THE OREGON PLAN *for Salmon and Watersheds*

Assessment of Oregon Coastal Adult Winter Steelhead – Redd Surveys 2010

Report Number: OPSW-ODFW-2010-09

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SUMMARY

This report provides a summary of results from winter steelhead spawning ground surveys conducted along the Oregon coast in 2010. 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 2010 spawning year were up compared to prior years for the Oregon Coast DPS, but were down compared to prior years for the 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 2010). More information on methods and study background is available in Suring (In Prep.).

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) (±34%). Sites were selected at a rate of 1/33 miles of habitat. Sixty five percent of the total number of sites selected were successfully surveyed (Table 1). Nine percent coast-wide were not surveyed because of landowner access restrictions,

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

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 Non-response	Non-target
Oregon Coast	North Coast	32	6	7
	Mid Coast	36	14	9
	Mid South Coast	34	20	5
	Umpqua	20	29	8
	Total	**122**	**69**	**29**
Klamath Mountains Province	South Coast	14	4	0
	Rogue River	-	-	-
	Total	**14**	**4**	**0**

with the Mid-South Coast having the highest proportion of access denials. Twenty-six percent of sites in the Umpqua were not used in final estimates due to turbidity and/or gaps in data. The percentage of sites falling outside of steelhead spawning habitat ranged from 8% (Mid-South Coast) to 16% (North Coast), with the South Coast being the only exception (0%).

Oregon Coast DPS

The 2010 estimate of wild winter steelhead redds in the Oregon Coast DPS is the second highest on record, dating back to 2003 (Figure 2). The 71,806 wild redds estimated in the Oregon Coast DPS were relatively evenly distributed among the monitoring areas (Table 2). Density of redds (redds/mile of steelhead spawning habitat) was also fairly equal, except for the Umpqua MA (Figure 3). The Mid-South Coast MA had the highest wild density at 23 redds/mile, with 94% of sites having at least one redd. The North Coast, Mid Coast and Umpqua MAs had densities of 17, 16 and 10 redds/mile, with 75%, 83%, and 65% of sites having at least one redd, respectively.

The proportion of hatchery steelhead naturally spawning varied among the monitoring areas (Table 3). The Mid Coast had the highest proportion of hatchery produced fish (37%), while only 3% of spawning fish in the Umpqua were of hatchery origin (Table 3 & Figure 4).

Oregon coast steelhead spawn timing in 2010 (Figure 5) occurred early in most areas, with a high proportion of redd deposition occurring earlier than in 2009 in all areas but the North Coast (Brown and Lewis 2009). Spawning in the North Coast peaked in mid- May; about one month later than normal. Stream discharge was lower than average until late-March when a series of unseasonably cold, wet fronts elevated flows for the remainder of the season (Figure 6). This flow regime is not thought to have greatly altered spawn-timing, though reduced flows may have limited the distribution of early spawners in some areas.

Table 2. Coastal Oregon 2010 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	32	30.6	20,649	7,468	18,928	6,845
	Mid Coast	36	27.5	26,417	11,986	16,864	7,570
	Mid South Coast	34	35.0	22,890	5,276	19,927	4,593
	Umpqua	20	14.9	16,808	6,427	16,266	6,220
	Total	**122**	**108.0**	**86,763**	**16,388**	**71,806**	**12,804**
Klamath Mountains Province	South Coast	14	13.0	4,430	1,521	4,430	1,521
	Rogue River	-	-	-	-	-	-
	Total	**14**	**13.0**	**4,430[b]**	**1,521**	**4,430**	**1,521**

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 2010. As a result the Klamath Mtn. DPS estimate is incomplete.*

