based on an account by William Dane Phelps, that a sealing crew left on SE Farallon by the *Albatross* in 1811 collected 30,000 fur seal skins in approximately five months. Around the time of the establishment of Fort Ross in 1812, Russian fur traders, along with Native Alaskans and Californians, established a hunting camp on Southeast Farallon that persisted for about 25 years before being abandoned sometime in the late 1830s (Riddell 1955; Wake and Graesch 1999).

The Russian-American Company (RAC) established the hunting camp, or *artel,* on the Farallon Islands in 1812 as a base for harvesting sea mammals and birds for food and raw materials that were shipped back to Fort Ross. Khlebnikov (1976:123; 1990) presents yields reported by the RAC from its hunting efforts on the islands. In the first six years of its operation, hunters slaughtered 8,437 fur seals (some questions remain about the precise identifications of sea lions versus fur seals in these records) or about 1200-1500 per year. This number decreased over time and by the early 1830s only 200-300 fur seals were captured per year. Hunters at the *artel* also harvested up to 200 sea lions per year. The fur seal and sea lion meat was dried, salted, and shipped to Fort Ross as a principal dietary staple for the RAC's workforce. The sea lion skins and sinews were used for making *baidarkas* (skin kayaks) and *baidaras* (larger, open skin boats that could hold up to 30 people). The sea lion intestines were employed in making

kamleis (waterproof garments), the bladders as watertight containers, and both fur seal and sea lion fat was stored in small kegs for use as food and lamp oil. The hunters also harvested 5,000 to 10,000 "sea ducks" (maybe gulls but more likely murres) from the Farallon *artel.* Khlebnikov (1976: 123) notes that in 1828 a total of 50,000 sea ducks were butchered for their meat (dried and shipped to Fort Ross) and feathers. They collected eggs as well, and these also were sent to the mainland.

The Farallon *artel* was populated by one Russian overseer and 6-10 Native Alaskans and Native Californians who lived in earthen dugouts in the settlement (Khlebnikov 1976:123). Istomin (1992:5) reports that in 1826 the settlement consisted of 12 Native Alaskans and six Native Californians. The Russian accounts make it very clear that living conditions on the windswept, barren Farallon Islands were very difficult as there was no source of freshwater or wood. Water was collected during winter storms and they used sea lion bones soaked in oil as fuel for cooking and warmth. Supplies from Fort Ross were shipped to the *artel* by *baidarkas* or *baidaras* five to six times a year to supply the camp with water, firewood, and containers for packing the dried sea mammal and bird meat, skins, and oil for shipment back to the mainland (Khlebnikov 1976:123; Khlebnikov 1990:64, 99, 103, 192). RAC census records indicate that at least some of the Native Californian men working at the *artel* were prisoners serving time for crimes committed at Fort Ross, while others included Native Californian women "married" to Native Alaskan men stationed on the islands. The 1821-1822 Kuskov census lists the following Native Californians living on the Farallon Islands: *Kap'pisha*, a Coast Miwok man from Bodega Bay, serving time as a prisoner, who was joined by his wife, *Vayamin* (also from Bodega Bay), along with *Yayumen*, a Kashaya Pomo woman married to a Native Alaskan man (*Talizhun*

Kosma), and *Liyamin*, a Kashaya Pomo woman married to a Native Alaskan toyon (leader) (*Kurnyk Moisei*) (Istomin 1992: 5. 24-25, 30-31).

As the San Francisco Bay region grew during the 19th century gold rush, there was heavy demand for bird eggs and other resources. An apparent dearth of chickens fueled an intensive seabird egging industry on the Farallones from 1849, with the incorporation of the Farallone Egg Company in 1855, which persisted until about 1881 (Doughty 1971). The California Academy of Sciences (CAS) worked to ban egg collecting from the islands in 1896, although some illicit collecting continued. This bird egging devastated the islands' sea bird populations with some 14,000,000 eggs collected between 1850-1896 (Ainley 1990:19; Doughty 1971:568). In 1855 the US Coast Guard established a light house on Southeast Farallon, with several of the keepers bringing out cats and other domesticated animals until automation of the light in 1972. North Farallon Island received federal protection in 1909, with Southeast gaining protection in 1969. The islands are currently managed by the US Fish and Wildlife Service (USFWS), with the surrounding waters forming the Greater Farallones Marine Sanctuary.

The historical devastation of the islands' pinniped populations has long been of interest to marine ecologists, who have studied and monitored the recovery of these populations over the last few decades. In particular, researchers have speculated about the presence/absence of Guadalupe (*Arctocephalus townsendi*) and northern (*Callorhinus ursinus*) fur seals. After reviewing records of commercial sealing, Starks (1922) speculated that, since there were no records indicating northern fur seals bred on California or other Pacific Coast islands, the fur seals taken by the American, Indian, and Russian sealers on the Farallon Islands were

Guadalupe fur seals. This was accepted and repeated in the literature (Townsend 1931; King 1954; Riddell 1955; Peterson and LeBoeuf 1969) for the next ~50 years. Repenning et al. (1971) published a review of the systematics of the fur seals of the genus *Arctocephalus*. They reported that fur seal bones from a Russian sealers' garbage dump on SE Farallon Island in the CAS were identified by J. Schonewald as northern fur seals and not Guadalupe fur seals. Pyle et al. (2001), based in part on analysis of bones from CA-SFR-1, argued that no Guadalupe fur seals were present on the islands prior to recent occasional records of a few individuals (Hanni et al. 1997), with the population dominated by northern fur seals. Although Guadalupe fur seal abundance today in Alta California is relatively low, they have been identified in a wide variety of prehistoric archaeological sites, including some on the mainland near San Francisco (Rick et al. 2009). Important questions persist about the nature of Russian era pinniped hunting on the Farallon Islands, the presence and abundance of different species prior to and during the Fur Trade, as well as the nature of seal processing and other activities that were conducted onshore at CA-SFR-1.

