

NOAA 2012 Protected Species Studies of Eulachon Smelt in Oregon and Washington

PROGRESS REPORT

Funded by: National Oceanic and Atmospheric Administration (NOAA)

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Reporting Period: July 1, 2012 to December 31, 2012

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Project accomplishments by objective are:

A). Stock Assessment Objective

1. *Complete larval sampling at mainstem Columbia River stations January 1–May 31.*

Season One: January 1–May 31, 2011

(See previous progress report for time period January 1 through June 30, 2011.)

Season Two: January 1–May 31, 2012

(See previous progress report for time period January 1 through June 30, 2012.)

Season Three: January 1–May 31, 2013

Due to indications of early spawning during the previous season, we began sampling the Columbia River transect index sites the last week of November, on November 28, 2012. Sampling is ongoing.

2. *Complete calculations of river discharge by July 31*

Season One: January 1–May 31, 2011

(See previous progress report for time period July 1, 2011 through December 31, 2011.)

Season Two: January 1–May 31, 2012

Weekly estimates of Columbia River discharge have been calculated for the 2012 season using values from USGS gauge station 14246900 (See Figure 1 for gauge location).

Season Three: January 1–May 31, 2013

(Task is not scheduled for completion during this reporting period.)



Figure 1: Map of lower Columbia River with index sites indicated by orange circles, and USGS gauge station indicated by blue triangle.

3. *Complete laboratory work (larval densities in samples) by June 30*

Season One: January 1–May 31, 2011

(See previous progress report for time period July 1, 2011 through December 31, 2011.)

Season Two: January 1–May 31, 2012

(See previous progress report for time period January 1 through June 30, 2012.)

Season Three January 1–May 31, 2013

(Task is not scheduled for completion during this reporting period.)

4. *Complete sampling of adult smelt December 1 - March 31*

Season One: December 1, 2010–March 31, 2011

(See previous progress report for time period July 1, 2011 through December 31, 2011.)

Season Two: December 1, 2011–March 31, 2012

(See previous progress report for time period January 1 through June 30, 2012.)

Season Three: December 1, 2012–March 31, 2013

The NOAA Pt. Adams Field Station began trial tows in December 2012; full sampling effort will begin in January 2013.

5. *Complete fecundity, sex, and age determinations on adult samples by July 31*

Season One: December 1, 2010–March 31, 2011

(See previous progress report for time period July 1 through December 31, 2011.)

Season Two: December 1, 2011–March 31, 2012

(See previous progress report for time period January 1 through June 30, 2012.)

Season Three: December 1, 2012–March 31, 2013

(Task is not scheduled for completion during this reporting period.)

6. *Compile environmental correlates by August 15*

Season One: December 1, 2010–May 31, 2011

(See previous progress report for time period July 1, 2011 through December 31, 2011.)

Season Two: December 1, 2011–May 31, 2012

Measures of the Pacific Decadal Oscillation (PDO; Figure 2) and Southern Oscillation Index (SOI; Figure 3) were compiled as indices of general climate patterns that have been identified as potentially impacting forage fish abundance.

