



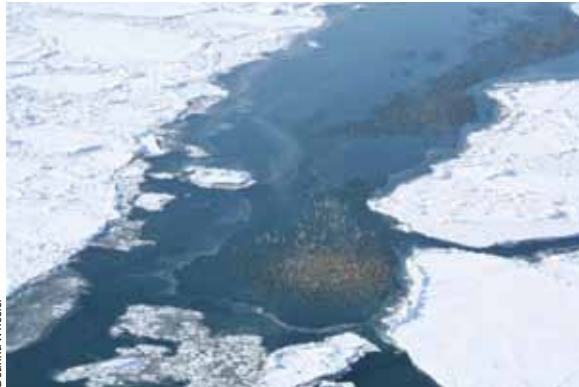
Brendan Smith

SEABIRDS :: Foraging Success

World Population of Spectacled Eiders

Project 820

IN ALASKA WATERS, ONE OF THE KEY THREATENED SPECIES IS THE spectacled eider, whose world population winters in small areas of open water among the ice of the northern Bering Sea. Project 820 looks at spectacled eider distribution, abundance, and diet, while making concurrent surveys of benthic prey in collaboration with other NPRB and NSF projects in the Bering Sea Integrated Ecosystem Research Program. Investigators are testing and refining a model predicting where eiders can maintain positive energy balance, and where they have enough food to survive, giving resource managers vital information for delineating protected habitat in the northern Bering Sea.



Deanna Wheeler

Spectacled eiders in an open lead in the northern Bering Sea, spring 2009 BEST-BSIERP Bering Sea Project spring cruise of the USCGC Healy.

Marine Habitat Use

MARINE RESOURCE MANAGEMENT IS INCREASINGLY MOVING TOWARD ECOSYSTEM-BASED APPROACHES. BOTH THE U.S. COMMISSION ON OCEAN POLICY AND THE NPRB SCIENCE PLAN HIGHLIGHT THE NEED FOR INFORMATION THAT UNDERPINS ECOSYSTEM-BASED DECISION-MAKING.

We currently have little information about how seabirds use marine habitats at regional or basin scales, which limits the opportunity to build seabird habitat use into large-scale ecosystem-based, management planning.

The *Science Plan* also encourages cross-cutting and integrated research projects. Projects previously described in the Lower Trophic Level research theme (302, 536, and 601) quantify the abundance of plankton at basin scales in the North Pacific using ships of opportunity to tow a continuous plankton recorder (CPR). To gather data on top predators whose feeding and distribution patterns are linked either directly or indirectly to plankton, the Board supported four linked projects (206, 409, 611, and 801) focused on marine mammal and bird surveys that coordinate and integrate with the CPR surveys.

SEABIRDS :: Marine Habitat Use

Surveying Seabirds at Sea

Projects 206, 409, 611, 801

PROJECT 206 FIRST ESTABLISHED STANDARDIZED methods for surveying marine birds and mammals from the large container ships used in the CPR program described on page 36. The project then carried out six surveys across a 7500 kilometer swath of ocean, from British Columbia to Japan. Data on oceanographic variables were also collected underway, using satellite remote sensing. Project 409 extended this time series, allowing for yearly variability in seabird and marine mammal distributions relative to CPR-derived plankton communities and satellite-sensed temperature and chlorophyll measurements. Results of the two combined projects allowed the investigators to define ten distinct “meso-marine ecosystems” in the North Pacific and southern Bering Sea study area. Project 611 further extended the survey dataset, crossing into what appears to be a transition to a cold-water regime, increasing the investigators’ ability to connect plankton, bird, and mammal diversity and abundance with oceanographic variables at



A northern fulmar flies low over the Bering Sea.

large spatial scales. Project 801 provides additional funding to support integrated analyses of seabird, zooplankton, phytoplankton, and physical oceanographic measurements with specific focus on the Gulf of Alaska ecosystem.

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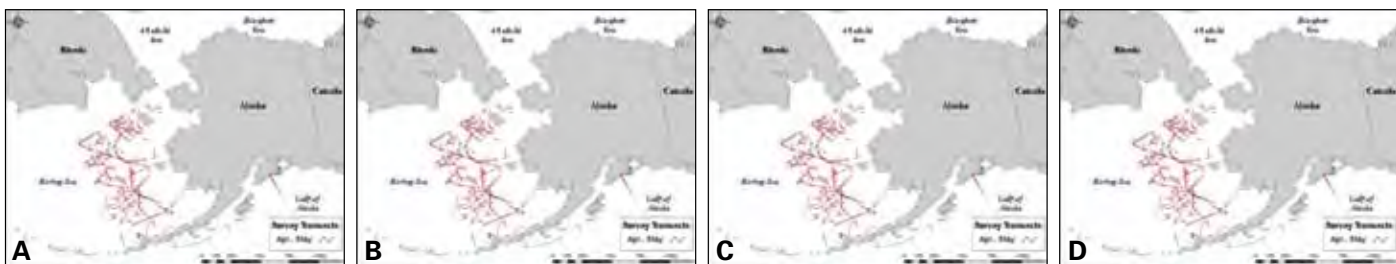
Shipbased Seabird Observers

Project 637

THE CPR-MARINE BIRD AND MAMMAL PROJECTS HIGHLIGHT the value of combining surveys of predators, prey, and habitat characteristics. Project 637 is a separate but related study that increased the coverage of the North Pacific Pelagic Seabird Database (NPPSD), a USGS-USFWS project to consolidate data on seabirds at sea.

Most of the data in the NPPSD were collected in the 1970s and 1980s. Since then, many bird populations have declined, and oceanic regimes, seabird prey, fisheries, and marine traffic have changed, affecting the foraging patterns and habitat use of seabirds at sea. Project 637 supported a marine bird observer program, placing observers

on selected vessels of opportunity, in collaboration with NOAA, projects funded by the NSF and NPRB, the USFWS, and the Canadian Wildlife Service. The project placed observers on 25 cruises, surveying 46,373 kilometers of pelagic Alaska waters from the Arctic Ocean to the northern Gulf of Alaska. These surveys improved distributional data for a variety of species, especially during spring and fall months. All the data were contributed to the NPPSD, strengthening the database’s ability to provide insights into the broad-scale patterns of distribution and abundance for apex predators in Alaska’s pelagic waters. Continued support for seabird-at-sea surveys is being provided through the Bering Sea Integrated Ecosystem Research Project.



Spatial distribution of survey effort by season, from March 2006 through March 2008. Seasons were defined as winter (A; February-March), spring (B; April-May), summer (C; June-July), and fall (D; August-October).