THE OREGON PLAN *for Salmon and Watersheds*

Assessment of Oregon Coastal Adult Winter Steelhead – Redd Surveys 2008

Report Number: OPSW-ODFW-2008-09

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SUMMARY

This report provides a summary of results from winter steelhead spawning ground surveys conducted along the Oregon coast in 2008. Sufficient surveys were conducted to meet precision estimates for populations within both the Oregon Coast and Klamath Mountains Province. Winter steelhead redd estimates for the 2008 spawning year were comparable to prior years for each of these distinct population segments. 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.

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 2008). 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. 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 (http://oregonstate.edu/dept/ODFW/spawn/index.htm). In 2008 surveys were also conducted above Gold Ray Dam on the Rogue River, though redd estimates in this report do not include these investigations.

The 95% confidence interval for monitoring area estimates was within the target precision of ±30% for the Oregon Coast and the Klamath Mountains Province DPS (KMP). Sites were selected at a rate of 1/55 miles of habitat, with higher density sampling (1/10 miles) in the Nestucca basin and above Gold Ray Dam (Rogue Basin, 1/18 miles). Sixty six percent of the total number of sites selected were successfully surveyed (Table 1). Nine percent

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

coast-wide were not surveyed because of landowner access restrictions, with the Mid-South Coast having the highest proportion of access denials. Thirty six percent of the sites in the South Coast were too remote to survey because of their location in a road less area, and 18% of the sites in the North Coast were considered outside of steelhead spawning habitat.

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	35	6	9
	Mid Coast	34	6	4
	Mid South Coast	18	9	2
	Umpqua	32	11	5
	Total	**119**	**32**	**20**
Klamath Mountains Province	South Coast	15	11	2
	Rogue River	22	10	4
	Total	**37**	**21**	**6**

Oregon Coast DPS

The 2008 estimate of wild redds in the Oregon Coast DPS is similar to previous years (Figure 2). The 58,849 wild redds estimated in the Oregon Coast DPS (Table 2) were not evenly distributed across the area (Figure 3). The Mid-South Coast MA had the highest wild density of 19 redds/mile with 89% of sites with at least one redd. The North Coast, Mid Coast and Umpqua MAs had densities of 11, 7, and 10 redds/mile, with 86%, 79%, and 81% of sites with at least one redd.

The proportion of hatchery steelhead naturally spawning varied among the monitoring areas (Table 3), with the Mid Coast and North Coast having the highest proportions of hatchery produced fish (Figure 4). The average redd density among 5th field HUCs with greater than >4 identified steelhead was greater for those with >20% hatchery fish ($\bar{x}$ = 32, n = 8) than those with ≤20% hatchery fish ($\bar{x}$ = 19, n = 15).

Oregon coast steelhead spawn timing in 2008 was similar to previous years in the North Coast and Umpqua MA's but peak redd counts were two weeks earlier than usual in the Mid-Coast and Mid-South Coast (Figure 5). The later portion of the Mid Coast run was not as large a proportion of the total run as in other years. Stream discharge was lower than average during February (Figure 6) which may be related to earlier mainstem and tributary spawn timing in the Mid Coast and Mid-South Coast.

Table 2. 2008 Coastal Oregon winter steelhead redd abundance estimates. Estimates are derived from counts in random EMAP 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	35	32.0	18,183	10,211	11,859	6,660
	Mid Coast	34	30.3	22,730	6,677	12,628	3,710
	Mid South Coast	18	16.0	22,332	10,216	18,806	8,603
	Umpqua	32	30.8	20,384	9,228	15,556	7,043
	Total	**119**	**109.0**	**83,630**	**18,395**	**58,849**	**13,480**
Klamath Mountains Province	South Coast	15	16.4	5,635	2,139	5,520	2,095
	Rogue River	22	21.8	6,598	2,896	5,822	2,555
	Total	**37**	**38.2**	**12,233**	**3,600**	**11,342**	**3,304**

