THE OREGON PLAN *for Salmon and Watersheds*

Assessment of Oregon Coastal Adult Winter Steelhead – Redd Surveys 2011

Report Number: OPSW-ODFW-2011-09

Assessment of Oregon Coastal Adult Winter Steelhead – Redd Surveys 2011

Oregon Plan for Salmon and Watersheds

Monitoring Report No. OPSW-ODFW-2011-09

May, 2012

Eric Brown
Jonathan Nott
Mark Lewis

Oregon Adult Salmonid Inventory and Sampling Project
Western Oregon Research and Monitoring Program
Oregon Department of Fish and Wildlife
28655 Highway 34
Corvallis, OR 97333

Citation: Brown. E. and Nott.J. and M. Lewis. 2011. Assessment of Oregon Coastal Adult Winter Steelhead – Redd Surveys 2011. Monitoring Program Report Number OPSW-ODFW-2011-09. Oregon Department of Fish and Wildlife, Salem, Oregon.

Table of Contents

List of Figures

List of Tables

SUMMARY

This report provides a summary of results from winter steelhead spawning ground surveys conducted along the Oregon coast in 2011. Sufficient surveys were conducted to meet precision estimates at the DPS level in the Oregon Coast DPS, while precision in the Klamath Mountains Province DPS failed to reach goals. Winter steelhead redd estimates for the 2011 spawning year are relatively low compared to prior years for both the Oregon Coast and Klamath Mountains DPS. Regional patterns are apparent for redd density, hatchery independence, and spawn timing.

INTRODUCTION AND METHODS

As part of the Oregon Plan for Salmon and Watersheds, the Oregon Department of Fish and Wildlife (ODFW) initiated a project to monitor spawning winter steelhead (*Oncorhynchus mykiss*) in coastal Oregon streams in 2003. This project is designed to assess the yearly status and trend, presence of hatchery fish, and distribution of winter steelhead spawners in six coastal Monitoring Areas (MA) in two Distinct Population Segments (DPS) (Figure 1). In 2008 the project was modified to assess status only at the DPS level and in 2010 monitoring ceased in the Rogue MA, both due to budget constraints.

A spatially balanced probabilistic sampling design (Stevens 2002) was used to select survey sites across a stream network of winter steelhead spawning habitat. The selection frame was developed using best professional knowledge of biologists from a variety of private and governmental organizations. Monitoring of winter steelhead abundance is based on counts of redds instead of live or dead fish, in accordance with prior work conducted by ODFW in Oregon coastal streams (Susac and Jacobs 1999). Repeat visits to each site from February through May generated a total redd count for each survey. Redds were marked with colored rocks and flagging to prevent re-counting during subsequent surveys. The survey interval of once every fourteen days is based on prior research (Susac and Jacobs 1999). Specific descriptions of project protocols can be found in the annual survey procedures manual (ODFW 2011).

RESULTS AND DISCUSSION

This report contains monitoring area level summaries for each steelhead DPS along the Oregon Coast. Counts of lamprey redds and adults are recorded during steelhead surveys but are not reported here. Additional data for individual sites is available by contacting the Oregon Adult Salmonid Inventory and Sampling (OASIS) project.

The 95% confidence interval for monitoring area estimates was within the target precision of ±30% for the Oregon Coast DPS. However, this confidence goal was exceeded in the Klamath Mountains Province DPS (KMP) (±53%) due to lack of viable surveying conditions and a small sample size as a result of budget constraints. Precision goals for the 95% confidence intervals in the five MA were not met, ranging between ±36-53%. Sites were selected at a rate of 1/29 miles of habitat. Fifty-one percent of the total number of target sites selected were

Figure 1. Steelhead monitoring study area showing the winter steelhead populations, monitoring areas and distinct population segments.

successfully surveyed (Table 1). Ten percent coast-wide were not surveyed because of landowner access restrictions, with the Mid-South Coast having the highest proportion of access denials. Twenty-five percent of sites coast-wide were not used in final estimates due to turbidity and/or gaps in data (66% in South Coast; 30% in Umpqua). The percentage of sites selected falling outside of steelhead spawning habitat (non-target) ranged from 0% (South Coast) to 15% (North Coast). Four percent of sites coast-wide were not accessible by surveyors, and another 4% of sites were dropped for other reasons.