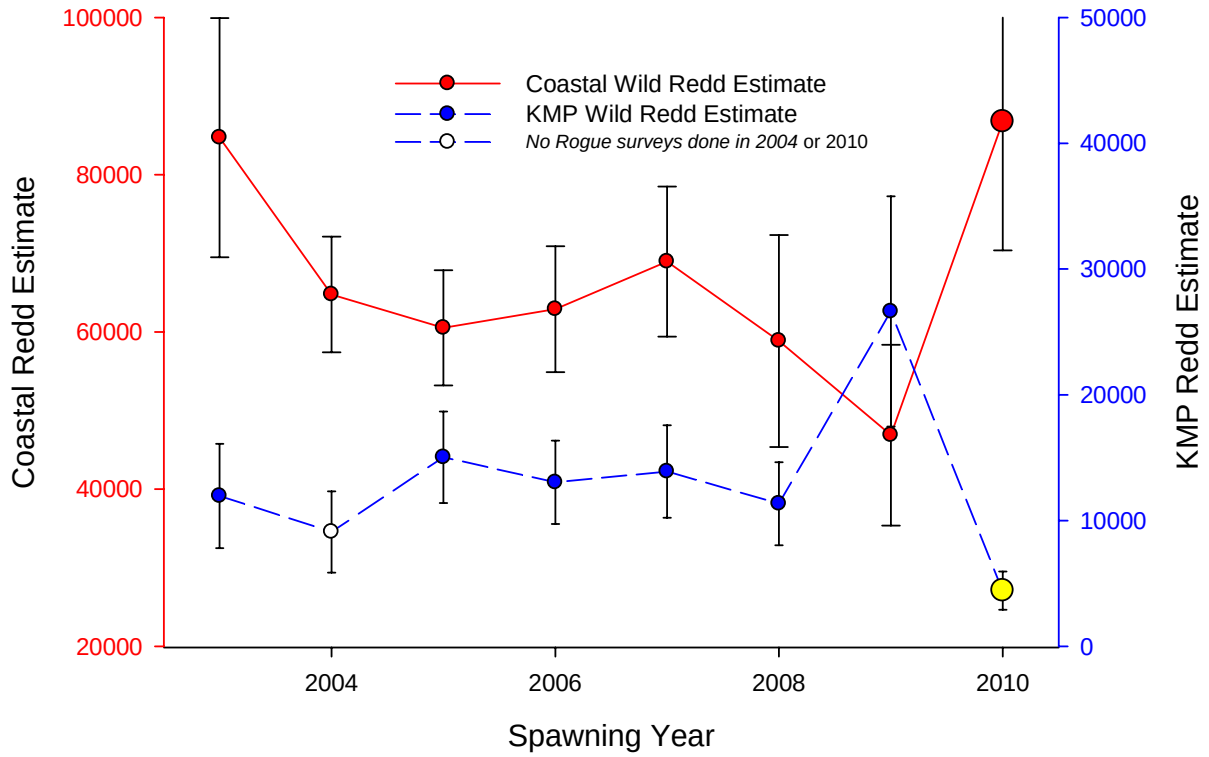

Figure 2. Winter steelhead wild redd estimates based on random surveys from 2003 to 2010. Error bars are 95% confidence intervals. 2004 & 2010 KMP data does not include the Rogue.

Klamath Mountains Province DPS

No surveys were performed in the Rogue MA in 2010, and as a result the estimate for the KMP DPS is incomplete for this year. In the South Coast MA we estimate that there were 4,430 wild steelhead produced redds (Table 2). The estimate is the lowest recorded since monitoring began in 2003. The density of redds was 13 redds/mile, with at least one redd observed in 100% of the 14 successfully surveyed sites in this MA.

The proportion of hatchery steelhead observed in South Coast surveys was 0% (Table 3). Spawn timing in 2010 occurred early(figure 5), with peak activity occurring over one month earlier than in 2009 (Brown and Lewis 2009). In addition to the earlier 2010 peak in redd counts, there was greatly reduced steelhead spawning activity during the normally significant March to April period in the South Coast MA (Figure 5).

Table 3. Percentage of hatchery fish found on spawning surveys in 2010 based on adipose fin clip observations of live and dead steelhead.

DPS	Monitoring Area	Known Fish	Hatchery Percentage
Oregon Coast	North Coast	24	8%
	Mid Coast	19	37%
	Mid South Coast	85	13%
	Umpqua	31	3%
	Total	**159**	**13%**
Klamath Mountains Province	South Coast	47	0%
	Rogue River	-	-
	Total	**47**	**0%**