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

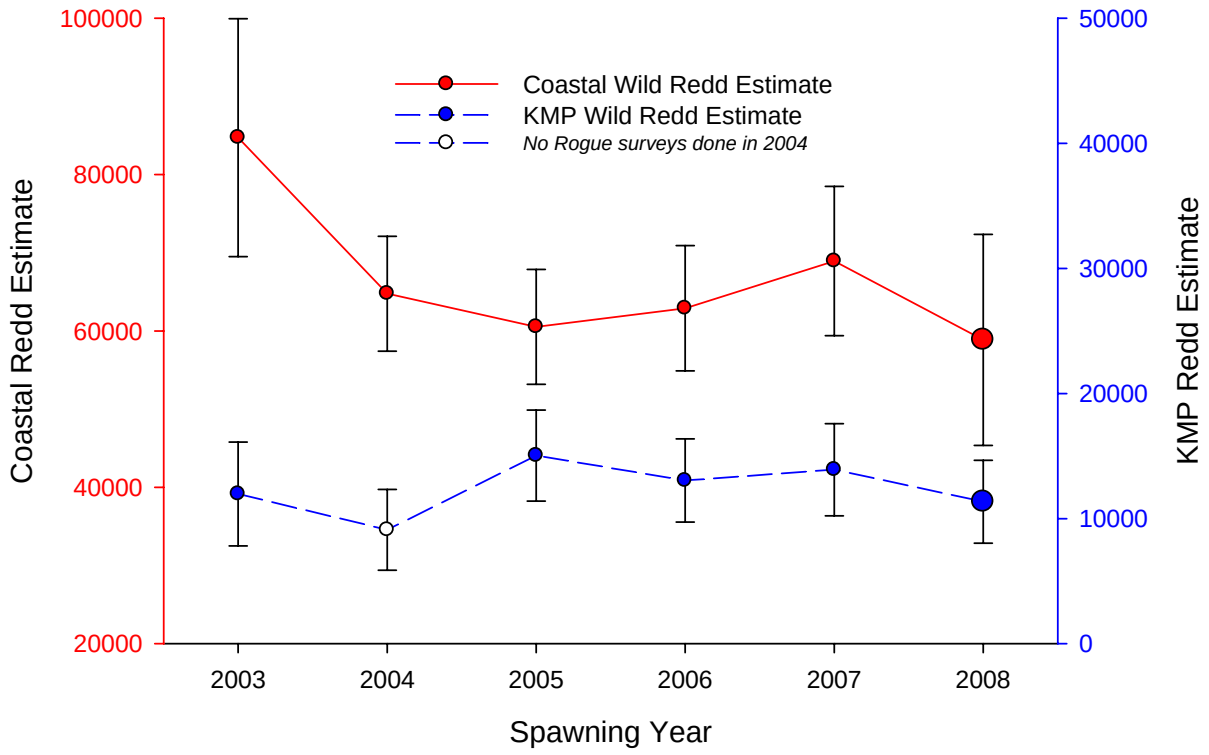

Figure 2. Winter steelhead wild redd estimates based on random surveys from 2003 to 2008. Error bars are 95% confidence intervals. 2004 KMP data does not include the Rogue.

Klamath Mountains Province DPS

In the area below Gold Ray Dam 11,342 wild produced redds were estimated in the Klamath Mountains Province DPS (Table 2). This redd estimate is similar to previous years (Figure 2). The density of wild produced redds in the South Coast MA was higher than in the Rogue MA, at 18 redds/mile compared to 5 redds/mile. A least one redd was found in 93% of South Coast sites and 73% of Rogue sites.

The Rogue MA had a higher proportion of hatchery steelhead (Table 3), which were found solely in the Applegate River watershed. In the South Coast MA hatchery spawners were only found in Miller Creek in the Humbug-Nesika watershed, with 17% hatchery spawners. Spawn timing was normal, with South Coast activity slightly earlier than in the Rogue (Figure 5).

