

Yurok Tribe Studies of Eulachon Smelt in the Klamath River Basin, California

PROGRESS REPORT

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Project Goals:

- Adult eulachon sampling on the Klamath River, Redwood Creek, and the Mad River.
- Juvenile and larval eulachon sampling on the Klamath River, Redwood Creek, and the Mad River.
- Water sampling for environmental dna on the Klamath River, Redwood Creek, and the Mad River.

Project Accomplishments:

Klamath River

A) Adult Sampling:

We conducted seine and dip net sampling on the Klamath River from January 17th 2011 to April 22nd, 2011. Approximately 600 individual dip net hauls were made and 126 seine net hauls were completed. This sampling took place at 12 locations between river kilometer (rkm) 0 and rkm 23. No eulachon were captured during seining operations and two eulachon adults were captured using dip nets (Table 1). Five other adult eulachon were donated to the Yurok Tribal Fisheries Program (YTFP) by local pacific lamprey fishermen. These eulachon were captured in the surf near the mouth of the Klamath River (Table 2). Judging by the condition of their gonads, all five seemed to be sexually mature adults.

B) Juvenile / Larval Sampling:

Plankton net sampling for juvenile and larval eulachon began on February 2nd, 2011 and ended on March 9th, 2011. A total of 49 plankton net samples were done at 10 different locations between rkm 3.2 and rkm 20 (Table 3). Collected samples will be processed in our lab at a later date, sometime during the summer of 2011.

C) Water Sampling (e-dna):

Water sampling on the Klamath River began in May of 2011 which was later than originally planned. Once a week four liters of river water are collected from a site at rkm 1. These water samples are filtered at our lab within 24 hours of collection. Each filtered liter of water produces one filter paper sample which is stored in a centrifuge tube and frozen. These samples will be stored in our lab freezer until the Microbiology Department at Oregon State University develops a method to extract and identify eulachon dna from the filter paper. This goal was not fully accomplished due to uncertainty regarding methodology as protocols and techniques are still being developed.

Redwood Creek

A) Adult Sampling:

We conducted seine and dip net sampling on March 29th and March 31st, 2011 on Redwood Creek. Over the two sampling days we conducted 16 seine hauls and 315 dip net hauls. All seine net and dip net hauls were made between rkm 0 and rkm 4.75 and occurred at 9 separate locations. River discharge during these two sampling events averaged 3750 cfs and river temperature averaged 9.75 C. No adult eulachon were captured at Redwood Creek. This goal was not fully accomplished due to permitting issues discussed below.

B) Juvenile / Larval Sampling

One plankton net sample was attempted at Redwood Creek on March 29th, 2011. Due to unusually high turbidity and debris levels, no samples were collected. This goal was not fully accomplished due to permitting issues discussed below.

C) Water Sampling (e-dna)

Water sampling on Redwood Creek began in May of 2011. Once a week four liters of river water are collected from a site at rkm 1. These water samples are filtered at our lab within 24 hours of collection. Each filtered liter of water produces one filter paper sample which is stored in a centrifuge tube and frozen. These samples will be stored in our lab freezer until the Microbiology Department at Oregon State University develops a method to extract and identify eulachon dna from the filter paper. This goal was not fully accomplished due to uncertainty regarding methodology, and permitting issues discussed below.

Mad River

A) Adult Sampling:

We conducted seine and dip net sampling on March 30th and March 31st, 2011 on the Mad River. Over the two sampling days we conducted 3 seine hauls and 185 dip net hauls. All seine net and dip net hauls were made between rkm 0 and rkm 8 and occurred at 7 separate locations. River discharge during these two sampling events averaged 5400 cfs and river temperature averaged 10.25 C. No adult eulachon were captured at Mad River. This goal was not fully accomplished due to permitting issues discussed below.

B) Juvenile / Larval Sampling

One plankton net sample was conducted on the Mad River on March 30th, 2011. Due to high turbidity and debris levels, no samples were collected. This goal was not fully accomplished due to permitting issues discussed below.

