FISH RESEARCH PROJECT
OREGON

STEELHEAD ESCAPEMENT MONITORING IN THE UPPER GRANDE RONDE RIVER BASIN

ANNUAL TECHNICAL REPORT

CONTRACT PERIOD: August 1, 2008 to July 31, 2009

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EXECUTIVE SUMMARY

Objectives

1. Estimate redd density and spawner escapement of summer steelhead for the Upper Grande Ronde River summer steelhead population.
2. Estimate freshwater productivity (smolts/redd or smolts/adult) of summer steelhead above rotary screw trap locations.
3. Estimate spawners/redd above adult weir collection points and correlate independent counts.

Accomplishments and Findings

We sampled 30 random, spatially-balanced sites throughout the Upper Grande Ronde River basin during the spring (18 March–1 July) of 2009 to determine summer steelhead *Oncorhynchus mykiss* redd abundance and adult escapement. Survey sites encompassed 58.5 km of an estimated 1,178 km of steelhead spawning and rearing habitat within the basin. During these surveys, 43 redds and 26 live steelhead were observed resulting in a density of 0.735 redds/km. Redds were observed at 21 of the 30 sites (70%). Redd abundance and adult steelhead escapement estimates for the basin were 866 and 3299, respectively. Both redd counts and adult steelhead escapement estimates were greater than the previous year. Two hatchery steelhead were observed on spawning ground surveys, one on Clark Creek and another on Whiskey Creek. High flow events persisted throughout much of April and May making redd observations sometimes difficult. Only two random sites were selected for the Catherine Creek watershed, and only one sample site was randomly selected for the Lookingglass Creek watershed, we therefore did not make weir and redd count comparisons for these singular watersheds. Surveys on Deer Creek, where a permanent weir is present, indicated a 3.81 fish/redd ratio during the 2009 spawning season. Productivity measures of smolts/redd will be reported in future years when smolt abundance estimates from trap collections become available for the 2007 and 2008 brood years.

Management Recommendations

1. Using the current data of steelhead spawning distribution and geographic landscape variables, refine the sampling universe for *O. mykiss* in the Upper Grande Ronde River basin to improve our knowledge of steelhead spawning distribution.

2. Determine the level of change in the escapement estimate that we would consider to be biologically and statistically significant in order to determine short- and long-term population changes.

3. Continue to manage the Upper Grande Ronde River basin exclusively for wild steelhead and determine the extent and distribution of hatchery steelhead in the basin through observations of hatchery fish during the spawning season.

ACKNOWLEDGEMENTS

We would like to acknowledge the assistance and cooperation of the many private landowners throughout the Grande Ronde River basin who allowed us access to their property. The cooperation of private landowners was essential in meeting our project objectives. Additionally, we would also like to thank Tim Bailey and Jeff Zakel for providing much needed guidance and advice regarding steelhead spawning ground surveys. The information they provided was helpful for survey planning and landowner contacts. Nadine Craft provided information regarding index spawner surveys and Mike McLean provided data from weir collections. Further, we would like to acknowledge our field crew members Nick Albrecht, Marika Dobos, and Matt Saladin for their assistance. This project was funded by the U. S. National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

INTRODUCTION

The Upper Grande Ronde River basin supports a population of summer steelhead *O. mykiss* that has been defined by segregating it from the other three populations inhabiting the Grande Ronde River basin based on topographic, genetic, observational, and other evidence of interactions. Historically, the Grande Ronde River was one of the more significant anadromous fish producing rivers in the Columbia River Basin. Steelhead in the Grande Ronde River basin compose part of the Snake River DPS for summer steelhead and are listed as threatened by the ESA. Despite recovery efforts, these populations remain depressed relative to historic levels.

This project evaluates summer steelhead population abundance for the upper Grande Ronde River summer steelhead population by conducting surveys of redds and spawning activity. These surveys provide the data needed to estimate adult steelhead escapement, improve our understanding of habitat utilization, and contribute to productivity and survival estimates for this population. We monitored steelhead using a probabilistic sampling approach by incorporating a sample-site selection procedure similar to the Environmental Protection Agency (EPA) environmental monitoring and assessment program (EMAP). We used this EMAP or Generalized Random Tessellation Stratified design (GRTS) approach to select sample sites for status and trend monitoring of steelhead redds within the Upper Grande Ronde River watershed. This steelhead monitoring follows the Oregon Plan for Salmon and Watersheds Monitoring Program approach.

METHODS

Study Area

The Grande Ronde River flows generally northeast 212 miles from its origin to join the Snake River at river mile (RM) 169, about 20 miles upstream of Asotin, Washington and 493 miles from the mouth of the Columbia River. The Grande Ronde River begins in the Blue Mountains near the Anthony Lakes recreation area, flows north, then northeast and through the cities of La Grande and Island City (RM 157). Here, in the valley, the river slows and meanders the valley floor before continuing north-northeast. The Upper Grande Ronde watershed drains approximately 1,650 mi^2, with a perimeter of 264 mi. and contains 917 mi of streams (732 miles of anadromous salmonid habitat). The upper Grande Ronde watershed (Figure 1) includes

the Grande Ronde River and its tributaries from the headwaters to the confluence with the Wallowa River. Elevations in the watershed range from 2,312 ft. at the confluence of the Grande Ronde and Wallowa Rivers to over 7,000 ft. in the headwater areas. The upper Grande Ronde summer steelhead population is recognized as encompassing this drainage above the confluence with the Wallowa River. Fish distribution within this watershed was determined by historic and recent surveys of fish and barriers to anadromy, with additional professional judgment. Major tributaries of the river within this area include Lookingglass Creek, Catherine Creek, and Meadow Creek. Catherine Creek originates in the Eagle Cap Wilderness Area of the Wallowa Mountains and flows northwest to join the Grande Ronde at RM 140. Dry Creek, which was an outlier in the genetic analysis, is included in this population. Like other outliers, this may reflect the contribution of resident fish to the sample.