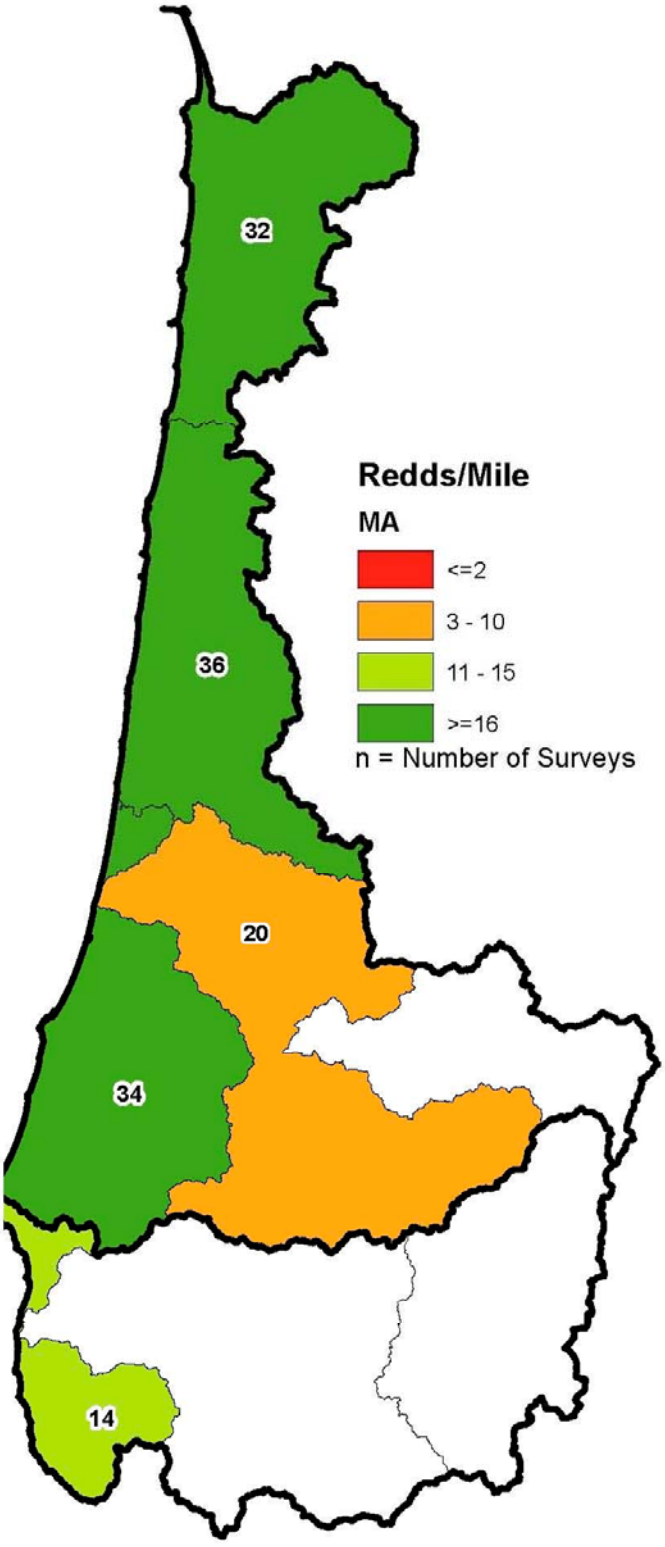

Figure 3. Total redds/mile in random surveys in 2010 by monitoring area with the number of surveys in each monitoring area.