70 Years of Archaeological Research

1949 University of California Berkeley Excavations

The first well-documented archaeological project on the Farallon Islands occurred in 1949 by the University of California, Berkeley (Riddell 1955). This expedition of the UC Archaeological Survey lasted for nine days in April 1949. The project was inspired by the history of the islands and, in particular, the Russian and Aleut occupation, including ethnohistoric descriptions of

stone structures and hunting activities (Riddell 1955). The 1949 investigation of the RAC *artel* was permitted and supported logistically by the US Coast Guard, and included Francis Riddell, Franklin Fenenga, Arnold Pilling, and Ynez Haase. As Riddell (1955:2) notes, a one day expedition by Fenenga and Haase a few weeks prior to this project had located archaeological site CA-SFR-1, the focus of their research.

Riddell's group mapped and excavated five trenches (A-E), subdivided into several pits at CA-SFR-1 (Figure 2). The deposits were relatively shallow, extending 6 to 12 inches (15-30 cm) in depth in Trench A. There is no mention of screens being used during excavation in the field notes or by Riddell (1955). However, based on other UC Berkeley field methods used at the time, it is likely that Riddell focused on shovel broadcasting, with screens only used for excavating human burials or a special feature (Meighan 1950). The vast majority of materials recovered were seal, sea lion, and bird bones, although they also noted pig bones. Bone densities varied between the units and included articulated flippers (flipper bones include the carpals/tarsals, the metapodials and the phalanges), as well as crushed skulls. Decomposed shell, ash, and rock were also noted.

In addition to work at CA-SFR-1, Riddell excavated CA-SFR-24 located about 250 yards (229 m) east of CA-SFR-1. This area was thought to be where the Russian structures stood, but mostly objects post-dating Russian occupation were found in the limited work in this area of the site (Riddell 1955:4).

The excavations at CA-SFR-1 produced a number of artifacts (Figure 3). These include a composite bone harpoon head from a type common for Pacific Northwest tribes, likely made using a metal knife. Two small barbed bone points similar to those found on the Aleutian

Islands or Kodiak Island are also similar to purportedly Aleut/Koniag atlatls from Santa Rosa Island (Riddell 1955:5). Additional bone artifacts from the site include: blunt marine mammal bone implements, a cut bird ulna from which a tubular bird bone bead may have been removed, a bird bone tube bead, two incised bird bone tubes, an incised mammal bone fragment, bipointed bird bone perhaps from a fishing gorge, a modified marine mammal rib (in two pieces), and a bone awl. Two chipped stone chert projectile points that are stylistically similar to those produced by local Native Californians were also recovered. A rectangular piece of abalone that was perhaps an ornament and four clam shell disk beads also were recovered. The incised bird bone and clam shell disk beads reported by Riddell (1955:18, Plate 1, g,i,k,m,p) were likely made by local Native California tribes such as the Coast Miwok and/or Kashaya Pomo. Two pieces of sandstone, perhaps used as whetstones, four pieces of modified slate, a cobble hammerstone, and a notched cobble also were recovered.

Riddell (1955:8) describes several historical artifacts as well. These include brass nails, a square headed metal spike, copper rivets, a brass disk button, a bone button, a porcelain button, a light blue glass bead, a complete clay pipe, and fragments of five pipe stems. One of the pipe stems has a French stamp that dates to the mid 19th century suggesting it was not part of the Russian occupation. Finally, gun flints, lead and copper objects associated with fire arms, and brick fragments also were recovered. At least one of these objects dates to after the 1840s and one brick appears to date to 1858, after the Russian occupation. Glazed ceramics from the site appear to come from the American period, with a few from the Russian period, while a cloth doll also likely dates to the later American period. The Riddell report includes

measurements for some of these objects and photographic plates depicting many of the specimens.

Riddell (1955:11-12) briefly discusses faunal remains that were recovered, noting that marine mammal and bird bones make up the vast majority of specimens recovered. They suggest the presence of southern (Guadalupe) fur seal, sea otter, deer, elk, domestic pig, cat, and a variety of shellfish (limpets, California mussels [*Mytilus californianus*], red abalones [*Haliotis rufescens*], and turbans [*Cholorsotoma funebralis*]). They also noted some cutmarks and processing evidence on the pig and marine mammal remains.

