

Salt River Ecosystem Restoration Project



Habitat Mitigation and Monitoring Plan Monitoring Report 2021

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Prepared by the Humboldt County Resource Conservation District
5630 South Broadway
Eureka, CA 95503
707.442-6058 ext. 5
hcrd@gmail.com



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EXECUTIVE SUMMARY

The Salt River Ecosystem Restoration Project (Project) has been developed in collaboration with landowners and resource and regulatory agencies for over 30 years. The Humboldt County Resource Conservation District (HCRCD) is spearheading the Project on behalf of multiple private landowners throughout the Salt River watershed. The Salt River watershed is located in Humboldt County, California; approximately 15 miles south of the City of Eureka. The watershed surrounds the City of Ferndale and is bounded to the south by the Wildcat Mountains, to the east and north by the Eel River and to the west by the Pacific Ocean. The watershed derives its name from the Salt River that historically flowed across the Eel River delta discharging into the Eel River estuary, approximately 0.2 miles from the mouth of the Eel River.

The overarching goal of the Project is to restore and improve hydrologic function and fish and wildlife habitat in the Salt River watershed. The Project area includes the main stem of the Salt River, four Salt River tributaries originating in the Wildcat Hills above the town of Ferndale (Williams Creek, Francis Creek, Reas Creek, and Smith Creek), and the approximately 400-acre Riverside Ranch, which is contiguous to the Salt River estuary. The California Department of Fish and Wildlife (CDFW) acquired Riverside Ranch in 2012 from Western Rivers Conservancy, who had purchased the property from a willing seller. CDFW is an active partner in the Project. The remainder of the Project area is primarily in private ownership with City of Ferndale occupying multiple small parcels at the wastewater treatment plant.

The Project intends to restore natural hydrologic processes to a significant portion of the watershed, promoting restoration of ecological processes and functions. The Project is presented in two primary phases to distinguish between the tidal wetland restoration (known as Phase 1) and the riverine restoration work (known as Phase 2). The Project includes work that will be accomplished over several years. Within the two phases, the Project is further broken down in to four primary components, discussed below:

- **Upslope erosion control:** Work with willing landowners to implement upslope erosion control activities in the upper portions of the Francis, Williams, and Reas Creeks watersheds to reduce the level of sediment input and delivery to the Salt River, thereby improving water quality while reducing sediment deposits in the channel.
- **Riverside Ranch tidal marsh restoration:** Restore tidal marsh in the lower Salt River. This will also increase the tidal prism exchanged through the lower river, increasing sediment transport potential, increasing scour and promoting hydraulic connectivity with the upper watershed.

- **Salt River channel excavation:** Excavate and rehabilitate approximately 7.4 miles of the historic Salt River channel to restore hydrologic connectivity within the watershed thereby improving aquatic and riparian habitat, providing fish passage to tributaries, and improve drainage in the delta.
- **Adaptive Management:** Work with the community and regulatory agencies to implement an environmentally and geomorphically acceptable adaptive maintenance and management program to maintain hydraulic and ecological function in the Project area into the future.

In 2013, restoration of Riverside Ranch (Phase 1 of the Project) restored 330 acres of pasture land back to intertidal wetland habitat, while also preserving approximately 70 acres that will be agriculturally managed to provide short-grass habitat for Aleutian cackling geese and other wetland-associated birds. Three miles of internal slough networks were excavated to create additional habitat for salmonids, tidewater goby, and other fish and aquatic species, and provide areas for the natural recruitment of eelgrass. Two miles of setback berm were constructed to create a boundary between the tidal area and the retained agricultural area, and a gravel road was installed on top of the berm to provide access for monitoring and maintenance. This component of the Project also widened and deepened approximately 2.5 miles of the tidally-influenced portion of the Salt River channel, thereby increasing tidal exchange and greatly improving fish passage and fish habitat in the lower Salt River channel.

Phase 2 represents the Salt River “corridor restoration” portion of the larger project. Within Phase 2, 4.5 miles of the Salt River channel and its adjacent floodplain are being constructed and restored. Wetlands and riparian corridors are being re-vegetated with a diverse palette of native plants. Fish passage is being restored to three watershed tributaries – Reas, Francis and Williams Creeks.

Across the years of 2013, 2014, 2015, 2017, 2018, and 2019 a total of 6.2 miles of Salt River channel and floodplain were constructed and re-vegetated. These construction efforts also reconnected two tributaries (Reas and Francis Creeks). The 2017 construction season also restored 0.5 miles of the channel and floodplain in Francis Creek (Figure 1). The remaining 1.2 miles of the Phase 2 construction will complete the Salt River corridor restoration. However, due to regulatory and hydraulic constraints, along with landowners’ belief of the watershed’s function, completion of the project is on indefinite hold.

