TECHNICAL MEMORANDUM 3-1a

Stream Fish Populations
Wise Powerhouse Overflow Reach
2008/2009 Progress Report

Drum-Spaulding Project
FERC Project No. 2310-173

June 2009

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Stream Fish Populations Qualitative Level I Sampling in the Wise Powerhouse Overflow Reach of Auburn Ravine – Executive Summary

This technical memorandum presents stream fish population data collected on April 22, 2009 in the Wise Powerhouse Overflow Reach of Auburn Ravine. In 2008, stream fish populations were surveyed at 44 of 45 stream reaches prescribed with Level I open-sampling qualitative methodology as specified in the Stream Fish Populations Study Plan (Study 2.3.1) for the Drum-Spaulding Project and the Yuba-Bear Hydroelectric Project. The remaining Level I site at Wise Powerhouse Overflow Reach of Auburn Ravine required additional permission to electrofish due to the potential for ESA protected steelhead to be present.

A total of 43 fish were collected, representing three species: riffle sculpin (n=27, 63%), rainbow trout (n=15, 35%), and speckled dace (n=1, 2%). All collected rainbow trout represented either yearling or 2+ age groups. No young-of-the-year rainbow trout were captured. All fish collected appeared in relatively good condition. Length-weight regressions for rainbow trout and sculpin also indicated good condition.

No variances occurred during this effort.

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Stream Fish Populations Qualitative Level I Sampling in the Wise Powerhouse Overflow Reach of Auburn Ravine - 2008 Progress Report

1.0 Background

This technical memorandum presents stream fish population data collected on April 22, 2009 in the Wise Powerhouse Overflow Reach of Auburn Ravine. In 2008, stream fish populations were surveyed at 44 of 45 stream reaches prescribed with Level I open-sampling qualitative methodology as specified in the Stream Fish Populations Study Plan (Study 2.3.1) for the Drum-Spaulding Project and the Yuba-Bear Hydroelectric Project. Fish population surveys in 2008 were performed under a standard Scientific Collectors Permit issued by the California Department of Fish and Game (CDFG). The remaining Level I site at Wise Powerhouse Overflow Reach of Auburn Ravine required an additional Section 4(d) Permit from the National Marine Fisheries Service (NMFS) to electrofish due to the potential occurrence of threatened California Central Valley steelhead (*Oncorhynchus mykiss*) that are protected under the Endangered Species Act (ESA).

The Section 4(d) Permit was applied for in October 2008, when the open application period began, and was issued by NMFS on March 24, 2009. CDFG also provided a letter of permission on April 17, 2009. Field sampling subsequently occurred on April 22, 2009.

The following summary is a description of the methods and results of sampling in the Wise Powerhouse Overflow Reach of Auburn Ravine.

2.0 Methodology

The methodology for the survey followed the detailed parameters for Level I sampling in the Stream Fish Population Study Plan. A complete description of the Level I sampling methodology can be found in the study plan.

The Wise Powerhouse Overflow Reach, located in Auburn Ravine, is approximately 1.2 miles long and extends from PCWA's Auburn Tunnel (RM 26.4) upstream to the point where PG&E's Wise Powerhouse discharges into Auburn Ravine (RM 27.6). The reach ranges in elevation from 45 to 880 feet and has a channel gradient of 0.7 percent.

Qualitative Level I electrofishing was conducted over two accessible sections of the Wise Powerhouse Overflow Reach. The upper section began at the City of Auburn's Waste Water Treatment Plant (RM 27.4) and extended approximately 765 feet upstream to a weir located just below the point where flows from Wise Powerhouse can be released into Auburn Ravine. The lower section began at the Placer County Water Agency (PCWA) tunnel near the stream crossing

at Lozanos Road (RM 26.4) in Newcastle, California and extended upstream approximately 350 feet.

The open sampling approach did not require partitioning (*i.e.*, blocknetting) any habitat or section of stream; however, it did require the sampling of a minimum 50 habitat units or "spot" samples. Collected fish were identified to species, measured by fork length (mm), and weighed to the nearest 0.1 gram. Additional information collected included habitat characterization information, water temperature, conductivity, and representative photographs.

3.0 Results

A total of 88 potential fish habitat spots along two sections of the Wise Powerhouse Overflow Reach were sampled on April 22, 2009. The total length of stream sampled was 1,115 feet. During the survey, the crew was informed by a PG&E field representative that the flow that was currently being released from South Canal during sampling was approximately 35 cfs.