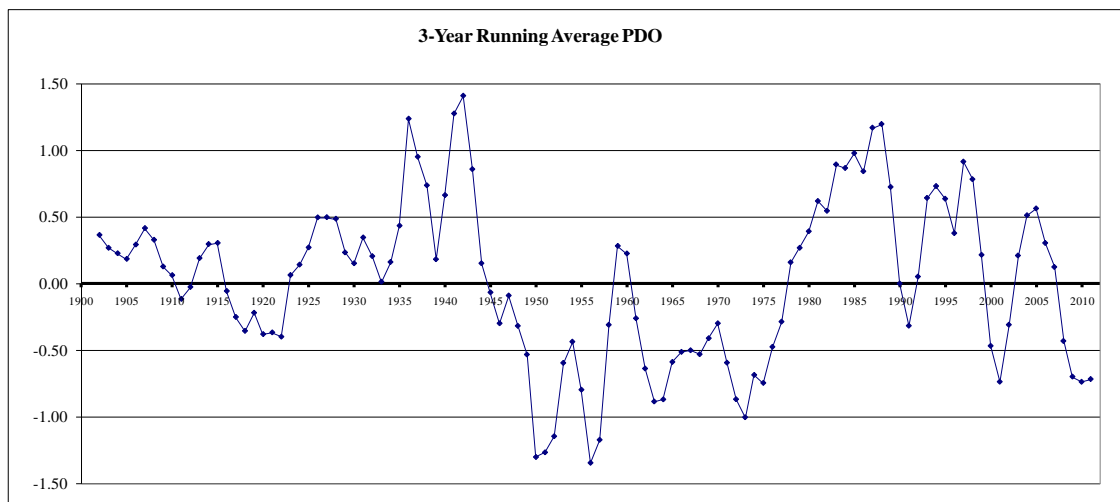


Figure 2: Three-year running average of the Pacific Decadal Oscillation (PDO) index of ocean conditions.

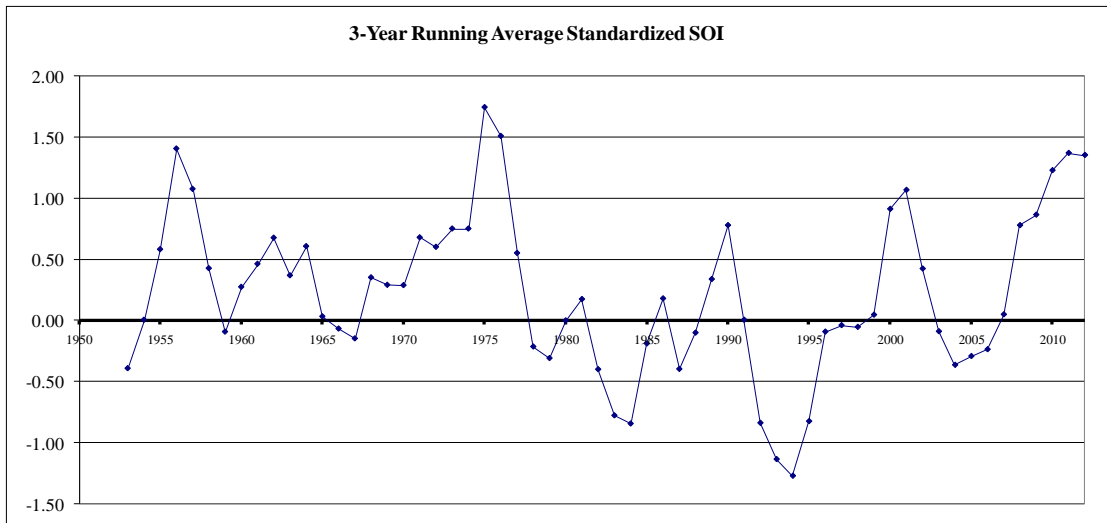


Figure 3: Three-year running average of the Southern Oscillation Index (SOI) of ocean conditions.

7. *Complete calculation of Spawning Stock Biomass calculations by August 31*

Season One: January 1–May 31, 2011

Preliminary spawning stock biomass (SSB) was estimated based on an estimate of cumulative egg and larvae outflow for the season (Table 1).

Season Two: January 1–May 31, 2012

Preliminary spawning stock biomass (SSB) was estimated based on an estimate of cumulative egg and larvae outflow for the season (Table 2).

Season Three: January 1–May 31, 2013

(Task is not scheduled for completion during this reporting period.)

Table 1: Preliminary 2011 spawner estimates. Estimates were made with the following assumptions: sex ratio = 1:1; fecundity = 29,452 eggs/ female; 8.2 eulachon per pound; eggs and larvae are equivalent, 100% survival.

