California Department of Fish and Wildlife

Region One

CDFW Salt River Restoration Project Fisheries Monitoring Report Number 2014_12_14

Results of Fish Species Presence and Distribution Monitoring Conducted from March to July, 2014 Within the Salt River, Eel River Estuary, Phase One Project Area, Humboldt County California

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Abstract

Phase one of the Salt River, Eel River Estuary restoration project was implemented during the summer of 2013. Eleven sites were selected for post Salt River phase one project fish species presence and distribution monitoring on March 18, 2014 by personnel from the California Department of Fish and Wildlife (CDFW) and Humboldt County Resource Conservation District (HCRCD). Baited minnow traps and a 1/8th Inch mesh pole seine were operated at each of the eleven sites during surveys that occurred once monthly from March to July, 2014, and captured fish were identified and released. Surveys identified the species presence of tidewater goby (*Eucyclogobius newberryi*), coho (Oncorhynchus kisutch), chinook (Oncorhynchus tshawytscha), three-spine stickleback (*Gasterosteus aculeatus*), sculpin species (*Cottoidea*), juvenile smelt, topsmelt (*Atherinops affinis*), shiner perch (*Cymatogaster aggregate*); surf perch (*Perciform*); pipefish (*Syngnathus leptorhyncus*), and a saddle back gunnel (*Pholis ornata*).

1. INTRODUCTION

The Salt River is a tidally influenced slough tributary to the Eel River Estuary located in Humboldt County near Ferndale, California. Salinity in the Salt River varies by the interaction of tides, Eel River flow stage, and the input of freshwater tributary streams that drain from the Wildcat Ridge above Ferndale. In the mid 1800's the channel was deep enough to support ship traffic to Port Kenyon on the Salt River, but increased sediment delivered from the upper watershed and reduced tidal prism to flush sediment resulted in an aggraded channel of much smaller dimension. The frequency of flooding of Ferndale and surrounding farmland increased incrementally as the Salt River filled over the last century, and efforts to find a solution were initiated as flooding became an annual issue. Planning by residents and farm interests, as well as local, state, and federal government culminated in a multi-phase plan to restore hydraulic and ecological function to the Salt River.

At the mouth of the Salt River the 420 acre Riverside Ranch was purchased from an interested seller, and phase one of the Salt River restoration was focused upon this area. The 2013 phase one restoration included slough excavation and slough levee and tide gate removal with the goal of increasing hydraulic flow function to the lower two and a half miles of the Salt River. All fish within the phase one project area were captured and relocated from the Salt River and its finger sloughs prior to channel dewatering and excavation. Water was allowed back into the Salt River phase one project area in October of 2013 following completion of the projects excavation and construction activities.

A post Salt River phase one project monitoring will be conducted by CDFW, HCRCD, and partners over multiple years to determine fish species presence and distribution. That monitoring is the focus of this report.

2. METHODS

a. Site Selection: Eleven sites on the Salt River phase one restoration project area were selected for fish presence and distribution monitoring to represent the diversity of channel size and habitats in the main Salt River Slough, N1 Slough, and S1 Slough (Figure 1) (Table 1). Some of the eleven sites were also associated with constructed project habitat features such as in-channel large wood and a hump in the channel long profile referred to as a tidewater goby lift (Table 1). Site locations were documented in field notes and GPS, and all sites were staked and flagged. All monitoring site locations were transferred to a Salt River phase one project area GIS base map provided by HCRCD.

b. Survey Gear and Methods: Each site is sampled using a 1/8th inch mesh pole seine net and a baited minnow trap. Minnow traps are baited with a 2 cm diameter ball of certified disease free salmon roe and deployed at sites for no less than one hour. Typically a single 1/8th inch mesh pole seine pass is made through each site. Captured fish are held in aerated buckets, identified to species, counted, and released back into the waterway. Additionally, juvenile salmonids are measured, held in a recovery bucket, and then released back into the waterway. Captured pike minnow are enumerated into 100 millimeter size classes by ocular

estimation, and the non-native pike minnow are humanely euthanized and buried via permit requirement. A start time, end time, and air and water temperature, measured by thermometer, are recorded for each minnow trap and seine deployment. Start and end water salinity and dissolved oxygen measurements are also recorded for each minnow trap and seine deployment; however, this equipment was not available for the March 18-24, 2014 survey.