The Phoebe A. Hearst Museum of Anthropology (PAHMA) at the University of California Berkeley (UCB) maintains collections of the artifacts from Riddell's CA-SFR-1 collection, including a net sinker, sawed bone, pipestem, bottle glass, a button, and projectile points. A small amount of bone (*n*=66 specimens) is also present. Recent analysis of 47 specimens housed by PAHMA by Sanchez indicate the presence of an adult female California sea lion (*Zalophus californianus*), and other fragmented otariid remains, domestic cat (*Felis catus*), deer (*Odocoileus* sp.), elk (*Cervus elaphus*), domestic pig (*Sus scrofa*), and goat (*Capra hircus*). Records at PAHMA document a loan of these vertebrate materials to Repenning, which were later returned in the 1970s, with numbers in the records roughly matching current identifications and counts in the collections. However, neither the PAHMA or Vertebrate Zoology (MVZ) at UCB have the large quantities of bird and marine mammal bone described from the Ridell (1955) report. As we discuss below, these were either not collected in the field, discarded later in time, still somewhere at PAHMA but not yet relocated, or, less likely, some of them may have been incorporated into CAS collections. The PAHMA also maintains archival

records from the UC Archaeology Survey research, including field notes and photos of the surrounding areas, and a site record for CA-SFR-1, all of which were reviewed for this paper. Ultimately, Riddell (1955:13) concluded that CA-SFR-1 supported a small population of Russians, Native Alaskan, and Native Californian workers, similar to brief ethnohistoric accounts as outlined above.

1970 California Academy of Sciences Excavations

The California Academy of Sciences has long had an interest in the Farallon Islands, having worked to stop egg collection since the 19th century and being a subsequent partner in decades of biological research. The CAS appears to have collected material from CA-SFR-1 at least twice, and possibly other times, but the records of this work are poor and at times conflicting. The CAS appears to have performed at least one excavation project in 1970, with some collection of bones at CA-SFR-1 also made in 1949 or possibly 1941. In 1970, Laurence Binford, then Chair of Ornithology and Mammalogy at CAS, excavated at CA-SFR-1 for three days in February and four days in April. The results of his work have never been published, except for some of the faunal materials reported in Pyle et al. (2001). Binford was not a trained archaeologist and much of his work did not follow modern archaeological protocols or sampling. The following descriptions are based on review of his field notes and other archival materials at the CAS.

From February 4-5, 1970, interspersed with periodic trips to observe birds, Binford excavated eight prospecting units down to about 10 inches (25 cm) and then about a dozen more, finding no archaeological materials. However, after moving to an area south of the railroad and the Point Reyes Bird Observatory (PRBO) house, they immediately found bone

down to about 12 inches (30 cm). There is no mention of any screens being used. They discarded most of the bird bone, thought to be murre and cormorant, and mammal fragments, except cranial elements and some long bones. Binford speculated in his notes that this material represented “a kitchen midden rather than a killing field.” They reported finding a button from one of the holes, but in our 2018 review of the CAS collections we were unable to relocate this artifact. Two sea lion teeth with drilled holes, however, are present in the CAS collections, and we determined these to be from *Eumetopias jubatus* (Steller sea lion; Figure 4). Binford noted finding scapulae, well preserved long bones, and cranial elements, but it is unclear precisely how much of the total material he excavated was retained.

From April 12 to 15, Binford arrived on the island with a group of 40 people, including museum donors and others, with 13 people staying for the four days. He noted that conditions were very windy and fieldwork began on April 13, with two workers digging for two hours and identifying small amounts of animal bone. Their excavation holes were located on either side of the rail tracks. On April 14, it was deemed too windy to excavate and they went fishing. On April 15, they prepared some collections for return back to CAS, but reportedly left behind a large box of bone “for anyone who wants them.”

From a summary of the notes, we can conclude that in February and April of 1970, Binford and colleagues dug four primary holes (A, B, C, D) and a number of probes, with Hole A being the main hole producing vertebrate faunal remains and the button. Binford indicates that his excavations were done in consultation with G. Dallas Hanna, Curator of Paleontology at the CAS, who had visited the Farallones in 1949, the same year as the UC Archaeological Survey excavation. Despite review of CAS archives, we found no mention of Hanna excavating or

collecting archaeological materials on the Farallones. However, a handwritten note in the CAS collections states “Mammal bones from South Farallon Island, Calif. Collected by Dr. G. Dallas Hanna and Allen G. Smith, May 6-13, 1949.” This is about one month after Riddell’s excavations. Hanna’s archival materials at CAS confirm that he was out on the island then, in part working on a paper detailing Farallon Island geology (Hanna 1951). Hanna appears to have collected some bones from CA-SFR-1 during this time, which are currently curated at the CAS. However, a separate note suggests that this could have been in 1941 rather than 1949, though we suspect 1949 to be the most likely date. In either case, Riddell (1955) does not mention any work by Hanna or other archaeologists on the Farallones prior to their research.

The CAS maintains a large collection of bones from the collecting projects and excavations at CA-SFR-1, including numerous California sea lion long bones and cranial elements, and smaller numbers of fur seal, elephant seal (*Mirounga angustirostris*), and bird bones. These bones are listed under three catalog numbers with the numbers written on some of the bones. CAS accession notes attribute 16161 to Binford, 16160 to Ainley, and 14923 to Hanna and Smith, with the majority from 16161. These numbers appear to indicate which excavations/collecting events that the material came from, but the precise attribution is difficult to reconstruct. CAS is assigning new geology numbers to these materials where CAS MAM 14923 is now CASG-79597, CAS MAM 16160 is now CASG 79598, and CAS MAM 16161 is now CASG 79599. David Ainley, a bird biologist, did not excavate at CA-SFR-1 and his association with the materials numbered 16160 appears to be an error (David Ainley, personal communication, 2019). Pyle et al. (2001), in their analysis of fur seal bones from the site, state: “Archaeological and historic faunal material was recovered by the California Academy of

Sciences (CAS) from Russian middens near the end of an extensive marine terrace of SEFI (Fig. 1) in the 1940s and 1970s (CAS specimen #16161)." Correspondence from their research suggests that this refers to collections made by Hanna in 1949 (or 1941) and the later work by Binford in 1970 (Peter Pyle, personal communication, 2019).