Cumulative Values for:	Plankton Outflow	Number of Spawners	SSB (Pounds)
Max	1.1E+12	7.6E+07	9.3E+06
Upper CI (95%)	9.1E+11	6.2E+07	7.5E+06
Mean	6.0E+11	4.1E+07	5.0E+06
Median	5.9E+11	4.0E+07	4.9E+06
Lower CI (95%)	3.7E+11	2.5E+07	3.1E+06
min	3.0E+11	2.0E+07	2.5E+06

Table 2: Preliminary 2012 spawner estimates. Estimates were made with the following assumptions: sex ratio = 1:1; fecundity = 29,452 eggs/ female; 8.2 eulachon per pound; eggs and larvae are equivalent, 100% survival.

Cumulative Values for:	Plankton Outflow	Number of Spawners	SSB (Pounds)
Max	1.0E+12	6.9E+07	8.4E+06
Upper CI (95%)	8.2E+11	5.6E+07	6.8E+06
Mean	5.8E+11	3.9E+07	4.8E+06
Median	5.7E+11	3.9E+07	4.8E+06
Lower CI (95%)	3.9E+11	2.7E+07	3.3E+06
min	3.3E+11	2.3E+07	2.8E+06

8. *Complete retrospective analysis and report on performance of indicators relative to SSB by September 30, 2012*

High larval production has not always corresponded to large adult returns, and poor ocean conditions during any part of the marine life-stage may negate favorable spawning and outmigration conditions (implied by high larval densities). For example, 2004-2008 adult returns were poor, despite good 2000-2003 larval production. Larval density values at the mainstem Columbia River index sites in 2011 were the highest since 2003. The 2012 larval density values were nearly equal to those in 2011. In general, the average larval density (at the mainstem index site) has corresponded with the historical commercial catch per landing (Figure 4). Those landings are reflective of the size of the adult run.

In order to expand the larval outflow data to spawner biomass, good estimates of age structure, sex ratios, and fecundities are needed. Historical values are quite variable, and often based on tributary samples, which may not be reflective of the overall run composition. In 2012, funds were made available by the NOAA Northwest regional office to try to address the data gap. As a result, WDFW has teamed up with the NOAA Pt. Adams Field Station in an effort to collect returning adult eulachon in the lower Columbia River. To maximize the value of this effort, WDFW will continue sampling for eulachon eggs and larvae at the stock assessment index sites in the lower Columbia River during 2013.