Salt River Ecosystem Restoration Project Permitted Project Area & Implementation Status

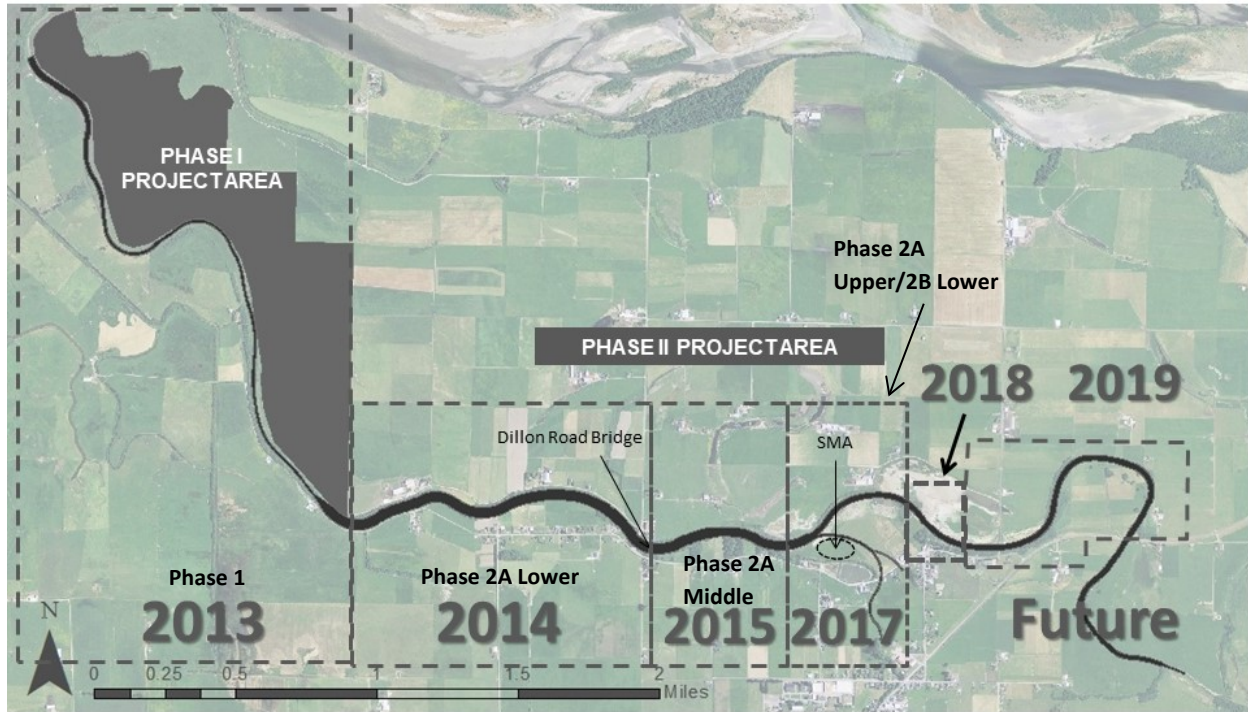


Figure 1: Salt River Ecosystem Restoration Construction Timeline as of 2021

Upon completed portions of the Project, monitoring is performed under direction of the Humboldt County Resource Conservation District and complies with requirements generated from Project documents, including the Salt River Ecosystem Restoration Project's Habitat Mitigation and Monitoring Plan (HMMP) and the Adaptive Management Plan (AMP). This report provides information on data collected for monitoring tasks pertaining to the HMMP of the Salt River Ecosystem Restoration Project as follows:

- Phase 1: Year 8 (post construction 2013)
- Phase 2: Year 7, Year 6, Year 4, Year 3, Year 2 (post construction 2014, 2015, 2017, 2018, and 2019 respectively)

As mentioned in the Summary of Conclusions section below, monitoring results demonstrate the Project is performing successfully and largely meeting Project goals.

SUMMARY OF CONCLUSIONS

As detailed in this report, the 2021 monitoring results provide a point of reference on how the restoration activities completed in 2013 (Phase 1), 2014 (Phase 2A Lower), 2015 (Phase 2A Middle), 2017 (Phase 2A Upper/2B Lower), 2018 (Phase 2B Middle), and 2019 (Phase 2B Upper) have responded to the area's environmental conditions during its formative years after construction. One important environmental input to consider is the previous season's amount of precipitation. The north coast of California generally experiences precipitation from October to the end of April. This period of time is referred to as a *hydrologic year*. The amount of the hydrologic year's precipitation prior to monitoring efforts can significantly affect the findings of a handful of monitoring tasks, such as riparian success and cross-sectional surveys. The 2020/2021 hydrologic year experienced 22.98 inches of precipitation, which is nearly 23 inches below average rain totals. The California Department of Water Resources categorized the 2020/2021 hydrologic year as critically dry.

The following is a brief summary of the findings of the various HMMP monitoring efforts. Please reference reports listed at the end of this report for more detailed findings.

Vegetation

Habitat mapping occurred in riparian areas for the Phase 2A Lower (2014), Phase 2B Middle (2018), and Phase 2B Upper (2019). Mapping concluded that the riparian areas are achieving and exceeding established success criteria.

The 2021 percent cover sampling results indicate that a majority of surveyed restored areas are achieving appropriate success criteria. Wetland and riparian in the Phase 2A Lower, Phase 2B Middle, and Phase 2B Upper restoration areas were monitored in 2021. The wetland habitats are achieving and exceeding the minimum success criteria for wetlands associated with the active channel and active bench (floodplain). Riparian cover is also achieving and exceeding the established success criteria. However, invasive species are impacting wetland and riparian habitats in all phases.

Average tree diameter/basal area was estimated in Phase 2B Middle (2018) to establish baseline levels. It was noted that planted woody riparian species were not thriving and may need additional riparian planting if future monitoring merits action.

Wildlife

Since 2014, CDFW has performed annual fish sampling across the Salt River restoration footprint. However, survey methods require multiple people to perform fish sampling which violated CDFW's COVID 19 restriction guidelines in 2021. Therefore, spring and summer sampling was cancelled due to potential health risks. However, one

sampling event occurred in the winter (performed by an independent contractor) and sampled 25 juvenile coho individuals.