Current records suggest that most of the bones at CAS are from Binford's 1970 excavation. Hanna made collections at CA-SFR-1 and the CAS material appears to be a combination of Hanna's and Binford's work, with the Ainley notation remaining unclear. Finally, we explored the possibility that the CAS marine mammal bones might include some of the material from Riddell's excavation. We reviewed Riddell's notes and accession records at the PAHMA and consulted with the MVZ at UCB, but found no records of any formal transfer of material. While the UCB material lacks most of the complete marine mammal and bird remains mentioned in Riddell (1955), it remains possible that these materials were discarded before they were formally accessioned and catalogued by the PAHMA. It is also possible that some of these materials are still at the PAHMA, or were deposited at CAS, but no records of this transfer (if it occurred) exist. Some possible confirmation that they may have been discarded comes from a 1975-1976 permit application from CAS, described below, suggesting that the Riddell material "does not appear to be available anymore." However, in the permit application the precise origins of the CAS material that had already been analyzed are unclear. The most likely scenario is that the CAS material is from Binford's 1970 work and to a lesser extent collections made by Hanna in the 1940s, with most of the complete mammal bird bones from Riddell's work disappearing sometime after the excavation.

A final component of the CAS work on the CA-SFR-1 collections relates to Jacquelin Schonewald, a former collections assistant at the CAS. Schonewald was a co-author on Pyle et al.'s (2001) review of fur seal abundance on the Farallones, had identified the northern fur seal bones referenced in Repenning et al. (1971), had a long interest in the CA-SFR-1 zooarchaelogical material, and invested considerable effort studying the materials. CAS contains abundant notes on the CA-SFR-1 collection including photographs and measurements of specimens, all of which were the meticulous work of Schonewald, along with fellow CAS researcher Douglas Long. Schonewald and Long worked to piece together the long-standing question about which species of pinniped were present on the island prior to historical decimation of the populations, especially the presence of *C. ursinus* and *A. townsendi*. Schonewald surmised that the current collections could only take this research so far and she had planned additional fieldwork at CA-SFR-1, including submitting federal permit (with Binford) applications for excavation to the Smithsonian Institution, who at the time was in charge of issuing such permits.

Review of permit applications and records at the Smithsonian and at the CAS indicate that between 1975 and 1976, CAS sought a permit to excavate on the Farallones. Although both records contain only a handful of documents, a stamp on the forms at the Smithsonian suggests that a permit was recommended in August 1976, following questions about needing a trained archaeologist involved in the work. For whatever reason, this fieldwork appears to have never been performed and Schonewald's subsequent notes do not mention Farallon Island archaeology and focus mostly on marine mammal strandings.

Aspects of the CAS expeditions and fieldwork at CA-SFR-1 remain a bit of a mystery. We can say with confidence that Binford excavated at the site and made some collections, but discarded other materials. Hanna collected bones in 1949 (or 1941), but it is unclear if these were from the surface, or if he excavated samples. Finally, it remains possible that some of Riddell's bones were transferred from UCB or directly from Riddell to the CAS, although given Schonewald and Binford's statements on the permit application this seems unlikely. The CAS material currently contains a number of marine mammal bones, including 254 cataloged entries and two modified teeth, with the button noted by Binford apparently missing. DeLong, Braje, and Rick recently reviewed these collections and assessed taxonomic identifications, largely confirming past reports that there were some northern fur seals, but no definitive Guadalupe fur seals in the collection. The majority of the collection appears to be from adult female California sea lions, something that has not been previously reported, but that Schonewald also noted in her review of the collection. Trace amounts of Steller sea lion, northern elephant seal, and harbor seal *(Phoca vitulina*) were also present. More detailed analysis of this collection, including genetic, isotopic, and protein analyses should be prioritized.

1998 University of California Los Angeles Excavations

The most recent archaeological project on the Farallon Islands was performed by Thomas Wake and colleagues from the University of California Los Angeles in 1998, supported by the USFWS and under an ARPA permit from the US Coast Guard. During a two week period in September of 1998, Wake, Daniel Murley, and Anthony Graesch mapped, discovered archaeological features, and conducted controlled surface collections at CA-SFR-1 (Wake and Graesch 1999). This

project was designed to build on Wake's (1994, 1995, 1997a, b, c) previous research at Fort Ross and to investigate the nature of 19th century Russian occupation of the Farallon Islands. Similar to past projects, Wake's goals were to investigate the presence or absence of various pinniped species, including Guadalupe fur seals, as well as various bird and other species.

