

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

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

14120111-F

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).

We conducted the annual fall survey of 8 bays; four of which were the Sound Ecosystem Assessment (SEA) bays: Simpson, Eaglek, Whale, and Zaikof (Cooney et al. 2001) and the other four were Gravina, Figalga, Lower Herring and Windy. The survey was conducted from November 15-24, 2014 aboard the R/V Montague. PWSSC staff aboard were: Michele Buckhorn (acoustics), Kirsti Jurica, Megan Roberts (fish capture), and Anne Schaefer (bird surveys).

Surveys were conducted using 120 kHz split-beam hydroacoustic unit in a stratified systematic survey design (Adams et al. 2006). Bays were stratified as MOUTH, MIDDLE, and HEAD. Hydroacoustic transects were conducted at night with the vessel running completely dark. Direct capture after the transects were conducted using a midwater trawl with Star-Oddi CTDs attached to the head rope and the foot rope. For safety purposes, the concurrent acoustic and trawls are conducted with the lights on. Midwater trawl samples were used to ground truth the acoustics as well as supply samples to energetics and disease studies. Samples for the energetics were weighed, measured, counted, and divided amongst the NOAA and PWSSC energetics projects. These specimens are frozen aboard the vessel. Disease samples are required to be alive in order to collect a blood smear and the heart. The remaining carcass is then placed in a whirlpak bag. The requested amount was a total of 180 age-0 samples; 60 from three separate bays. Due to the time constraint maintaining the fish alive, no weights were collected for these samples. A gillnet was deployed over the side of the vessel while at anchor each night as well as castnetting for samples. These specimens were collected in order to compare the methods of herring capture used in prior survey years before the midwater trawl was acquired.

When possible, daytime transects with the hydroacoustics were conducted in each bay for bird surveys.

During the first two nights of the survey, the acoustics vessel was shadowed by a second vessel to conduct surveys using a Didson in locations that were trawled that same night. This occurred in Simpson and Gravina bays.

PRELIMINARY RESULTS

Overall, the survey was successful. Hydroacoustic transects were conducted in all bays targeted and enough samples were collected with the midwater trawl to provide each project with the requested number of samples. Gillnetting was more successful than castnetting for collecting samples in each bay. Even with the lights on and staying up all night to castnet, few fish would come to the surface; they were usually 2-3 feet below the surface and dispersed quickly when the net hit the water. Gillnets and castnets methods were deployed in every bay except Zaikof Bay. This was due to weather and the decision was made to transit to Windy Bay while we had the window to safely cross Hinchinbrook Entrance rather than anchor up for the night. Data for the hydroacoustics and fish capture are detailed in the Survey Event Log and Fish Capture Datasheets.

The first night in Simpson, only 30 fish were able to be maintained alive for the disease processing. Since Simpson is a bay located near our final survey bay, Windy, a second attempt was made to capture fish at the end of the survey to complete a set of 60 for that bay. This was accomplished with a single trawl at the head of the bay (no acoustics) before moving onto the night transects in Windy.

Below are some sample echograms from the survey. In each echogram, the colored bar on the left is the key to the decibel (dB) level displayed in the echogram. The right axis is the depth in meters below the transducer. The numbers across the top are the ping numbers. Data is collected at three pings/second so each echogram window represents just under four minutes. Although they don't represent the entire transect or trawl, the patterns within the echogram are consistent through the entire section of the survey being demonstrated. Within each echogram, if the seafloor is within the 150m range of the transducer then it is delineated by a line in the 0-25 dB range (red through light green).

From the echograms (Figures 1-8), for the most part, the scatter patterns are very spread out in the upper layers of the water column and then larger, denser targets closer to the seafloor. The one exception was in the east arm of Whale Bay (Figures 9 and 10) where there were denser aggregations closer to the surface close to the mouth of the bay. We stopped the transects and turned around to trawl on those aggregations in order to verify if they were age-0 herring. All of the trawls captured sphyphozoans, but the echograms are displayed at -70 db which is the level that typically filters them out but includes smaller fish.