Geomorphic

Geomorphic monitoring tasks include photo documentation at established photo points and cross-sectional and longitudinal surveys. The photo documentation visually records the dramatic differences between pre-construction to post-construction conditions and records the vegetation recruitment and tidal effects. Phase 1 and 2 geomorphic surveys were not performed in 2021 due to lack of interest by surveyors. However, an observational survey was performed in the Phase 2 channel corridor and no significant concerns were identified.

INTRODUCTION

The Salt River Ecosystem Restoration Project (SRERP) took some 30 years to develop and drew upon several studies and assessments completed during that time that examined cultural, biological, geological, aquatic, and vegetative resources as well as tidal influences in the watershed. Project proponents also developed documents to guide implementation, maintenance, and long-term monitoring. Monitoring documents include the Salt River Monitoring Plan, Habitat Mitigation and Monitoring Plan, the Adaptive Management Plan, and other specialized plans to assure the protection of sensitive wildlife habitats, landowner properties, and the hydrologic system itself.

As outlined in the Project's CEQA and the Habitat Mitigation and Management Plan documents, a variety of monitoring tasks are required to be conducted to help determine if Project goals and objectives are being achieved, as well as to guide Project management and maintenance. Most of the monitoring tasks are to be completed over a period of ten years, post-implementation. Monitoring was conducted prior to beginning Project implementation to establish baseline data and/or assist in identifying and protecting resources in the Project area. Post-implementation monitoring is being conducted as required by the Project's various funders, permit requirements, and environmental compliance documents. Many of the individual monitoring reports are available from the Humboldt County Resource Conservation District upon request or can be accessed on the website (<http://humboldtccd.org/resources/reports-and-documents/>).

This report presents monitoring results under three broad categories:

1. Vegetation
2. Wildlife
3. Geomorphic

Within each category is a discussion that identifies 1) the discrete task called for, 2) the agency requiring the task, 3) the reference document, 4) a description of the task, 5) goals and objectives of the tasks, 6) the resulting monitoring report (if applicable), 7) a description of methods, and 8) a results and discussion section.

VEGETATION

Monitoring Task: Habitat Mapping – Riparian Acreage (Phase 2A Lower and Phase 2B Middle project areas)

Agencies/Acts: Coastal Commission

Compliance Documents: Coastal Development Permit- Special Conditions; SRERP Habitat Mitigation and Monitoring Plan and the Adaptive Management Plan

Description: For the 2021 monitoring effort, the Phase 2A Lower and Phase 2B Middle existing and planted riparian acreages are estimated.

Goals:

- Achieve 85 acres of riparian in Phase 2 by Year 10

Report: 2021 Annual Habitat Monitoring Report - Salt River Ecosystem Restoration Project, Prepared for the Humboldt County Resource Conservation District by J.B. Lovelace & Associates

Methods: Habitat maps were created using ArcMap® (ESRI) geographic information system (GIS) desktop software, the most recent satellite imagery (Google Earth 2019 and National Agriculture Imagery Program [NAIP]) and were based on observations made during fieldwork performed in 2021. Geographic field data were collected using a Trimble® Juno® global positioning system (GPS) device with ArcPad® software (ESRI). Habitat area (acreage) totals were calculated as part of this process.

Results & Discussion: Monitoring efforts determined that the total area of the Phase 2A Lower (2014) riparian habitat is 26.39 acres and Phase 2B Middle (2018) riparian habitat is 6.77 acres. The Total riparian area of existing and planted riparian across the entire constructed Phase 2 footprint is 83.76 acres which constitutes 108% of projected riparian acres. Table 1 summarizes the riparian acreages in the monitored areas.

Table 1. Summary of 2021 Observed Riparian Acreage & Respective Success Criteria

Habitat Areas	Riparian Area (Acres)		
	2021 Observed	Final Success Criteria	% of Projected
PHASE 2			
Riparian - Planted & Existing			
Phase 2A Lower	26.39		
Phase 2B Middle	6.77		
<i>TOTAL PHASE 2 Existing and Planted Riparian</i>	83.76	≥ 69.76	108%

VEGETATION

Monitoring Task: Vegetation Percent Cover – Wetland and Riparian Areas (Phase 2A Lower, Phase 2B Middle, and Phase 2B Upper)

Agencies/Acts: Coastal Commission

Compliance Documents: Coastal Development Permit- Special Conditions; SRERP Habitat Mitigation and Monitoring Plan and the Adaptive Management Plan

Description: Estimate percent cover of vegetation for: wetlands and riparian areas in Phase 2A Lower, Phase 2B Middle, and Phase 2B Upper; including native, non-native, and invasive species within all monitored areas.

Goals:

- Achieve Native Vegetation Percent Cover of: ≥50% in Phase 2A Lower Wetlands; ≥60% in Phase 2A Lower Riparian; ≥30% in Phase 2B Middle Wetlands; ≥30% in Phase 2B Middle Riparian; ≥20% Phase 2B Upper Wetlands; and ≥15% Phase 2B Upper Riparian.
- Achieve Non-Native Non-Invasive Vegetation Percent Cover of: <15% in all restored habitats
- Achieve Invasive Vegetation Percent Cover of: <5% in all restored habitats

Report: 2021 Annual Habitat Monitoring Report - Salt River Ecosystem Restoration Project, Prepared for the Humboldt County Resource Conservation District by J.B. Lovelace & Associates

Methods:

A stratified, randomized sampling approach is used to characterize the abundance, species composition, and structural composition of existing vegetation in each vegetation sampling area. A previous year power analyses of vegetation sampling data, established a sample size ($n=32$) that was determined to be sufficient to detect a “medium” effect size of 0.5 standard deviations (following Cohen 1988) between the observed sample means and their respective success criteria using a two-sided t-test, and assuming both 95% confidence and a statistical power of 80%.

