

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

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

14120111-B

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

PWS Herring Program – Tracking Seasonal Movements of Adult Pacific Herring

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

Mary Anne Bishop

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

1 February 2014 – 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/>

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

Much of the effort in the past year was in analyzing the data from fish tagged in 2012 and 2013. A summary of that analysis follows with the complete materials in a final report that will be submitted soon.

Post-spawning movements by acoustic-tagged Pacific herring were studied at Port Gravina Prince William Sound during spring 2012 and 2013, and at the entrances from the Gulf of Alaska into Prince William Sound from April 2013 through early January 2014. Our study is a component of the integrated, multi-project *PWS Herring Research and Management* program. This project was designed to inform the Herring Program's objective to: *Develop new approaches to monitoring herring*. Objectives specific to the *Seasonal Movements of Adult Herring* study include:

- (1) Field test the application of recent advances in acoustic telemetry on wild adult herring.
- (2) Elucidate herring movement patterns between spawning and overwinter sites.
- (3) Utilize the Ocean Tracking Network acoustic arrays to monitor herring migration into and out of PWS.

We acoustic-tagged prespawning Pacific herring in Port Gravina during April 2012 and 2013. Post release, 23 of 25 (92%) tagged individuals in 2012 were detected by an acoustic receiver at the Port Gravina release site on one or more days with final detections coinciding with cessation of spawning in the immediate area. The 2013 deployment of the Ocean Tracking Network (OTN) arrays located at the entrances to the Gulf of Alaska from Prince William Sound allowed us to document post-spawn herring movements outside of the immediate release site. In April 2013 we acoustic-tagged 69 herring in spawning areas around Port Gravina. Tags had an expected life of 263 d. Post-release we detected all but 5 of the 69 tagged herring either at Port Gravina and/or the OTN arrays. Based on detections at the OTN arrays, some herring appeared to quickly move out into the Gulf of Alaska, while many remained in and around the entrances, most likely to feed on the *Neocalanus* bloom through June.

Following the decline of the *Neocalanus* bloom, herring departed from Hinchinbrook Entrance and Montague Strait, with fish at Montague often shifting west and into to the Southwest Passages. Herring schools appeared to be actively moving throughout fall in and around Montague Strait and the Southwest Passages, although no equivalent movements were detected at Hinchinbrook Entrance. Arrays detected herring around Montague Strait and the Southwest Passages right up to when tags expired in early January 2014, indicating that not all herring winter in northeast PWS and that some herring may be moving back and forth into the Gulf even during winter months.

The results of this pilot study demonstrate the exceptional opportunity to document migration patterns by PWS herring, and specifically the connectivity between the Gulf of Alaska and Prince William Sound. The Ocean Tracking Network is expected to last at least through early 2019. As currently configured, however, the Ocean Tracking Network arrays do not permit determination of movement direction by tagged fish. With a relatively small investment, this could be remedied. We found that most detections occurred at the outermost receivers, therefore placement of receivers just above and below the outermost receivers would allow for determination of the movement direction for a large proportion of the detections. In addition, by using acoustic tag programmed at low power only, battery life on acoustic tags would be increased to of ~400 d days. This would allow us to monitor acoustic-tagged herring from one spawning season to the next.

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

- a) This project in the analysis phase and results are being shared with other projects. The information is of particular interest to the predator studies and forage fish projects in Gulf Watch Alaska. We are working with the environmental drivers investigators in GWA to help find an explanation for the observed behavior of the adult herring.
- b) No coordination exists with other EVOSTC funded projects
- c) There is no coordination with EVOS Trustee agencies other than sharing of findings.

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

- a) Publications – Two manuscripts are in preparation
- b) Presentations – Cordova Community Lecture series
- c) Data products – there are no specific data products outside of reports and presentations.
- d) Information archive. All tagging data and associated metadata are on the Ocean Workspace.

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

No project specific comments were provided.

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

<b>Budget Category:</b>	Proposed FY 12	Proposed FY 13	Proposed FY 14	Proposed FY 15	Proposed FY 16	TOTAL PROPOSED	ACTUAL CUMULATIVE
Personnel	\$7,300.0	\$8,900.0	\$11,300.0	\$0.0	\$0.0	\$27,500.0	\$ 11,002
Travel	\$5,100.0	\$2,700.0	\$0.0	\$0.0	\$0.0	\$7,800.0	\$ 2,028
Contractual	\$400.0	\$300.0	\$1,000.0	\$0.0	\$0.0	\$1,700.0	\$ 19,249
Commodities	\$37,100.0	\$500.0	\$0.0	\$0.0	\$0.0	\$37,600.0	\$ 32,813
Equipment	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	
Indirect Costs ( <i>will vary by proposer</i> )	\$15,000	\$3,700	\$3,700			\$22,400.0	\$ 19,490
<b>SUBTOTAL</b>	<b>\$64,900.0</b>	<b>\$16,100.0</b>	<b>\$16,000.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$97,000.0</b>	<b>\$84,582.0</b>
General Administration (9% of	\$5,841.0	\$1,449.0	\$1,440.0	\$0.0	\$0.0	\$8,730.0	
<b>PROJECT TOTAL</b>	<b>\$70,741.0</b>	<b>\$17,549.0</b>	<b>\$17,440.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$105,730.0</b>	
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.

Some personnel funding remains unspent for preparation of the final report and submission of manuscripts. The excess spending on contractual came from the need for additional tagging cruises.



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