Table 1. Site status by monitoring area. Target sites fell within steelhead spawning habitat; response sites were successfully surveyed and non-response sites were not surveyed because of issues such as lack of landowner permission, site inaccessibility, or gaps in survey effort usually from stream turbidity. Non-target sites are outside of steelhead spawning habitat.

DPS	Monitoring Area	Target Response	Target Nonresponse	Non-target
Oregon Coast	North Coast	24	16	7
	Mid Coast	37	13	9
	Mid South Coast	26	29	4
	Umpqua	19	35	8
	Total	**106**	**93**	**28**
Klamath Mountains Province	South Coast	5	13	0
	Rogue River			
	Total	**5**	**13**	**0**

Oregon Coast DPS

The 2011 estimate of wild winter steelhead redds in the Oregon Coast DPS is the second lowest on record, dating back to 2003 (Figure 2). The 50,206 wild redds estimated in the Oregon Coast DPS were relatively evenly distributed among the monitoring areas, except for the Mid Coast which had nearly twice the estimate of any other MA (Table 2). Density of redds (redds/mile of steelhead spawning habitat) was fairly equal across the Oregon Coast DPS (Figure 3). The average density of steelhead redds coast-wide was 11 redds/mile, and steelhead redds were present in 85% of all sites surveyed (Table 3).

The proportion of hatchery steelhead naturally spawning varied among the monitoring areas (Table 4). The Mid-South Coast had the highest proportion of hatchery produced fish (26%), while there were no hatchery steelhead observations in the North Coast or Umpqua (Table 4 & Figure 4).

Oregon coast steelhead spawn timing in 2011 (Figure 5) occurred early in the Mid-South Coast and Umpqua, late in the North Coast, and well-distributed over the whole season in the Mid-Coast. These run-timing observations are similar to 2010 (Brown and Lewis 2010), though both the Mid-South and Umpqua occurred even earlier in 2011. Both of these monitoring areas recorded peaks around the first of February. Spawning in the North Coast peaked in mid- May,

about one month later than normal. Stream discharge was much lower than average early in the season, with several storm events then elevating flows to higher levels for most of March and April (Figure 6). These higher flows were prevalent coast-wide and crews reported the likelihood of missed redds due to stream turbidity, with the exception of the Mid-Coast which did not experience as many turbidity issues. Since it is thought that some redds may have been missed across several MA, survey conditions may have biased estimates downward.

Klamath Mountains Province DPS

No surveys were performed in the Rogue MA in 2011, and as a result the estimate for the KMP DPS is incomplete for this year. In the South Coast MA there were an estimated 1,808 wild steelhead produced redds in 2011 (Table 2). This estimate is the lowest recorded since monitoring began in 2003. The density of redds was 5 redds/mile, with at least one redd observed in 100% of the 5 successfully surveyed sites in this MA (Table 3). Like much of the coast, the South Coast experienced high flows and poor surveying conditions through much of March and April, which may have resulted in missed redds and a negatively biased estimate.

The proportion of hatchery steelhead observed in South Coast surveys was 0%, though fin mark status was identified on only four fish (Table 4). Spawn timing in 2011 occurred a bit early compared to past years (Figure 5), though peak activity did occur two weeks later than in 2010 (Brown and Lewis 2010). There was a second peak in steelhead spawning activity in late April; though spawning activity in the second half of the season was diminished compared to previous years in the South Coast MA.