Using updated SRERP habitat GIS data and ArcMap® software, each phase and sub-phase of the restoration area was partitioned into vegetation sampling areas of specific habitat types within project phases. ArcMap® software was then used to randomly distribute sampling plots throughout each of these sampling areas. Given that each sampling area is composed of multiple, geographically separated polygons, the 32 sample plots were randomly allocated throughout each sampling area, in quantities proportionate to the size (i.e., area) of each polygon. Once sample plots were located in the field, a 1m² sampling frame, or "quadrat," constructed from ¼-inch diameter PVC was then used to visually estimate:

- (total) percent vegetative cover, and
- (absolute) percent cover of each species present.

In order to evaluate these data against the success criteria for specific vegetative parameters, each observed plant species was categorized as:

- native,
- non-native non-invasive,
- non-native invasive, or
- sterile “wheatgrass” hybrid (*Elymus* x *Triticum*);

as well as being:

- herbaceous (an herb),
- arborescent (a tree), or a
- shrub.

Percent cover data collected for each species is absolute cover, which is distinct from relative cover. Absolute cover quantifies the vegetative coverage of each species, or category, within the sample frame, regardless of any canopy overlap between different species. When measuring absolute cover, resulting cumulative cover values for sampled locations that exceed 100% for a given sample are not uncommon (Barbour et al. 1998, etc.).

The vegetation success criteria specified in the HMMP consist of minimum percent cover thresholds for native species and maximum percent cover thresholds for both non-native non-invasive and non-native invasive species.

Results & Discussion: The sampling effort shows that the 2021 monitoring areas are both approaching and achieving the 2021 vegetative percent cover success criteria of native vegetation area (Table 2). However, invasive species are heavily impacting recently restored areas.

Wetlands – Percent cover native vegetation in the wetland habitats located in Phase 2A Lower, Phase 2B Middle, and Phase 2B Upper are achieving and exceeding the minimum success criteria for wetlands associated with the active channel and active bench (floodplain). Non-native non-invasive vegetation in the wetland areas are also achieving the success criteria. However, all surveyed wetland areas exceed the maximum threshold for invasive species. The Phase 2B sections (lower and middle) exceed the maximum presence of invasive species up to 50%, where the active benches appear to be the most impacted. Invasive species occurring in the Phase 2B areas include *Phalaris arundinacea* (reed canary grass), *Raphanus sativus* (radish), *Lotus corniculatus* (bird's-foot trefoil), *Agrostis stolonifera* (creeping bent), *Holcus lanatus* (common velvet grass), and *Helminthotheca echioides* (bristly ox-tongue). The Phase 2B sections are recently constructed (2 to 3 years) and those areas are still vegetatively stabilizing.

Riparian – Native vegetation in the riparian habitat areas in the Phase 2A Lower and Phase 2B Upper are achieving and exceeding the success criteria. However, Phase 2B Middle is not achieving the minimal success criteria of by nearly 10%. Though non-native non-invasive presence is within the success criteria, the robust presence of invasive vegetation is likely suppressing the presence of native vegetation in this phase. Non-native non-invasive vegetation is below the maximum allowable levels in all phases (though, the Phase 2B Middle replanted riparian forest exceeded the maximum by 0.9%). All phases exceeded the invasive species maximum success criteria by 4.8% to 62.9%, where Phase 2B Middle is the most impacted. Invasive species described in the wetlands Phase 2B areas also applies in the Phase 2B riparian areas.

Recommendations include to initiate immediate efforts to reduce and/or eradicate invasive vegetation across the project area.

Table 2: Summary of 2019 SRERP Quantitative Vegetation Percent Cover Sampling Results & Respective

Summary of 2021 SRERP Quantitative Vegetation Percent Cover Sampling Results & Respective Success Criteria.
Mean percent cover estimates are in bold and associated 95% confidence intervals follow in brackets.