Sampling Domain and Site Selection

Sites were selected using the EMAP protocol which uses a spatially balanced random sampling design (Stevens 2002). The sampling universe for EMAP surveys is based on professional knowledge of steelhead life history use in the Upper Grande Ronde River basin. This knowledge is derived from ODFW biologists as well as biologists from other natural resource entities, and is currently the best information available concerning the distribution and habitat use of steelhead in the Upper Grande Ronde River basin (Figure 2). All reaches upstream of known barriers to anadromous fish passage were eliminated from the sampling universe. Thirty sample sites are targeted each year. In order to balance the needs of status (more random sites) and trend (more repeat sites) monitoring, the following rotating panel design was implemented:

- 10 sites repeated every year (annual)
- 10 sites repeated once every 3 years on a staggered basis
- 10 sites new every year (new)

A Geographic Information System (GIS) incorporating a 1:100,000 digital stream network was used to insure an unbiased and spatially balanced selection of sample site. The GIS site selection process provides geographic coordinates (i.e. latitude and longitude) of each candidate site. From these site coordinates, topographic maps were produced showing the location of each sample point. Landowner contacts were then developed based on county plat maps. With the assistance of ODFW District Biologists, permission was sought from landowners for survey sites. In the field, crews used a handheld Global Positioning System (GPS) to locate the established survey reaches which encompassed the selected EMAP points. Some candidate sites were not sampled due to a lack of permission from private landowners or because sites were located upstream of previously unknown fish passage barriers. In such events, replacement sites were drawn from a pre-selected list of over-sample sites. Every year the EMAP sampling universe is refined based on field observations of previously unknown barriers and other restrictions (e.g. dry streams) that limit fish life history stages (defined as “Excluded Reaches”, or the removal of barriers (e.g. road culverts) that limited access to habitat. These stream reaches are removed or added into our sampling universe accordingly.

Steelhead Redd Surveys

Steelhead redd surveys were based on standard ODFW methods (Susac and Jacobs 1999; Jacobs et al. 2000; Jacobs et al. 2001) were conducted from March to July 2009 (Table 1). Individual sites were surveyed up to seven times to quantify the number of redds constructed at each site, with approximately two week intervals between successive surveys to account for the temporal variation in spawning activity. Survey reaches were approximately 2 km in length and encompassed the sample point derived from the EMAP sampling design. Surveyors walked upstream from the downstream end of each reach and counted all redds, live fish, and carcasses observed. New redds were flagged and the location marked with a handheld GPS unit.

During each visit, surveyors recorded the number of new redds and redds that had been identified and flagged during previous surveys. Redd visibility was estimated for redds that were found during previous surveys. Ideally, each site was to be visited by different surveyors on successive visits, however this was not always logistically possible with the number of personnel available. Overall redd density (R_D) was estimated by summing observations of individual survey sites (i) as:

$$R_D = \sum_{i=1}^{n} r_i/d_i \quad (1)$$

where r_i is the number of unique redds observed at site i, d_i is the distance surveyed (km) at site i. The total number of redds (R_T) occurring throughout the basin was estimated by:

$$R_T = R_D \cdot d_u \quad (2)$$

where d_u is the total kilometers available to steelhead for spawning and rearing (1178 km). Steelhead escapement (E_S) was then estimated by:

$$E_S = 3.81 \cdot R_T \quad (3)$$

where 3.81 is a fish per redd constant. This constant is developed each year from repeat redd surveys of a tributary of the Wallowa River (Deer Creek) in the Grande Ronde River basin where a known number of adult steelhead are passed above a counting weir (Flesher et al. 2005; Gee et al. 2008; Lance Clarke and Jim Ruzycki, ODFW, unpublished data). This constant or weighting value represents a single spawning year. A locally weighted neighborhood variance estimator (Stevens 2004), which incorporates the pair-wise dependency of all points and the spatially constrained nature of the design, was used to estimate a 95% confidence interval of the escapement estimate using R statistical software (R Development Core Team 2005).

Steelhead carcasses were examined to obtain population and life history information (age, sex, length, and spawner origin). For all carcasses, surveyors collected scale samples from the key scale area (Nicholas and Van Dyke 1982) for age determination, recorded sex, measured MEPS length (middle of eye to posterior scale), and determined spawner origin (hatchery or wild) by inspecting carcasses for the presence (wild) or absence (hatchery) of an adipose fin. The hatchery/wild fish ratio was calculated by dividing the total number of fin marked fish by all fish that could be observed for marks (live fish only). The number of hatchery fish straying to the basin was then estimated by multiplying this proportion of hatchery and wild steelhead by our estimate of steelhead escapement.