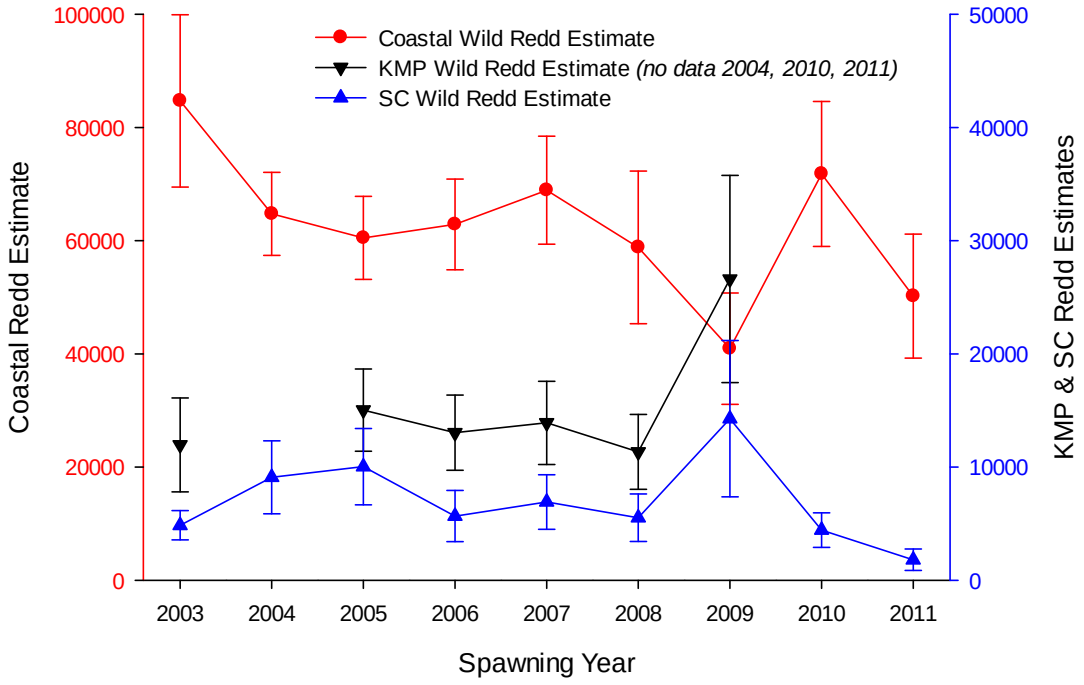

Figure 2. Winter steelhead wild redd estimates based on random surveys from 2003 to 2011. Error bars are 95% confidence intervals. *(Note: KMP & SC estimates are displayed at a different scale than coastal estimates)*

Table 2. Coastal Oregon 2011 winter steelhead redd abundance estimates. Estimates are derived from counts in random GRTS spawning surveys.

		Survey Effort		Winter Steelhead Redd Abundance			
				Total		Wild[a]	
DPS	Monitoring Area	Number of Surveys	Miles	Estimate	95% Confidence Interval	Estimate	95% Confidence Interval
Oregon Coast	North Coast	24	22.3	9,961	5,175	9,961	5,175
	Mid Coast	37	27.4	22,111	8,858	19,347	7,751
	Mid South Coast	26	24.9	12,925	5,531	9,504	4,067
	Umpqua	19	13.3	11,394	4,113	11,394	4,113
	Total	**106**	**87.9**	**56,391**	**12,359**	**50,206**	**10,969**
Klamath Mountains Province	South Coast	5	3.7	1808	950	1808	950
	Rogue River	-	-	-	-	-	-
	Total	5	3.7	1,808[b]	950	1,808[b]	950

[a] *Estimates of wild spawners derived through application of live and carcass fin-mark recoveries in random surveys.*

[b] *No surveys were conducted in the Rogue River MA for 2011. As a result the Klamath Mtn. DPS estimate is incomplete.*

Table 3. Oregon winter steelhead redd densities and percent occupancy.