SRERP Habitat Sampling Area	Mean Percent Cover for Vegetation Categories of Interest										Sterile Hybrid Wheatgrass ¹
	Total Vegetation ¹	Native Vegetation		Non-Native Non-Invasive Vegetation		Invasive Vegetation					
	Observed	Observed	2021 Success Criteria ²	Observed	Final Success Criteria ³	Observed	Final Success Criteria ³	Observed			
Phase 1 – Riverside Ranch Tidal Marsh Restoration Area											
Replanted Riparian Forest (n=32)	100.0 [N/A]	60.8 [46.7, 72.9]	≥60%	5.4 [3.0, 8.7]	<15%	33.9 [22.9, 46.2]	<5%	0 [N/A]			
Phase 2 – Salt River Corridor Restoration Area											
Phase 2A (Lower) – Salt River Channel Wetlands											
Active Channel (n=33)	90.8 [84.2, 94.2]	72.6 [64.3, 79.5]	≥50%	1.3 [0.5, 3.1]	<15%	16.8 [11.3, 25.1]	<5%	0 [N/A]			
Active Bench (n=32)	96.7 [93.9, 98.3]	75.2 [65.9, 81.9]	≥50%	0.6 [0, 2.0]	<15%	20.9 [14.0, 30.9]	<5%	0 [N/A]			
Phase 2A (Lower) – Riparian Planting Zones											
Replanted Riparian Forest (n=32)	99.2 [95.9, 99.8]	89.4 [79.6, 94.2]	≥60%	0.1 [0, 0.2]	<15%	9.8 [5.2, 19.8]	<5%	0 [N/A]			
Active Riparian Berm (n=32)	97.2 [93.9, 98.8]	79.7 [74.3, 84.8]	≥60%	1.3 [0.2, 5.6]	<15%	16.2 [11.2, 22.2]	<5%	0 [N/A]			
Phase 2B (Middle) – Salt River Channel Wetlands											
Active Channel (n=32)	96.1 [92.0, 98.3]	45.3 [35.1, 54.9]	≥30%	6.9 [3.2, 13.7]	<15%	43.8 [34.7, 53.9]	<5%	0 [0, 0.1]			
Active Bench (n=32)	99.8 [98.9, 100.0]	30.5 [21.2, 41.5]	≥30%	6.6 [3.7, 15.0]	<15%	62.7 [52.1, 72.1]	<5%	0 [0, 0.1]			
Phase 2B (Middle) – Riparian Planting Zones											
Replanted Riparian Forest (n=32)	99.4 [97.8, 99.8]	22.5 [15.7, 31.0]	≥30%	15.9 [9.8, 25.1]	<15%	61.0 [52.1, 69.2]	<5%	0 [N/A]			
Active Riparian Berm (n=32)	99.1 [97.7, 99.5]	21.2 [13.7, 29.9]	≥30%	9.9 [6.1, 15.7]	<15%	67.9 [59.5, 75.6]	<5%	0.2 [0, 0.6]			
Phase 2B (Upper) – Salt River Channel Wetlands											
Active Channel (n=32)	87.7 [82.0, 91.6]	53.2 [44.8, 61.2]	≥20%	7.5 [4.2, 12.1]	<15%	25.9 [19.1, 34.1]	<5%	1.1 [0.1, 3.8]			
Active Bench (n=32)	95.5 [91.9, 97.5]	26.5 [18.7, 36.3]	≥20%	11.1 [6.1, 19.1]	<15%	57.4 [47.3, 67.6]	<5%	0.5 [0.1, 1.7]			
Phase 2B (Upper) – Riparian Planting Zones											
Replanted Riparian Forest (n=32)	100.0 [N/A]	60.2 [50.0, 68.9]	≥15%	7.2 [3.6, 13.9]	<15%	32.5 [24.1, 41.8]	<5%	0.1 [0, 0.4]			
Active Riparian Berm (n=33)	94.1 [89.9, 96.5]	29.9 [21.2, 39.3]	≥15%	9.7 [6.3, 14.7]	<15%	53.5 [44.6, 62.6]	<5%	0.9 [0.3, 2.6]			

VEGETATION

Monitoring Task: Average Tree Diameter – Average Basal Area – Phase 2A Middle

Agencies/Acts: Coastal Commission

Compliance Documents: Coastal Development Permit- Special Conditions; SRERP Habitat Mitigation and Monitoring Plan and the Adaptive Management Plan

Description: Estimate average tree diameter at breast height (DBH) in Phase 2B Middle (2018).

Goals:

- Planted trees in restoration area will show an increasing trend of average DBH between sampling years 3, 5, and 10.

Report: 2021 Annual Habitat Monitoring Report - Salt River Ecosystem Restoration Project, Prepared for the Humboldt County Resource Conservation District by J.B. Lovelace & Associates

Methods: The percent cover sampling approach was used for stratifying restoration sampling areas and creating random basal area 10-meter radius sampling plots (using ArcMap® GIS software and the Trimble GPS unit), throughout Phase 2A Middle which include the active riparian berm and replanted riparian forest. Diameter-at-breast-height (DBH) in millimeters, species, and geographic coordinates were recorded for all trees located within the plot that were ≥4.5 feet tall. For sampling purposes, “Breast Height” is defined as 4.5 feet.

Following direction from HCRCD staff (Hansen pers. comm.), individual plants were considered to be a “tree” if they were a species whose vegetative “habit” is described in relevant botanical literature (e.g., Baldwin et al. 2012; etc.) as being a tree at maturity.

All metric DBH measurements collected during fieldwork were subsequently converted to inches, and were then squared and multiplied by 0.005454 ("the forester's constant") to derive basal area values (measured in square-feet), otherwise expressed as:

$$\text{Basal area} = \text{DBH}^2 \times 0.005454$$

Resulting sampling plot measurements of both basal area and actual-plot-area were summed to derive basal-area-per-unit-area-sampled totals for each tree species in each sampled habitat. These measurements were then extrapolated to produce projected estimates of total habitat- and phase-wide basal area for each species using respective habitat areas (acreages) obtained from current SRERP GIS data. Tabulated values for

the resulting projected basal area estimates are provided to characterize the current developmental status of this vegetation type in sampled habitats.

Results & Discussion:

The 2021 monitoring of basal area only included the Phase 2B Middle riparian area. This area has not been sampled before, therefore this monitoring effort will establish baseline conditions in this area.

Basal area in the 2021 sampling effort reflects development of replanted and naturally recruited woody riparian vegetation (Table 3). Only 35 saplings were tall enough to meet sampling protocols within the sampling plots. Pacific willow (*lasianandra* ssp. *lasianandra*), arroyo willow (*Salix lasiolepis*), California wax-myrtle (*Morella californica*) were the most represented species sampled. It is noted that this woody vegetation is lacking when compared to more recent restored areas, though no apparent cause is determined. It is recommended that this phase be replanted if future monitoring indicates poor establishment.

