

# California Department of Fish and Wildlife

## Region One

### CDFW Salt River Restoration Project Fisheries Monitoring

Report Number 2015\_12\_31

### Results of Fish Species Presence and Distribution Monitoring Conducted from April to July, 2015 Within the Salt River, Eel River Estuary, Phase One and Two Project Areas, 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. A fish sampling program was developed in the spring of 2014. A lower portion of the Phase two footprint was constructed in the summer and fall of 2014. Currently 12 sites are sampled across phase one (Riverside Ranch) and phase 2 (channel corridor) of the Salt River project. Fish species presence and distribution monitoring began on April 23, 2015 by personnel from the California Department of Fish and Wildlife (CDFW) and Humboldt County Resource Conservation District (HCRCD). A 1/8th inch mesh pole seine was operated at each of the 12 sites during surveys that occurred once monthly from April to July, 2015, and captured fish were identified, enumerated, and released. Surveys identified the species presence of tidewater goby (*Eucyclogobius newberryi*), three-spine stickleback (*Gasterosteus aculeatus*), sculpin species (*Cottoidea*), juvenile smelt, top smelt (*Atherinops affinis*), shiner perch (*Cymatogaster aggregate*); speckled sanddab (*Citharichthys stigmaeus*); Bay pipefish (*Syngnathus leptorhyncus*), and 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 implementation fish sampling program was developed with NOAA, CDFW, Humboldt State University, and the Humboldt County Resource Conservation District. Phase one project monitoring will be conducted for five years by CDFW, HCRCD, and partners to determine fish species presence and distribution. This report describes the third year of the monitoring effort (2015).

## **2. METHODS**

- a. Site Selection: Twelve sites on the Salt River phase one and phase 2 restoration project areas 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: Minnow traps were implemented in the first year of monitoring; however, it was not effective in capturing fish in the tidal estuary. Therefore minnow trapping was abandoned in the second year, 2015. Net seining continued to be an effective method of sampling fish. Each site is sampled using either a 1/8<sup>th</sup> inch or a 1/16<sup>th</sup> inch mesh pole seine net and a baited minnow trap. Typically a single 1/8<sup>th</sup> inch or 1/16<sup>th</sup> 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 non-native pike minnow are enumerated into 100 millimeter size classes by ocular estimation, and humanely euthanized and buried via permit requirement. A start time, end time, and air and water temperature are recorded for each seine deployment. Start and end water salinity and dissolved oxygen measurements are also recorded for each seine deployment.
- c. Survey Frequency: In year two of monitoring, a monthly survey interval of the 12 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 HCRC, 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