c. Survey Frequency: In year one of monitoring, a monthly survey interval of the eleven sites is planned to identify seasonal use, presence, and distribution of fish within the Salt River Phase one project area.
d. Data Storage and Analysis: Monitoring site survey data is recorded in the field on paper data forms. Paper data sheets are error checked in the field, and survey data is entered into an excel data file with back up file system on the CDFW Fortuna server at location U/FRGP Data/Salt River/Monitoring. Paper data sheets are retained on file at CDFW Fortuna office 1487 Sandy Prairie Ct, Suite A, Fortuna, CA 95540. Data will be analyzed for fish species presence associated with each monitoring site, seasonality, water temperature, salinity, dissolved oxygen, and project habitat features. Pike minnow data will be analyzed for presence of length classes of pike minnow in 100 millimeter size class increments. Salmonid fork length data will be analyzed for seasonal growth rate.
e. Data Reporting and Distribution: A report will be written and distributed for each monthly monitoring survey under the title "*CDFW Salt River Restoration Project Fisheries Monitoring Report Number Year_Month_Day. Results of Fish Species Presence and Distribution Monitoring Conducted Month, Day(s), Year Within the Salt River, Eel River Estuary, Phase One Project Area, Humboldt County California*". An annual report will be written and distributed under the title "*CDFW Salt River Restoration Project Fisheries Monitoring Annual Report Number Year_Month_Year_Month. Results of Fish Species Presence and Distribution Monitoring Conducted Year Month to Year Month Within the Salt River, Eel River Estuary, Phase One Project Area, Humboldt County California*. Reporting will be distributed to HCRCD, United States Fish and Wildlife Service (USFWS), NOAA Fisheries Service, and The California Coastal Commission. Reports will be archived and available from CDFW Fortuna office 1487 Sandy Prairie Ct, Suite A, Fortuna Ca, 95540.

Figure 1: *Salt River Phase One Project Area Fisheries Monitoring Site locations*