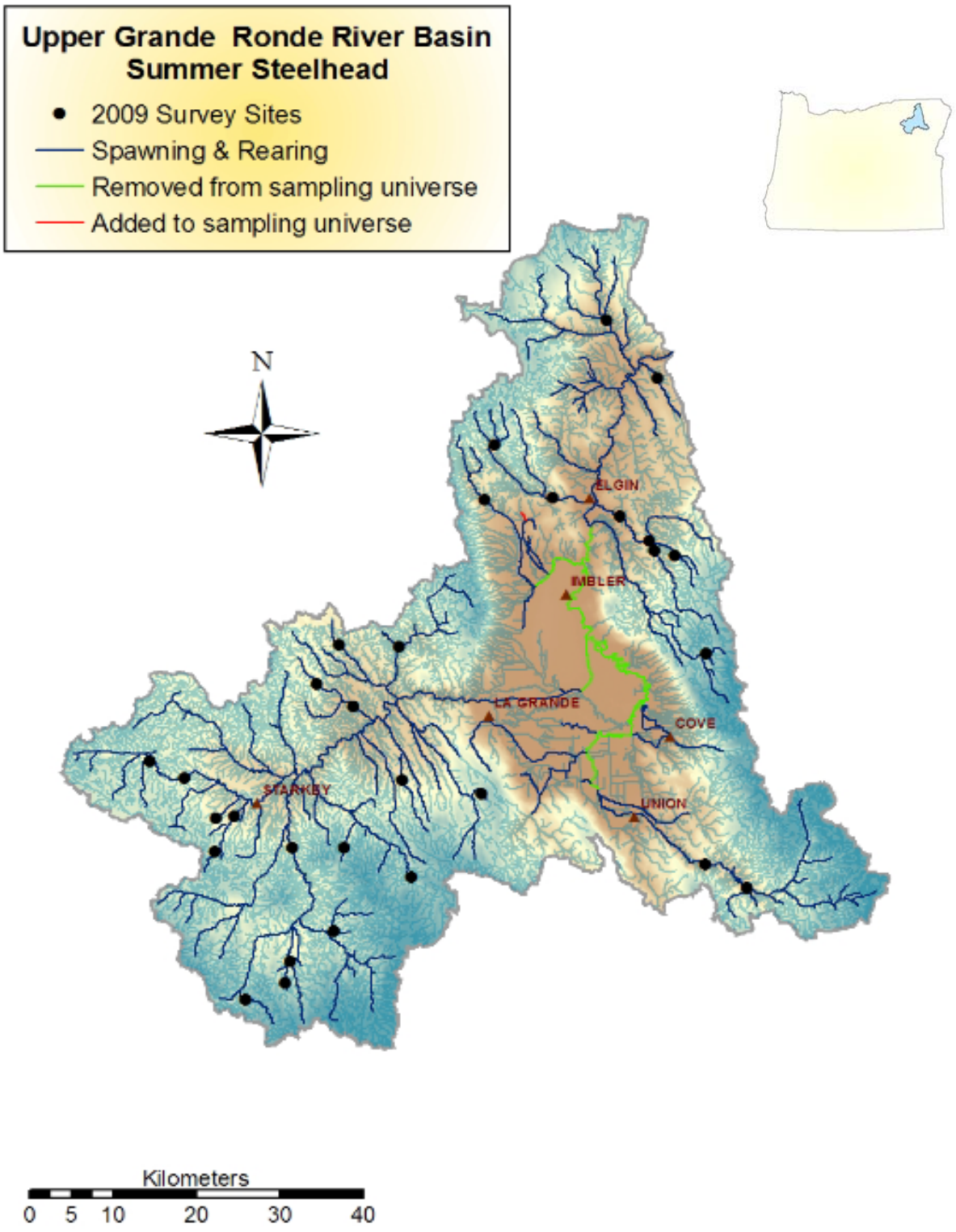

Figure 1. Map of the Upper Grande Ronde River basin showing steelhead use (dark blue stream reaches), sections of stream removed from (green stream reaches) and added to (red stream reaches) the sampling universe, and the 30 sample sites visited during 2009.

Table 1. Stream, site identification number, UTM zone, site coordinates, survey distance, and dates of steelhead spawning surveys conducted in the Upper Grande Ronde River basin from March to July, 2009.

			Start Coordinates		End Coordinates		Survey Distance	Survey Dates						
Stream	Site	UTM	Easting	Northing	Easting	Northing	(km)	1	2	3	4	5	6	7
Battle Creek	227	11	0382888	5009218	0381432	5007864	1.7	3/24	4/8	4/21	5/5	5/20		
Beaver Creek	231	11	0404364	5001313	0405088	4999909	1.9	6/4	6/30					
Burnt Corral Creek	107	11	0382183	5004526	0380725	5003360	2.0	4/21	5/5	5/20	6/2			
Burnt Corral Creek	239	11	0384152	5008590	0382986	5007077	1.9	4/6	4/28	5/12	5/26	6/9		
Camp Creek	240	11	0440657	5026151	0442269	5026614	2.0	5/21	6/9	7/1				
Catherine Creek	232	11	0439983	5000156	0441724	5000078	1.9	4/1	6/25					
Catherine Creek	216	11	0444188	4997952	0445472	4996772	1.9	3/19	3/30	6/25				
Chicken Creek	236	11	0389693	4990926	0390336	4989145	1.9	4/8	4/20	4/30	5/13	6/1	6/22	
Clark Creek	225	11	0430549	5044224	0432040	5043385	1.8	4/27	5/13	6/3	6/18			
Clark Creek	109	11	0435197	5040570	0435955	5038825	2.0	3/26	4/7	4/16	4/27	5/11	5/27	6/8
Clark Creek	241	11	0435756	5039238	0436739	5037446	2.2	4/27	5/11	5/27	6/8			
Coyote Creek	228	11	0412624	5010060	0413917	5009801	1.9	5/11						
Dry Beaver Creek	220	11	0397641	5005795	0397045	5003902	2.0	5/19	6/1					
Dry Creek	229	11	0415967	5046283	0414709	5047672	2.0	4/7	4/29	5/19	6/3	6/18		
Duncan Canyon Creek	237	11	0435875	5062106	0437131	5060441	2.2	4/20	5/4	5/19				
East Phillips Creek	105	11	0416396	5052712	0417743	5053809	1.8	4/29	5/13	6/2				
East Sheep Creek	219	11	0383781	4986882	0384731	4985504	2.0	4/22	5/18	6/1	6/23			
Five Points Creek	106	11	0404307	5028459	0405970	5029285	2.0	5/12	5/28	6/10				
Grande Ronde River	104	11	0390432	5005389	0390852	5003771	2.0	3/23	4/3	6/25				
Little Lookingglass Creek	217	11	0431718	5067133	0430983	5068591	2.0	4/17	5/4	6/3	6/16			
Meadow Creek	115	11	0374325	5015697	0373596	5016682	2.0	5/15	5/26	6/8	6/23			
Meadow Creek	111	11	0379739	5014229	0378270	5013398	1.9	3/24	4/6	4/28	5/12	5/26	6/9	
Middle Fork Clark Creek	218	11	0437055	5039835	0438326	5038392	2.0	4/6	5/14	6/8				
Pelican Creek	222	11	0398740	5027733	0397543	5029205	2.0	5/4	5/20	6/1	6/30			
Phillips Creek	113	11	0424074	5046398	0422474	5046704	1.9	3/18	3/30	6/2	6/16			
S. Fork Limber Jim Creek	224	11	0394946	4994316	0396447	4993350	1.9	4/2	4/13	4/29				
Spring Creek	110	11	0399215	5021324	0397621	5022291	2.0	4/7	4/16	4/28	5/11	5/26	6/8	
Spring Creek	238	11	0396321	5023425	0394705	5024245	1.9	4/28	5/12	5/26	6/8			
West Chicken Creek	108	11	0389482	4988843	0389348	4987112	1.8	4/21	5/5	5/18	6/1	6/22		
Whiskey Creek	230	11	0404152	5012986	0404750	5011177	2.0	4/29	5/11	5/29	6/9			

