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Lower-Klamath River juvenile salmonid fish health sampling 2006

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INTRODUCTION

During June and July of 2006, staff from the Yurok Tribal Fisheries Program (YTFP) collected juvenile chinook salmon from the lower-Klamath River for an evaluation of the severity and occurrence of fish disease. The project was conducted in cooperation with staff from the U.S. Fish and Wildlife (USFWS) California Nevada Fish Health Center who performed the analysis of fish pathogens in their laboratory in Red Bluff, California. The primary function of YTFP staff was to obtain samples from the river, and the main role of USFWS staff was to analyze samples for signs and severity of disease.

Because only a fraction of juvenile hatchery chinook salmon are marked in the Klamath Basin, adipose clipped fish were of particular interest to USFWS staff because the hatchery of origin of these fish could be determined. This allowed for a comparison of disease occurrence and severity between Iron Gate Hatchery chinook salmon and Trinity River chinook salmon. This information could help shed light on differences in vulnerability to disease between the two stocks, when and how badly fish become infected, etc.

The purpose of this report is to document the activities of the Trinity River Division of Yurok Tribal Fisheries Program during the sampling efforts; it is not intended to be a full or final report on the disease evaluation which is being conducted by USFWS personnel. Additional sampling by YTFP staff occurred near the Klamath River Estuary, but results from those efforts are not summarized in this document

METHODS

We used a beach seine that was 15.24 m long and 1.22 m high to capture fish. We generally used the seine in a downstream direction, one person holding on to each wing, running with the current as quickly as possible in order to ensnare fish. Fish were pulled close to the edge of the water, but left in the water in the cod end of the seine as this greatly reduced mortalities. Captured fish were then scooped up and placed in buckets for sorting.

We then worked quickly, two people at one time, counting the number of non-adipose clipped chinook salmon and other species. Each person kept a mental record until the data could be entered into a log book prior to the next seine set. When an adipose clipped chinook salmon was encountered, it was placed in a lethal dose of MS-222. Each week, we collected up to 10 non-adipose clipped chinook salmon and as many adipose clipped chinook salmon as possible. After 10 non-clipped chinook salmon were collected, all others were released directly back into the river. Collected fish were placed on ice immediately. A portion of unclipped coho salmon and brown trout were measured to fork length.

We often captured large numbers of juvenile fish and non-target species in one seine set, especially when the bulk of the hatchery chinook salmon arrived in our sampling area. During the heat of the summer and with warm water temperatures, high numbers of mortalities could mount in a matter of minutes if one did not exercise caution. The method we used to sort fish reduced the amount of mortalities, reduced the equipment needed for sampling, and increased the sample size of adipose clipped chinook salmon by allowing us to sort through large numbers of chinook salmon quickly.

We sampled in the Klamath River near Roaches Creek (rkm 50.5), to Pecwan Creek (rkm 40.25) (Figure 1). We found it very challenging to locate sites in this reach that were suitable for the use of a beach seine; and the ones we did find were often marginal. For instance, many of the sandy areas, which is the type of substrate a seine is meant for, were too steep and deep to sample effectively. Other areas such as gravel bars looked appealing, but any large cobbles would be captured in the cod end and dragged with the seine, tearing holes in the area where fish collect. A large backwater at Pecwan Creek seemed to provide a good area for sampling, but a deep layer of silt was consistently captured in the cod end causing high mortality rates and making sampling very difficult.

Nonetheless, we managed to find a few places that were marginally suitable and spent time clearing these areas of large rocks and woody debris. Some of the best areas seemed to be gravel bars with small sized substrate.

