

*Please refer to the Reporting Policy for all reporting due dates and requirements.

1. Program Number: *See*, Reporting Policy at III (C) (1).

14120111-E

2. Project Title: *See*, Reporting Policy at III (C) (2).

PWS Herring Program – Expanded Adult Surveys

3. Principal Investigator(s) Names: *See*, Reporting Policy at III (C) (3).

Michele Buckhorn and Dick Thorne

4. Time Period Covered by the Report: *See*, Reporting Policy at III (C) (4).

1 February 2014 to 31 January 2015

5. Date of Report: *See*, Reporting Policy at III (C) (5).

February 2015

6. Project Website (if applicable): *See*, Reporting Policy at III (C) (6).

[Http://pwssc.org/research/fish/pacific-herring/](http://pwssc.org/research/fish/pacific-herring/)

7. Summary of Work Performed: *See*, Reporting Policy at III (C) (7).

The 2013 hydroacoustic survey of adult herring in Prince William Sound was conducted between March 27 and April 5 aboard the chartered vessel Auklet. The first two days of the survey were focused on Port Gravina and Port Fidalgo, and included a survey over a substantial concentration of herring in Port Fidalgo the night of March 28. The next day was spent searching for herring in Tatitlek Narrows and Galena Bay, before returning to Port Fidalgo for a second night-time survey. Zaikof Bay and Rocky Bay were searched on March 30, and a survey was conducted on a small concentration of fish in Rocky Bay. The next two days included searches for herring off Montague Point, Stockdale, Chalmers, Green Island, Drier Bay, Herring Bay, Northwest Bay, around Naked Island and into Wells Inlet ending in a night survey on a small concentration of fish in Cedar Bay. The next day, April 2, we returned to Port Fidalgo, but the herring concentrations observed previously were absent. The last two days of the survey focused in Port Gravina and included a broad-scale survey on April 3 and a more focused survey on April 4 of a large concentration of herring between Hells Hole and Redhead.

The effort during spring 2014 expanded in time as well as space. One survey took place March 25-28 and covered areas around Montague Island as well as Port Fidalgo and Port Gravina. A second cruise took place April 21-25, later than previous years, and focused around Montague Island.

Results

Despite the expanded survey effort during the March 27-April 5 period in 2013, no appreciable adult herring were located outside of Port Gravina and Port Fidalgo. The two surveys each in those two areas did detect considerable movement from Port Fidalgo to Port Gravina, a pattern observed previous years.

The final, focused survey in Port Gravina on April 4, estimated a biomass of 16,300 metric tons with 95% confidence intervals of 13,700 to 18,800.

In contrast, the effort during March 25-28, 2014, could not locate any substantial biomass in Port Gravina and Port Fidalgo. Two large schools were detected in the vicinity of Port Fidalgo, both over 1000 mt, but the schools were migrating rapidly and were not successfully surveyed. Several whales were foraging on both schools. Some adult herring were detected and surveyed around Montague Island, but the biomass was relatively minor.

Many adult herring schools were detected around Montague Island during the April 21-25 period, extending from Chalmers to Rocky Bay. Although these herring schools were small compared to the massive schools typically seen in Port Fidalgo and Port Gravina, the densities of the herring in these schools were quite high, reaching 7 kg/m². The biomass of adult herring in the region was estimated to be in the range of 1-3 thousand metric tons. The schools were located close to shore, but were still targeted by several humpback whales. The whales could be seen as close as 10 m from shore.

Discussion

The accuracy of these hydroacoustic surveys is affected primarily by the ability to cover the spatial extent of the adult herring population. The fundamental assumption is that the survey design can take advantage of the spawning behavior to restrict coverage to an area that can be effectively covered and still be comprehensive. The viability of this assumption is challenged by complex and variable behavior patterns. For example, the twenty plus years of surveys documented a major change in the distributional pattern that took place between 1999 and 2004, when the spawning distribution changed from the Montague Island area to Port Fidalgo and Port Gravina. Predation by humpback whales may have been a factor in this change. Further, the timing of the movement of the herring into Port Fidalgo and Port Gravina has varied considerably over the past several years. An extensive time series during spring 2007 documented the complexity of this movement. Surveys by PWSSC in 2008, 2010 and 2011 underestimated the adult herring biomass because the dates of the surveys missed the peak of the spawning migration. Water temperature may be a factor in the timing, but again whale predation may be a driving factor in the rapid and seemingly unpredictable nature of the movements.

