

Gannon Slough/Jacoby Creek, Thence Humboldt Bay
City of Arcata Property
June 16, 2010

On June 16, 2010 CA Department of Fish and Game's (DFG) Natural Stocks Assessment Project (NSA) conducted fish and water quality (WQ) sampling in the Gannon Slough and Jacoby Creek estuary complex (Figure 1). Monthly fish and WQ sampling was conducted to determine if juvenile salmonids and other fish species utilize the complex for rearing and if water quality is adequate to support juvenile salmonids. We collected information to establish baseline data about juvenile salmonids and other fish species presence and use of the complex prior to planned restoration work in an effort to measure the success of habitat restoration projects.

Fish Sampling

We deployed minnow traps baited with frozen salmon roe in Gannon Slough and Beith Creek (Figure 2). We deployed a minnow trap in a jump pool at the upstream end of Gannon Slough. We fished it for 290 minutes and captured <10 threespine stickleback. We deployed a minnow trap at the base of the jump pools at the upstream end of Gannon Slough and fished it for 275 minutes and captured 10-50 threespine stickleback. We deployed a minnow trap in the West tributary just upstream of its confluence with Gannon Slough (Figure 2). We fished the trap for 255 minutes and captured 50-100 threespine stickleback. We deployed a minnow trap in Beith Creek approximately 50 feet upstream of its confluence with Gannon Slough (Figure 2). We fished the trap for 30 minutes and captured no fish. Finally, we deployed a minnow trap in the pool just downstream of the new tide gate in the east channel of Gannon Slough. We fished the trap for 90 minutes and captured one prickly sculpin. We made two seine hauls in Gannon Slough at its confluence with Beith Creek and captured no fish. We made two seine hauls just upstream of the new tide gate and captured one coho salmon. It was 108 mm FL and we applied a PIT tag to it. We also captured <10 threespine stickleback and <10 Pacific staghorn sculpin. We made two seine hauls in the west channel of Gannon Slough about 100 feet downstream of the old tide gate and captured one coho salmon. It was 108 mm FL and we applied a PIT tag to it. We also captured 10-50 threespine stickleback, <10 saddleback gunnel, 10-50 Pacific staghorn sculpin, <10 adult shiner surfperch, <10 juvenile shiner surfperch, and <10 juvenile Dungeness crab. Finally, we conducted two seine hauls in Jacoby Creek just upstream of the Highway 101 Bridge and captured two yearling coho, seven yoy coho, one juvenile steelhead, and three yoy trout. Their mean FL's were 98 mm (range 92-104) for the yearling coho; 52 mm (range 45-59) for yoy coho; 36 mm (range 29-46) for the yoy trout; and the steelhead was 86 mm. We applied PIT tags to two yearling coho, two yoy coho, and one steelhead trout. We also captured 10-50 threespine stickleback, <10 Pacific staghorn sculpin, and <10 adult surfsmelt.

Water Quality Sampling

CDFG collected water quality samples at eight locations on Gannon Slough on June 16, 2010 using a Yellow Springs Instruments Model 85 meter (Figures 1 &2). We collected water quality samples in Gannon Slough from about one hour before to about three hours after a predicted -1.3 foot low tide (1027 hours at the Arcata Wharf). Jacoby Creek was completely freshwater this month and measured water quality parameters were good for juvenile salmonids (Table 1). A landslide in a tributary upstream had caused Jacoby Creek to run very turbid for a number of weeks. However, the stream