A total of 50 spots were sampled in the upper section. The channel substrate was comprised of boulder (60%), cobble (20%), gravel (10%), and bedrock (10%). The upper section averaged 20 feet in width and 1.5 feet in depth, and was characterized as riffle (60%), pool (15%), and glide (25%) habitat. Approximately 70 percent of the channel was covered by the riparian canopy. Conductivity in the upper reach was 51.7 microseimens. Instantaneous water temperature at the site on the day of sampling was 9.9º C. Photographs of the upper section are presented at the end of this document in Figure 1.

A total of 38 spots were sampled in the lower section. Channel substrate was composed of boulder (40%), cobble (40%), and gravel (20%). The lower section averaged 25.0 feet in width and 2 feet in depth, and was characterized as riffle (60%), pool (20%), and glide (20%) habitat. Approximately 40 percent of the channel was covered by riparian canopy. Conductivity in the lower reach was 83.3 microseimens. Instantaneous water temperature was 13.5º C. Photographs of the lower section are presented in Figure 1.

A total of 43 fish were collected representing three species overall between both stream sections. The upper stream section was dominated by rainbow trout (n=11, 92%), with only one speckled dace (8%). The lower stream section was numerically dominated by riffle sculpin (n=27, 87%) with fewer rainbow trout (n=4, 13%). Table 1 provides a summary of catch (both raw count and CPUE), relative abundance, length, weight, and condition by stream section for all species. Overall, the catch was numerically dominated by riffle sculpin (n=27, 63%) followed by rainbow trout (n=15, 35%) and speckled dace (n=1, 2%). However, overall, rainbow trout were dominant in terms of biomass. Catch Per Unit Effort (CPUE) averaged 2.7 fish per minute overall for the reach.

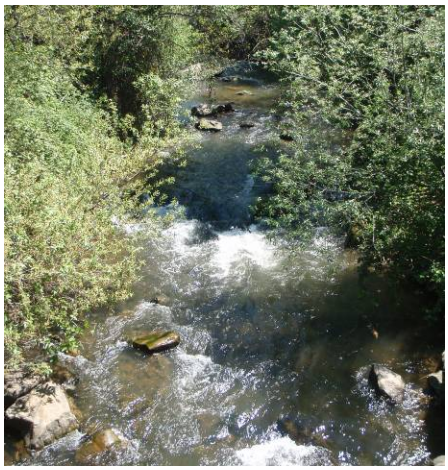
Weight data collected from the sampling event allowed for length-weight regressions to be performed on rainbow trout and sculpin. The plotted data and regressions are presented in Figures 2 and 3, respectively. Relative condition factor could not be calculated for speckled dace due to insufficient sample size.

Table 1. Summary of species, catch (both raw count and CPUE), relative abundance, length, weight, and condition of fish collected in the Wise Powerhouse Overflow Reach of Auburn Ravine, April 22, 2009. Relative condition factor was only calculated for the both stream sections combined.

Section	Species	No.	Catch/min	Relative Abundance	Length (mm)			Weight (g)			Rel. Cond. Factor		
					min	max	mean	min	max	mean	min	max	mean
Upper Section	Rainbow Trout	11	1.2	92%	102	165	122	14.4	52.1	23.7			
	Speckled Dace	1	0.1	8%	85	85	85	9.5	9.5	9.5			
Lower Section	Rainbow Trout	4	0.6	13%	129	210	152	25.9	118.1	51.6			
	Riffle Sculpin	27	3.8	87%	42	111	69	0.8	0.8	5.9			
Sections Combined	Rainbow Trout	15	0.9	35%	102	210	130	14.4	118.1	32	0.77	1.11	0.92
	Riffle Sculpin	27	1.7	2%	42	111	69	0.8	0.8	5.9	0.64	1.40	1.02
	Speckled Dace	1	0.1	63%	85	85	85	9.5	9.5	9.5	n/a	n/a	n/a

Upper section looking upstream

Upper section looking downstream



Lower section looking upstream

Lower section looking downstream

Example of rainbow trout and most commonly represented size class

Image of the largest collected rainbow trout (210 mm and 118.1g)

Figure 1. Photographs of the Wise Powerhouse Overflow Reach and examples of collected rainbow trout.

Rainbow trout ranged from 106 mm to 210 mm in fork length (avg=130 mm) and 14.4 g to 118.1 g in weight (avg=32 g). Mean condition factor for rainbow trout was 0.92 (n=15, R^2=0.96). Sculpin ranged from 42 mm to 111 mm in fork length (avg=69 mm) and 0.8 g to 20.0 g in weight (avg=5.9 g). Mean condition factor for sculpin was 1.02 (n=27, R^2=0.96).