Wake's pedestrian survey was informed in part by conversations with Peter Pyle, then island biologist. This survey identified numerous architectural features, artifact scatters, walls, trash dumps, and other materials that. Most of the work concentrated in the southern and easterly areas of Southeast Farallon, although they surveyed North landing, this area requires further investigation. Synthesized in a report to the US Fish and Wildlife, in addition to survey, surface collection, and mapping, Wake and colleagues excavated a 1 x 0.5 m unit to a depth of 80 cm in Shubrick Point Cave and three 1 x 1 m units to 25-30 cm in depth near Riddell's excavations in 1949 (Figures 5 and 6). Wake's report provides details on all of the findings and excavated features. All of their units produced some artifacts, and although analysis is ongoing, these include a ground murre ulna awl, a ground pinniped rib beamer (Figure 7), two wound red glass beads decorated with a white floral pattern (Figure 8), a non-ferrous (zinc?) metal spike head, the tip of a bronze fish hook, and a faceted bronze spike head (Figure 9).

Similar to past work at SFR-1, vertebrate faunal remains, particularly those of marine mammals and birds, dominate the materials recovered during excavation. Preliminary analyses identify over 27,000 vertebrate specimens from a variety of sea birds (primarily common murres), marine mammals (primarily California sea lion), and a few domesticated animals. Detailed results of this work are forthcoming. However, the analysis of marine mammal remains appears to confirm past work, with an overwhelming abundance of California sea lions,

fewer than 10 specimens each of Steller sea lion, harbor seal, elephant seal and northern fur seal, and no Guadalupe fur seals.

Conclusions

Despite a long history of archaeological research on the California Islands, little has been published on the Farallon Islands of northern California. However, at least three terrestrial archaeological projects have been conducted on the island over the past 70 years. These projects have primarily focused on CA-SFR-1, an archaeological site that contains evidence of 19th century Russian and Native Alaskan/Californian occupations during the fur trade, as well as some evidence of the later American occupation of the island. The faunal remains from these sites have generated much interest due to their ability to help characterize recovering marine mammal and bird populations on the Farallon Islands and in the broader North American Pacific Coast (see Pyle et al. 2001; Wake and Graesch 1999). Wake and colleagues have performed the only systematic survey of Southeast Farallon, noting the need for additional fieldwork and reconnaissance of possible archaeological materials.

Current research suggests that there is no evidence for prehistoric Native American occupation prior to the Russian colonial presence, an assertion that needs to be tested with additional fieldwork, especially given the extensive Native American occupations on the California Channel Islands and islands in the San Francisco Bay. Similarly, future research should investigate the possibility that some of the archaeological collections may contain evidence of the extensive 19th to 20th century bird egging activities. Although questions remain about the

precise nature of archaeological collections from the Farallones, especially from the Riddell and CAS projects, and some materials (e.g., faunal remains) were discarded from both projects, there remain substantial archaeological collections for future research. These include the artifacts housed at the PAHMA and the faunal remains at the CAS. Arguably the best materials will come from Wake's forthcoming analyses of the material he excavated at CA-SFR-1. These materials have the best provenience and are systematically curated at UCLA. Our analysis and past work demonstrates the value of legacy collections like these for archaeological research on the Farallon Islands, elsewhere in California, and beyond.

Future research will help determine the occurrence and frequency of various birds, marine mammals, and domestic species in these collections. For now, our review of CAS materials, previous work by Schonewald and Long (see Pyle et al. 2001 and unpublished CAS notes), and Wake's research suggest that adult female California sea lions dominate the assemblages with much smaller amounts of Steller sea lions and northern fur seals, trace amounts of elephant and harbor seal, and no Guadalupe fur seals. But aspects of the matter of which fur seal species bred on the Farallon Islands has been determined by the analysis of bones from 17 individual northern fur seals identified by Schonewald. It is inconceivable that thousands of fur seals were slaughtered there and only the remains of such a small number have been recovered. Forthcoming work by Wake should help clarify seal and sea lion species abundance at Southeast Farallon. Ultimately, genetic and other analyses are needed to investigate this pattern further, and the question of which species were primarily being hunted and deposited on the Farallones remains an important area for future studies with implications for documenting the broader historical ecology of the North American Pacific Coast.

Globally, there has been renewed interest in the archaeology of small islands (Fitzpatrick et al. 2016), including California's Anacapa and Santa Barbara islands (Perry et al. 2017; Rick and Reeder-Myers 2018). Small islands often played unique roles in human cultural developments and environmental interactions. The Farallones have much to contribute to this important research, especially providing information on the extent and duration of past human activities and how they helped shape the past and present ecosystems of these small islands. We hope this paper will inspire future work on existing collections and additional fieldwork designed to explore early fur seal and bird exploitation by Europeans and Americans, and systematically search for evidence of any earlier Native American occupation.

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References Cited

Ainley, David G.

1990 Introduction. In *Seabirds of the Farallon Islands: Ecology, Dynamics, and Structure of an Upwelling-System Community*, edited by D. G. Ainley and R. J. Boeklheide, pp. 3-22. Stanford University Press, Stanford.

Ainley, David G., and Robert J. Boekelheide, eds.

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 the Farallon Island Marine Bird Populations, 1854-1972. *The Condor* 76:432-446.

Carrell, Toni

1984 *Submerged Cultural Resources Inventory: Portions of Point Reyes National Seashore and Point Reyes—Farallon Islands National Marine Sanctuary: Field Research Results, Session 1, 1983*. Submerged Cultural Resources Unit, Southwest Cultural Resource Center, National Park Service, Santa Fe, NM.

DeGeorgey, Alex

2016 *Contributions to San Francisco Prehistory: Archaeological Investigations at CA-MRN-44/H, Angel Island State Park, Marin County, California*. Publications in Cultural Heritage 33, California Department of Parks and Recreation.