RESULTS

Steelhead Redds and Escapement

We observed 43 steelhead redds while surveying 58.5 km of an estimated 1,178 km of steelhead spawning and rearing habitat within the Upper Grande Ronde River basin during 2009 (Table 2). This results in a redd density of 0.735 redds/km. By expansion, an estimated 866 observable redds were constructed within the Upper Grande Ronde River basin in 2009 by an estimated 3,299 spawners (95% CLs; 2216, 4383). Redds were observed at 21 of the 30 sites (70%). Two hatchery steelhead were observed on spawning ground surveys resulting in a 6:1 ratio of wild to hatchery origin adult steelhead.

Adult steelhead were captured and passed at each of the three weirs operated by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) on the Upper Grande Ronde River basin. One hundred forty seven adults were passed at the weir on Catherine Creek, 194 were passed at Lookingglass Creek, and 36 were passed at the Upper Grande Ronde River. This total of 377 passed adults was a 48% increase above the 2008 total of 255 adults.

On Deer Creek, where we establish a fish per redd ratio, surveyors observed 21 new redds while conducting surveys on four separate dates from late April through late June. Eighty adult steelhead were passed above the weir at Big Canyon resulting in a 3.81 fish/redd ratio.

Steelhead Spawning Timing

We observed new steelhead redds from late March through June, 2009 (Figure 3). The first new redd was observed on Catherine Creek on 19 March while the last new redd was observed on Pelican Creek on 30 June, 2009. Thirty two of the 43 (74%) new redds were observed in the months of April and May. Highly variable stream flows during April and May likely influenced both new redd observations and visibility of previously identified redds (Figure 4).

Table 2. Stream, site identification number, total number of steelhead redds, redds/km, and unmarked (wild), marked (hatchery), and unknown origin live and dead steelhead observed during spawning surveys conducted in the Upper Grande Ronde River basin from 18 March to 1 July, 2009.

Stream	Site ID	Redds	Redds/Km	Live Fish				Dead Fish
				Unmarked	Marked	Unknown	Total	
Battle Creek	227	0	0.00	0	0	0	0	0
Beaver Creek	231	2	1.05	0	0	0	0	0
Burnt Corral Creek	107	1	0.50	0	0	0	0	0
Burnt Corral Creek	239	2	1.05	1	0	0	1	0
Camp Creek	240	0	0.00	0	0	0	0	0
Catherine Creek	216	3	1.58	0	0	0	0	0
Catherine Creek	232	0	0.00	0	0	0	0	0
Chicken Creek	236	2	1.05	0	0	0	0	0
Clark Creek	109	5	2.50	2	1	2	5	0
Clark Creek	225	0	0.00	0	0	0	0	0
Clark Creek	241	1	0.45	0	0	0	0	0
Coyote Creek	228	0	0.00	0	0	0	0	0
Dry Beaver Creek	220	0	0.00	0	0	0	0	0
Dry Creek	229	2	1.00	0	0	0	0	0
Duncan Canyon Creek	237	2	0.91	0	0	0	0	0
East Phillips Creek	105	1	0.56	0	0	1	1	0
East Sheep Creek	219	1	0.50	0	0	0	0	0
Five Points Creek	106	2	1.00	0	0	1	1	0
Grande Ronde River	104	0	0.00	0	0	0	0	0
Little Lookingglass Creek	217	5	2.50	1	0	3	4	0
Meadow Creek	111	3	1.58	0	0	2	2	0
Meadow Creek	115	1	0.50	0	0	0	0	0
Middle Fork Clark Creek	218	1	0.50	3	0	0	3	0
Pelican Creek	222	1	0.50	1	0	0	1	0
Phillips Creek	113	0	0.00	0	0	1	1	0
South Fork Limber Jim Creek	224	0	0.00	0	0	0	0	0
Spring Creek	110	1	0.50	0	0	0	0	0
Spring Creek	238	2	1.05	2	0	0	2	0
West Chicken Creek	108	1	0.56	1	0	0	1	0
Whiskey Creek	230	4	2.00	2	1	1	4	0
Basin Total		**43**	**0.73**	**13**	**2**	**11**	**26**	**0**