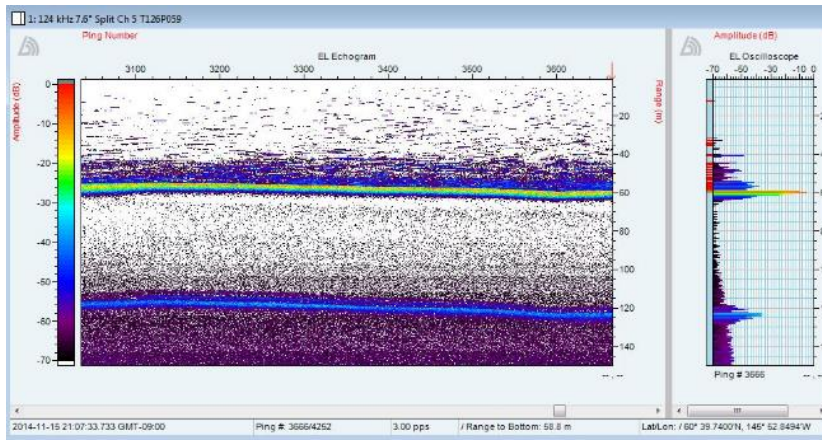


Figure 1. Simpson Bay during trawl 1 (event 3). This trawl captured 312 herring and 8 walleye pollock.

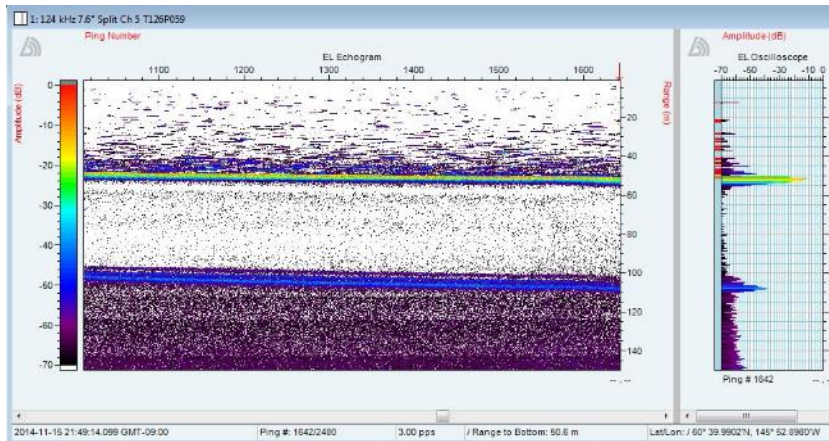


Figure 2. Simpson Bay during trawl 3 (event 7). This trawl capture 280 herring and 1 walleye pollock.

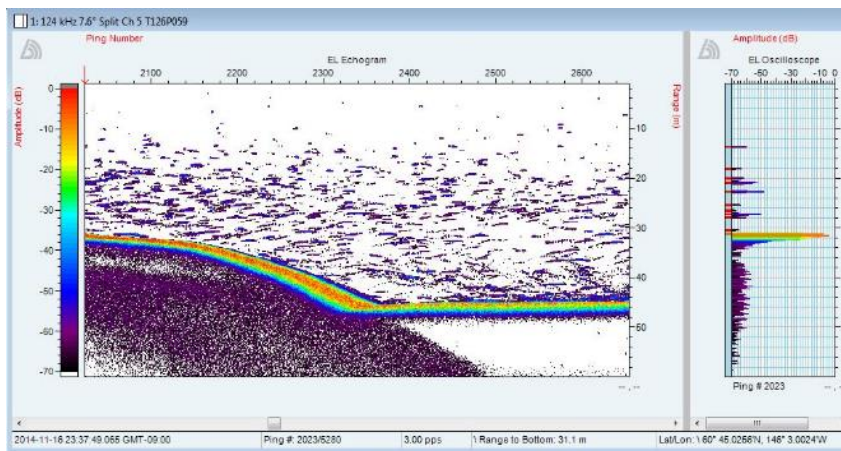


Figure 3. Gravina Bay during trawl 3. This trawl captured 148 herring and 7 capelin.