C) Water Sampling (e-dna)

Water sampling on the Mad River began in May of 2011. Once a week four liters of river water are collected from a site near rkm 3. These water samples are filtered at our lab within 24 hours of collection. Each filtered liter of water produces one filter paper sample which is stored in a centrifuge tube and frozen. These samples will be stored in our lab freezer until the Microbiology Department at Oregon State University develops a method to extract and identify eulachon dna from the filter paper. This goal was not fully accomplished due to uncertainty regarding methodology, and permitting issues discussed below.

Problems Encountered:

Klamath River:

We encountered few problems on the Klamath River in regards to adult eulachon sampling and a majority of our project goals were met. The most severe issue was unusually high and turbid water during certain time periods of the study. This created unsafe working conditions which inhibited our ability to sample for adult eulachon. These conditions were present during the middle of March and no sampling was done during this time period. High river discharges and turbidity levels also hampered our juvenile and larval sampling efforts on the Klamath River. After the large flow event of mid March the river remained high and turbid through April. Plankton net sampling was not feasible during this time period. Water sampling for dna analysis began later than expected on the Klamath River. This was due to uncertainty regarding the feasibility and design of this segment of the study. We continue to work closely with the Microbiology Department at Oregon State University to develop the necessary tools to complete this portion of the study.

Redwood Creek and Mad River:

Sampling on Redwood Creek and the Mad River was severely restricted in 2011 due to unforeseen circumstances regarding the California State Department of Fish and Game (CDFG) permitting process. In order to sample on Redwood Creek or the Mad River, we needed CDFG permits that would cover any incidental take of coho salmon. The CDFG refused to issue these documents because we did not have coho take coverage in our Federal Biological Opinion (BiOp) for the project. The BiOp had to be rewritten to include coho take and then the CDFG produced a Memorandum of Understanding (MOU) with the YTFP allowing the incidental take of coho. This MOU was not completed until after March 31st, which was the last day we were allowed to sample on Redwood Creek or the Mad River under our Federal BiOp. Fortunately, we were granted a temporary permit to sample these streams the last week of March by the CDFG. This temporary permit was valid until the MOU was completed. Unfortunately, both Redwood Creek and Mad River were unusually high and turbid during the last week of March, which hampered our ability to effectively sample for adult, juvenile, and larval eulachon. However, we were still able to sample on both streams two times in the extremely small sampling window that we had. Water sampling for dna analysis began later than expected on Redwood Creek and the Mad River. This was due to uncertainty regarding the feasibility and design of this segment of the study. We continue to work closely with the Microbiology Department at Oregon State University to develop the necessary tools to complete this portion of the study.

Expenditures:

Personnel	\$55,304.89
Supplies	\$11,652.08
Vehicles	\$4,955.72
Jet Boat Fuel	\$1,065.98
Indirect	\$20,082.94
Total	\$93,061.61

Table 1: Weekly results for adult eulachon sampling on the Klamath River in 2011. Water temperatures are shown in degrees Celsius and discharge is expressed in thousands (k) of cubic feet per second (cfs).

Week	Date	Average Water Temp	Discharge (Avg. k/cfs)	# of Seines	# of Dips	# Of Fish Captured
1	1/17 - 1/21	8.1	55.6	0	85	0
2	1/24 - 1/28	8.3	12.3	8	0	0
3	1/31 - 2/4	7.5	15.3	8	150	0
4	2/7 - 2/11	6.9	12.4	11	0	0
5	2/14 - 2/18	7.0	24.9	15	80	0
7	2/21 - 2/25	7.0	14.8	23	0	0
8	2/28 - 3/4	7.6	17.0	17	30	0
9	3/7 - 3/11	9.7	39.6	13	0	0
10	3/28 - 4/1	9.4	46.7	0	45	2
11	4/4 - 4/8	8.9	39.8	14	210	0
12	4/11 - 4/15	9.4	28.1	14	0	0
13	4/18 - 4/22	9.4	48.6	3	0	0

Table 2: Data related to captured or donated eulachon from 2011 Klamath River eulachon study. Locations are shown in river kilometers (rkm) and left bank or right bank (LB, RB). Fin clip sample number and collected fish sample number can be correlated genetic and whole fish samples from this study. Sex is either male (M), female (F), or unknown (U), and length is presented in millimeters (mm).

