

**North Pacific Research Board Progress Report
January – June, 2008**

Project #: 632

Title: Distribution, Abundance, and Ecology of Pacific Walrus in the Bering Sea

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Contract Period and Amount of Funding:

August 1, 2006 to June 30, 2008

\$182,634, \$53,019, \$64,115

Report Period: January 15 to July 15, 2008

Report Date: July 15, 2008

Lead Author of Report: C.V. Jay

Project Summary:

The Pacific walrus (*Odobenus rosmarus divergens*) is a sea ice-dependent pinniped that faces an uncertain future. Little information exists to allow prediction or interpretation of the impacts of Arctic warming on Pacific walrus, their sea ice habitats, or their benthic prey. The U.S. Fish and Wildlife Service (USFWS), in collaboration with the U.S. Geological Survey (USGS) and Russian scientists from GiproRybFlot and ChukotTINRO, carried out a range-wide survey of the Pacific walrus in March and April of 2006, with the primary goal of estimating the size of the population. The survey was unique in that it utilized thermal scanners to enumerate walrus over large geographic areas, and remotely-deployed satellite tags to measure the haul-out behavior of free-ranging walrus. In addition, the survey supported collection of benthic samples for a University of Alaska Fairbanks (UAF) study in an important walrus foraging area. This project examines aspects of Pacific walrus population biology and ecology using data resulting from this complex and highly collaborative field study. The first study component involves collaboration with Russian scientists to integrate survey data collected in U.S. and Russian territories, standardize data analysis, and derive a population estimate of the Pacific walrus. The second study component examines relationships between walrus haul-out and movement behaviors and their sea ice environment. The third study component determines whether benthic walrus prey composition, abundance, and biomass within an area of the St. Lawrence Polynya have significantly changed in the past 20+ years.

Progress Summary:

Walrus-Sea Ice Relationships in the Bering Sea: Understanding the Importance of Sea Ice as a Foraging Platform (Chadwick Jay, USGS, 907-786-7414, chad_jay@usgs.gov)

1. Relations between walrus haul-out state and meteorological variables

We developed and have continued to refine a model that predicts walrus haul-out state from meteorological variables. The most recent version of the model was presented during a coordination meeting of U.S. and Russian walrus survey teams last month (June 2008) in St. Petersburg, Russia. The model is being integrated with the aerial survey data collected in spring 2006 to estimate the size of the Pacific walrus population. Walrus haul-out state estimated from the model has a large impact on the overall population estimate. Because of the utmost importance of the model to providing an accurate walrus population estimate from the 2006 survey, further refinement of the model will be undertaken, and completed by 31 December 2008.

2. Relations between walrus movements and sea ice drift

This collaborative project uses walrus radio tracking data collected by USGS during a spring 2006 walrus abundance survey and estimates of sea ice motion generated from NASA's Jet Propulsion Laboratory (JPL) under contract with USGS. Ice motion measures in the Bering Sea in 2006 were produced by JPL using the RADARSAT Geophysical Processor System (RGPS). USGS and JPL convened several phone teleconferences during the course of the project to discuss data summaries and identify an approach to matching sea ice motion data to walrus movement data. JPL identified all RADARSAT images available from UAF Geophysical Institute that were less than 12 hrs from available walrus locations, used walrus locations with time separations of at least 12 hrs as the starting point on the sea ice images for computation of ice displacements, tracked common ice features at the point or within the vicinity (~50 km) of the point, and delivered the ice motion products to USGS for statistical analysis. The walrus tracking and ice motion data resulted in 269 paired walrus and ice motion vectors. Preliminary examination of this data by USGS resulted in 134 paired vectors suitable for further analysis. The results confirm that walruses often travel in opposition to prevailing sea ice movements. Conditions under which walruses traveled with or in opposition to sea ice motion will be explored relative to the hypothesis that animals tend to maintain their location within preferred habitat, such as productive foraging areas.