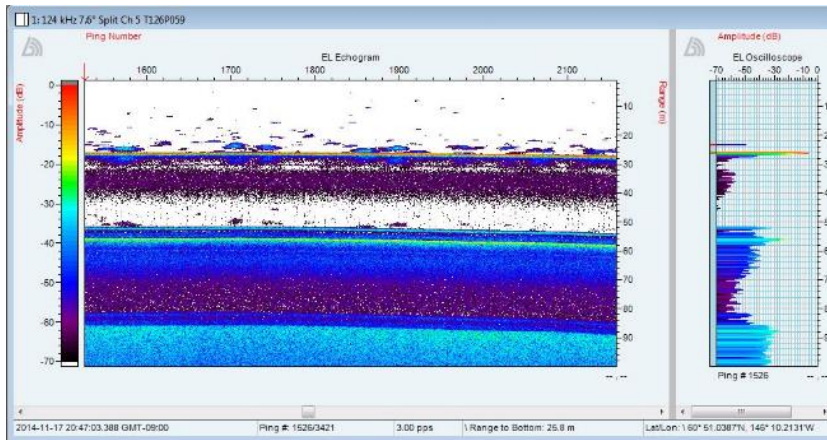


Figure 4. Fidalgo Bay during trawl 1 (event 22). This trawl captured 8 herring and 3 capelin.

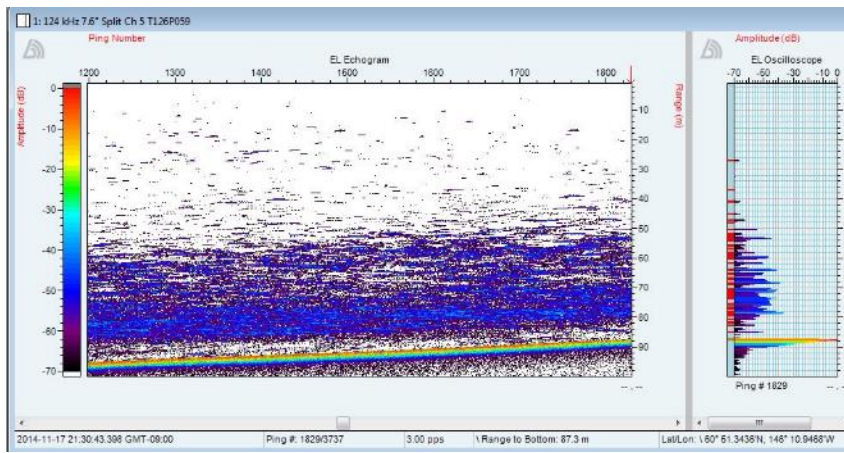


Figure 5. Fidalgo Bay during trawl 3 (event 26). This trawl captured 29 herring and 6 walleye pollock.

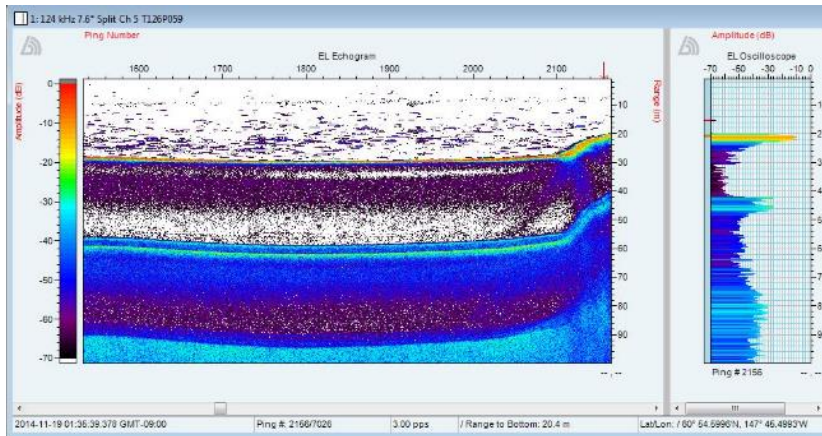


Figure 6. Eaglek bay during trawl 1 (event 33). This trawl captured 20 herring and 12 walleye pollock.