Table 3. Percentage of hatchery fish found on spawning surveys in 2008 based on adipose fin clip observations of live and dead steelhead.

DPS	Monitoring Area	Known Fish	Hatchery Percentage
Oregon Coast	North Coast	69	35%
	Mid Coast	63	44%
	Mid South Coast	38	16%
	Umpqua	76	24%
	Total	**246**	**31%**
Klamath Mountains Province	South Coast	49	2%
	Rogue River	17	12%
	Total	**66**	**5%**

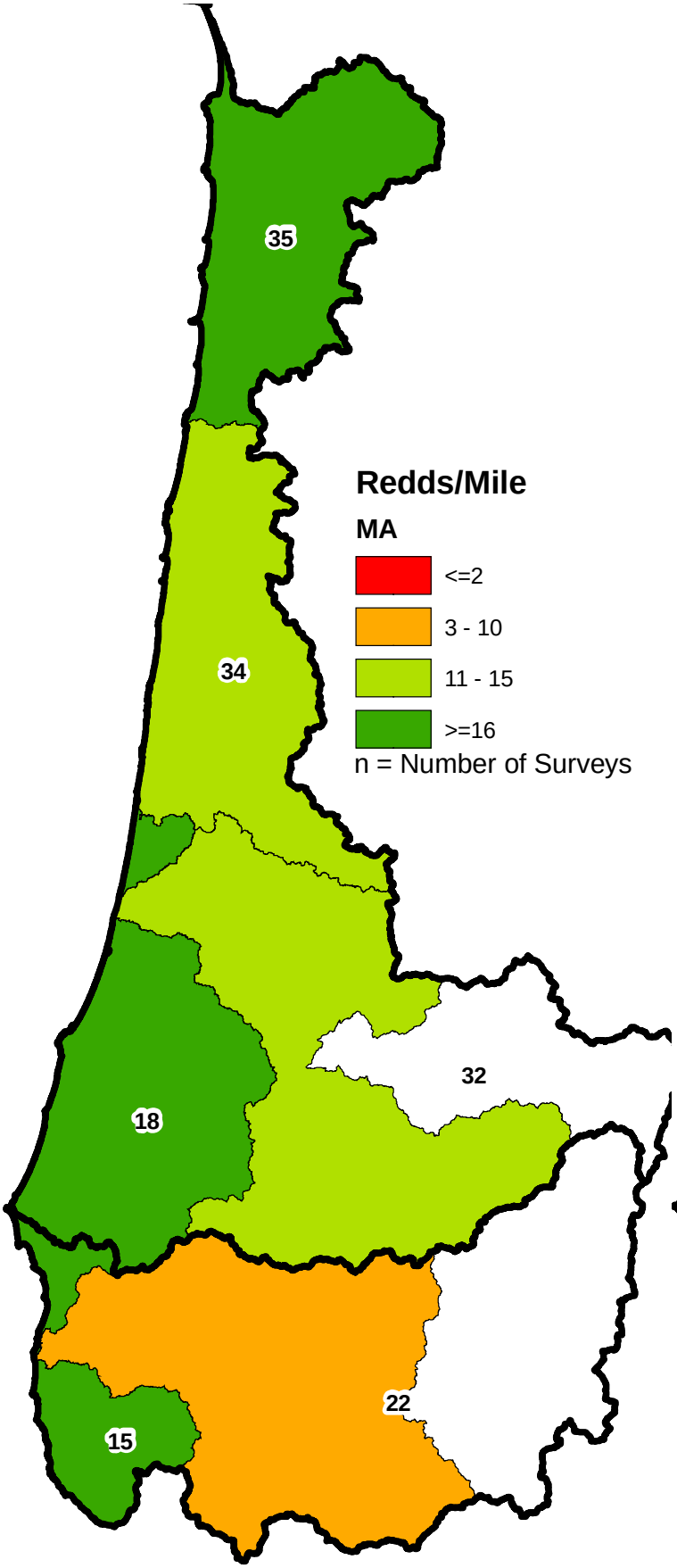

Figure 3. Total redds/mile in random surveys in 2008 by monitoring area with the number of surveys in each monitoring area.