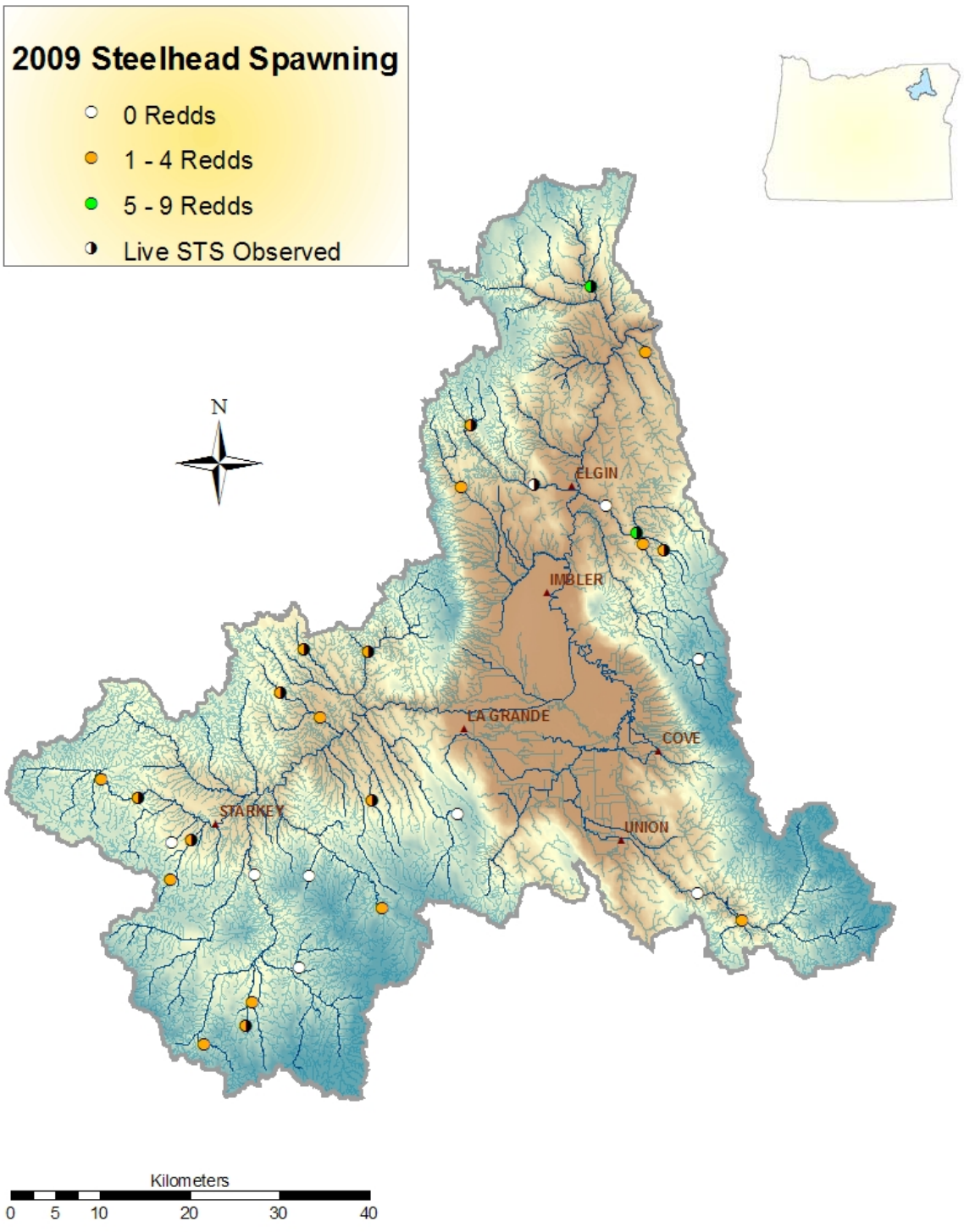

Figure 2. Map of the location and number of redds and steelhead observed in the Upper Grande Ronde River basin during spawning ground surveys conducted during the spring of 2009.

Table 3. Distance surveyed, total number of observed redds, redds/km, total number of estimated redds, and spawner escapement with 95% confidence intervals for steelhead in the Upper Grande Ronde River basin from March to July, 2008 and 2009.

Survey Year	Distance Surveyed (km)	Redds	Redds/km	Expanded Redds	Spawner Escapement	Lower 95% CL	Upper 95% CL
2008	69.8	24	0.34	401	1630	490	1912
2009	58.5	43	0.74	866	3299	2216	4383

Table 4. Redd and steelhead observations at annual spawning survey sites in the Upper Grande Ronde River basin conducted from March to July, 2008 and 2009. N/A represents sites that were not surveyed that year due to revoked access or unsuitable spawning habitat and the replacement sites which were added later.

		Observed redds		Observed steelhead	
Stream	Site ID	2008	2009	2008	2009
Duncan Canyon Creek	101	0	--	0	--
Willow Creek	102	0	--	0	--
Grande Ronde River	104	0	0	1	0
East Phillips Creek	105	0	1	0	1
Five Points Creek	106	0	2	0	1
Burnt Corral Creek	107	0	1	0	0
West Chicken Creek	108	0	1	0	1
Clark Creek	109	2	5	3	5
Spring Creek	110	4	1	3	0
Meadow Creek	111	0	3	0	2
Phillips Creek	113	4	0	0	1
Meadow Creek	115	--	1	--	0
Total		**10**	**15**	**7**	**11**

