

Project #:

B66

Title:

Whale broad-scale distribution

Principal Investigator(s) and Recipient Organization(s):

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Contract Period and Amount of Funding:

1 February 2008 to 31 December 2012
\$299,960

Report Period:

1 April 2009 through 30 September 2009

Report Date:

2 September 2009

Lead Author of Report:

Nancy Friday

Proposed timeline and milestones within report period:

- Prepare sighting and oceanographic data for preliminary abundance and habitat analyses, Spring, 2009
- Develop preliminary habitat models, 2009 & 2010
- Prepare NPRB semi-annual report (Apr-Sep, due Oct 1), September, 2009

Project Summary:

Estimate density and abundance of cetaceans in the survey area of the AFSC/NOAA walleye pollock (*Theragra chalcogramma*) acoustic stock assessment survey. Model cetacean distribution data and density estimates in terms of oceanographic and bathymetric variables and prey distribution and density to investigate cetacean habitat characteristics and to create predictive models of cetacean distribution. All analyses will focus on fin and humpback whales, but other cetaceans will be included as sample sizes permit. We will address the following BSIERP hypotheses:

3. Later spring phytoplankton blooms as a result of early ice retreat will increase zooplankton production, thereby resulting in increased abundances of piscivorous fish (pollock, cod and arrowtooth flounder) and a community controlled by top-down processes [Oscillating Control Hypothesis] with the possible trophic consequences:
 - b. Growing populations of humpback and fin whales increasingly will both consume and compete with forage fish (juvenile pollock) for zooplankton (euphausiids and copepods). By reducing the prey base of forage fish, whales not only reduce the amount of forage fish available to other predators, but also their quality (lipid content).
 - c. In a top-down control community, fishing will reduce the degree of top-down control of forage species (including juvenile pollock) by adult pollock, cod and arrowtooth flounder. Owing to light exploitation rates, top-down control by arrowtooth flounder will increase, as will their level of competition with piscivorous fish, seabirds and marine mammals. As a result of these two processes, arrowtooth flounder will determine ultimate community composition, such that the climax community will be arrowtooth flounder-dominated (similar to the Gulf of Alaska).
4. Climate and ocean conditions influencing circulation patterns and domain boundaries will affect the distribution, frequency and persistence of fronts and other prey-concentrating features and thus the foraging success of marine birds and mammals largely through bottom-up processes. Specifically:
 - a. Climate-ocean changes will displace predictably located, abundant prey (hot spots) necessary for successful foraging by central place (seabirds and fur seals while nurturing young) and hot spot (baleen whales, walrus) foragers.

5. Climate-ocean conditions will change and thus affect the abundance and distribution of commercial and subsistence fisheries. Specifically:

- c. Current management strategies for fish, seabirds and marine mammals in the Bering Sea are robust to climate scenarios (range of frequencies of cold and warm years) and associated range of trophic relationships and spatial redistributions.

Progress Summary:

Sighting data were prepared for preliminary abundance and habitat analyses in the following manner. Survey data were extracted from WinCruz files and error checked using a customized FORTRAN program (Paul Wade, National Marine Mammal Laboratory). Data were also processed through a customized VBA program (Alex Zerbini, National Marine Mammal Laboratory) in preparation for importing into program DISTANCE for line transect analysis. Tracklines and cetacean sightings were plotted in ArcMap to check for accuracy. Finally, data were error checked by ensuring that the minimum and maximum values and categorical values for each variable were within normal range. The next step is to coordinate with the AFSC/NOAA walleye pollock survey team and other BEST-BSIERP projects to acquire relevant oceanographic and prey data for preliminary habitat models to be developed later this year and next year. Processing the oceanographic and prey data was postponed until a contractor could be employed to develop preliminary habitat models to ensure that the data are processed in the appropriate manner. A request for proposals was advertised in August and a contract was awarded to Cascadia Research Collective for the development of preliminary habitat models. Cascadia Research Collective has employed Alex Zerbini to perform the work defined in this contract and develop the preliminary habitat models.

Lessons learned and project adjustments:

The contract for the development of preliminary habitat models was developed and awarded later than anticipated. It was decided that the contractor developing the preliminary habitat models (Zerbini) should be involved in the processing on the oceanographic and prey data to ensure that the data are prepared in the appropriate format. Therefore, the oceanographic and prey data will be acquired and processed this winter 2009/2010 rather than spring 2009.

Integration activity:

We have participated in all of the monthly lead PI calls.

Education and Outreach:

None

Next year’s Work plan (not part of the 5 page target length):

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Tasks, Assignments, Timeline for the next 12 months

Prepare oceanographic and prey data for preliminary abundance and habitat analyses	Friday, Waite, Zerbini	Winter, 2009/2010	
Develop preliminary habitat models	Zerbini, Friday	2009 & 2010	
Prepare NPRB semi-annual report (Oct-Mar, due Apr 1)	Friday, Zerbini	March, 2010	Semi-annually 2008-2012
Contract with Aquatic Farms for cetacean Observers	Friday, Waite	Mid-March, 2010	
Ship survey gear to AK	Friday, Waite	April, 2010	
Cetacean observers on AFSC/NOAA walleye pollock (<i>Theragra chalcogramma</i>) acoustic stock assessment surveys	TBA	June & July, 2010	
Prepare NPRB semi-annual report (Apr-Sep, due Oct 1)	Friday, Zerbini	September, 2010	Semi-annually 2008-2012