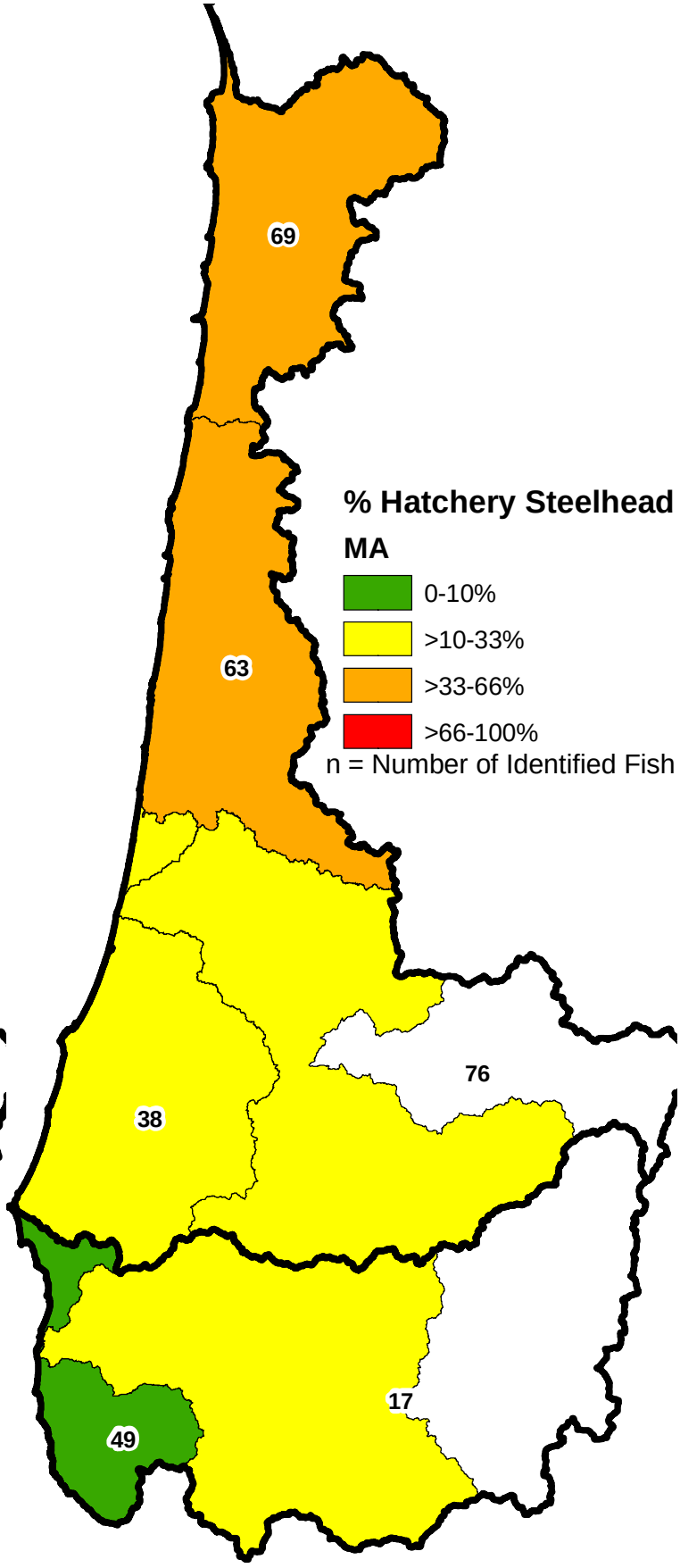

Figure 4. Percentage hatchery fish found on random surveys in 2008 based on adipose fin clip observations of live and dead steelhead. Data in each monitoring area may be based on multiple surveys.