Doughty, Robin W.

1971 San Francisco's Nineteenth-Century Egg Basket: The Farallons. *Geographical Review* 61(4):554-572.

Erlandson, Jon M., Torben C. Rick, Todd J. Braje, Molly Casperson, Brendan Culleton, Brian Fulfrost, Tracy Garcia, Daniel A. Guthrie, Nicholas Jew, Douglas J. Kennett, Madonna Moss, Leslie Reeder, Craig Skinner, Jack Watts, and Lauren Willis

2011 Paleoindian Seafaring, Maritime Technologies, and Coastal Foraging on California's Channel Islands. *Science* 331:1181-1185.

Fitzpatrick, Scott M., Victor D. Thompson, Aaron S Poteate, Matthew F. Napolitano, and Jon M Erlandson

2016 Marginalization of the Margins: The Importance of Smaller Islands in Human Prehistory. *Journal of Island and Coastal Archaeology* 11:155-170.

Hanni, K. D., D. J. Long, R. E. Jones, P. Pyle, and L. E. Morgan

1997 Sightings and Strandings of Guadalupe Fur Seals in Central and Northern California. *Journal of Mammalogy* 78:684-690.

Hanna, G. Dallas

1951 Geology of the Farallon Islands. In Geologic Guidebook of the San Francisco Bay Counties. *State of California Division of Mines Bulletin* 154:301-310, San Francisco.

Istomin, Alexei A.

1992 *The Indians at the Ross Settlement According to the Censuses by Kuskov, 1820-1821* Fort Ross Interpretive Association, Inc., Fort Ross, California.

Kennett, Douglas J.

2005 *The Island Chumash: Behavioral Ecology of a Maritime Society.* University of California Press, Berkeley.

Khlebnikov, Kirill

1976 *Colonial Russian America: Kyrill T. Khlebnikov's Reports, 1817-1832*. Translated by Basil Dmytryshyn, and E.A.P. Crownhart-Vaughan. Oregon Historical Society, Portland, Oregon.

Khlebnikov, Kirill

1990 *The Khlebnikiov Archive: Unpublished Journal (1800-1837) and Travel Notes (1820, 1822, and 1824)*. Translated by John Bisk. University of Alaska Press, Fairbanks, Alaska.

King, Judith E.

1954 The Otariid Seals of the Pacific Coast of America. *Bulletin of the British Museum of Natural History, Zoology* 2(1)311-337.

Lightfoot, Kent G.

2006 *Indians, Missionaries, and Merchants: The Legacy of Colonial Encounters on the California Frontiers*. University of California Press, Berkeley.

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

1991 *The Archaeology and Ethnohistory of Fort Ross, California, Volume 1, Introduction*. Contributions of the Archaeological Research Facility 49, Berkeley, California.

Luby, Edward M.

1994 Excavations at East Marin Island (MRN-611), 1992. *Proceedings of the Society for California Archaeology* 7:105-115.

Meighan, Clement W.

1950 Observations of the Efficiency of Shovel Archaeology. *Reports of the University of California Archaeological Survey* 7:15-21.

Murley, Daniel F.

2005 Interpretation of Culture Contact at Colony Ross. *Proceedings of the Society of California Archaeology* 18:211-216.

Ogden, Adele

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

Perry, Jennifer E., Michael A. Glassow, M. L. Neal, and Kelly R. Minas

2017 *Archaeological Survey and Site Assessment on Santa Barbara Island*. Report on File, Channel Islands National Park, Ventura, CA.

Peterson, Richard S., and Burney J. LeBoeuf

1969 Fur seals in California. Pacific Discovery, California Academy of Sciences 22(3): 12-15.

Pyle, Peter, Douglas J. Long, Jacqueline Schonewald, Robert E. Jones, and Jan Roletto

2001 Historical and Recent Colonization of the South Farallon Islands, California, by Northern Fur Seals (*Callorhinus ursinus*). *Marine Mammal Science* 17:397-402.

Reilly, Sean B., Ammon Corl, and David B. Wake
2015 An Integrative Approach to Phylogeography: Investigating the Effects of Ancient Seaways, Climate, and Historical Geology on Multi-Locus Phylogeographic Boundaries of the Arboreal Salamander (*Aneides lugubris*). *BMC Evolutionary Biology* 15:241-

Repenning, Charles A., Richard S. Peterson, and Carl L. Hubbs
1971 Contributions to the Systematics of the Southern Fur Seals, With Particular Reference to the Juan Fernandez and Guadalupe Species. In *Antarctic Pinnipedia*, edited by H. B. Burt, Antarctic Research Series 18:1-34.

Rick, Torben C. and Leslie A. Reeder-Myers
2018 *Deception Island: Archaeology of 'Anyapax, Anacapa Island, California*. Smithsonian Contributions to Anthropology 52, Washington, DC.

Rick, Torben C., Robert L. DeLong, Jon M. Erlandson, Todd J. Braje, Terry L. Jones, Douglas J. Kennett, Thomas A. Wake, and Phillip L. Walker
2009 A Trans-Holocene Archaeological Record of Guadalupe Fur Seals (*Arctocephalus townsendi*) on the California Coast. *Marine Mammal Science* 25: 487-502.

