The effects of human hunting on northern fur seal (*Callorhinus ursinus*) migration and breeding distributions in the late Holocene

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Abstract

The effects of human hunting on northern fur seal (*Callorhinus ursinus*) migration and breeding distributions in the late Holocene

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Northern fur seals (*Callorhinus ursinus*) have figured prominently in archaeological and contemporary biological studies on the west coast of North America. Previous research indicates that major changes in fur seal biogeography have occurred within the past 100-300 years. This dissertation evaluates what role human hunting has had in causing these changes. Determining the extent, the timing, and the cause (or causes) of the changes in fur seal biogeography is directly relevant to a wide variety of archaeological and zoological studies that involve fur seal distributions during the late Holocene.

To do this, I develop variables with which to measure the age composition of fur seals being exploited, with particular emphasis on identifying the breeding distribution of fur seals. Analysis of archaeological fur seal skeletal material clearly indicates that the breeding distribution of fur seals was much more widespread than historically documented, with previously-unidentified rookeries in Alaska, and on or near the Washington coast. This breeding distribution appears to have been stable until the early historic period.

Because population-level effects of harvest pressure may have pre-dated changes in fur seal biogeography, I also measure individual growth rates of fur seals, which scale inversely with population density. Male fur seals from the Ozette assemblage tended to be

smaller in any given age class than animals collected during the 20th century from the Pribilof Islands population. Although it cannot be determined if this size difference reflects a population level consistently at carrying capacity, or latitudinal differences in body size, the pattern is consistent throughout the Ozette sequence, indicating that prehistoric hunting did not significantly affect fur seal population levels over the time period examined.

The data examined here suggest that prehistoric exploitation of fur seals was sustainable, and that all of the biogeographic changes documented for fur seals were caused by the commercial fur trade. More generally, the research presented here adds a unique viewpoint to a long-standing debate regarding the propensity of humans to over-exploit their resource bases. The temporal sequences of fur seal exploitation presented here clearly indicate that over-exploitation is not a universal characteristic of subsistence economies.

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