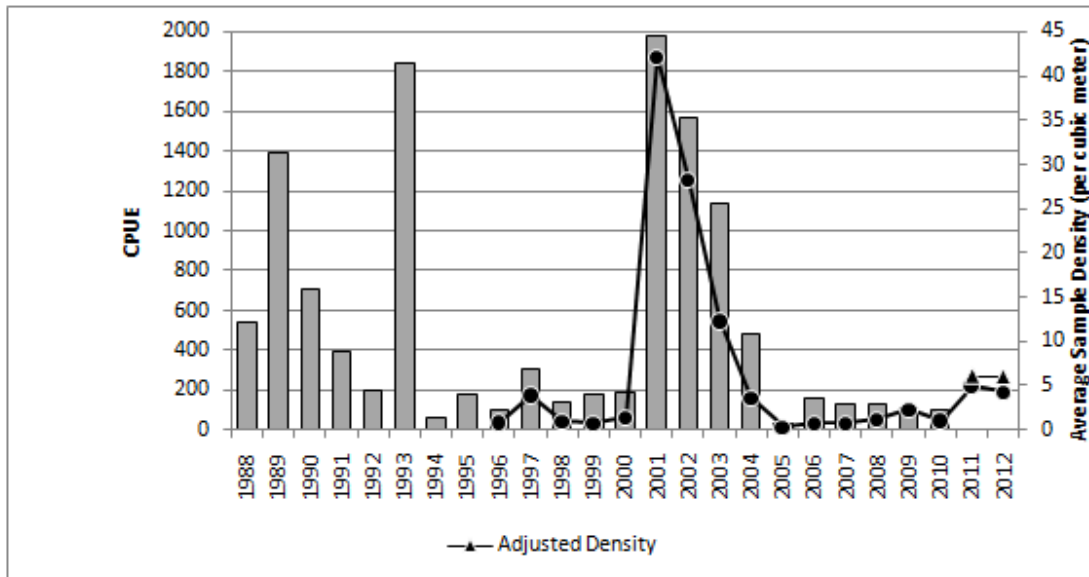


Figure 4. Comparison of CPUE of eulachon in mainstem Columbia River commercial fisheries and larval densities in mainstem Columbia index sites, 1988-2012. Adjusted density is February through April only for 2011 and 2012, which is more comparable to pre-2011 sampling periods. CPUE are not available for 2011 and 2012 due to fisheries being disallowed.

B) Freshwater Distribution Objective.

1. *Complete plankton tows and spawning substrate sampling at Columbia River and tributary stations January 1–May 31*

Season One: January 1–May 31, 2011

(See previous progress report for time period January 1 through June 30, 2011.)

Season Two: January 1–May 31, 2012

(See previous progress report for time period January 1 through June 30, 2012). Due to severe reductions in federal funding during years 2 and 3 of project implementation, this task was not scheduled to continue beyond 2012.

2. *Complete plankton tows and spawning substrate sampling from coastal streams outside the Columbia Basin January 1–June 30, 2011–2013*

Season One: January 1–May 31, 2011

(See previous progress report for time period January 1 through June 30, 2011.)

Season Two: January 1–May 31, 2012

(See previous progress report for time period January 1 through June 30, 2012). Due to severe reductions in federal funding during years 2 and 3 of project implementation, this task was not scheduled to continue beyond 2012.

3. *Complete surveys of Sandy and Cowlitz River for extent of spawning activity January 1–May 31, 2011–2013*

Season One: January 1–May 31, 2011

(See previous progress report for time period January 1 through June 30, 2011.)

Season Two: January 1–May 31, 2012

(See previous progress report for time period January 1 through June 30, 2012).

Due to severe reductions in federal funding during years 2 and 3 of project implementation, this task was not scheduled to continue beyond 2012.

C) Marine Life-stage Objective.

1. *Complete experiments on gear-related bycatch reduction*

a. *Pilot phase: August 1–October 31, 2010*

(See previous progress report for time period July 1 through December 31, 2010.)

b. *Season 1: April 1–October 31, 2011*

(See previous progress reports for time periods January 1 through June 30, 2011 and July 1 through December 31, 2011.)

c. *Season 2: April 1- October 31, 2012*

Due to severe reductions in federal funding during years 2 and 3 of project implementation, this task was not scheduled to continue beyond 2011.

2. *Complete observation of Washington ocean shrimp trawl fisheries*

a. *Pilot phase: August 1–October 31, 2010*

(See previous progress report for time period July 1 through December 31, 2010.)

b. *Season 1: April 1–October 31, 2011*

(See previous progress report for time period July 1 through December 31, 2011.)

c. *Season 2: April 1–October 31, 2012*

The second year of observations, aligning with the fishery season, was initiated April 2012 and completed October 2012. During this period, WDFW observers were deployed on Washington licensed shrimp trawlers based out of Westport and Ilwaco, Washington. The project objective was to observe no less than 20% of the trips in a season. In 2011, four observers were hired. Following further reductions in federal funds during

year 3 of project implementation, only two observers were hired for 2012. Table 3 presents a summary of observation statistics.

Table 3. Numbers of Washington ocean shrimp trawl fishery trips and fishery tows observed in 2011 and 2012.