Rick, Torben C., Jon M, Erlandson, René L. Vellanoweth, and Todd J. Braje
2005 From Pleistocene Mariners to Complex Hunter-Gatherers: The Archaeology of the California Channel Islands. *Journal of World Prehistory* 19:169-228.

Riddell, Francis A.
1955 Archaeological Excavations on the Farallon Islands, California. *Reports of the University of California Archaeological Survey Reports* 32:1-18.

Schoenherr, Alan A., C. Robert Feldmeth, and Michael J. Emerson
1999 *Natural History of the Islands of California*. University of California Press, Berkeley.

Simmons, Dwight D., and Tim Carpenter
2009 Fish Remains from CA-MRN-44/H, Angel Island, Marin County, California. *Proceedings of the Society for California Archaeology* 21:69-81.

Starks, Edwin C.
1922 Records of the Capture of Fur Seals on Land in California. California Fish and Game 8(3):155-160

Townsend, C. H.
1931 The Fur Seal of the California Islands. *Zoologica (New York)* 9(12):443-458.

Wake, Thomas A.
1994 Social Implications of Mammal Remains from Fort Ross, California. *Proceedings of the Society for California Archaeology* 7:19-32.
1995 Mammal Remains from Fort Ross: A Study in Ethnicity and Culture Change. PhD Dissertation, Department of Anthropology, U.C. Berkeley.
1997a Bone Artifacts and Tool Production in the Native Alaskan Neighborhood. In *The Native Alaskan Neighborhood: A Multiethnic Community at Colony Ross. The Archaeology and Ethnohistory of Fort Ross, California, Volume 2*, edited by K. G. Lightfoot, A. M. Schiff, and T. A. Wake, pp. 248-278. Contributions of the University of California Archaeological Research Facility, Number 55.

1997b Mammal Remains from The Native Alaskan Neighborhood. In *The Native Alaskan Neighborhood: A Multiethnic Community at Colony Ross. The Archaeology and Ethnohistory of Fort Ross, California, Volume 2*, edited by K. G. Lightfoot, A. M. Schiff, and T. A. Wake, pp. 279-309. Contributions of the University of California Archaeological Research Facility, Number 55.

1997c Subsistence, Ethnicity, and Vertebrate Exploitation at the Ross Colony. *Kroeber Anthropological Society Papers* 81:84-115.

Wake, Thomas A., and Anthony P. Graesch

1999 *Surface Archaeology of Southeast Farallon Island, California: Preliminary Report on the 1998 Season*. Unpublished Report on File Cotsen Institute of Archaeology, University of California, Los Angeles.