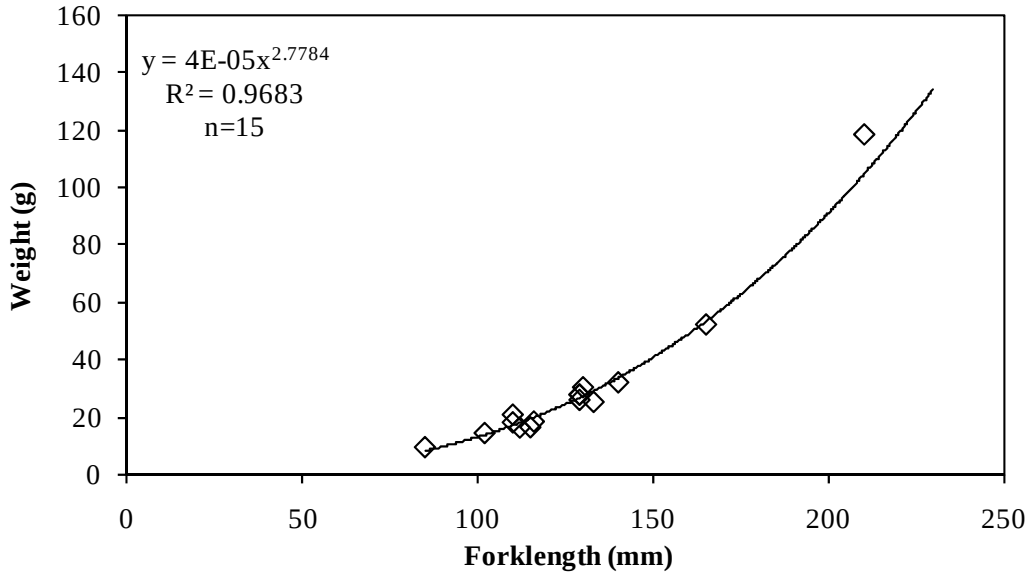


Figure 2. Length-weight regression for rainbow trout collected in the Wise Powerhouse Overflow Reach of Auburn Ravine, April 22, 2009.

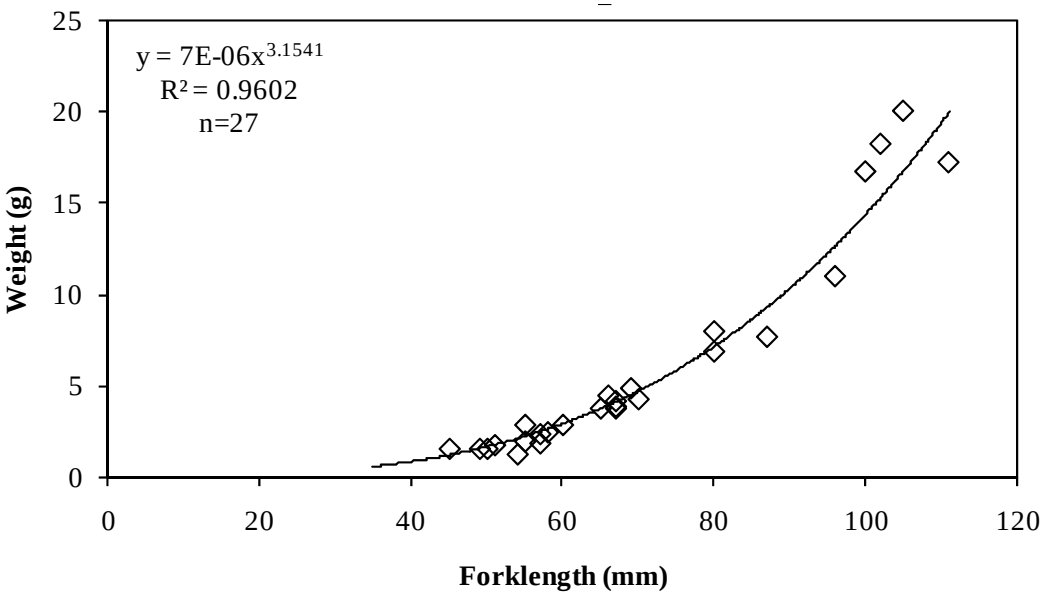


Figure 3. Length-weight regression for riffle sculpin collected in the Wise Powerhouse Overflow Reach of Auburn Ravine, April 22, 2009.

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