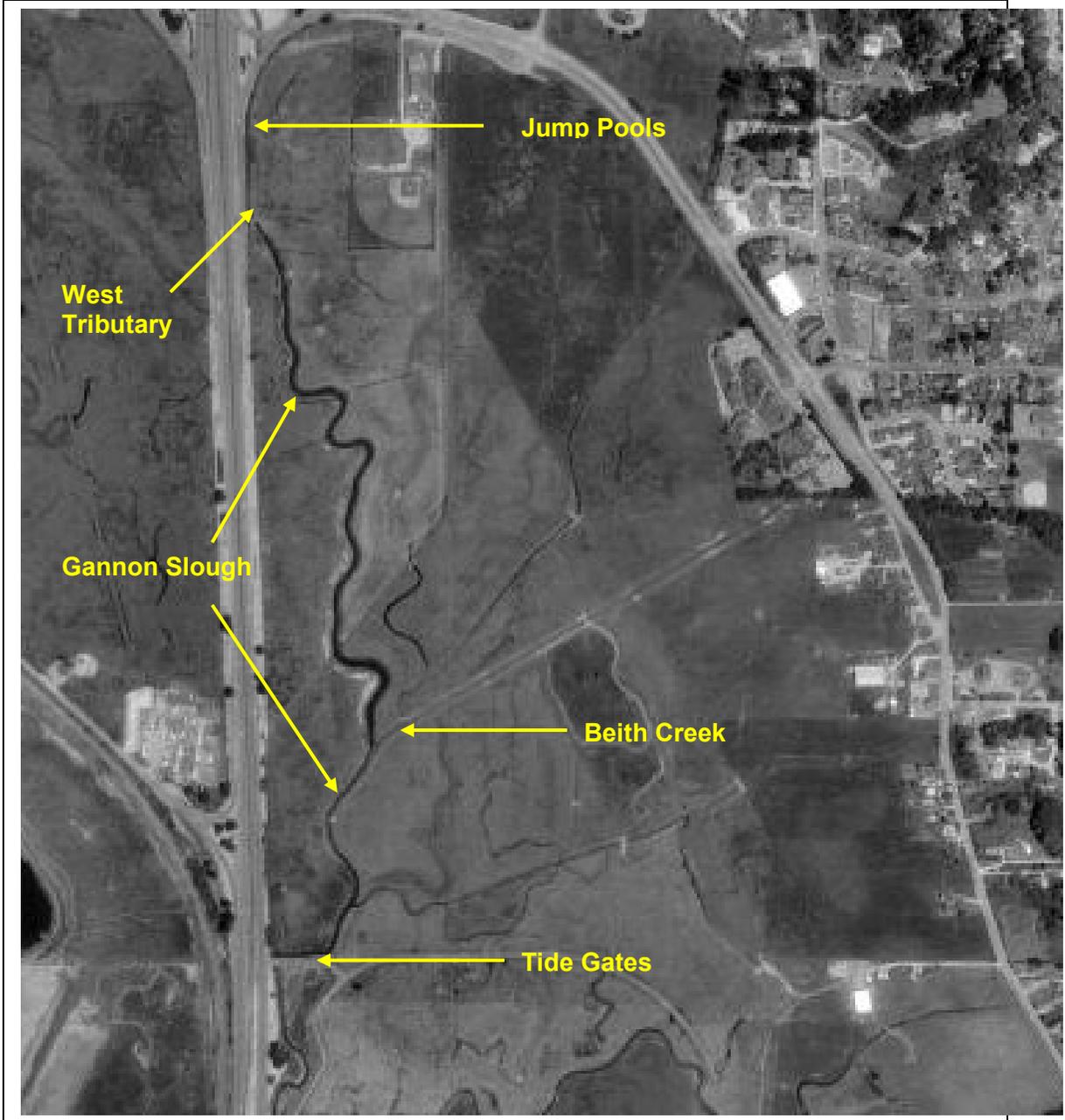


Figure 1. Approximate locations of fish sampling sites in Gannon Slough. The Jacoby Creek site is farther south and does not appear in photo.