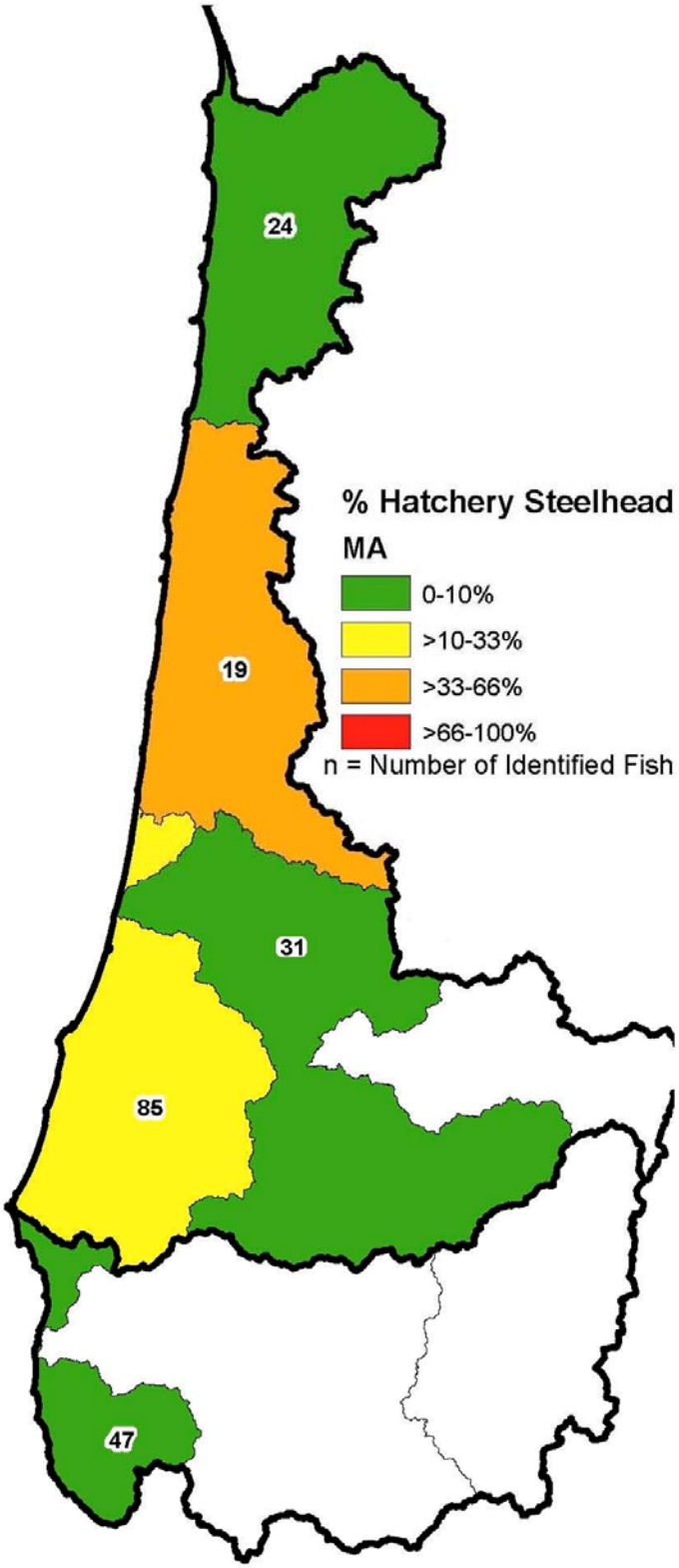

Figure 4. Percentage hatchery fish found on random surveys in 2010 based on adipose fin clip observations of live and dead steelhead. Data in each monitoring area may be based on multiple surveys.