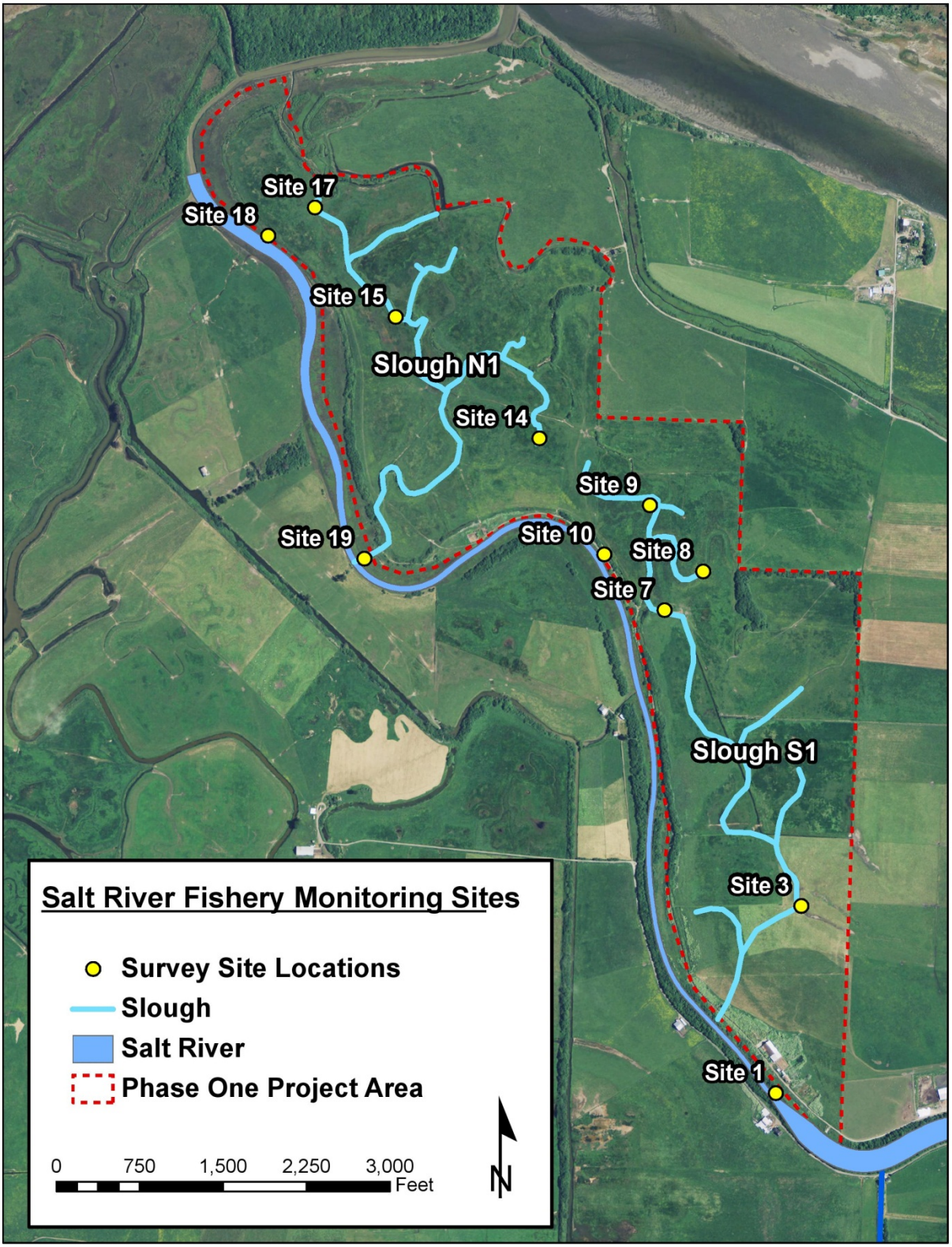

Table 1. *Salt River Phase One Project fisheries monitoring site location descriptions:*

- Site 1 is located on the main stem Salt River near the Riverside Ranch Barn and a telephone pole adjacent to the main road. Seine the main channel from approximately 150 feet up stream of the telephone pole down to the pole. Set minnow trap under telephone line.
- Site 3 is located at the confluence of the S1 slough and a left bank tide gated drainage channel not depicted in blue line on the map. Seine both the S1 slough and runoff channel. Set minnow trap in slough upstream of the confluence.
- Site 7 is associated with a piece of placed large woody debris (LWD) in the S1 slough. Seine 100 feet on either side of the LWD. Place minnow trap in close proximity to the LWD.
- Site 8 is associated with a goby lift on a branch of the S1 slough. Seine from the lift to the upstream end of the excavated channel. Place minnow trap in the middle of the channel above the goby lift.
- Site 9 is associated with a goby lift on a branch of the S1 Slough. Seine from the lift to the upstream end of the excavated channel. Place minnow trap in the middle of the channel above the goby lift.
- Site 10 is on the main stem Salt River between the mouths of the two sloughs. Seine 150 feet of the river channel and place minnow trap in the middle of the channel.
- Site 14 is located on a branch of the N1 Slough. Seine last 150 feet of the channel and place minnow trap in the middle of the seine section.
- Site 15 is on main stem of the N1 slough upstream of the second left bank branch. Seine 150 feet above confluence with slough branch. Place minnow trap in N1 slough adjacent to site stake.
- Site 17 is associated with a piece of placed LWD on the main stem of the N1 Slough. Seine 100 feet on both sides of the LWD. Place minnow trap in close proximity to the LWD.
- Site 18 is on the main stem of the Salt River near the confluence with Cutoff Slough. Seine 150’ of slough and place minnow trap at site stake.
- Site 19 is on the main stem of the Salt River just upstream of the confluences with the N1 Slough. Seine the 150 feet above the confluence and place the minnow trap in the main stem Salt River at the confluence with N1 Slough.

3. OBSERVATIONS

The Salt River phase one project minnow trapping and seining surveys occurred once monthly from March to July in 2014. The March, April, and May surveys were conducted by Allan Renger of the California Department of Fish and Wildlife (CDFW). Various crew members included Alex Blessing (CDFW technical assistant), Gale Garmin (CDFW biologist), AmeriCorp members, Darren Ward (Humboldt State University), Doreen Hansen (Humboldt County Resource Conservation District), Dave Ericson (The Wildlands Conservancy), and Erin Taylor (Natural Resource Conservation Service). The June and July surveys were conducted by Humboldt State University (HSU) professor Darren Ward. Crew members include Sean Cockran (HSU), and a number of volunteers listed above.