Table 3: Summary of Phase 2B 2021 of Planted SRERP Woody Riparian Basal Area Sampling Results.

2020 Sampling Area	Mean Change in Basal Area (ft ² /acre)	Acres
Phase 2A Middle		
Replanted Riparian Forest	0.0191	0.13
Active Riparian Berm	0.0084	0.22
Active Bench (Floodplain)	0.0029	0.32
Total Riparian	0.0305	0.67

WILDLIFE

Monitoring Task: Salmonid and Tidewater Goby Monitoring

Agencies/Acts: Coastal Commission

Compliance Documents: Coastal Development Permit- Special Conditions 12, 13; SRERP Habitat Mitigation and Monitoring Plan and the Adaptive Management Plan

Description: Survey for presence of salmonids across the constructed SRERP and tidewater gobies on Phase 1 in the spring through summer months.

Goals:

- Surveys will show that salmonids and tidewater gobies will utilize the restored Salt River main channel and the tidal slough networks.

Report: DUE TO COVID 19 RESTRICTIONS MONITORING FOR SALMONID AND TIDEWATER GOBY DID NOT OCCUR

Though spring and summer fish sampling did not occur in 2021, a winter fish sampling event occurred once in 2021 by Ross Taylor and Associates (2022). In February 2021, 25 juvenile coho were sampled in the Salt River from the confluence of Francis Creek to the upstream end of the constructed project and under the HWY 211 bridge. A majority of the sampled individuals (13) occurred in the rock-grade-control pool at the terminus of the constructed project. Three-spined-stickleback and Sacramento pike minnow were also sampled during the seining effort.

GEOMORPHIC

Monitoring Task: Restoration Documentation Photos

Agencies/Acts: Coastal Commission

Compliance Documents: SRERP Habitat Mitigation and Monitoring Plan

Description: Perform qualitative documentation of the restoration project with feature and landscape photos such as stream profile, floodplain, and riparian conditions.

Goals:

- Photo point monitoring will be used to qualitatively document pre- and post-project visual changes at restoration sites.

Report(s): Salt River Ecosystem Restoration Project – Photo Monitoring - 2021.
Prepared by HCRCD.

Methods: Photo monitoring was performed across the Phase 1 and the completed Phase 2 footprint by a staff member of the HCRCD.

Five photo monitoring sites were established across Phase 1 and ten sites across the completed Phase 2 channel corridor (Figure 2). Photos were taken prior to construction and annually post construction. The compass direction of the photo was recorded and

aligned with previous photo elements. Post-project photos will be taken during the same season or month as pre-project photos (Fall/Winter - November/December).

