

WHERE WERE THE NORTHERN ELEPHANT SEALS IN PREHISTORIC TIMES?

In this study and paper, the authors are looking for archaeological evidence to show how the geographic distribution of Northern Elephant seals (NES) today compares to their distribution in recent, pre-historic times.

The authors reference the fact that NES were hunted to near extinction by commercial and recreational hunters during the fur and oil trade in the mid to late 1800s. While the rapid decimation of the then existing NES population by commercial hunting has been well documented, little was known about the population prior to that time. By studying and synthesizing all known occurrences of NES bones and teeth in northeastern Pacific Coast (Alaska to Baja, Mexico) archaeological sites, plus studying previously reported materials and new unpublished data; the authors attempt to compare pre-historic NES populations and distribution to those existing today.

They point out that, despite their large size and the fact that they spend the majority of their lives in deep, offshore waters, when NES do come on land for molting, puping, breeding, or other purposes, they usually prefer more level sand or gravel beaches; compared to other seal and sea lion species who tend to use rocky, less accessible areas. Plus, during their post weaning fast, weaner pups would have been very susceptible to hunting by prehistoric Native American people.

From this, they make the assumption that humans would have hunted/scavenged prehistoric NES and other pinnipeds in direct proportion to their natural abundance, therefore:

- 1) Holocene (11,700 yrs. ago to present) NES remains should occur in archaeological sites from Baja to Alaska.
- 2) The greatest numbers of archaeological NES specimens should come from Baja and central/southern California where the largest populations now breed and live.
- 3) In archaeological sites on the offshore islands of California, NES remains should be one of the most abundant of the six pinniped species documented in the area.
- 4) Since NES are found mostly offshore in northern waters, archaeological specimens north of California should be comparatively rare.

After describing their own analysis of site data and their extensive search of the literature from documented archaeological sites from Baja to Alaska, they go on to describe their attempts to determine more specific age and sex data of remains found.

After this detailed study, they found only 28 sites with NES bones from Baja to southern British Columbia; with a total of only 96 NES bones or teeth identified in the total of sites investigated or literature reviewed. In comparison, the remains of Guadalupe fur seals, rare in California today, are common in central/southern California where nearly 3,500 specimens of remains have been reported from 60 sites spanning 8,000 years. Most of the NES bones and teeth were from the Channel Islands, where 13 sites from 6 of the eight islands contain NES remains. Along the mainland coast of California, only three sites have produced NES remains, including 21 specimens from a site at Point Mugu, where they represent just 1% of the total pinniped bones found. A single NES bone was identified from a site at Point Año Nuevo and another was recovered at Diablo Canyon.

To the south, a site at Isla Cedros, Baja, produced one NES bone. NES bones or teeth occurred in 11 archaeological sites north of California, including three NES bones from a site in Oregon, which produced abundant remains of Northern Fur seals and Steller sea lions. Several sites in Washington have produced NES bones, but these generally constitute less than 1% of each assemblage. Finally, three sites in southern British Columbia, all on the west coast of Vancouver Island, each produced NES bones, but these also generally constitute less than 1% of each assemblage.

(Reviewers comment: they do not reference the total number of coastal sites examined or reviewed that did not include NES remains. I felt this would have been a useful comparison.)

The geographic distribution of these sites suggests that ancient NES had a geographic range similar to today, that is from Isla Cedros, Baja, Mexico; to the southern end of Vancouver Island, B.C. Canada. Roughly 85% of the NES bones identified from Pacific Coast archaeological sites come from between San Clemente Island to just N. of Point Arguello, but most of these are from the Channel Islands. Although the Channel Islands contain the most archaeological sites with NES remains and also have several large present day breeding colonies; NES remains are extremely rare in the archaeological assemblages, generally making up only about 0.7 to 7.8% of the total number of identified specimens present, and always ranking much lower than other pinnipeds.

The highest percentage found at any site is from the site located within the present huge NES rookery at Point Bennett, on San Miguel Island. But even here they are significantly outnumbered by remains of Guadalupe fur seals and California sea lions. This is compared to the more modern population estimates for San Miguel Island of 80,000 California seal lions and 50,000 NES.

On the Central California mainland coast, where there are now four substantial rookeries, only two archaeological sites have revealed NES bones, and only one bone has been found at each site. One at Año Nuevo and one at Diablo Canyon. The extensive dig at the site at Piedras Blancas Lightstation (2005) failed to produce any NES remains at all; instead California sea lion remains dominate the assemblage.

The majority of NES specimens found from all sites come from late-Holocene (3,500 yrs. ago) sites. The oldest specimens may come from San Nicolas Island where 14 bones were reported from a large site dated between about 7,000 and 500 years ago. Two specimens from San Miguel were securely dated to around 6,000 years ago. Collectively, these data suggest sporadic human hunting of NES for at least 6,000 years, but with most evidence from sites dated to the last 1,500 years.