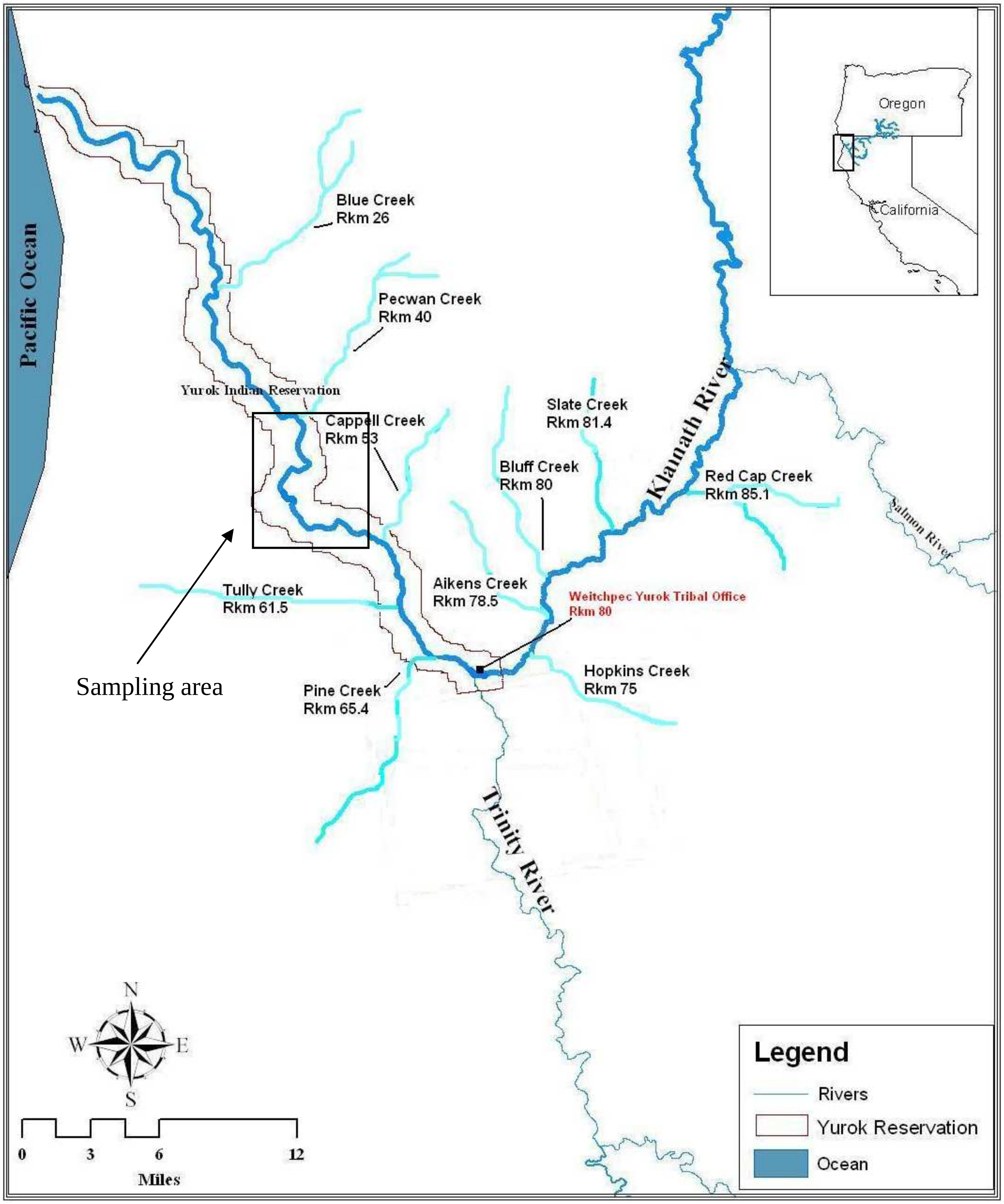

Figure 1. Map of the lower-Klamath River and sampling area.

RESULTS

Catch of both marked and unmarked juvenile chinook salmon peaked in the last week of June and the first week in July (Figure 2 and Table 1). The pattern of catch-per-unit of effort (CPUE) of both clipped and unclipped juvenile chinook salmon was very similar and it is likely that the majority captured were of hatchery origin.