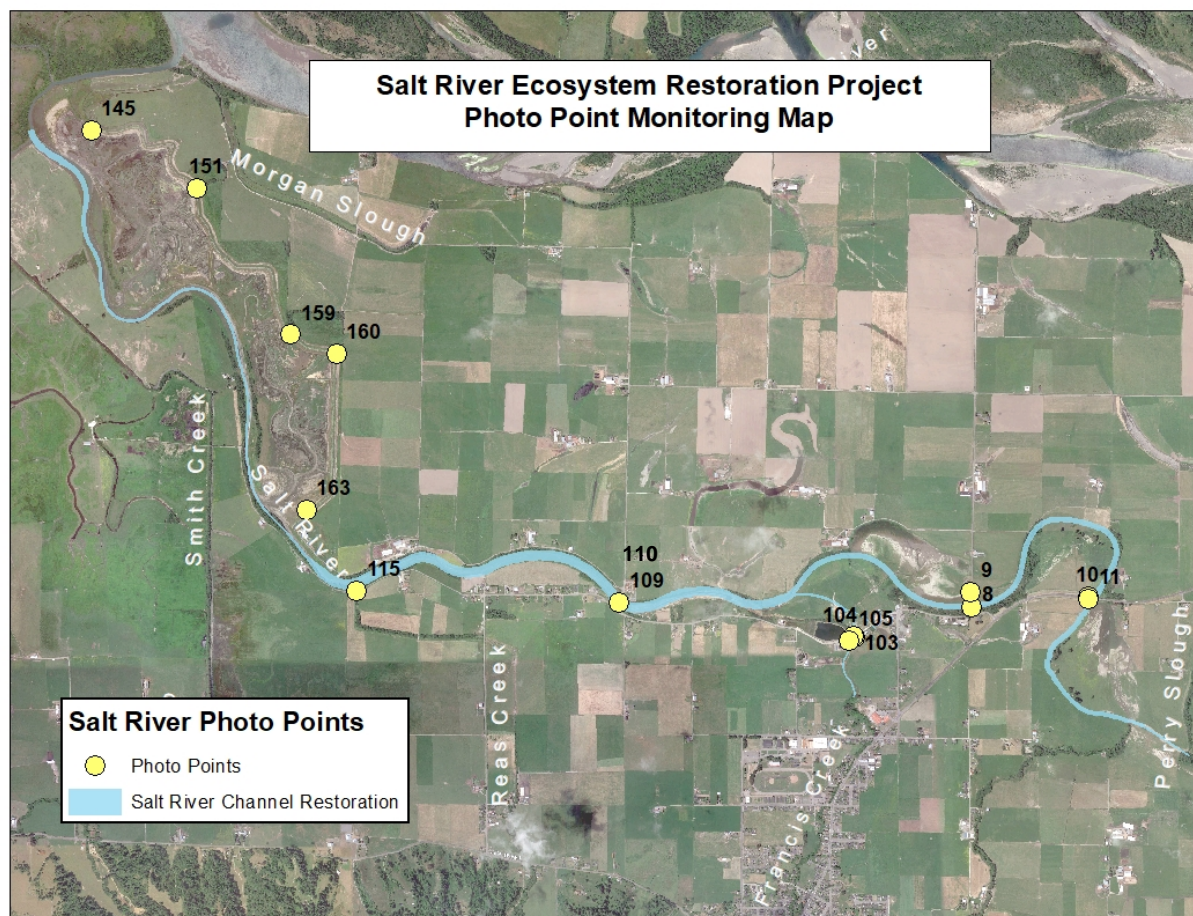


Figure 2: Photo Monitoring Points for the Constructed Footprint - 2020

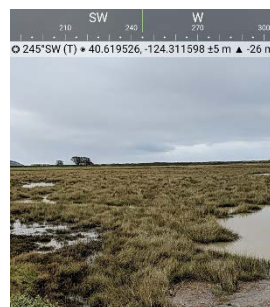
Results and Discussion: A total of 15 photo point sites are established across the Phase 1 and the completed portion of the Phase 2 project area. Pre-construction and post-construction photos have been recorded. The following five photo points are a sample of the 15 sites described in the two photo monitoring reports cited above.



PP145 – SW – Nov 2013



PP145 – SW – Dec 2017



PP145 – SW – Dec 2021



PP159 – SW Tidegates – Nov 2013



PP159 – SW Tidegates – Nov 2015



PP159 – SW Tidegates – Dec 2022



PP115 – Reas Ck – Jul 2011



PP115 – Reas Ck – Jan 2018



PP115 – Reas Ck – Dec 2022



PP109 – Dillon Br Dwn – Nov 2014



PP109 – Dillon Br Dwn – Jan 2015



PP109 – Dillon Br Dwn – Dec 2022



PP103 – Up Strm – Apr 2017



PP103 – Up Strm – Dec 2017



PP103 – Up Strm – Dec 2022



PP9 – Fulmor Br E – Oct 2018



PP9 – Fulmor Br E – Oct 2020



PP9 – Fulmor Br E – Dec 2022

Photo documentation indicates that vegetation continues to establish on Phase 1 and 2 where seed mixes are persisting and natural recruitment of natives, non-natives, and invasives are evolving. Some sites are experiencing increasing canopy cover.

GEOMORPHIC

Monitoring Task: Cross Sectional and Longitudinal Surveys – Riverside Ranch – Phase 1 - Erosion and Sediment Deposition Surveys

Agencies/Acts: Coastal Commission, and California Environmental Quality Act (CEQA)

Compliance Documents: Coastal Development Permit- Special Conditions; Salt River Ecosystem Restoration Project Final Environmental Impact Report (FEIR); and Salt River Ecosystem Restoration Project Adaptive Management Plan

Description: Cross-sectional and longitudinal profile surveys are performed across and along the main channel Salt River at established sites on the interior northern and southern slough channels.

Goals:

- Cross-sectional and longitudinal surveys will describe how the channel is remaining consistent with restoration designs or if areas are aggrading or eroding to the point of intervention.

Report: DUE TO COVID AND THE LACK OF A QUALIFIED SURVEYOR, A PHASE 1 GEOMORPHIC SURVEY WAS NOT PERFORMED IN 2021.

However, considering the limited winter flow input due to critical drought conditions and the relatively stable geometry of the constructed Salt River channel and interior slough channels over the past eight years, the Humboldt County Resource Conservation District feels confident that no significant changes in channel functionality is occurring that would merit intervention.

GEOMORPHIC

Monitoring Task: Cross Sectional and Longitudinal Surveys-Salt River Channel Corridor –Phase 2 - Erosion and Sediment Deposition Surveys

Agencies/Acts: Coastal Commission, and California Environmental Quality Act (CEQA)

Compliance Documents: Coastal Development Permit- Special Conditions; Salt River Ecosystem Restoration Project Final Environmental Impact Report (FEIR); and Salt River Ecosystem Restoration Project Adaptive Management Plan

Description: Cross-sectional and longitudinal profile surveys are performed across and along the Phase 2 main channel Salt River.

Goals:

- Cross-sectional and longitudinal surveys will describe how the channel is remaining consistent with restoration designs, or if areas are aggrading or eroding to the point of intervention.

Report: 2021 Channel Profile Report: Salt River Ecosystem Restoration Project – Phase Two – Year 2021 by Humboldt County Resource Conservation District. January 2022.

Methods: In the previous four years, channel monitoring consisted of performing elevational surveys at four established cross-sections and within the entire constructed 3.5 mile length of the Phase 2 channel by an experienced surveyor or engineer. However, in 2021, due to funding constraints and limited availability and interest by surveyors and engineers, elevational surveys were not performed. As a substitute for

these surveys, three Humboldt County Resource Conservation District staff members and landowners walked the entire length of the Phase 2 channel (Figure 3), between the months of April and June, to observe and determine geomorphic conditions in the channel corridor.