Table 1. Status of project deliverables for this reporting period

Deliverable/Milestone	Status
Analysis and biomass estimates	Completed
Submit FY 15 Work Plan for review	Work Plan submitted in August 2014
Alaska Marine Science Symposium	Attended January 2015
Submit annual report	February 2015

8. Coordination/Collaboration: *See*, Reporting Policy at III (C) (8).

- a) This project works closely with the validation project that collects samples for acoustic validation.

- b) No collaboration with other Trustee Council funded projects
- c) All herring biomass information was shared with Steve Moffitt at the Alaska Department of Fish and Game (ADF&G) office in Cordova. Fish collected off Montague Island were provided to ADF&G for their age-sex-length analysis. The fish were then provided to the genetic stock structure project.

9. Information and Data Transfer: See, Reporting Policy at III (C) (9).

Presentations on the HRM research program were given at the EVOSTC fall meeting. A poster titled “**Expanded hydroacoustic surveys of adult herring in Prince William Sound, 2013-2014**” was presented at the 2015 Alaska Marine Science Symposium. Raw hydroacoustic data prior to November 2014 has been uploaded to the AOOS workspace. Data upload is ongoing as processing and analysis continues.

10. Response to EVOSTC Review, Recommendations and Comments: See, Reporting Policy at III (C) (10).

We have not yet met with ADF&G personnel to determine a level of precision acceptable to them.

11. Budget: See, Reporting Policy at III (C) (11).

Budget Category:	Proposed FY 12	Proposed FY 13	Proposed FY 14	Proposed FY 15	Proposed FY 16	TOTAL PROPOSED	ACTUAL CUMULATIVE
Personnel	\$0.0	\$49,900.0	\$40,900.0	\$55,300.0	\$55,900.0	\$202,000.0	\$ 44,544
Travel	\$0.0	\$3,600.0	\$3,600.0	\$3,600.0	\$3,600.0	\$14,400.0	\$ 4,414
Contractual	\$0.0	\$2,000.0	\$3,600.0	\$3,000.0	\$0.0	\$8,600.0	\$ 991
Commodities	\$0.0	\$4,000.0	\$0.0	\$2,000.0	\$0.0	\$6,000.0	\$ 426
Equipment	\$6,000.0	\$0.0	\$0.0	\$0.0	\$0.0	\$6,000.0	\$ 6,000
Indirect Costs (<i>will vary by proposer</i>)	\$0	\$17,900	\$14,400	\$19,200	\$17,900	\$69,400.0	\$ 15,112
SUBTOTAL	\$6,000.0	\$77,400.0	\$62,500.0	\$83,100.0	\$77,400.0	\$306,400.0	\$71,487.0
General Administration (9% of	\$540.0	\$6,966.0	\$5,625.0	\$7,479.0	\$6,966.0	\$27,576.0	
PROJECT TOTAL	\$6,540.0	\$84,366.0	\$68,125.0	\$90,579.0	\$84,366.0	\$333,976.0	
Other Resources (Cost Share Funds)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	

COMMENTS:
 This summary page provides an five-year overview of proposed funding and actual cumulative spending. The column titled 'Actual Cumulative' should be updated each fiscal year to provide information on the total amount actually spent for all completed years of the project. On the Project Annual Report Form, if any line item exceeds a 10% deviation from the originally-proposed amount; provide detail regarding the reason for the deviation.

Spending in the Personnel category is behind due to the intended tech leaving his position and it wasn't necessary to replace the position. This funding will be used to contract with Kevin Boswell at Florida International University to provide technical services with Michele's departure. All other categories have not been billed yet. Indirect is \$18.0K underspent because of the other categories currently not billed.



*We appreciate your prompt submission
 and thank you for your participation.*