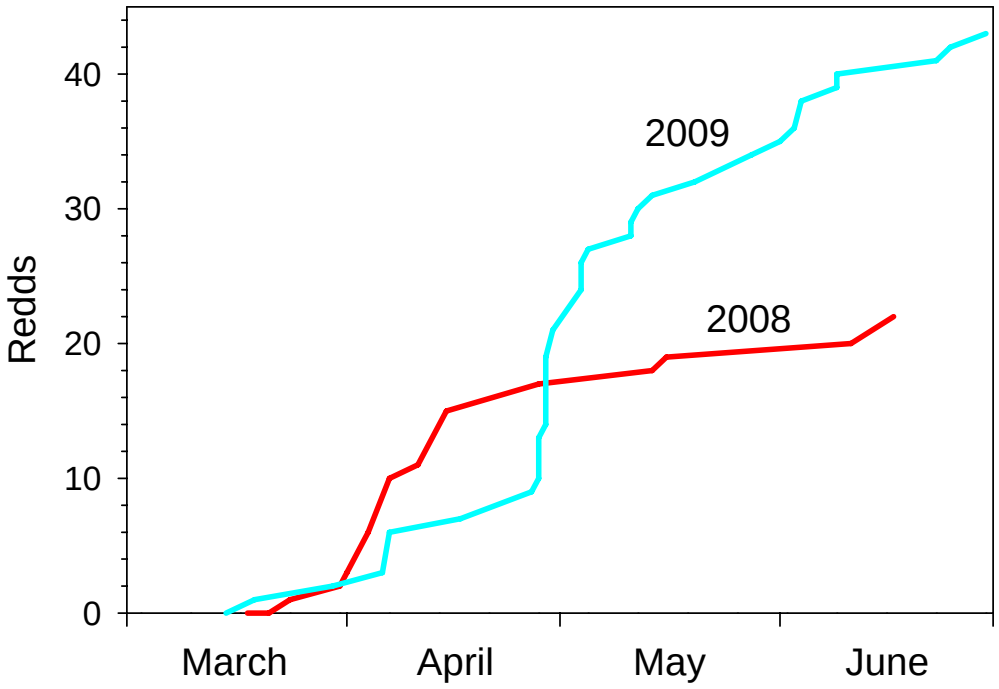

Figure 3. Cumulative number of steelhead redds observed in the Upper Grande Ronde River basin while conducting EMAP spawning ground surveys during 2008 and 2009.

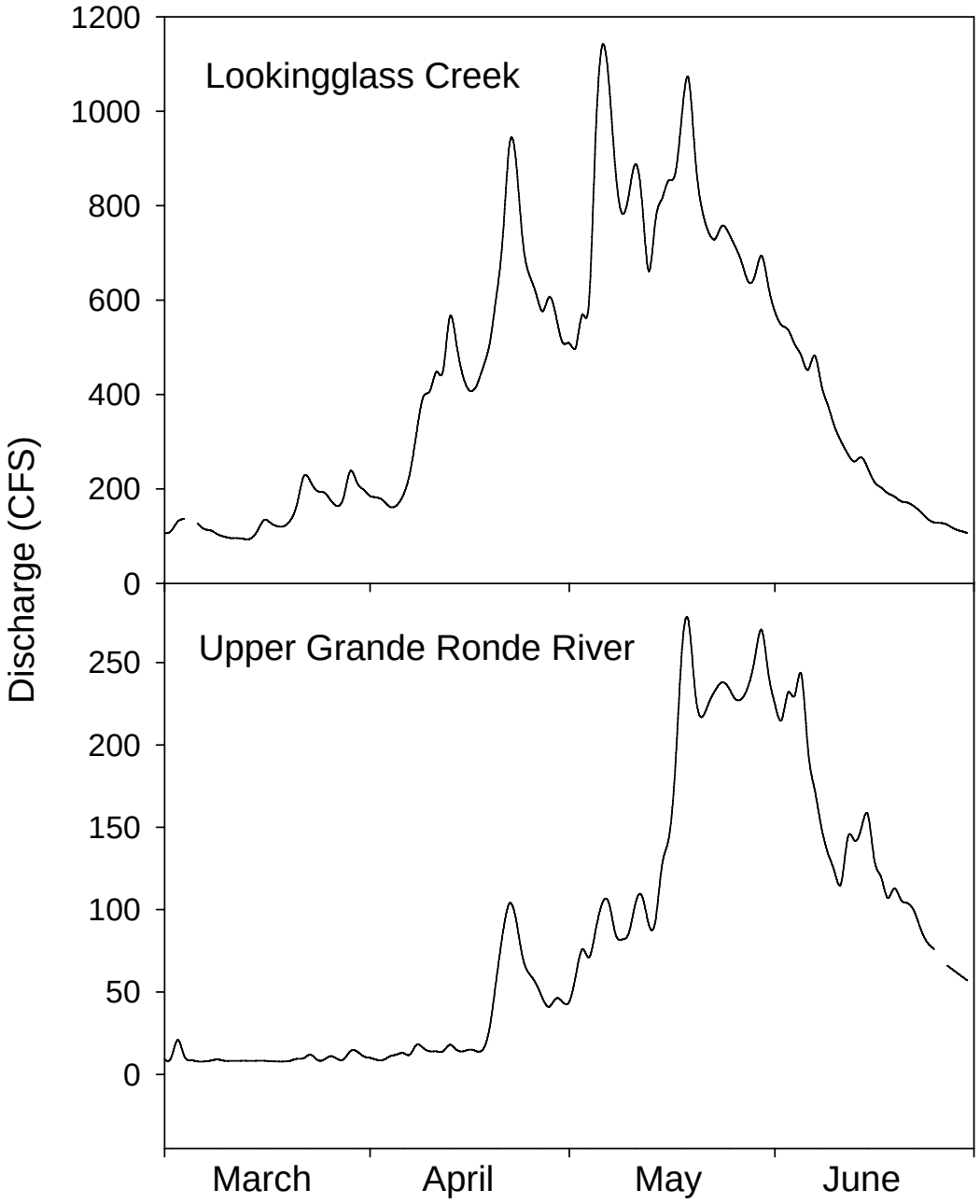

Figure 4. Mean daily discharge (ft^3/s) of two streams in the Upper Grande Ronde River basin, the Upper Grande Ronde River (near Clear Creek) and Lookingglass Creek, from March to July, 2009.