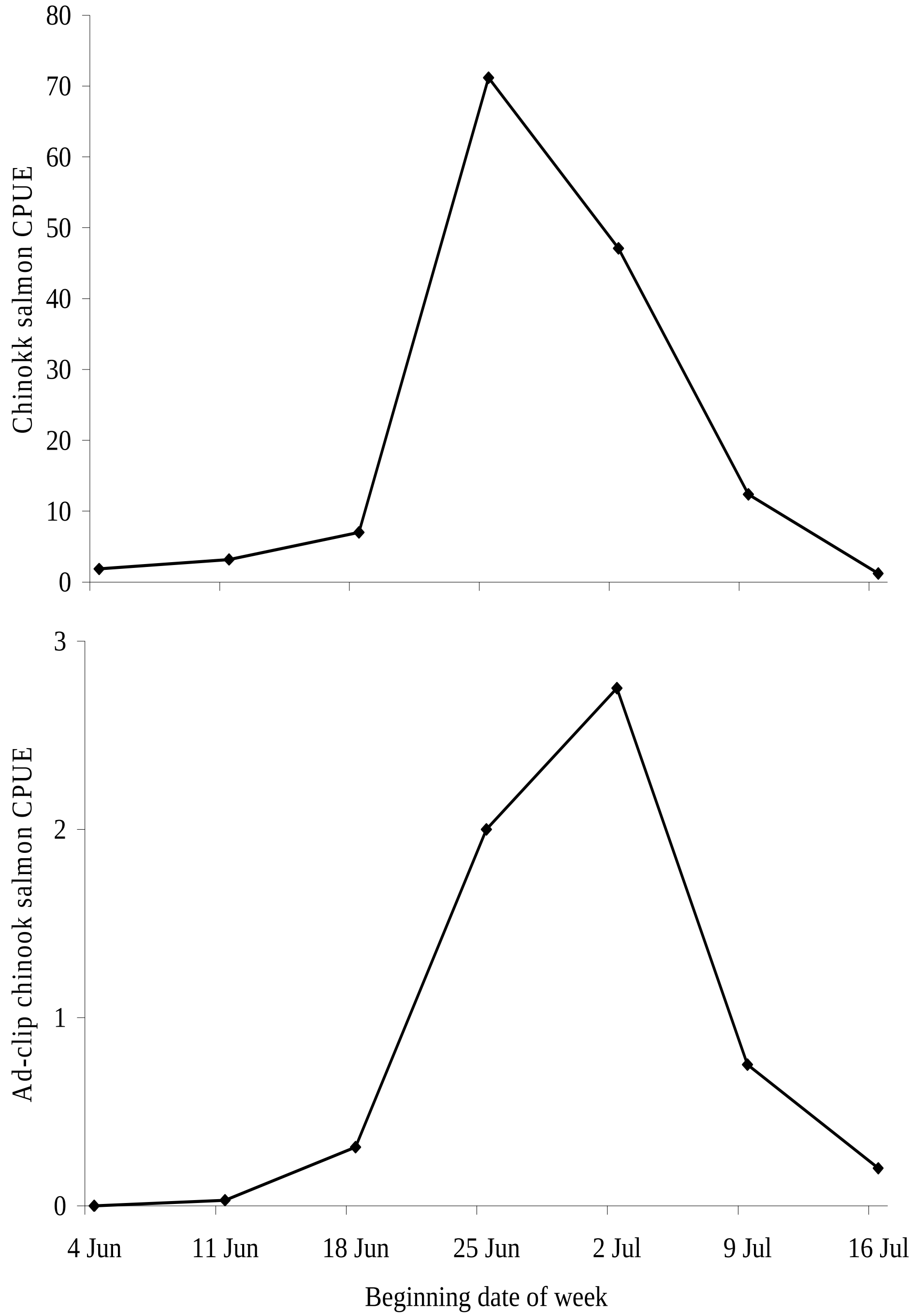

Figure 2. Chinook salmon CPUE, and adipose clipped chinook salmon CPUE, expressed as catch per seine set, lower-Klamath River California, 2006.

Table 1. Data collected by YTFP staff using a 15.24 × 1.22 m beach seine in the lower-Klamath River, California, 2006.

