

EVOSTC Annual Project Report

Project Number: 10100132-D

Project Title: PWS Herring Survey: Value of Growth and Energy Storage as Predictors of Winter Performance in YOY Herring from PWS

PI Names: Ron Heintz, J. Vollenweider

Time Period Covered: September 1, 2010 – September 1, 2011

Date of Report: August 8, 2011

Report Prepared By: R. Heintz, J. Vollenweider, F. Sewall

Project Website: N/A

Work Performed:

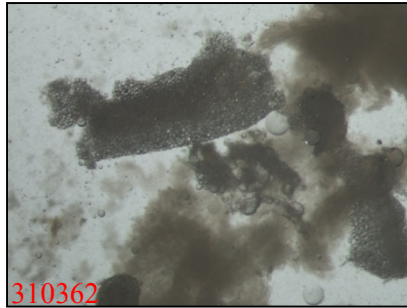
1. A total of 890 herring were received from the Prince William Sound Science Center herring survey cruises in fall 2010 and spring 2011.

Table1. Numbers of samples received by location and season.

Location	Fall 2010	Spring 2011
Eaglek Bay	19	71
Lower Herring Bay	36	68
Simpson Bay	48	100
Whale Bay	81	--
Zaikof Bay	76	--
Cedar Bay	39	--
Jackson Hole	32	--
Main Bay	--	97
Paddy Bay	--	50
Port Fidalgo	44	129
TOTAL	375	515

2. Morphometrics including fork length and wet mass of all herring received were measured and recorded in the Nutritional Ecology Lab database.

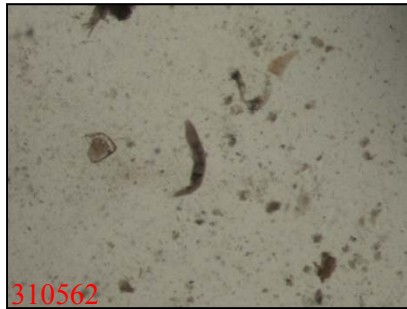
3. Subsamples of 20 – 30 herring from each collection (location X season) were scrutinized more thoroughly. For these samples, stomach contents were removed, weighed, predominant taxa identified where possible, and digital photographs were taken of representative examples from each collection. Preliminary results indicate that recent foraging activity and the main prey species consumed varied widely by location and time period.



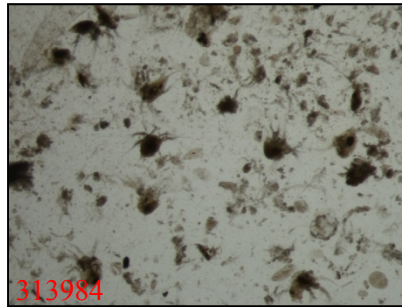
Whale Bay, fall 2010, eggs



Zaikof, fall 2010, copepod



Port Fidalgo, fall 2010, empty, with trematode parasite



Port Fidalgo, spring 2010, nauplii

Figure 1. Photos of YOY herring stomach contents.

Table 2. Percentages of herring with empty stomachs versus those with identifiable prey items (evidence of recent foraging). Location	Fall 2010		Spring 2011	
	Empty	Foraging	Empty	Foraging
Eaglek Bay	21%	79%	40%	60%
Lower Herring Bay	44%	56%	40%	60%
Simpson Bay	83%	17%	45%	55%
Whale Bay	50%	50%	--	--
Zaikof Bay	25%	75%	--	--
Port Fidalgo	90%	10%	25%	75%
Mean ± 1SD	52% ± 29%	48% ± 29%	38% ± 9%	63% ± 9%

4. Muscle plugs were also dissected from the subsamples RNA/DNA analysis. Preliminary analysis suggests that growing conditions in fall varied among bays, and were not necessarily correlated with evidence of recent foraging activity, with Simpson and Zaikof bays showing particularly high RNA/DNA ratios in fall 2010, while Eaglek and Whale bays were lower. No

samples from Whale and Zaikof bays were available from spring 2011 for analysis, though RNA/DNA ratios from the remaining bays in spring were consistently relatively low.