Coverage Rates		
	2011	2012
Total Trips	206	254
Observed Trips	50	41
Rate	24.3%	16.1%
	2011	2012
Total Tows	3461	4176
Observed Tows	819	666
Rate	23.7%	15.9%

3. *Complete processing of the observation data from the Washington ocean shrimp trawl fisheries by December 31, 2010–2012*

Information collected during the project includes pink shrimp total catch weight, bycatch total weight, bycatch species composition and biological data from selected bycatch species. Biological data collection included lengths and weights from individual species of fish; in addition, tissue samples were taken from eulachon smelt for genetic analyses. Skipper logbooks were required for all fishing trips and include date, latitude–longitude, depths fished, and catch information for each tow. Observers maintained a separate logbook to document daily operations, notes on fishing gear configuration and other information to supplement collected data.

Project data has been entered into a MS Access database. Data entry and QA/QC procedures of all project data are complete. Error-checking was accomplished using two technicians: one read each record of data from the database out loud and entries were confirmed by the second technician viewing the original data forms. Skipper data (logbooks) were transferred into ArcGIS for additional error analysis. Data analysis is underway to generate expanded estimates and summaries.

4. *Complete processing of the data from the gear experiments by December 31, 2010–2012*

See C) 1.b. and 1.c above

Due to severe reductions in federal funding during years 2 and 3 of project implementation, this task was not scheduled to continue beyond 2011.

5. *Complete outreach education for the ocean shrimp trawl fishers*

a. *Project Launch: July 31, 2010*

(See previous progress report for time period January 1 through June 30, 2011.)

b. *Pilot Phase Review: February 28, 2011*

(See previous progress report for time period January 1 through June 30, 2011.)

c. *Season Review: February 29, 2012*

In addition to outreach targeted at members of the pink shrimp fishery industry, the project has initiated development of outreach materials oriented to informing a broader audience (e.g. recreational angling groups, angler-conservation associations, local marine resource councils).

Camera equipment was purchased in 2012 allowing both filming onboard and underwater while at sea. The primary purpose for collecting the underwater footage was to assist skippers in making modifications to their trawl gear or excluders to improve non-retention of fish. The video footage provided visual feedback as to which configurations or adjustments maintained shrimp catch rates as well.

A short video will be produced that provides an overview of eulachon in particular and the importance of forage fish in the marine ecosystem in general, a brief summary of the observer project, interviews with skippers, and the efforts to improve the excluding capabilities of trawl gear using footage from underwater cameras deployed in trawl nets. A poster capturing these same topics is also under development.

d. *Project Completion: December 31, 2013*

(Task is not scheduled for completion during this reporting period.)

D) Genetic Analysis Objective.

1. *Complete collection of genetic samples in conjunction with activities under objectives 1–3.*

(See previous progress report for time period January 1 through June 30, 2011.)

2. *Complete laboratory work (genetic sample processing) by June 30, 2011–2013.*

(See previous progress report for time period July 1 through December 31, 2011.)

3. *Complete all genetic analyses by September 30, 2013.*

Genetic analyses will only be pursued if sufficient funds are made available during FFY 2013. The priority will be on getting genetic analysis completed for the shrimp trawl eulachon bycatch, with other sub-objectives taking on a lower priority.

E) Reporting.

1. *Complete annual progress reports for each objective by June 30, 2011–2013*

This is the fifth of six semi-annual progress reports.

2. *Complete comprehensive report of three year study by December 31, 2013*

3. *Document and distribute datasets from the study by December 31, 2013*

4. *Complete submission of articles to peer reviewed journals by December 31, 2013*

Presentations:

Dionne, P.E., E. VanDyke, and L. Wargo. 2012. Studies of Eulachon Smelt in Oregon and Washington. Presented September 13th at the Friday Harbor Laboratories Research Symposium: Conservation and Ecology of Marine Forage Fish, Friday Harbor, WA.

Expenditures (Estimated):

ODFW, July 1 – December 31, 2012:	\$ 53
Subcontract to WDFW July 1 – December 31, 2012:	<u>\$104,444</u>
Total expenditures July 1 – December 31, 2012:	\$104,497