DPS	Monitoring Area	Redds/Mile	% Sites With Redds
Oregon Coast	North Coast	10.2	83%
	Mid Coast	13.0	89%
	Mid South Coast	12.9	92%
	Umpqua	8.0	74%
	Total	**11.0**	**85%**
KMP	South Coast	5.3	100%

Table 4. Percentage of hatchery fish found on spawning surveys in 2011 based on adipose fin clip observations of live and dead steelhead.

DPS	Monitoring Area	Known Fish	Hatchery Percentage
Oregon Coast	North Coast	33	0%
	Mid Coast	40	13%
	Mid South Coast	68	26%
	Umpqua	17	0%
	Total	**158**	**15%**
Klamath Mountains Province	South Coast	4	0%
	Rogue River	-	-
	Total	**4**	**0%**

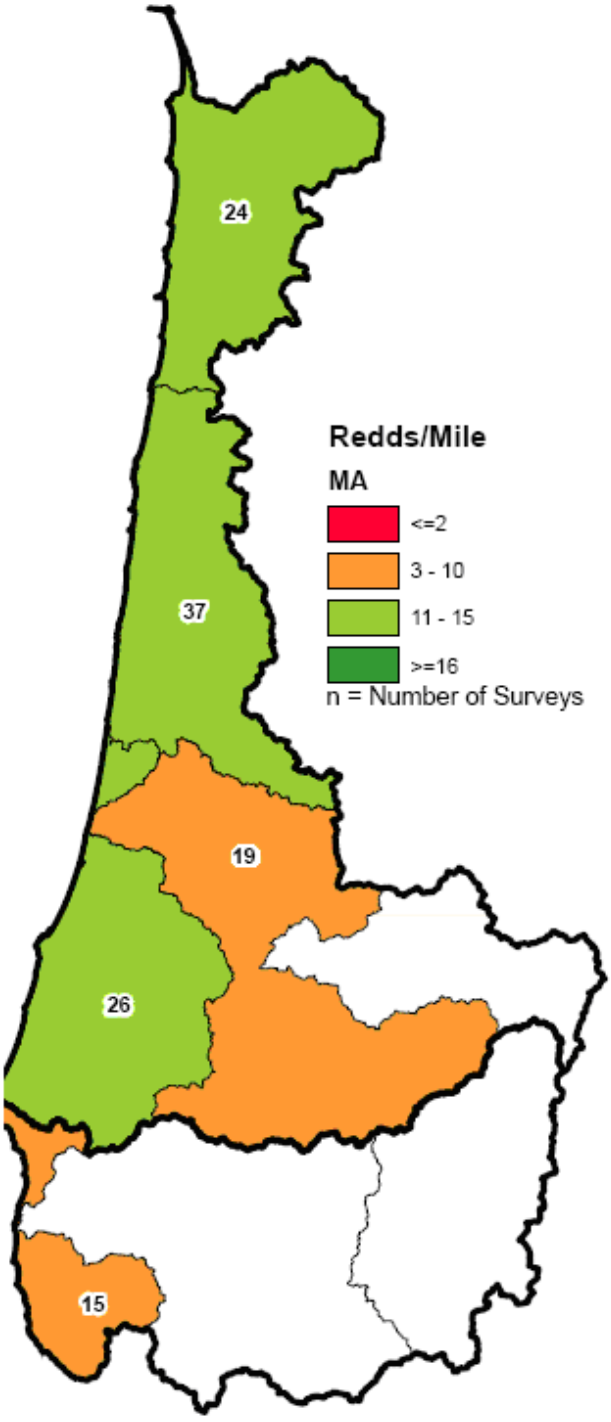

Figure 3. Total redds/mile in random surveys in 2011 by monitoring area with the number of surveys in each monitoring area.