Sample #	Date	Time Captured	Location rkm/Bank	Fin Clip Sample #	Collected Fish Sample #	Sex	Length (mm)
1	1/17/2011	2100	0/LB	011711_KE1_W	KDE1_011711_W	M	170
2	3/4/2011	1830	0/RB	030411_KE2_W	KDE2_030411_W	F	184
3	3/4/2011	2000	0/RB	030411_KE3_W	KDE3_030411_W	M	164
4	3/4/2011	2200	0/RB	030411_KE4_W	KDE4_030411_W	F	184
5	3/30/2011	1030	0/RB	033011_KE1_K	N/A	F	176
6	3/31/2011	1130	0/RB	033111_KE2_K	N/A	U	175
7	4/28/2011	1100	0/LB	042811_KE3_K	KDE3_042811_K	M	195

Table 3: Klamath River plankton net sampling data for 2011 YTFP eulachon study. Locations are shown as river kilometers (rkm) and either right bank (RB) or left bank (LB).

Sample Number	Date	Location (rkm/bank)	Time Sampled (minutes)	Volume Sampled (cubic meters)
1	2/2/2011	11/ RB	25	133.38
2	2/2/2011	11/ RB	21	83.68
3	2/9/2011	11/ RB	20	17.97
4	2/9/2011	11/ RB	10	0.60
5	2/10/2011	14/ LB	60	275.68
6	2/10/2011	14/ LB	20	214.93
7	2/10/2011	4/ RB	25	308.94
8	2/10/2011	4/ RB	20	303.66
9	2/16/2011	11.5/ RB	48	60.62
10	2/16/2011	11.5/ RB	6	60.56
11	2/17/2011	14/ LB	10	3.97
12	2/17/2011	14/ LB	10	4.68
13	2/17/2011	11/ LB	4	54.16
14	2/17/2011	11/ LB	7	110.97
15	2/18/2011	14.5/ RB	50	13.34
16	2/18/2011	14.5/ RB	10	16.22
17	2/18/2011	11/ LB	10	98.75
18	2/22/2011	14/ LB	20	4.46
19	2/22/2011	14/ LB	16	76.82
20	2/22/2011	11/ LB	44	121.20
21	2/22/2011	11/ LB	5	81.90
22	2/22/2011	4/ RB	60	813.65
23	2/22/2011	4/ RB	16	230.74
24	2/23/2011	14/ LB	56	648.13
25	2/23/2011	14/ LB	12	140.06
26	2/23/2011	11/ LB	56	596.92
27	2/23/2011	11/ LB	22	118.33
28	2/24/2011	7.5/ RB	24	187.36
29	2/24/2011	7.5/ RB	58	259.23
30	2/24/2011	5.6/ LB	20	141.54
31	2/24/2011	5.6/ LB	51	501.98
32	3/1/2011	7.5/ LB	18	112.00
33	3/1/2011	7.5/ LB	21	135.70
34	3/1/2011	3.2/ RB	18	140.42
35	3/1/2011	3.2/ RB	14	132.69
36	3/2/2011	11/ RB	60	977.30

Table 3
continued:

Sample Number	Date	Location (rkm/bank)	Time Sampled (minutes)	Volume Sampled (cubic meters)
37	3/2/2011	11/ RB	26	224.63
39	3/2/2011	4/ RB	60	629.76
40	3/4/2011	20/ LB	5	39.41
41	3/4/2011	20/ LB	6	46.06
42	3/4/2011	19/ RB	5	57.62
43	3/4/2011	19/ RB	5	51.17
44	3/7/2011	14/ LB	7	78.77
45	3/7/2011	14/ LB	5	80.16
46	3/9/2011	4/ RB	13	1.20
47	3/9/2011	4/ RB	7	1.49
48	3/9/2011	18/ LB	10	108.50
49	3/9/2011	18/ LB	10	108.66