

Project Number: 10100132-H

Project Title: PWS Herring Survey: Seasonal and Interannual Trends in Seabird Predation on Juvenile Herring

PI Names: Dr. Kathy Kuletz and Dr. Mary Anne Bishop

Time period covered: FY12

Date of Report: 1 September 2012

Report prepared by: Mary Anne Bishop, Prince William Sound Science Center

Project website: <http://www.pwssc.org/herringsurvey> with additional information at www.pwssc.org/research/biological/seabirds/SeabirdOnHerring.htm

Work Performed:

During FY2012, we performed diurnal and nocturnal surveys of marine bird distribution and abundance in Prince William Sound (PWS) during 14-21 November 2011 and 15-21 March 2012. As in previous years, both winter cruises focused on five bays in PWS that were historically known to hold large overwintering aggregations of juvenile herring including Eaglek, Simpson, Whale, Zaikof, and Lower Herring Bays. This year, we expanded the surveys to include two bays in Port Gravina: Beartrap Bay (both cruises) and St. Matthews Bay (November cruise only). A second vessel sampled fish in and around transects to validate the acoustic surveys, sample herring for disease and energetics and sample potential herring predators.

All seabird data recorded on the dlog program during the seabird/herring cruises have been edited, proofed, and entered into an Access database. Using GIS, we delineated into 1 km segments all seabird transects since 2007 and assigned a km reference number. In addition, nocturnal, infrared video surveys have now been viewed for four of the five cruises that we used this method.

A paper describing the statistical methods we use to analyze seabird/habitat associations was published in February 2012. We submitted a manuscript on seabird habitat associations to the *Canadian Journal of Zoology* that is currently in review. In addition, we completed a manuscript on seabird consumption of herring and submitted the manuscript to the journal *Fisheries Oceanography* for a special issue on top down predation of herring. This manuscript is currently being reviewed.

Bobby Hsu, the project biologist for this project left his position at the Prince William Sound Science Center at the end of May 2012 to begin graduate school. A search effort was mounted in advance of his departure and a job offer made. Unfortunately, just three weeks before the new employee was scheduled to arrive, the candidate declined the position. Therefore, the position was advertised again, and as of August 2012, the final candidates for the project biologist are being interviewed. It is anticipated that a new employee will be on site by 1 November 2012.

Future work:

Field work for this project has now been completed. We are now focusing on the analyses and writing up manuscripts for publication. We are working closely with Dr. Richard Thorne (PI of hydroacoustic juvenile herring study) to analyze avian response to juvenile herring availability.

Coordination/Collaboration:

Our project is part of the PWS Herring Survey Group. Field work and all project synthesis are being conducted in cooperation with hydroacoustic herring surveys as well as with energetics, disease, and fish predator studies. Principal investigators Bishop and Kuletz attended and presented at the April 2012 Herring Survey Group meeting in Cordova. In addition, Principal investigators Bishop and Kuletz attended presented research findings at a fall 2011 web-in-air meeting on top down regulation of herring populations in Prince William Sound sponsored by NOAA's Auke Bay Lab.

Community Involvement/TEK & Resource Management Applications:

The herring survey group uses local fishers to sample juvenile herring in Prince William Sound in spring.

Information Transfer:**Publications:**

Zuur, A.F., N. Dawson, M.A. Bishop, K. Kuletz, A.A Saveliev and E.N. Ieno. 2012. Two stage GAMM applied on zero inflated Common Murre density data. Pages 155-188 in A.F. Zuur, A.A.Saveliev, E.N. Ieno (eds). *Zero Inflated and Generalized Linear Mixed Models with R*. Highland Statistics Ltd, Newburgh, United Kingdom.

Publications in review:

Bishop, M.A., J.T. Watson, K. Kuletz, T. Morgan. Pacific herring consumption by marine birds during winter in Prince William Sound, Alaska. *Fisheries Oceanography*.
Dawson, N.M., M.A. Bishop, K.J. Kuletz, A.F. Zuur. Using ships of opportunity to assess winter habitat associations of seabirds in subarctic coastal Alaska. *Canadian Journal Zoology*.

Posters:

Hsu, B., M.A. Bishop, K.J. Kuletz, and R. Thorne 2012. Linking hydroacoustic surveys for juvenile herring with winter seabird distribution in Prince William Sound. Alaska Marine Science Symposium. January 2012, Anchorage.

Popular Press:

Hsu, B. 2012. Birds of a feather. *Delta Sound Connections*.
Over 12,000 copies of this free newspaper were placed at airports and various tourist areas in southcentral Alaska).

Public Radio

Our seabird predation on herring project was featured on public radio in a 27 February 2012 “Field Notes” radio program prepared by Allen Marquette, an educator at the Prince William Sound Science Center. The program was aired on KCHU Terminal Radio, the listener-supported public radio for Prince William Sound and the Copper River Valley. The station reaches more than 10,000 listeners, including the PWS communities of Valdez, Cordova, Tatitlek, and Chenega Bay and the interior communities of Glennallen, Copper Center, McCarthy and Kenny Lake. The *Field Notes* program for each week is aired on Sunday afternoon and Thursday evening. A recording can be downloaded at:
http://www.pwssc.org/education/community/community_radio.shtml

Web:

On the PWS Science Center web site, we have two pages that provide information on the project. The first web page is under the PWS Herring Group
<http://www.pwssc.org/herringsurvey>

The second web page is under the avian research program:

<http://www.pwssc.org/research/biological/seabirds/SeabirdOnHerring.htm>

Budget Changes: No major budget changes are anticipated at this time.