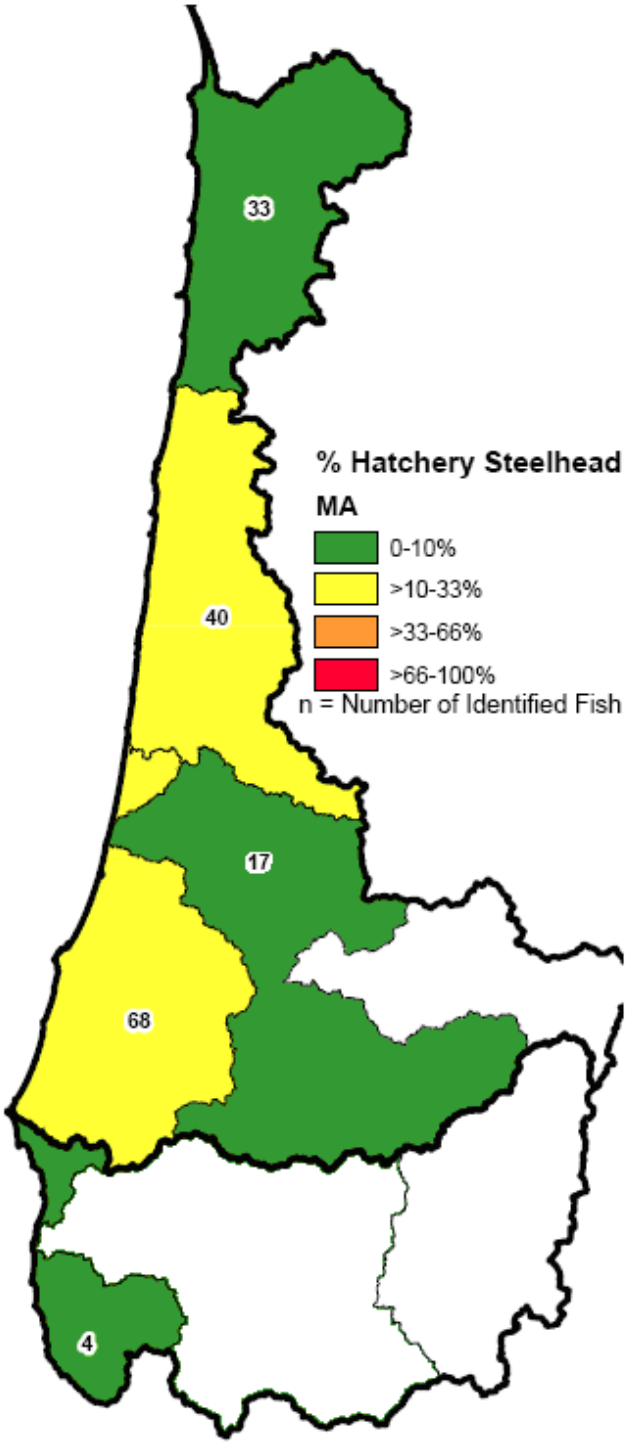

Figure 4. Percentage hatchery fish found on random surveys in 2011 based on adipose fin clip observations of live and dead steelhead. Data in each monitoring area may be based on multiple surveys.

