

Update July 2007

Project 070814: Seabird predation on juvenile herring in Prince William Sound.

Principal Investigators: Dr. Mary Anne Bishop, Prince William Sound Science Center
Dr. Kathy Kuletz, U.S. Fish and Wildlife Service

Project background

Juvenile herring are heavily preyed upon by multiple species of seabirds, including three species that have not yet recovered from the Exxon Valdez oil spill: pigeon guillemot, marbled murrelet, and Kittlitz's murrelet. Currently we know little about predation pressures on juvenile herring during winter months (October – March). By examining spatial and temporal abundance of seabird predators associated with juvenile herring schools, we are describing the physical and biological characteristics of the herring schools targeted by seabirds. In addition, we are conducting focal observations of foraging birds to determine herring consumption rates by seabird species. Our project is being performed in conjunction with vessels conducting hydroacoustic surveys for juvenile herring schools.

Progress to date

Our project began immediately upon receiving the EVOS contract in early March 2007. Field work began 18 March 2007 with the start of the juvenile herring hydroacoustic surveys. An experienced USFWS seabird observer joined Dr. Richard Thorne, PI for the EVOS juvenile herring surveys. On board the *MVAuklet*, marine bird and mammal surveys were conducted in Eaglek, Galena Bay, Port Fidalgo, Port Gravina, Simpson Bay, Wells Bay and Zaikof Bay.

The seabird surveys were conducted during daylight hours, and the associated herring hydroacoustic surveys followed the same transects during their nocturnal surveys. Transects were zigzags across the bays, excluding waters < 200 m from shore. Data were recorded into a voice/GPS data input program directly into a laptop computer. The seabird observer followed USFWS protocols for ship transects, recording birds within 100 m of the vessel in an 180° arc at the bow.

During surveys we observed 25 species of marine birds, including 7 species of sea ducks. In addition, we observed bald eagles, northwest crows and five species of marine mammals. Additional observations were made of foraging seabird flocks and individual foraging activity. We have received the herring hydroacoustic data from this spring and are beginning to analyze the data.

Changes from original budget and proposal

We are not proposing any substantive changes to the seabird predation on juvenile herring project. The budget described in the original proposal will be the same. We will be shifting our focal observation effort to coincide with the PWS juvenile herring hydroacoustic surveys (PI R. Thorne). The focal observation component of our study was originally associated with R. Crawford's proposed juvenile herring study in northeast PWS, which was not funded. Our study design and data analysis will be strengthened by joining the focal foraging observations with the Sound-wide juvenile herring surveys. We will be using the same data analysis as described in the original proposal to describe the relationship between seabird densities and juvenile herring biomass in PWS.

Reason to continue funding through FY10

Predation is contributing to the suppression of herring populations in Prince William Sound and seabirds are one of the major predators. A critical component of this study is the determination of seasonal and inter-annual changes in seabird species and foraging activity, particularly relative to the presence of and consumption rate of herring. Among years, many alcids (pigeon guillemot, marbled and Kittlitz's

murrelets, common murre, and puffins) appear to have highly variable densities in March. There is no comparable data for seabirds in PWS during the fall months, but our surveys will provide data on inter-annual variability during this period as well. The March variability may be connected to oceanic conditions in the Gulf of Alaska. If conditions are poor in the Gulf of Alaska, more alcids may move into Prince William Sound and herring consumption by seabirds may increase. Multiple years of data are crucial to assess interannual variation in seabird numbers and herring consumption.

The estimates of juvenile herring consumption produced by our project will aid in planning future herring restoration efforts as well as in assessing the role of seabird predation on herring recruitment by providing data to both herring and ecosystem modeling. Stock assessment models can then determine how much (what biomass) needs to be available to birds, so that both bird and fishery requirements do not create a “predator pit”. At the same time, this project will provide data on the impact of juvenile herring availability on the recovery of marbled murrelet, Kittlitz’s murrelet, and pigeon guillemot.