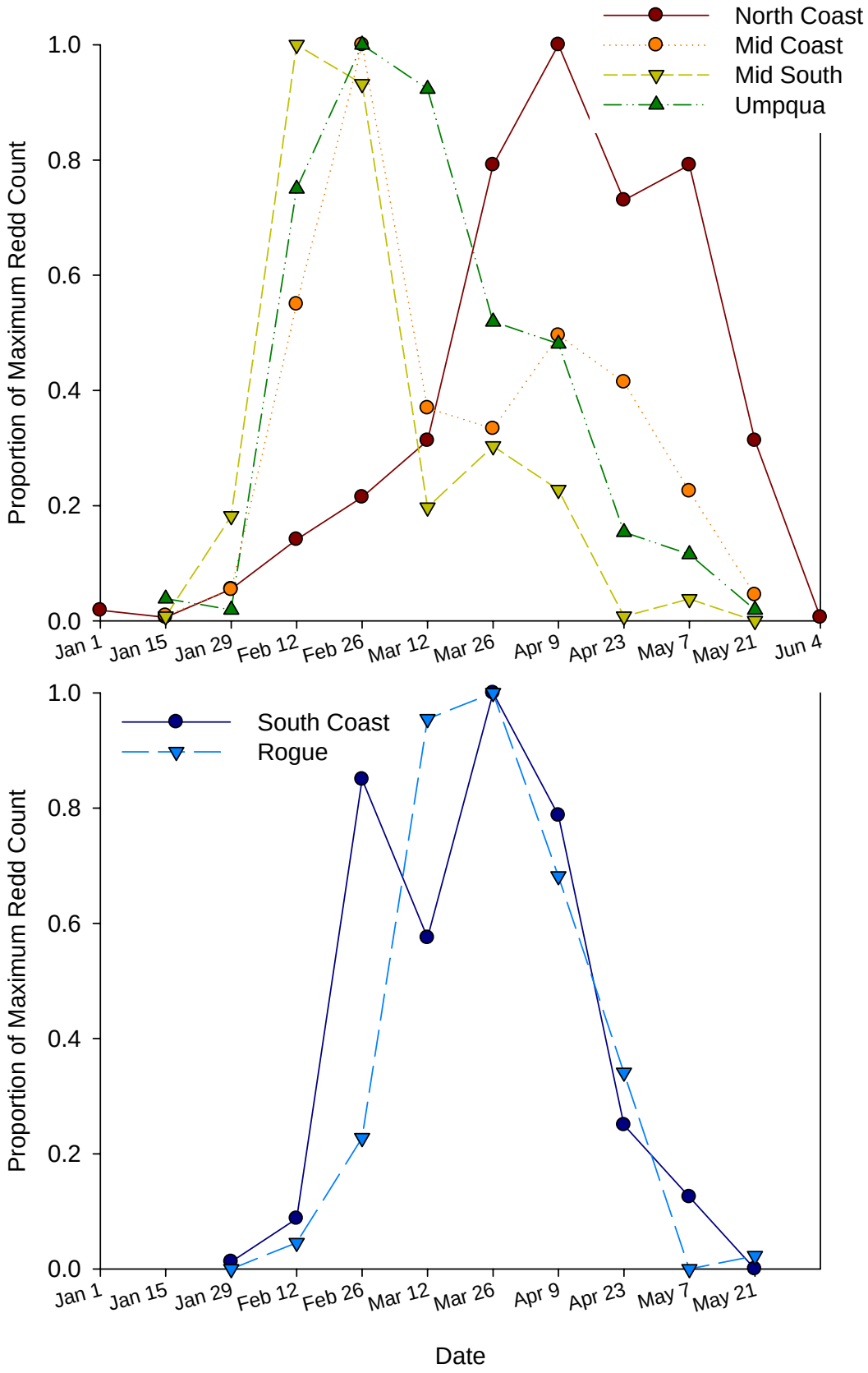

Figure 5. Proportion of the maximum winter steelhead redd count in each of the six monitoring areas by week of the year during 2008.