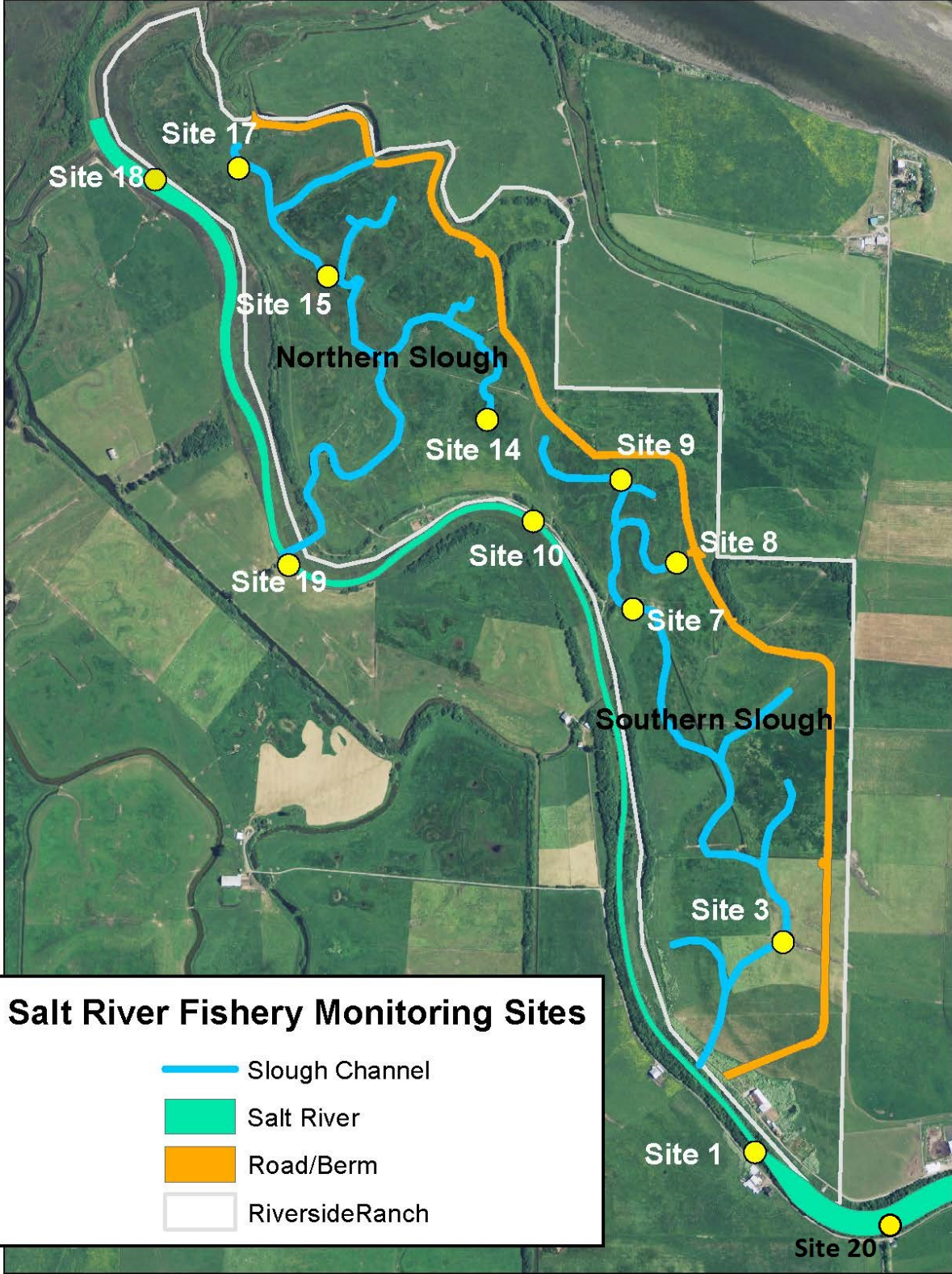


Table 1. Salt River Phase One Project fisheries monitoring site location descriptions:

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Site 18 is on the main stem of the Salt River near the confluence with Cutoff Slough. Seine 150' of slough.
- 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.
- Site 20 is located at the confluence of Reas Creek. Seine in the main Salt River channel across the mouth of Reas Creek. Seine up the Reas Creek wood weirs (step pools) to the outfall of the box culvert.

### 3. Observations

Project fisheries monitoring site selection occurred in March of 2014 with representatives of CDFW (Allan Renger and Alexander Blesing) , HCRCD (Curtis Ihle and Doreen Hansen), and NOAA (Benjamin Brengettsey). Salt River seining surveys occurred once monthly from April to July in 2015. The April and May surveys were conducted by Allan Renger of CDFW. Various crew members included CDFW scientific aides Brian Starks and Nick Massa, and CCC Americorps Watershed Stewards Program (WSP) members Jake Murphrey and Jon Guczek, CCC veteran Terrence Richmond HCRCD, HCRCD watershed coordinator Doreen Hansen, Wildlands Conservancy Eel River Preserve manager Emily Afriat-Hyman and ranger Alex Blessing, and NOAA Coho recovery coordinator Julie Weeder. The June and July surveys were conducted by Humboldt State University (HSU) fisheries biology professor, Darren Ward. Crew members included Gabriel Scheer (Humboldt State University graduate student).



G. Scheer and D. Ward seining site #19 in July 2015



Bay Pipefish in July 2015 site #19



Top Smelt sampled in April 2015 at site #18

Surveys throughout the spring and summer months showed that air temperatures ranged between a maximum of 20.5°C and minimum of 10.5°C. Water temperatures ranged between a maximum of 30.2°C and minimum of 13.8°C. Conductivity measurements were only taken in April and March, due to availability of a functioning meter. Conductivity ranged between a maximum of 49,748 µS and a minimum of 3,694 µS (ocean water is approximately 5,000,000 µS). Dissolved oxygen was also measured during the surveys and ranged between a maximum of 23.4 ppm and a minimum of 5.9 ppm (100% oxygen saturation is 10.0 ppm). The dissolved maximum value is beyond a maximum level, though dissolved oxygen probes are notorious for reading above 10.0 ppm. 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 12 fisheries monitoring sites, over the four month sampling period, identified the presence of over 16 known species. The following table presents the total number of fish and marine invertebrates sampled from April to July in 2015.

<b>Common Name</b>	<b>Scientific Name</b>	<b>Number Sampled</b>
Tidewater Goby	<i>Eucyclogobius newberryi</i>	160
Smelt species		3388
Three Spined Stickleback	<i>Gasterosteus aculeatus</i>	4633
Sculpin species	<i>Cottoidea</i>	1131
Top Smelt	<i>Atherinops affinis</i>	4
Top Smelt (Juvenile)	<i>Atherinops affinis</i>	255
Surf Smelt	<i>Hypomesus pretiosus</i>	144
Bay Pipefish	<i>Syngnathus leptorhyncus</i>	12
Starry Flounder	<i>Platichthys stellatus</i>	1
Flatfish species		18
California Roach	<i>Hesperoleucus symmetricus</i>	5
Shiner Surfperch	<i>Cymatogaster aggregate</i>	3
Whitebait smelt	<i>Allosmerus elongatus</i>	1
Dungeness Crab	<i>Metacarcinus magister</i>	131
Sacramento Pike Minnow	<i>Ptychocheilus grandis</i>	17
Speckled Sandab	<i>Citharichthys stigmaeus</i>	33
Saddleback Gunnel	<i>Pholis ornata</i>	6
Smelt species		25
Pacific Herring	<i>Clupea pallasii</i>	1
Crab species		133

No salmonid juveniles (Coho and Chinook) were present during any of the sampling months (April to July). The previous year (2014) salmonids were present in March and April. Drought conditions may have attributed to the absence of salmonids during the sampling effort. Tidewater gobies were present during the entire sampling season, though more abundant during the summer months. The gobies were sampled across most locations in the estuary, Salt River main channel, and at the Reas Creek mouth, though they were 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 12 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 12 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.



The presence of juvenile salmonids was expected in the month of April, given that the previous year sampling effort proved their presence. However, the multiple year drought may have made conditions unsuitable for a significant population to utilize the estuary. A winter salmonid sampling program for the same area sampled Coho from December of 2014 to March of 2015, indicating that Coho presence did occur prior to April of 2015.