Surveys throughout the spring and summer months showed that air temperatures averaged 16.2 °C with a maximum of 20°C and minimum of 10.5°C. Water temperatures averaged 16.8°C with a maximum of 21.5°C and minimum of 11°C. Salinity measurements over the survey period averaged 26.4 ppt with a maximum of 36.5 ppt and a minimum of 12.05 ppt (ocean water is approximately 36ppt). Dissolved oxygen was also measured during the surveys where the average was calculated to be 7.5 mg/L; the maximum was 16.2 mg/L; and the minimum was 3.3 mg/L (100% oxygen saturation is 10.0 mg/L). The maximum dissolved oxygen value is beyond a the 100% level, though it must be noted that dissolved oxygen probes are notorious for reading above 10.0 mg/L. In any case, the data appears to indicate that dissolved oxygen level decreased as the summer progressed. The presence of fish at each site indicates that the levels measured still support a healthy diversity and density of fish.

Seining and minnow trapping at the eleven fisheries monitoring sites, over the five month sampling period, identified the presence of over 19 species of fish. The following table presents the total number of fish sampled from March to July in 2014.

Fish Type	**Numbered Sampled**
Coho (juvenile)	40
Chinook (juvenile)	6
Tidewater Goby	327
Sticklebacks	25,975
Sculpin	1,753
Smelt (unidentified juvenile)	1,026
Top Smelt	929
Surf Smelt	29
Night Smelt	183
Pipefish	17
Pike Minnow	34
Shiner Perch	6
Cooper Rock Fish	1
Starry Flounder	3
Dungeness Crab	8
Jellyfish	5
Pacific Herring	5
Gunnel	8
Surf Perch	8

Both salmonid juveniles (Coho and Chinook) were only present during the months of March and April, and primarily located in the northern main channel and northern slough channels. The tidewater gobies were present during the entire sampling season, though more abundant during the summer months. The gobies were samples across most locations on Phase 1, though most abundant at the terminal ends of the southern slough channel network (sites 7, 8, and 9) and associated with specially designed backwater features.

4. DISCUSSION

In the summer of 2013 all fish were captured and relocated from the main stem Salt River Slough, S1 Slough, and N1 Slough of the Salt River phase one project area (Figure 1). The project area was cut off from inflow by coffer dams and diversions and fully dewatered. Water was allowed back into the Salt River phase one project area in October of 2013 following

completion of the project's excavation and construction activities. Since re-watering of the salt River occurred, all fish currently present in the Salt River phase one project area have immigrated from non-project sections of the Salt River and its connection to the Eel River Estuary, and from freshwater tributaries Reas Creek and Smith Creek. A multi-year monitoring of fish species presence and distribution within the Salt River Phase one project area was initiated with monitoring site selection and fish capture and identification surveys in March of 2014. Subsequent fish surveys are held once monthly, from March to July.

The eleven sites on the Salt River phase one restoration project area were selected for fish presence and distribution monitoring to represent the diversity of channel size and habitats in the main Salt River Slough, N1 Slough, and S1 Slough (Figure 1). Some of the eleven sites were also associated with constructed project habitat features such as in-channel large wood and a hump in the channel long profile referred to as a tidewater goby lift.

Tidewater goby are listed under the federal Endangered Species Act and Salt River phase one project permit conditions included the construction of habitat features for the benefit of tidewater goby. At several locations a hump was constructed in the longitudinal profile of a reconstructed slough channel, and this feature, referred to as a goby lift, was placed to provide tidewater goby an area of muted tidal exchange. Fisheries monitoring sites 8 and 9 are within an area of muted tidal exchange associated with a project constructed goby lift, and tidewater goby were captured at both of these sites. The presence of tidewater goby at the two sampling sites, and the capture of tidewater goby in the main Salt River channel (sites 1 and 14), confirms immigration from nearby non-phase one project slough habitat since re-watering of the project area in October of 2013.