

Project #: 818

Title:

Walrus Distributional and Foraging Response to Changing Ice and Benthic Conditions in the Chukchi Sea

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Lead Author of Report:

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PROJECT OVERVIEW

Walrus make foraging trips from sea ice and land to feed on benthic organisms. During ice-free conditions in the Chukchi Sea, their access to offshore foraging areas is reduced and they become more dependent on nearshore resources. We propose to compare the foraging range and effort of walrus using land haul-outs as a consequence of shelf-free ice conditions to walrus using ice haul-outs in the Chukchi Sea. We predict that foraging effort will be greater, and foraging range will be less, when walrus use land haul-outs than when they are able to use ice haul-outs. The foraging costs due to increased travel time to food patches from land may be significantly higher than the costs from sea ice haul-outs and result in reduced energy stores before wintering in the Bering Sea. We will also compare nearshore to offshore infaunal and epifaunal walrus prey communities and changes in these communities that may have occurred from retrospective analysis of archived benthic data. We predict that changing ice conditions over the past decade has resulted in a redistribution of productive areas and community structure. In addition, we predict that the community structure of prey that is accessible to walrus from land haul-outs will be different than that in offshore areas where they can be accessed by walrus using sea ice haul-outs. This project will provide insights into environmental mechanisms responsible for changing distributions and foraging behaviors in walrus from climate change that can ultimately impact benthic communities and walrus vital rates.

Timeline and Milestones

Project Duration: 2 years, June 1, 2008 – May 31, 2010

2008	Completion Date	Outcome
Order radio-tags	June	
Deploy radio-tags on walrus	September	Provide near real-time tracking data to public via USGS website after deployments
Compile walrus tracking and behavior data and pertinent benthic data into GIS database	December	

Complete summer Chukchi Sea field sampling-opportunistic (July); also support through other funding	July	Chukchi samples in process of sorting as well in line-up for sorting
Collecting data files for retrospective benthic analysis	December	
2009		
Graphically summarize walrus benthic faunal data; Presentation at annual NPRB symposium	January	Progress report to NPRB
Draft analysis of walrus and benthic data	June	
Past Chukchi Sea benthic data set being entered into GIS and PRIMER databases; processing new samples collected in summer 2008	June	
Provide new benthic data for GIS entry to Chad Jay	Jan-ongoing	Prepare poster for NPRB Alaska Symposium
Final analysis	December	Present results to Eskimo Walrus Commission, FWS, and MMS
2010		
Presentation at annual NPRB symposium and/or AGU/ASLO Oceans meeting	Jan or Feb	
Draft report	February	
Presentation at the Oceans meeting in Portland, Oregon		
Final report	May	
Prepare manuscripts for journal submissions		

PROGRESS SUMMARY

Walrus satellite radio-tags were purchased and preparations were made to deploy the radio-tags on walrus hauled out on shore from Pt. Lay with the help of local hunters. To accomplish this, we were relying on walrus hauling out on shore when the main pack ice receded off the continental shelf in late summer. As predicted, the main pack ice retreated far to the north of the Chukchi continental shelf and over the deep Arctic basin, and sparse remnant sea ice remained over parts of the shelf as it did in 2007. However, unlike 2007, in summer of 2008, the remnant ice persisted over the shelf and provided walrus with sufficient haul-out platforms to remain offshore and walrus did not come to shore as they did during ice minimum conditions in 2007. As a result, we were unable to meet our objective of radio-tagging walrus on shore and the tags are in storage. We will make another attempt to tag walrus on shore in September, 2009.

We have been consolidating the benthic data sets from the 1980s-present for the Chukchi Sea, along with processing further benthic data collections made opportunistically in 2007 and 2008. We are preparing prey field maps for the walrus-prey analyses as well as submission to data archives. Benthic data sets are being entered into GIS format for time series comparisons for benthic population structure and dominant prey status and trends.

Preliminary Results:

The first period of data collection was not completed as noted above and therefore data analysis has not yet begun.

There are distinct “hotspots” of benthic populations in the SE Bering Sea and in offshore waters of the Chukchi Sea that are important sites for walrus feeding. We are evaluating nearshore and offshore benthic populations in the context of biomass and caloric content (from literature and field collection laboratory determinations) to compare with walrus caloric needs.

In addition, benthic samples were collected during two separate cruises in the Chukchi Sea during 2008 and are now being sorted in the laboratory. These data will be included in our overall prey field analyses in the context of walrus energetic needs.

Project Progress Concerns:

The presence of remnant ice over the continental shelf in 2008 allowed walruses to remain offshore and therefore no radio-tagging was completed. This project relies on obtaining information from walruses restricted to hauling on shore during ice minimum conditions in late summer-fall. We will likely request a project extension, depending on success of another tagging attempt in 2009.

Benthic sorting is time-intensive, but we have two technicians working intently on these analyses, with oversight from PI Grebmeier. We also have hired a new senior technician with GIS and PRIMER statistic experience and she will be assisting with data entry and computer evaluations throughout 2009.

Education and Outreach:

Our staff made a site visit with the community of Pt. Lay to explain the objectives of this work, organize help from village hunters, and distribute to the community a flyer briefly stating objectives of the walrus tagging. Because we have not completed our first field effort, we have not yet been able to provide education and outreach on results.

We have presented results from the benthic retrospective studies at the Chesapeake Biology Laboratory (both education and public forums), at the Aspen Institute in Wye, Maryland, for an IPY class at Texas A&M, as well as an invited evening lecture at Yale University, all between June-December 2008.

PROJECT STATUS

Because of ice conditions that we have no control over, we are essentially one year behind on the walrus radio-tagging component of this project. We will attempt to deploy radio tags again in 2009. We have laid the groundwork for achieving this objective, including organizing field logistics, communicating with coastal communities, and lining up help from Native hunters in Pt. Lay.

We anticipate providing GIS-based distribution maps of dominant benthic infauna in the Chukchi Sea, both retrospective and recent data collections, to co-PI Chad Jay by this summer and early fall 2009. Once we process the 2007 and 2008 benthic data from opportunistic cruises, we will also provide these data to Chad Jay for prey field comparisons with walrus distributional data. We are also using PRIMER statistics to evaluate benthic population trends and environmental data.