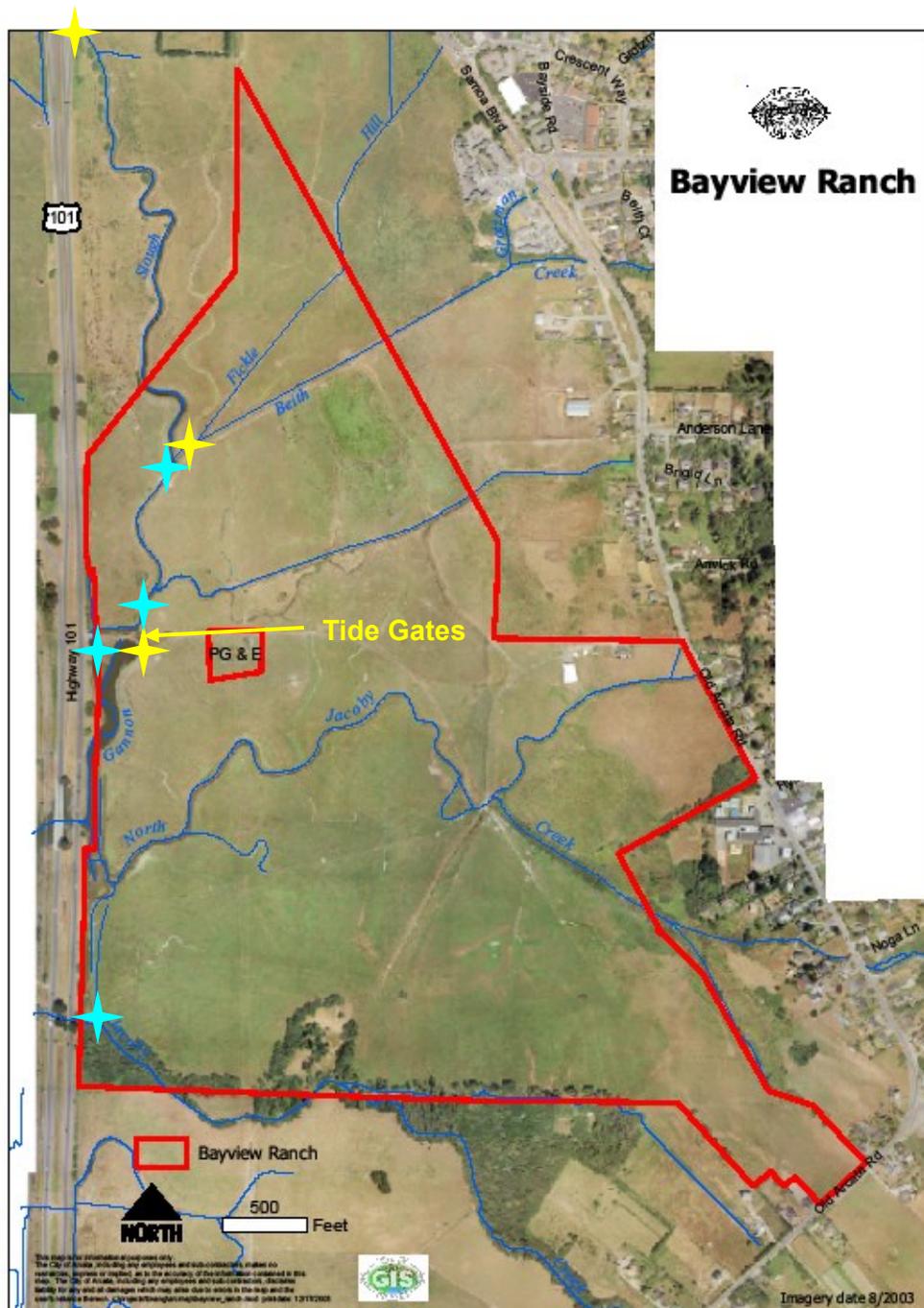


Figure 2. Approximate locations of fish sampling sites in Gannon Slough. Yellow stars indicate usual minnow trapping and blue stars indicate usual seining sites. Jump pool site sampled with a minnow trap is farther north and does not appear in photo.

Table 1. Water temperature measurements collected in Gannon Slough/Jacoby Creek estuary complex, June 16, 2010.

Water Quality Site	Time	Depth (feet)	Water Temp (° C)	Salinity (ppt)	Conductivity (µS/cm)	Dissolved Oxygen (mg/l)
Jump Pool surface	0925	0.5	12.4	0.1	186.5	6.59
bottom		1.5	12.4	0.1	187.1	7.09
Base of Jump Pool surface	0930	0.5	12.5	0.1	189.9	7.70
bottom		2.5	12.5	0.1	190.1	7.81
West Trib surface	0940	0.5	13.5	0.3	469.0	5.79
bottom		1.5	13.1	0.3	453.9	6.34
Above Beith Creek bottom	1305	0.5	21.8	1.8	3192	12.90
Beith Creek bottom	1320	1.0	15.9	0.7	183.8	9.73
Above Tidegate bottom	1230	1.0	18.7	1.8	2985	10.77
Below Tidegate East channel surface	1225	0.5	18.5	2.5	4111	11.80
bottom		2.0	18.6	2.5	4112	11.22
West channel bottom	1135	0.5	18.4	12.8	18.58 ms/cm	10.48
Jacoby Cr Hwy 101 Bridge surface	1025	0.5	10.6	0.1	111.3	11.33
middle		1.5	10.7	0.1	111.7	11.30
bottom		3.0	10.7	0.1	110.9	11.51

was running clear during our sampling day. In Gannon Slough we detected brackish water up to 13 ppt and brackish water up to 2 ppt as far upstream as the confluence with Beith Creek (Table 1). Water temperatures ranged from 12.4 to 13.5°C in upper Gannon Slough during the morning hours and 18.4 to 21.8°C in lower Gannon Slough during the early afternoon hours (Table 1). Dissolved oxygen was >6.5 mg/l at all sampled sites except for the west tributary (Table 1). Water quality conditions were adequate for juvenile salmonids in upper Gannon Slough but warm water temperatures in lower Gannon Slough were likely stressful for coho salmon.

We captured coho salmon in Gannon Slough for the second month in a row (Table 2). None contained PIT tags so we don't know if they moved downstream from Campbell or Beith Creek drainages or moved into Gannon Slough from Jacoby Creek. We captured two yearling coho and seven yoy coho salmon in Jacoby Creek this month. We've observed a declining number coho smolts migrating from other Humboldt Bay tributaries this month as their seasonal emigration winds to a close. Multiple juvenile life stages of

Table 2. Summary of the numbers of juvenile salmonids captured in Gannon Slough and Jacoby Creek September 2007 to June 2010. Seine effort is number of seine hauls and minnow trap (MT) effort is number of traps set.