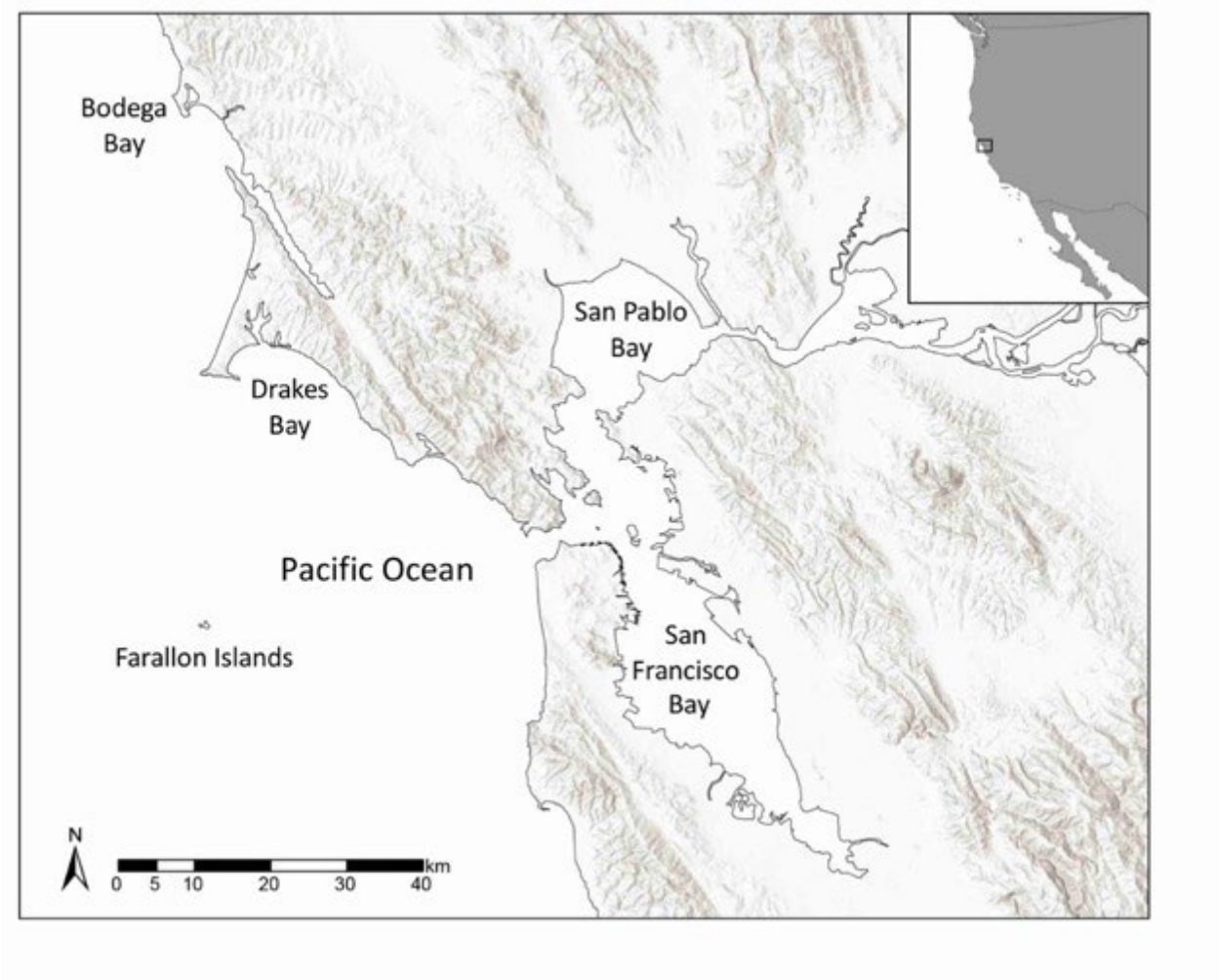

Figure 1. Location of the Farallon Islands and surrounding area.

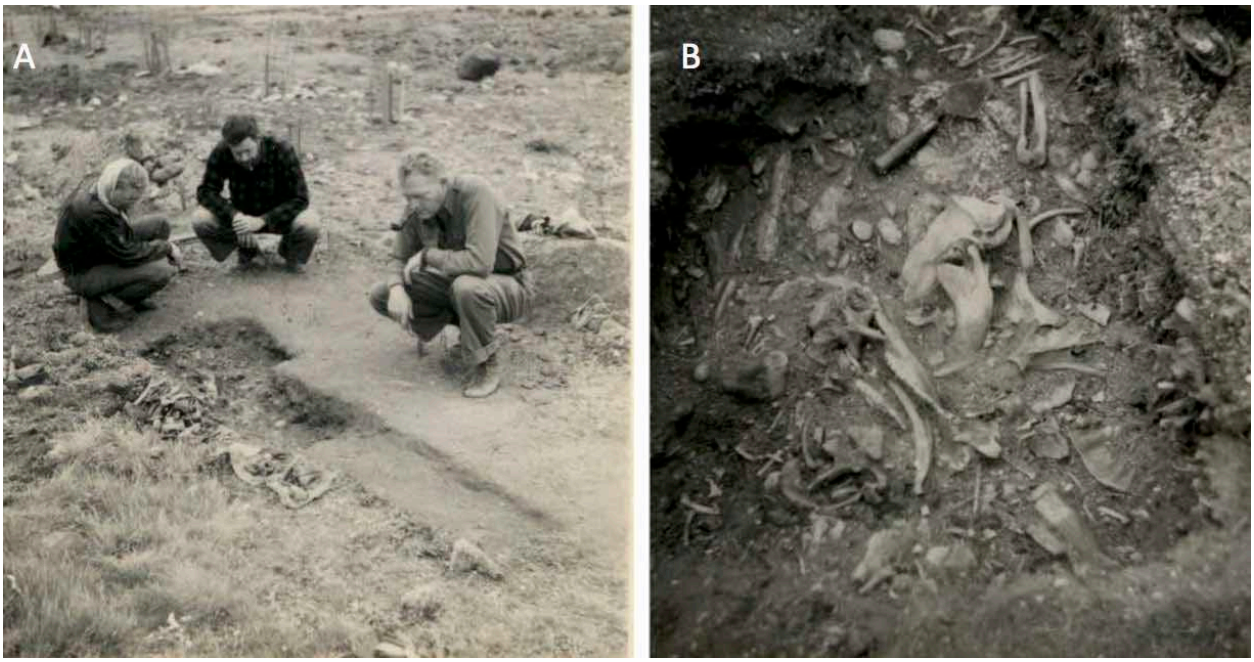

Figure 2. A. Haas, Pilling, and Fenenga viewing a harpoon from excavations at SFR-1. B. Close-up of excavation unit at CA-SFR-1 showing dense concentration of pinniped and other bones. A. by F. Riddell and B. by F. Fenenga courtesy of Phoebe A. Hearst Museum of Anthropology.

Figure 3. Artifacts recovered by Riddell and currently housed at Phoebe A. Hearst Museum of Anthropology. Left to right (clockwise): Net sinker (103409), sawed bone (103506), pipestem (103347), ceramic fragment (103502), historic bottle glass (103469), nail (103374), button (103471), awl fragment (103397), incised bone tube (103456), 103398), obsidian projectile point (103398), chert projectile point (103413). Photo by G. Sanchez.

Figure 4. Drilled Steller sea lion teeth from CA-SFR-1 excavated by Binford in 1970 and housed at California Academy of Sciences. Photo by T. Braje, scale in cm.

Figure 5. Wake (l) and Greasch (r) excavate Unit 1 at CA-SFR-1 in 1998, view to the west. Photo by Dan Murley.

Figure 6. Close up of Unit 1, 15-20 cmbs, September 1998 showing five articulated California sea lion Forelimbs. Photo by T. Wake.

Figure 7. Bone tools recovered from Unit 1, CA-SFR-1, 1998. Photo by T. Wake.

Figure 8. Decorated wound red glass beads recovered from Unit 1, CA-SFR-1, 1998. Photo by T. Wake.

Figure 9. Metal artifacts recovered from Units 1 and 2, CA-SFR-1, 1998. Photo by T. Wake.