DISCUSSION

Viewing conditions were marginal during April and May, but overall they were better than the previous year. The steelhead escapement estimate for the Upper Grande Ronde River basin exceeded 3,000 adults. Redd density estimates were greater than 2008, approximately one redd for every 1.3 km. The viewing conditions are corrected for by using an annual fish/redd estimate from Deer Creek, a survey with a known adult escapement above a weir and similar viewing conditions compared to the balance of our survey sites. By comparison, redd density for similar surveys conducted in the John Day River basin was 0.53 redds/km or 177% of the density estimate for the Upper Grande Ronde. Snow pack in the Grande Ronde basin was average for the 2009 water year. Cool temperatures early in the spawning season and intermittent warm periods coupled with above average snow pack resulted in high flows and relatively turbid water conditions throughout much of the survey period.

We did not observe spawning activity at 9 of 30 (30%) sites surveyed in 2009. This is approximately twice the percentage observed in 2008 when only 9 redds were observed at 33 sites. Consequently, this greater density of redds throughout the spawning habitat reduced our confidence intervals to 33% of our mean estimate. Current and future sampling will refine the domain but low redd densities will always affect our variance estimates. Several stream reaches were eliminated from the spawner distribution based on our observations. Willow Creek, for example, has long reaches of soft bottom substrates and slow currents unsuitable for spawning. Much of Willow Creek within the Grande Ronde Valley was eliminated from our sample universe. Many headwater streams also have inadequate habitat for spawning and only continued site visits will identify these reaches. We did not encounter any new permanent barriers to anadromous fish during 2009.

We were able to identify 15 of the 26 adult steelhead that we observed on surveys. Of these, we observed two (13%) marked or hatchery origin steelhead. This suggests that more than 400 hatchery fish entered the Upper Grande Ronde watershed to spawn but our small sample size may distort this number. Hatchery steelhead releases of smolts in the Upper Grande Ronde River were discontinued in 1999. CTUIR also currently removes all hatchery marked steelhead at the weirs they operate on Lookingglass and Catherine Creeks and the Upper Grande Ronde River. Both of the hatchery adults that we observed were below these weirs. No hatchery steelhead were observed at any of the weirs during 2009.

After only two years of observation, it is too early to realistically relate our observations of redds with weir counts. In addition, there were too few survey sites above the weirs on Lookingglass and Catherine creeks to draw any conclusions there and the weir on the Upper Grande Ronde partially failed during 2008. However, our redd and spawner counts trended higher in 2009 when compared to 2008 counts, which is in agreement with concurrent weir counts during those two years.

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APPENDIX

Appendix Table 1. Survey date, number of adult steelhead and redds for each EMAP survey conducted during the Spring of 2009 on the Upper Grande Ronde River basin.

Site ID	Date	Stream	Panel	# New Redds	Live Wild	Live Unknown	Live Hatchery	Dead Total
104	03/23/2009	Grande Ronde River	1	0	0	0	0	0
104	04/03/2009	Grande Ronde River	1	0	0	0	0	0
104	06/25/2009	Grande Ronde River	1	0	0	0	0	0
105	04/29/2009	East Phillips Creek	1	1	0	1	0	0
105	05/13/2009	East Phillips Creek	1	0	0	0	0	0
105	06/02/2009	East Phillips Creek	1	0	0	0	0	0
106	05/12/2009	Five Points Creek	1	0	0	1	0	0
106	05/28/2009	Five Points Creek	1	2	0	0	0	0
106	06/10/2009	Five Points Creek	1	0	0	0	0	0
107	04/21/2009	Burnt Corral Creek	1	0	0	0	0	0
107	05/05/2009	Burnt Corral Creek	1	0	0	0	0	0
107	05/20/2009	Burnt Corral Creek	1	1	0	0	0	0
107	06/02/2009	Burnt Corral Creek	1	0	0	0	0	0
108	04/21/2009	West Chicken Creek	1	0	0	0	0	0
108	05/05/2009	West Chicken Creek	1	1	1	0	0	0
108	05/18/2009	West Chicken Creek	1	0	0	0	0	0
108	06/01/2009	West Chicken Creek	1	0	0	0	0	0
108	06/22/2009	West Chicken Creek	1	0	0	0	0	0
109	03/26/2009	Clark Creek	1	0	0	0	0	0
109	04/07/2009	Clark Creek	1	3	1	2	0	0
109	04/16/2009	Clark Creek	1	0	0	0	0	0
109	04/27/2009	Clark Creek	1	2	1	0	1	0
109	05/11/2009	Clark Creek	1	0	0	0	0	0
109	05/27/2009	Clark Creek	1	0	0	0	0	0
109	06/08/2009	Clark Creek	1	0	0	0	0	0
110	04/07/2009	Spring Creek	1	0	0	0	0	0
110	04/16/2009	Spring Creek	1	0	0	0	0	0
110	04/28/2009	Spring Creek	1	1	0	0	0	0
110	05/11/2009	Spring Creek	1	0	0	0	0	0
110	05/26/2009	Spring Creek	1	0	0	0	0	0
110	06/08/2009	Spring Creek	1	0	0	0	0	0
111	03/24/2009	Meadow Creek	1	0	0	0	0	0
111	04/06/2009	Meadow Creek	1	1	0	0	0	0
111	04/28/2009	Meadow Creek	1	1	0	2	0	0
111	05/12/2009	Meadow Creek	1	0	0	0	0	0
111	05/26/2009	Meadow Creek	1	0	0	0	0	0
111	06/09/2009	Meadow Creek	1	1	0	0	0	0
113	03/18/2009	Phillips Creek	1	0	0	1	0	0
113	03/30/2009	Phillips Creek	1	0	0	0	0	0
113	06/02/2009	Phillips Creek	1	0	0	0	0	0
113	06/16/2009	Phillips Creek	1	0	0	0	0	0