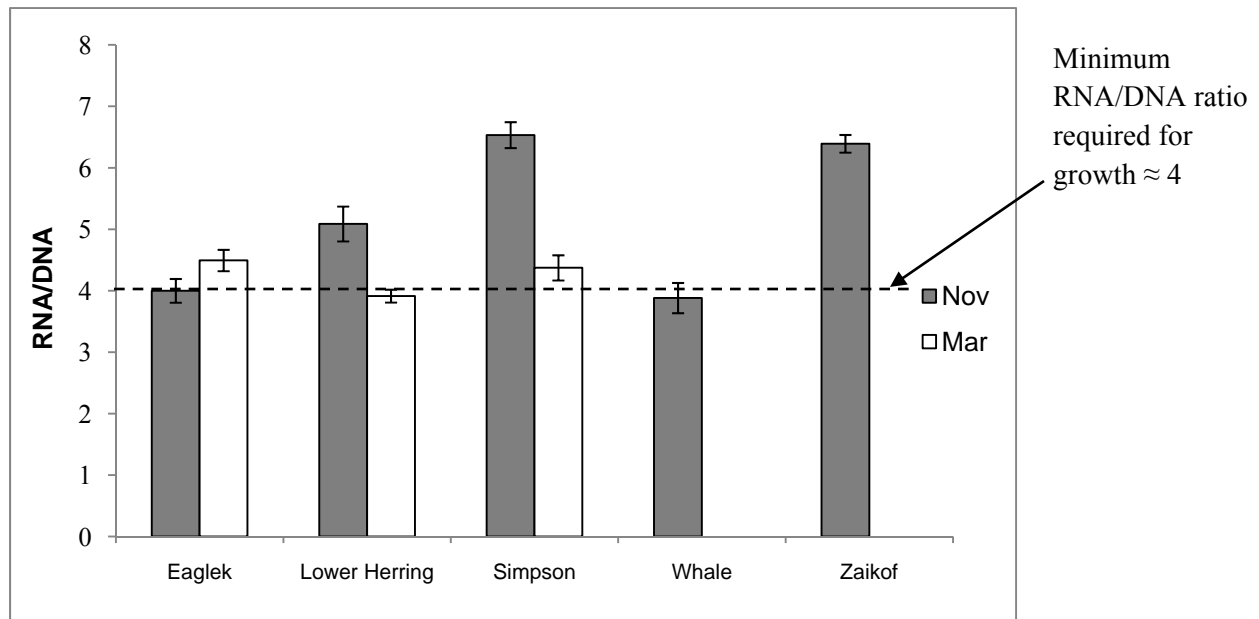


Figure 2. RNA/DNA ratios for YOY herring collected from different bays in Prince William Sound in November 2010 and March 2011. Dashed line shows the minimum value needed for growth, as derived from prior lab experiments.

5. Determination of proximate composition (percent moisture, protein, lipid, and ash) of the subsamples is ongoing, and is expected to be completed in October 2011. Data on proximate composition from winter 1 showed YOY herring lost varying amounts of fat overwinter among bays in Prince William Sound.

Future Work:

Work to be performed in the upcoming year is anticipated to adhere to the original proposal. Proximate composition analysis of winter 2 herring (collected November 2010, March 2011) will continue and is expected to be completed in October 2011. Fall samples for winter 3 are expected from the Prince William Sound Science Center in November 2011. Once these are received, we will commence morphometric measurements, analysis of RNA/DNA ratios, stomach contents analysis, and determination of proximate composition. Spring samples for winter 3 are expected in March of 2012.

Coordination/Collaboration:

Herring collections for this project rely on the sampling conducted and organized by the Prince William Sound Science Center (PWSSC). Fall 2010 samples were obtained from chartered cruises conducted by the PWSSC and spring 2011 samples were obtained from a coordinated sampling effort directed by PWSSC. Samples analyzed here for growth and energy storage

indices are subsamples from greater catches that have been apportioned for other analyses, including energy content by T. Kline, and disease prevalence by P. Hershberger. Our samples are derived under the 3-year Prince William Sound Herring Survey, which is a collaborative effort integrating a host of additional parameters, including herring abundance estimates (D. Thorne), oceanographic parameters (S. Gay), zooplankton abundance (R. Campbell), and predator abundance (M. Bishop).

Community Involvement/TEK & Resource Management Applications:

In the summer/fall of 2010, two student interns (Whitman University and Pacific University) and a contractor analyzed a subsample of YOY herring from year 1 to understand how herring heart size, lipid content and lipid class can be used as a tool to assess starvation. The student interns presented their work in school the following year and received college credits. The contractor made a scientific poster which was presented at the AK Marine Science Symposium and is currently displayed at the Auke Bay Laboratories.

Information Transfer:

Alaska Marine Science Symposium, Anchorage, AK, January 2011: PI's Heintz and Vollenweider attended, posters of winter 1 data were presented by PhD student Fletcher Sewall and contractor Rosa Spaeth PWS Herring Survey PI meeting, Cordova, AK, May 2011: PI's Heintz and Vollenweider and PhD student Fletcher Sewall attended; winter 1 data was presented by Vollenweider and Sewall.

Budget:

Budget expenditures are proceeding as per projections; no problems are anticipated.