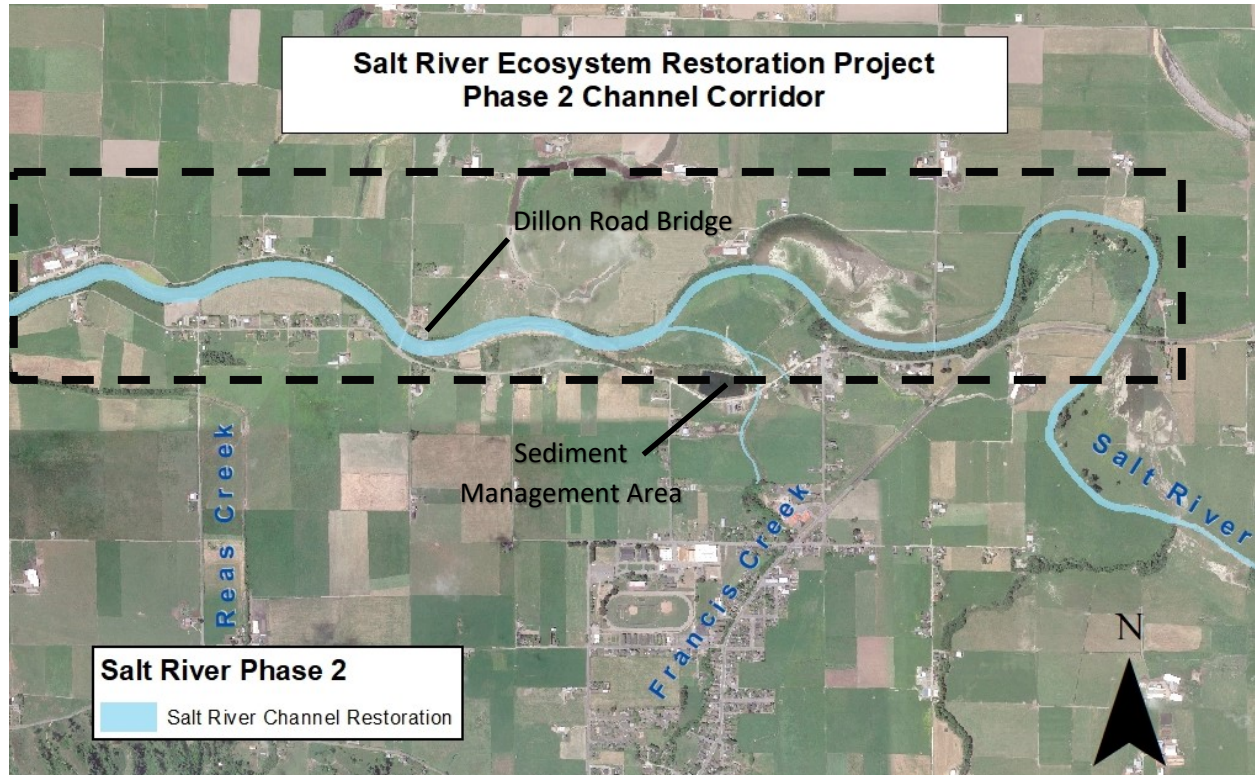


Figure 3: Salt River Phase 2 Channel Corridor. Dashed box delineates the Phase 2 channel that is constructed and surveyed.

Results and Discussion: The observational survey noted water presence throughout the Salt River Phase 2 active channel from Reas Creek to Francis Creek, where tidal influence was seen up to the Dillon Road Bridge area. The active channel from the confluence of Francis Creek to the end of the constructed project was dry, as no consistent flow input exists in this upstream area.

Established reaches of the Salt River channel (below the confluence of Francis Creek) were seen to have a channel bottom with a naturally formed thalweg, some undercut banks, and vegetated banks. The Salt River channel above the Francis Creek confluence is retaining its constructed channel trapezoidal geometry. Further observations gathered during the entire channel walk did not indicate substantial changes in the channel geometry from previous surveys. No new bank slumping, erosion, scour, or deposition were observed in or along the channel.

Some beds of cattail (*Typha sp.*) were noted in the channel between the Sediment Management Area and Dillon Road Bridge. This area could slow down water flow, causing deposition within the river channel. It was noted that sections of the channel that had a closed riparian canopy and/or tidal influence did not contain in-channel vegetation. Further vegetation concerns regard large arroyo willow branches growing down and across the channel. Multiple areas within 100 to 400 meters upstream of the Sediment Management Area showed accumulated wood debris amongst the willow branches. However, no apparent channel erosion was observed in the immediate area.

LIST OF AVAILABLE REPORTS

H. T. Harvey with Winzler and Kelly. 2012. Salt River Ecosystem Restoration Project Habitat Mitigation and Monitoring Plan. Prepared for the Humboldt County Resource Conservation District. Eureka, California

Humboldt County Resource Conservation District. 2022. 2021 Channel Profile Report: Salt River Ecosystem Restoration Project – Phase Two – Year 2021. Prepared by the Humboldt County Resource Conservation District. Eureka, California. January 2021.

Humboldt County Resource Conservation District. 2022. Salt River Ecosystem Restoration Project – Photo Monitoring - 2021. Eureka, California.

J.B. Lovelace & Associates. 2022. 2021 Annual Habitat Monitoring Report - Salt River Ecosystem Restoration Project. Prepared for the Humboldt County Resource Conservation District. March 2022.

Ross Taylor and Associates. 2022. Fish Monitoring Samplin in the Salt River – February 4, 2021. Prepared for Prepared for the Humboldt County Resource Conservation District. February 2022.