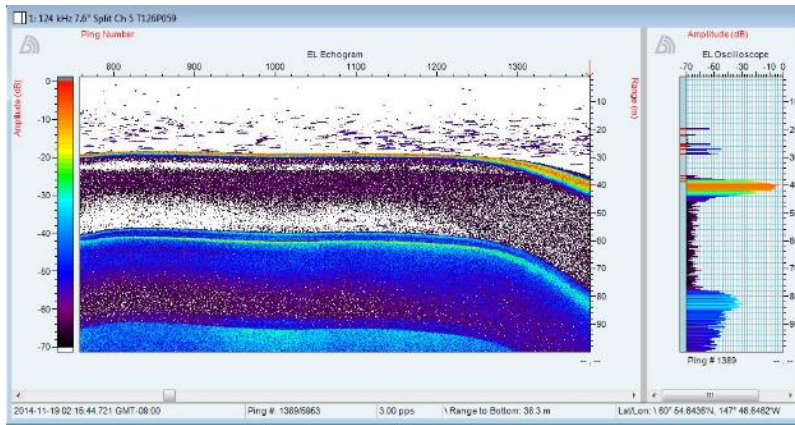


Figure 7. Eaglek bay during trawl 3 (event 37). This trawl captured 63 herring, 14 walleye pollock, and 9 capelin.

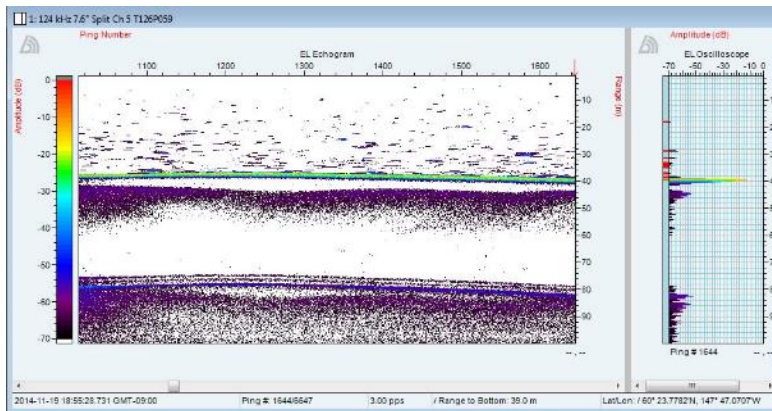


Figure 8. Lower Herring bay during trawl 1 (event 42). This trawl captured 4 herring and 1 walleye pollock.

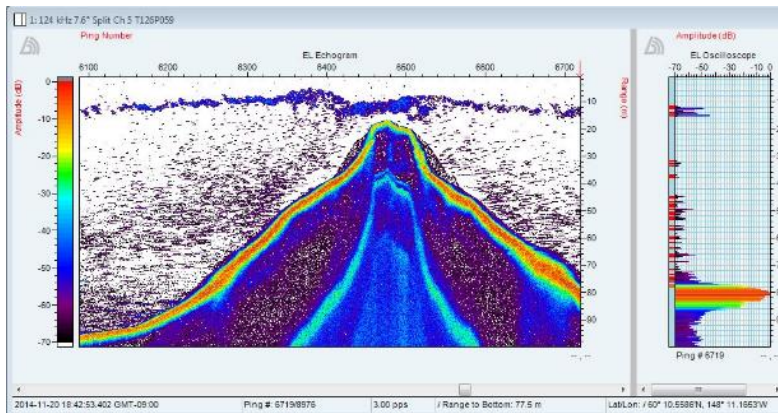


Figure 9. First transect at the mouth of the east arm of Whale Bay. This is the first time we had encountered this type of scatter on this survey that seemed indicative of age-0 herring. We turned around on this transect to trawl.