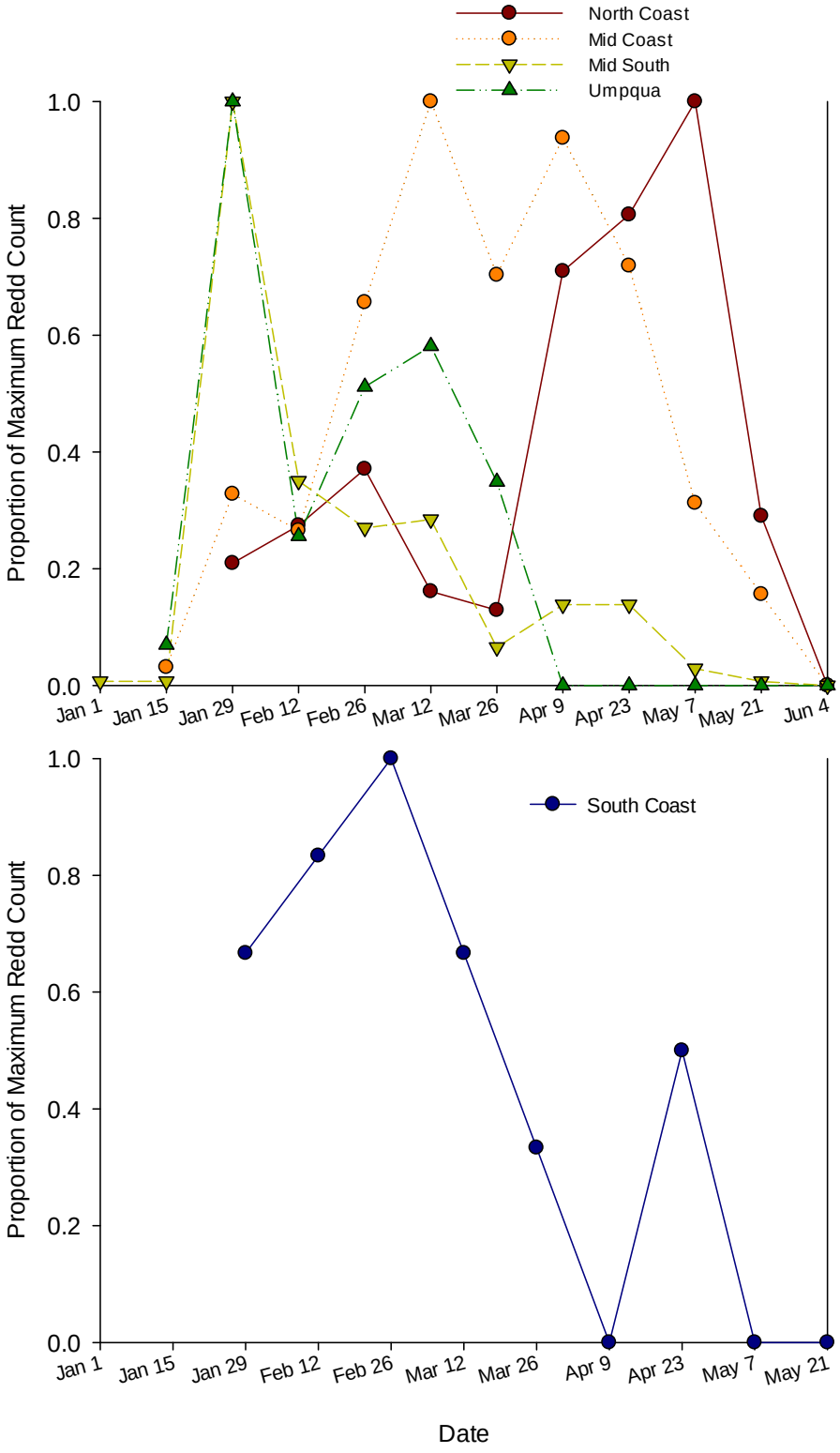

Figure 5. Proportion of the maximum winter steelhead redd count in each of the six monitoring areas by week of the year during 2011.