					Chinook salmon														
					No clip		Ad clip		Steelhead		Coho salmon								
Week	Date	Location	rkm	Seiene sets (*n*)	Captured	Collected	Captured	Collected	No clip	Ad clip	No clip	Right max	Left max	Sucker	Speckled dace	Three spine Stickleback	Sculpin	Brown trout
1	6 Jun	Pecwan Cr.	40.25	6	11	10	0	0	5	0	0	0	0	1	4	1	2	0
2	13 Jun	Pecwan Cr.	40.25	15	43	0	0	0	7	0	24	2	0	1	7	1	3	0
2	14 Jun	Pecwan Cr.	40.25	8	40	0	1	1	4	0	20	3	0	0	0	1	1	0
2	15 Jun	Pecwan Cr.	40.25	10	21	10	0	0	6	0	10	0	0	1	3	27	3	0
3	22 Jun	Pecwan Cr.	40.25	9	72	10	4	4	5	0	3	0	0	0	6	166	5	0
3	23 Jun	Pecwan Cr.	40.25	7	35	0	1	1	4	0	1	0	0	1	37	130	12	0
4	28 Jun	Notchko	47.75	5	343	10	12	12	3	0	0	0	0	3	9	5	2	0
4	29 Jun	Notchko	47.75	5	345	0	12	8	8	0	0	0	0	4	6	0	2	0
5	5 Jul	Notchko	47.75	3	172	0	11	11	3	0	0	0	0	0	1	37	1	0
5	6 Jul	Metah Cr.	45.75	2	77	10	5	5	43	0	8	0	0	0	0	0	0	2
5	6 Jul	Notchko	47.75	3	106	0	6	6	0	0	0	0	0	0	0	2	0	0
6	13 Jul	Notchko	47.75	2	2	0	0	0	0	0	0	0	0	0	1	3	1	0
6	13 Jul	Metah Cr.	45.75	3	73	10	6	6	11	0	6	0	0	0	0	0	0	1
6	14 Jul	Metah Cr.	45.75	3	18	0	0	0	11	0	0	0	0	0	0	8	0	1
7	19 Jul	Metah Cr.	45.75	2	4	4	1	1	6	0	0	0	0	0	0	3	0	0
7	20 Jul	Roaches Cr.	50.50	3	1	1	0	0	7	0	0	0	0	0	4	0	0	0
			Totals	86	1,363	65	59	55	123	0	72	5	0	11	78	384	32	4

However, all CPUE data must be viewed with caution. Changes in catchability, the proportion of the population removed per unit of effort (Ricker 1975), can lead to changes in CPUE, regardless of true population trends. The usefulness CPUE as a measure of abundance is questionable; some researchers have found that commercial (Harley et al. 2001; Crecco and Overholtz 1990) and sportfishing (Peterman and Steer 1981) CPUE is not proportional to abundance, while others have found that sportfishing CPUE varies directly with fish populations (Hansen et al 2000; Newby et al. 2000) and fish density (Deriso and Parma 1987). Moreover, CPUE measurement error causes bias in parameter estimates (Gould et al. 1997; Peterman et al. 1985), further complicating inferences one can make about fish populations using CPUE.

While it is not known if the CPUE data presented here is directly proportional to abundance, it serves the purpose of giving fisheries personnel a rough idea of when the number of hatchery chinook salmon peaked in the study area. This also provides fisheries personnel with a means by which to plan for future sampling efforts.

The bulk of the wild, juvenile steelhead that we captured were generally ensnared near a tributary stream, such as Metah Creek. Fewer numbers were found per seine set in areas such as Notchko where there are no streams in the immediate area.

Of particular concern was the presence of brown trout in our sampling reach. We captured 4 juvenile brown trout during the course of our sampling, all near the mouth of Metah Creek, possibly their natal stream. Two of these fish measured 123 mm and 149 mm. Fork length was not recorded for the other two brown trout, but their size was similar to the others. The stomach of the brown trout that was 149 mm contained fish parts. It is unfortunate that these non-native salmonids may be inhabiting streams in the lower-Klamath River that contain truly wild salmonids like steelhead. Brown trout compete with other species for limited food and habitat (McHugh and Budy 2006; Dewald and Wilzbach 1992; Wang and White 1994; Waters 1983) and could adversely affect juvenile chinook salmon populations (Glova and Field-Dodgson 1995).

Several unclipped juvenile coho salmon were captured, mainly in the large backwater just downstream from Pecwan Creek. We captured fish that were apparently from two different year classes; some were roughly 60-90 mm (juveniles) while another group was roughly 110-130 mm (smolts). The size range was 68 mm to 129 mm. Fork length data for 28 wild coho salmon are given below in 10 mm bins (61-70 mm, 71-80 mm, etc.):

Fork length (mm)	Count
70	1
80	2
90	12
100	6
110	2
120	3
130	2

These data suggest that both young of the year and yearling coho salmon may use the Klamath River, especially near tributary mouths, for rearing zones.

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