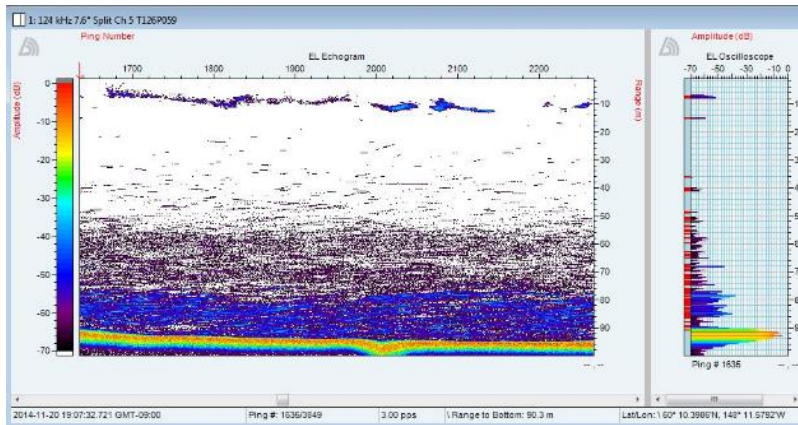


Figure 10. The first trawl in the east arm of Whale Bay. The scatter was not as dense as during the first transect but the trawl captured 744 herring and 2 capelin.

Table 1. Status of project deliverables for this reporting period

Deliverable/Milestone	Status
Post-process acoustic data from 2013	Completed May 2014
Collate trawl data with acoustic data from 2013	Completed June 2014
Analysis and biomass estimates	Ongoing
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

(C) (8).

- a) This project works closely with the validation project that collects samples for acoustic validation. Coordination occurred with the non-lethal sampling project to test that approach.
- b) No collaboration with other Trustee Council funded projects
- c) No collaboration occurred with Trustee agencies.

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. 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).

The figures included in this report represent the current level of data processing. With Dr. Buckhorn's departure we are examining the status of data and working with Dr. Boswell to provide technical support in catching up on processing.

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	\$16,200.0	\$49,900.0	\$40,900.0	\$55,300.0	\$55,900.0	\$218,200.0	\$ 49,736
Travel	\$0.0	\$2,600.0	\$2,600.0	\$2,600.0	\$2,600.0	\$10,400.0	\$ 3,977
Contractual	\$500.0	\$4,000.0	\$1,600.0	\$2,000.0	\$0.0	\$8,100.0	\$ 4,632
Commodities	\$1,500.0	\$0.0	\$1,500.0	\$0.0	\$0.0	\$3,000.0	\$ 2,295
Equipment	\$59,000.0	\$0.0	\$0.0	\$0.0	\$0.0	\$59,000.0	\$ 57,261
Indirect Costs (<i>will vary by proposer</i>)	\$5,500	\$17,000	\$14,000	\$18,000	\$17,600	\$72,100.0	\$ 18,181
SUBTOTAL	\$82,700.0	\$73,500.0	\$60,600.0	\$77,900.0	\$76,100.0	\$370,800.0	\$136,082.0
General Administration (9% of	\$7,443.0	\$6,615.0	\$5,454.0	\$7,011.0	\$6,849.0	\$33,372.0	
PROJECT TOTAL	\$90,143.0	\$80,115.0	\$66,054.0	\$84,911.0	\$82,949.0	\$404,172.0	
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. Travel has a balance due to lag in billing. Indirect is \$18.8K underspent because of the other categories currently not billed.



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