The authors describe the age and sex data from those remains that could be identified, and the sites where these data were collected, and from this they conclude that NES colonies were likely small in size and limited in distribution. In addition, the high incidence of juvenile remains (75%, with no incidence of adult males) raises the speculation that Native Americans either utilized stranded NES or perhaps hunted the vulnerable younger animals. Regardless of whether they were scavenged, hunted, or both, the data do provide a credible indication of the relative abundance of NES in the area at that time.

The results show a geographic distribution similar to today, but with a substantial difference from the abundance of modern NES populations compared with other pinniped populations. North of California the data are similar to modern times, with small numbers of NES in Oregon, Washington, and British Columbia. The limited data available from Baja prevent a comparison of abundance between ancient and modern times south of California. However, the limited occurrence and low abundance of NES remains in California, including absence from most sites located near modern rookeries and low numbers on the Channel Islands, suggest a very different pattern of abundance from the modern huge populations found in these areas (the California population estimated to be over 124,000: Carretta et al., 2009).

The authors then ask, why are there not more NES bones in California archaeological sites? They offer four hypotheses to explain this:

- 1) Preservation bias, i.e. NES bones deteriorates faster than bones from other pinnipeds. They quickly dismiss this based on the condition and age of the bones found in the sites.
- 2) Human food preference or hunting capability. They call this hypothesis unlikely, based on examples existing showing that ancient Native Americans hunted all other pinnipeds, including large sea lions; and other people who have harvested and eaten NES found them desirable.
- 3) Environmental and climatic variables during the Holocene reduced NES populations. They conclude that while there were highly variable climate periods during the Holocene period, there are no clear correlations in either climate or archaeological data to support this hypothesis.
- 4) Native American settlement and possible predation, and possibly predation by large carnivores (Saber-tooth cats, and later Mountain lions and Grizzly bears) resulted in the displacement of NES from many of their favored habitats.

The authors conclude that hypothesis four is the one best supported by the current archaeological and contemporary data. As Native Americans colonized the Pacific Coast, including the Channel Islands, they likely found an abundance of pinnipeds, including NES, especially on offshore islands where large carnivores were not present. Many of the primary beaches used by NES for rookeries today also have archaeological sites nearby. The presence of Native Americans on or near these preferred beaches, especially during late Holocene (3,500 yrs. ago) would have likely driven NES to increasingly remote pocket beaches and islands without human occupation. In contrast, other pinnipeds had options for using offshore rocks and more isolated rocky shores not utilized by NES.

The current abundance and distribution of breeding NES is a testament to their resilience and adaptability, both from their interactions with Native Americans and the near devastating onslaught of more recent Euro-American hunters during the fur and oil trade. In the absence of human interference the NES appear to do exceptionally well and maintain fitness despite low genetic diversity. The authors speculate that the modern abundance of NES on islands off California may provide a glimpse of what their population might have been during the Pleistocene (2.5 million – 11,700 yrs. ago) prior to human arrival; but their presence may have still been restricted on the mainland by large predators.

As research papers often tend to do, the authors point out that given the small sample of NES bones currently available, questions remain about the effects of ancient human activities and predation. And with unknown environmental variables on NES, important avenues for further research still remain. (Send money)

COMMENTS BY REVIEWER:

For those of us on the bluff, this study does provide answers to some frequently asked questions –

- Yes, prehistoric Native Americans probably did hunt and consume Elephant seals, but in surprisingly limited numbers.
- Elephant seal remains constitute less than 1% of the remains of all pinniped species found in any archaeological dig on the western mainland coast. In the digs on the Channel Islands, where the highest percentage of Elephant seal remains were found, they never exceeded more than 8% of the total remains identified.
- Probably due to large land mammal predators like Saber tooth cats and Grizzly bears, the Elephant seals killed by Native Americans were primarily located on the Channel Islands.
- In our local area, only one Elephant seal bone has been found in archaeological digs at Año Nuevo, and one at Diablo Canyon. No Elephant seal bones were found in the extensive dig at Piedras Blancas (2005).

The obvious unanswered questions are –

- Why were so few Elephant seal bones/teeth found? It appears that there were just very few Elephant seals around compared to other pinnipeds, is this true?
- The digs at the Channel Islands found that the vast majority of bones found were Guadalupe fur seals. So what happened to their population after the commercial hunting in the late 1800s?
- Both the Elephant seals and the fur seals were decimated by commercial hunting, so why have the Elephant seals recovered and not the Guadalupe fur seals? Has there been an environmental change, such as a shift in ocean currents and/or food supply that has had this effect? Or was the fur seal population less resilient for some other reason?

The paper reviewed:

Where were the northern elephant seals? Holocene archaeology and biogeography of *Mirounga angustirostris*.
Torben C. Rick, et. al.

Reviewed by Jack Morehead, 11 /13.

Edited by Tim Postiff