115	05/15/2009	Meadow Creek	1	0	0	0	0	0
115	05/26/2009	Meadow Creek	1	0	0	0	0	0
115	06/08/2009	Meadow Creek	1	0	0	0	0	0
115	06/23/2009	Meadow Creek	1	1	0	0	0	0
216	03/19/2009	Catherine Creek	2	1	0	0	0	0
216	03/30/2009	Catherine Creek	2	1	0	0	0	0
216	06/25/2009	Catherine Creek	2	1	0	0	0	0
217	04/17/2009	Little Lookingglass Creek	2	1	0	0	0	0
217	05/04/2009	Little Lookingglass Creek	2	3	1	3	0	0
217	06/03/2009	Little Lookingglass Creek	2	1	0	0	0	0
217	06/16/2009	Little Lookingglass Creek	2	0	0	0	0	0
218	04/06/2009	Middle Fork Clark Creek	2	0	0	0	0	0
218	05/14/2009	Middle Fork Clark Creek	2	1	3	0	0	0
218	06/08/2009	Middle Fork Clark Creek	2	0	0	0	0	0
219	04/22/2009	East Sheep Creek	2	0	0	0	0	0
219	05/18/2009	East Sheep Creek	2	0	0	0	0	0
219	06/01/2009	East Sheep Creek	2	1	0	0	0	0
219	06/23/2009	East Sheep Creek	2	0	0	0	0	0
220	05/19/2009	Dry Beaver Creek	2	0	0	0	0	0
220	06/01/2009	Dry Beaver Creek	2	0	0	0	0	0
222	05/04/2009	Pelican Creek	2	0	0	0	0	0
222	05/20/2009	Pelican Creek	2	0	0	0	0	0
222	06/01/2009	Pelican Creek	2	0	1	0	0	0
222	06/30/2009	Pelican Creek	2	1	0	0	0	0
224	04/02/2009	South Fork Limber Jim Creek	2	0	0	0	0	0
224	04/13/2009	South Fork Limber Jim Creek	2	0	0	0	0	0
224	04/29/2009	South Fork Limber Jim Creek	2	0	0	0	0	0
225	04/27/2009	Clark Creek	2	0	0	0	0	0
225	05/13/2009	Clark Creek	2	0	0	0	0	0
225	06/03/2009	Clark Creek	2	0	0	0	0	0
225	06/18/2009	Clark Creek	2	0	0	0	0	0
227	03/24/2009	Battle Creek	2	0	0	0	0	0
227	04/08/2009	Battle Creek	2	0	0	0	0	0
227	04/21/2009	Battle Creek	2	0	0	0	0	0
227	05/05/2009	Battle Creek	2	0	0	0	0	0
227	05/20/2009	Battle Creek	2	0	0	0	0	0
228	05/11/2009	Coyote Creek	2	0	0	0	0	0
229	04/07/2009	Dry Creek	2	0	0	0	0	0
229	04/29/2009	Dry Creek	2	2	0	0	0	0
229	05/19/2009	Dry Creek	2	0	0	0	0	0
229	06/03/2009	Dry Creek	2	0	0	0	0	0
229	06/18/2009	Dry Creek	2	0	0	0	0	0
230	04/29/2009	Whiskey Creek	2	3	1	0	1	0
230	05/11/2009	Whiskey Creek	2	1	1	1	0	0
230	05/29/2009	Whiskey Creek	2	0	0	0	0	0
230	06/09/2009	Whiskey Creek	2	0	0	0	0	0

231	06/04/2009	Beaver Creek	2	2	0	0	0	0
231	06/30/2009	Beaver Creek	2	0	0	0	0	0
232	04/01/2009	Catherine Creek	2	0	0	0	0	0
232	06/25/2009	Catherine Creek	2	0	0	0	0	0
236	04/08/2009	Chicken Creek	2	0	0	0	0	0
236	04/20/2009	Chicken Creek	2	0	0	0	0	0
236	04/30/2009	Chicken Creek	2	2	0	0	0	0
236	05/13/2009	Chicken Creek	2	0	0	0	0	0
236	06/01/2009	Chicken Creek	2	0	0	0	0	0
236	06/22/2009	Chicken Creek	2	0	0	0	0	0
237	04/20/2009	Duncan Canyon Creek	2	0	0	0	0	0
237	05/04/2009	Duncan Canyon Creek	2	2	0	0	0	0
237	05/19/2009	Duncan Canyon Creek	2	0	0	0	0	0
238	04/28/2009	Spring Creek	2	1	2	0	0	0
238	05/12/2009	Spring Creek	2	1	0	0	0	0
238	05/26/2009	Spring Creek	2	0	0	0	0	0
238	06/08/2009	Spring Creek	2	0	0	0	0	0
239	04/06/2009	Burnt Corral Creek	2	0	0	0	0	0
239	04/28/2009	Burnt Corral Creek	2	1	0	0	0	0
239	05/12/2009	Burnt Corral Creek	2	0	1	0	0	0
239	05/26/2009	Burnt Corral Creek	2	0	0	0	0	0
239	06/09/2009	Burnt Corral Creek	2	1	0	0	0	0
240	05/21/2009	Camp Creek	2	0	0	0	0	0
240	06/09/2009	Camp Creek	2	0	0	0	0	0
240	07/01/2009	Camp Creek	2	0	0	0	0	0
241	04/27/2009	Clark Creek	2	0	0	0	0	0
241	05/11/2009	Clark Creek	2	1	0	0	0	0
241	05/27/2009	Clark Creek	2	0	0	0	0	0
241	06/08/2009	Clark Creek	2	0	0	0	0	0