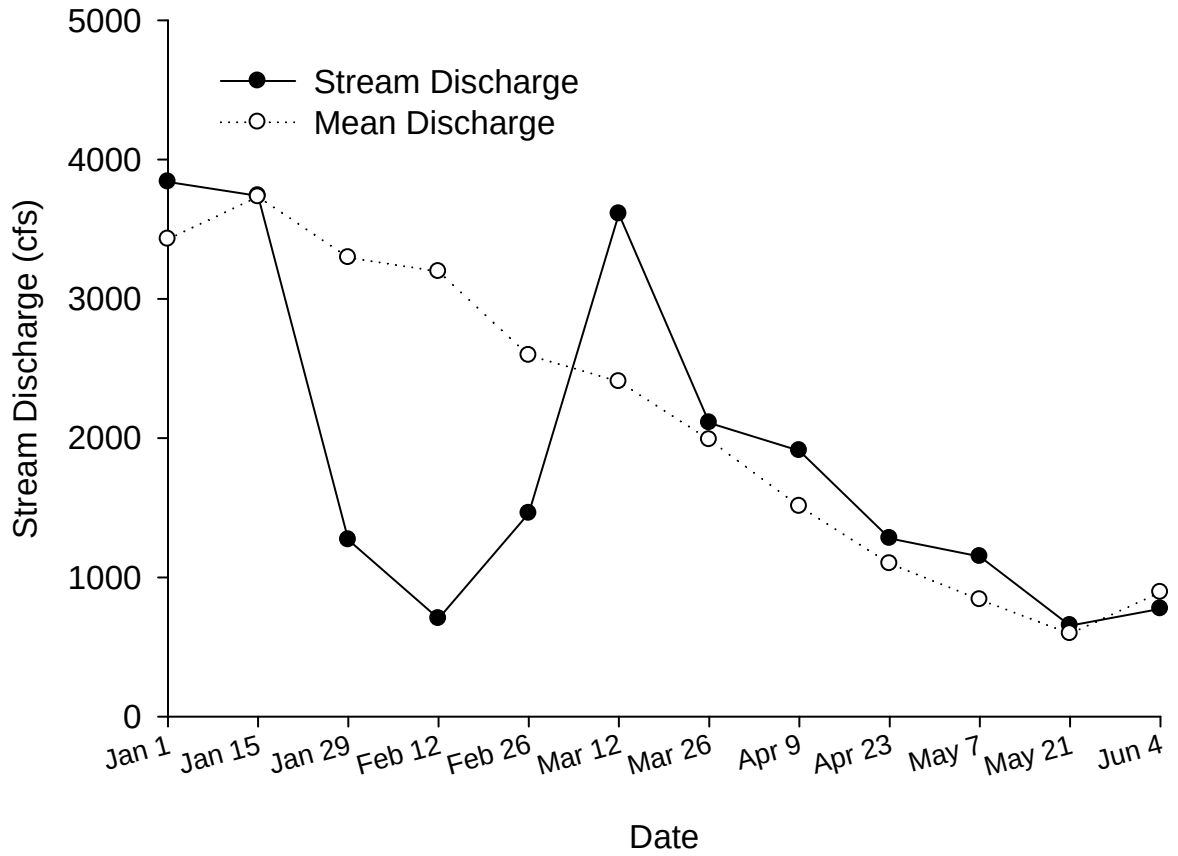

Figure 6. Stream discharge at Alsea River near Tidewater during 2011, compared to mean discharge from 1939 to 2006.

REFERENCES

Brown E. and M. Lewis. 2010. Assessment of Oregon Coastal Adult Winter Steelhead – Redd Surveys 2010. Monitoring Program Report Number OPSW-ODFW-2010-09. Oregon Department of Fish and Wildlife, Salem, Oregon.

ODFW. 2011. Coastal steelhead spawning surveys procedures manual 2011. Oregon Department of Fish and Wildlife.
Available: http://oregonstate.edu/dept/ODFW/spawn/reports.htm

Stevens, D.L. 2002. Sampling design and statistical analysis methods for integrated biological and physical monitoring of Oregon streams. OPSW-ODFW-2002-07, Oregon Department of Fish and Wildlife.

Susac, G.L. and S.E. Jacobs. 1999. Evaluation of spawning ground surveys for indexing the abundance of adult winter steelhead in Oregon coastal basins. Annual Progress Report, Oregon Department of Fish and Wildlife.

3406 Cherry Ave. NE
Salem, Oregon 97303