Date	Gannon Slough				Jacoby Creek				Yoy Trout		
	Effort		Coho	SH	Cutt	Effort		Coho		SH	Cutt
	MT	Seine				Seine	Seine				
09-28-07	4	0	0	0	0	-	-	-	-	-	
10-31-07	3	5	0	0	0	2	0	0	0	3	
12-04-07	4	6	0	0	0	0	-	-	-	-	
01-15-08	5	6	0	0	0	2	0	0	0	0	
02-14-08	5	6	0	0	0	2	0	0	0	0	
03-13-08	5	6	0	0	0	0	-	-	-	-	
04-14-08	5	6	2	0	0	2	0	0	0	0	
05-13-08	7	2	0	0	0	2	0	0	0	0	
06-12-08	6	4	0	0	0	2	2	0	0	5	
07-09-08	6	5	0	0	3	2	0	0	0	0	
08-21-08	6	4	0	0	1	2	14	6	0	0	
09-22-08	4	6	0	0	0	2	0	1	0	0	
10-23-08	4	6	0	0	0	2	0	0	0	0	
12-16-08	5	6	0	0	0	2	0	1	0	0	
01-29-09	5	6	0	0	0	2	0	0	0	0	
02-26-09	5	6	0	0	0	2	2	1	0	0	
03-19-09	5	6	1	0	0	2	0	0	0	0	
04-28-09	5	4	0	0	0	2	50	3	0	0	
05-27-09	6	4	0	0	0	2	19	0	0	1	
06-30-09	5	4	0	0	0	2	0	0	0	0	
07-28-09	4	6	0	2	2	2	0	0	0	0	
08-24-09	4	6	0	0	0	2	4	2	0	0	
09-23-09	4	6	0	1	0	2	0	0	0	0	
10-21-09	5	6	0	0	0	2	0	0	0	0	
11-24-09	5	6	2	0	0	2	0	0	0	0	
12-17-09	5	4	0	0	0	2	9	0	0	0	
01-21-10	4	0	0	0	0	0	-	-	-	-	
02-23-10	5	6	2	0	0	2	0	0	0	0	
03-23-10	6	4	0	0	0	2	0	0	0	0	
04-21-10	5	6	0	0	0	0	-	-	-	-	
05-24-10	5	6	3	0	1	2	19	1	0	2	
06-16-10	5	6	2	0	0	2	9	1	0	3	
Total	157	160	12	3	7	54	128	16	0	14	

coho salmon and steelhead trout were present in lower Jacoby Creek and exposed to high turbidity for weeks due to a landslide upstream in a Jacoby Cr tributary.

June was be the last month NSA is scheduled to sample Jacoby Creek and Gannon Slough. This completes an almost three year survey of water quality and juvenile salmonid use of these areas. We've shown that juvenile coho salmon are present in Jacoby Creek, mostly during the smolt migration in April and May, but are also present in lower numbers at other times of the year (Table 2). However, we captured relatively few juvenile salmonids in Gannon Slough. This is most likely due to the presence of brackish water during much of the year and high water temperatures from late spring to

mid fall. In other Humboldt Bay tributaries yearling coho salmon use the stream-estuary habitat to over-winter during high stream flows and in some tributaries sub yearling coho rear there during the summer. In other Humboldt Bay tributaries we found that juvenile coho routinely rear for months in the stream-estuary ecotone, however, we did not recapture any project marked fish in Jacoby Creek and Gannon Slough so we have not documented extended rearing by juvenile salmonids at these sites. However, we did recapture a coho in Rocky Gulch that was originally tagged in Jacoby Creek which confirmed that some juvenile coho from Jacoby Creek use adjacent watersheds as non-natal rearing habitat. Juvenile coho from Jacoby Creek probably also move into Gannon Slough though we never captured any project marked fish from Jacoby Creek in Gannon Slough. NSA also captured a few juvenile steelhead and cutthroat trout in Gannon Slough and a few juvenile steelhead and yoy trout in Jacoby Creek (Table 2). NSA also documented the persistent presence of tidewater goby in Gannon Slough and Jacoby Creek showing that restoration projects can create habitat that supports both listed coho salmon and tidewater goby. Based on information collected by NSA in other Humboldt Bay tributaries I believe we can increase juvenile salmonid use of Gannon Slough by creating better connections between Gannon Slough and Jacoby Creek. Also, improving habitat conditions in freshwater streams entering the Gannon Slough/Jacoby Creek estuary complex (i.e. Beith and Campbell Creeks) will also benefit juvenile coho in this area. Hopefully, NSA provided useful pre-project fish information for planned habitat restoration efforts in the Gannon Slough Jacoby Creek estuary complex.

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