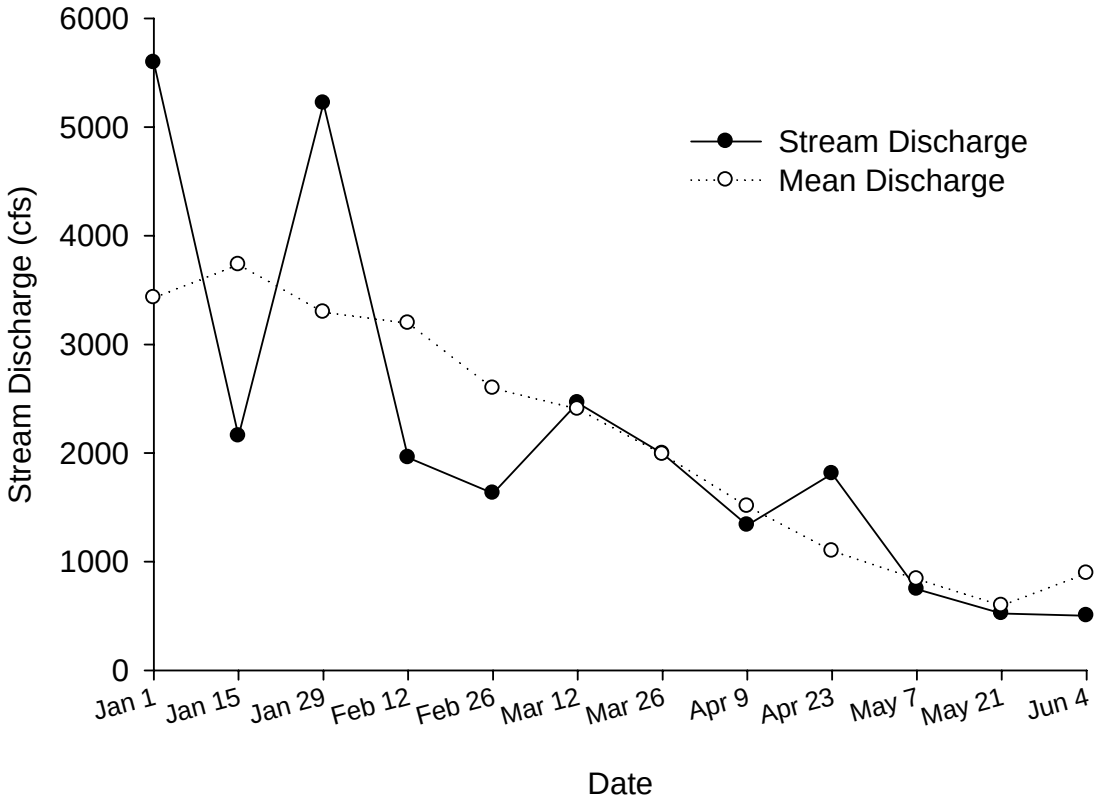

Figure 6. Stream discharge at Alsea River near Tidewater during 2008, compared to mean discharge from 1939 to 2006.

REFERENCES

ODFW. 2008. Coastal steelhead spawning surveys procedures manual 2008. Oregon Department of Fish and Wildlife. Available: oregonstate.edu/dept/ODFW/spawn/pdf%20files/reports/08StwManual.pdf

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. Available: http://oregonstate.edu/dept/ODFW/spawn/pdf%20files/reports/DesignStevens.pdf

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. Available: http://oregonstate.edu/dept/ODFW/spawn/pdf%20files/reports/steel.pdf

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