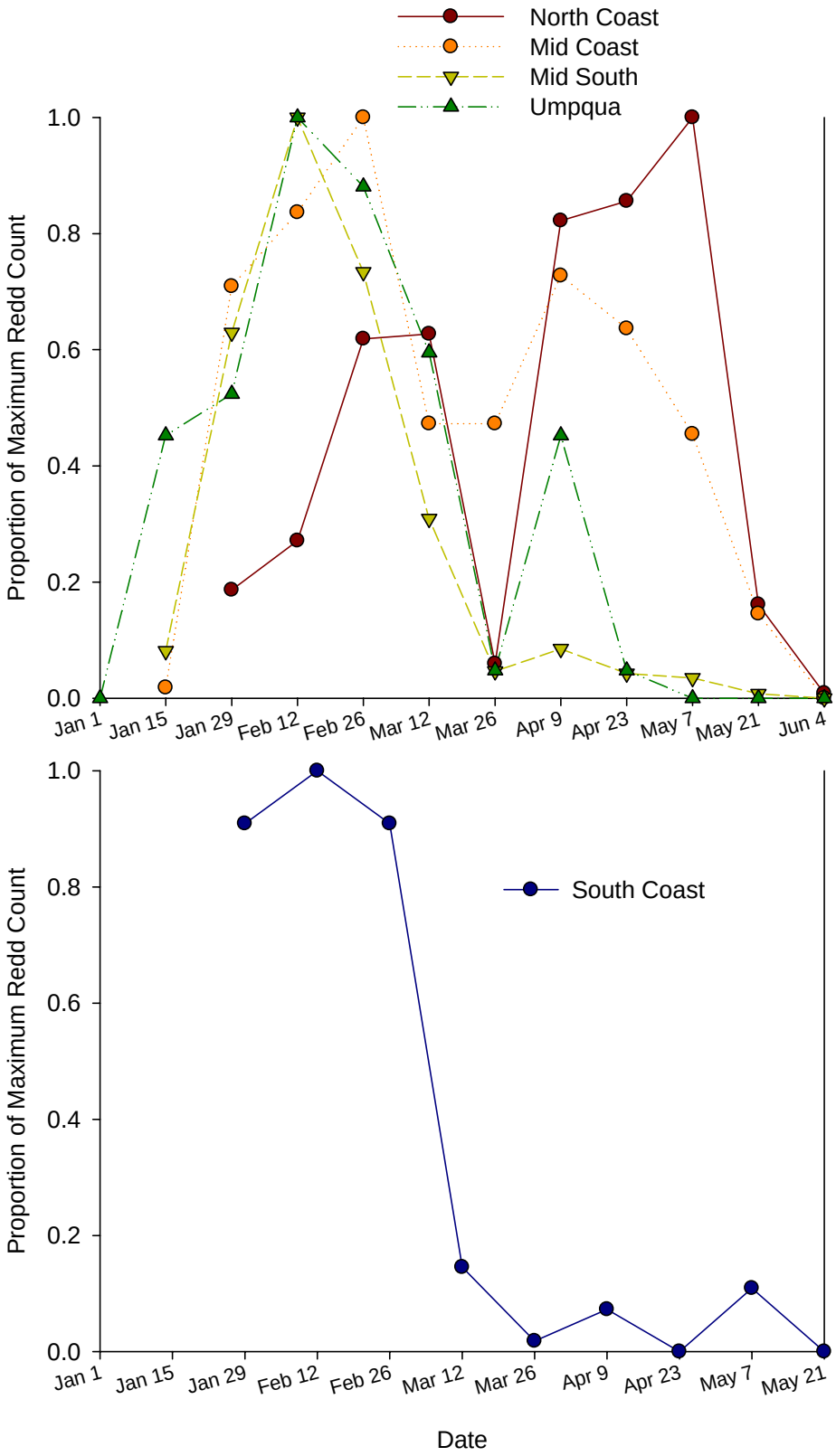

Figure 5. Proportion of the maximum winter steelhead redd count in each of the six monitoring areas by week of the year during 2010.

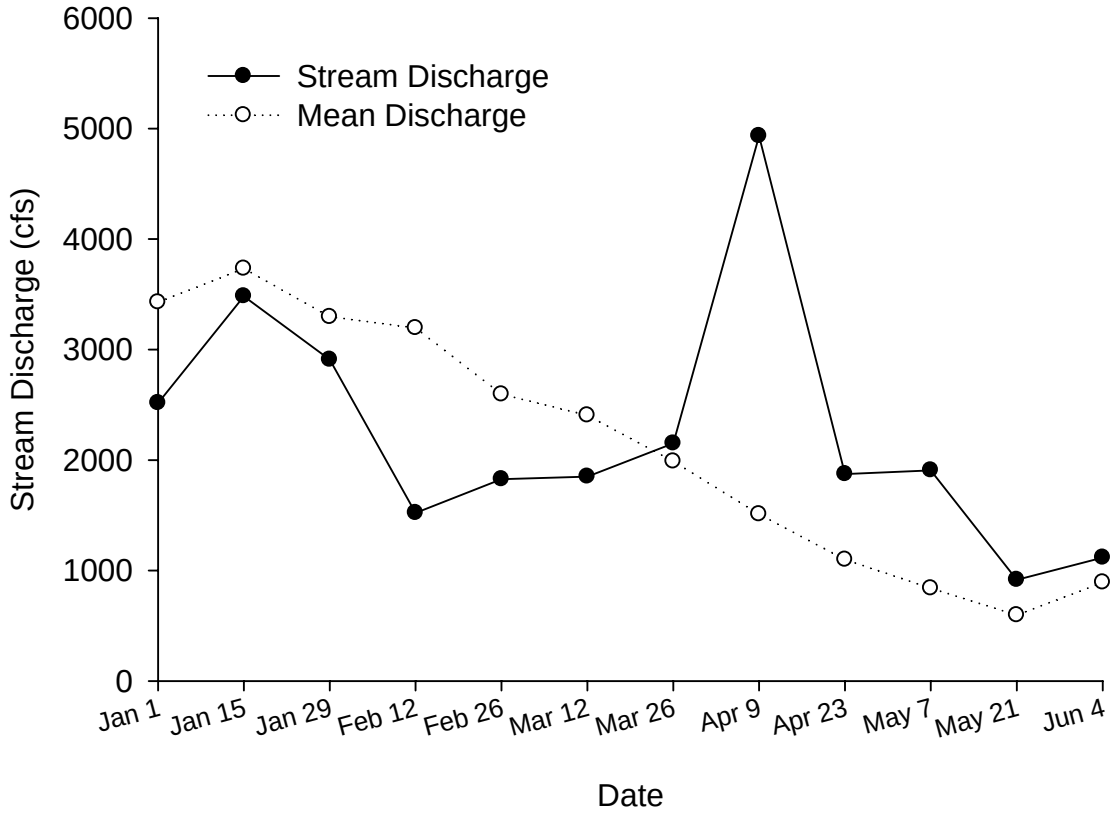

Figure 6. Stream discharge at Alsea River near Tidewater during 2010, compared to mean discharge from 1939 to 2006.

REFERENCES

ODFW. 2010. Coastal steelhead spawning surveys procedures manual 2010. 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.

Brown E. and M. Lewis. 2009. Assessment of Oregon Coastal Adult Winter Steelhead – Redd Surveys 2008. Monitoring Program Report Number OPSW-ODFW-2008-09. Oregon Department of Fish and Wildlife, Salem, Oregon.

Suring, E.S. In Prep. Assessment of Oregon Coastal Adult Winter Steelhead – Background and Methodology.

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.

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