Bering Sea Integrated Ecosystem Research Project: Format for Semiannual Progress Reports

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 2008 through 30 September 2008

Report Date:
29 September 2008

Lead Author of Report:
Nancy Friday

Proposed timeline and milestones within report period:
- Order survey gear**,** March 2008
- Contract with Aquatic Farms for cetacean Observers**,** April, 2008
- Ship survey gear to AK**,** Mid-April, 2008
- Cetacean observers on AFSC/NOAA walleye pollock (*Theragra chalcogramma*) acoustic stock assessment surveys**,** June & July, 2008
- Prepare NPRB semi-annual report (Apr-Sep, due Oct 1)**,** September, 2008
- Prepare sightings data for submission to BSIERP/BEST data management and to BSIERP Seabird and Cetacean Foraging Response to Prey Persistence Project**,** Fall, 2008
- Prepare sightings and oceanographic data for preliminary abundance and habitat analyses**,** Fall, 2008

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:

All gear was ordered and shipped to Dutch Harbor, AK in time for the AFSC/NOAA walleye pollock (*Theragra chalcogramma*) acoustic stock assessment survey. Tasks orders were let through NMML's IDIQ with Aquatic Farms for two cetacean observers on each of the three legs of the acoustic survey. Personnel recommended as cetacean leads were recently hired by NMML or the SWFSC for other projects and were borrowed as NOAA employees rather than contracted. One lead covered legs 1 and 2, and another lead covered leg 3. One observer covered all three legs, and three other observers rotated through each of the legs. The survey was underway from 1 June to 30 July and covered 2,692.8 nm on effort with total on-effort and off-effort sightings of humpback (46), fin (78), minke (7), gray (1), sei (1), killer (35), sperm (4), and Baird's beaked (2) whales, and harbor (55) and Dall's (171) porpoise. The acoustic survey was an interdisciplinary survey this year including cetacean, seabird, fish, macrozooplankton and oceanographic sampling. Data are currently being prepared for submission to the BSIERP/BEST data management and to project B92 (Top predator hotpot persistence). Sightings data will be combined with oceanographic data for later this fall preliminary abundance and habitat analyses next year.

Lessons learned and project adjustments:

Task orders under our IDIQ with Aquatic Farms will need to be prepared much earlier in order to have highly qualified observers in place for the 2010 AFSC/NOAA walleye pollock (*Theragra chalcogramma*) acoustic stock assessment survey.

Integration activity:

We are preparing the cetacean data and metadata from the AFSC/NOAA walleye pollock (*Theragra chalcogramma*) acoustic stock assessment survey for delivery to the BSIERP data manager. The acoustic survey was an interdisciplinary survey this year including cetacean, seabird, fish, macrozooplankton and oceanographic sampling. Cetacean distribution models will include oceanographic and bathymetric variables and prey distribution and density. Cetacean data will also be provided to Mike Sigler for project B92 (Top predator hotpot persistence). We have participated in all of the monthly lead PI calls. Sue Moore will be attending the PI meeting as a representative for this project.

Education and Outreach:

None

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

B66, **Whale broad-scale distribution O4.38**, Nancy Friday, Nancy.Friday@noaa.gov, 206-526-6266

2009 Tasks, Assignments, Timeline

What	*Who*	*Start (2009)*	*Other key dates*
Prepare sightings data for submission to BSIERP/BEST data management and to BSIERP Seabird and Cetacean Foraging Response to Prey Persistence Project	**Friday, Waite, Zerbini**	Fall, 2008	
Prepare sightings and oceanographic data for preliminary abundance and habitat analyses	**Friday, Waite, Zerbini**	Fall, 2008	
Submit data to BSIERP/BEST data management and to BSIERP Seabird and Cetacean Foraging Response to Prey Persistence Project	**Friday, Waite, Zerbini**	December, 2008	
Develop preliminary habitat models	**Zerbini, Friday**	2009	
Prepare NPRB semi-annual report (Oct-Mar, due Apr 1)	**Friday, Zerbini**	March, 2009	Semi-annually 2008-2012
Prepare NPRB semi-annual report (Apr-Sep, due Oct 1)	**Friday, Zerbini**	September, 2009	Semi-annually 2008-2012