

Ravenswood Restoration Project

Final Report

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EXECUTIVE SUMMARY

This report presents the results of all fish and water quality sampling conducted throughout 2022, 2023, and 2024 for the Ravenswood Restoration Project (Project). The Project is part of Phase 2 of the South Bay Salt Pond Restoration Project and is located within South San Francisco Bay between Ravenswood and Flood sloughs in the City of Menlo Park, California. The main goal of this Project is to restore and enhance former salt ponds into a mixture of tidal and managed wetlands with associated public access amenities. The purpose of the work presented in this report was to monitor fish and invertebrate species composition and abundance within their ecological communities, as well as water quality to evaluate any potential habitat or water quality condition changes over time in Pond R5/S5 and Flood Slough, as compared to reference conditions in Ravenswood Slough.

HELIX Environmental Planning, Inc. (HELIX) and subconsultants, John Brezina and Thomas Gast and Associates Environmental Consultants (TGAEC), conducted monitoring of the Project from April 2023 to January 2025. Continuous water quality monitoring was conducted by HELIX and Ducks Unlimited, Inc. from 2022 through early 2023, and continued by Ducks Unlimited through 2024. Pond R5/S5 became sufficiently inundated to begin sampling in October 2024 and was sampled until January 2025.

Sampling conducted throughout the monitoring period documented fish, invertebrate, and water quality conditions characteristic of the South San Francisco Bay tidal zone. A variety of fish and invertebrate species were captured, with an increased prevalence of invertebrate prey items observed in Flood Slough following the R4 Pond breach. The inundation of water and subsequent sampling of Pond R5/S5 indicates that it provides productive rearing habitat for young-of-the-year and juvenile fish, supported by abundant prey availability. Water quality parameters measured in Flood Slough, Ravenswood Slough, and Pond R5/S5 exhibited generally consistent trends, with some site-specific variability. Changes in water quality within Flood Slough resulting from the initial watering of Pond R5/S5 were short-lived and did not cause lasting impacts to local environmental conditions.

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1.0 INTRODUCTION

HELIX Environmental Planning, Inc. (HELIX) and Thomas Gast and Associates Environmental Consultants (TGAEC) prepared this report that presents the results of fish and water quality sampling conducted throughout the 2023 and 2024 monitoring period for the Ravenswood Restoration Project (Project). The Project is part of Phase 2 of the South Bay Salt Pond Restoration Project and is located within South San Francisco Bay between Ravenswood and Flood sloughs in the City of Menlo Park, California (Figure 1, *Site and Vicinity Map*). The goal and purpose of the Project is to restore and enhance former salt ponds into a mixture of tidal and managed wetlands with associated public access amenities. HELIX and TGAEC were selected to monitor fish and invertebrate species composition and abundance within their ecological communities, as well as water quality, to evaluate potential habitat changes or water quality condition changes over time in Pond R5/S5 and Flood Slough, as compared to reference conditions in Ravenswood Slough.

The source of water for the Project is Ravenswood Slough (reference habitat), where flows enter the Project area through an intentional breach in the northeast corner of Pond R4 and enter Pond R5/S5 through a water control structure (tidal gate) located in the northeast corner of Pond R5/S5 adjacent to Pond R4. Water then flows westward through these ponds and discharges to Flood Slough through the water control structure located on the western edge of Pond R5/S5 Forebay (Figure 2, *Sampling Locations*). The objective of Pond R5/S5 is to enhance waterfowl habitat and support local stormwater management; however, direct and indirect effects to fish, invertebrates, and their habitat may result from potentially degraded water quality discharge to Flood Slough. Monitoring can provide an assessment of potentially adverse effects on fish, invertebrates, and Essential Fish Habitat (EFH) as well as future adaptive management of Pond R5/S5 to help avoid and minimize adverse effects to listed and managed fish species (Ducks Unlimited 2024).

Construction activities related to bringing Pond R5/S5 online were conducted over a six-year period. From 2020 to 2022, the construction of water control structures and soil import for the All-American Canal were conducted. In 2022, the pilot channel was hydraulically dredged from the breach in the R4 pond to Ravenswood Slough. In 2023, construction activities included soil importation and revegetation of the habitat transition zone in Pond R4, the completion of the improvements to the All-American Canal levee, and the breach of Pond R4 on December 13, 2023. Water management within Pond R5/S5 was postponed until late 2024; therefore, no fish or water quality sampling within Pond R5/S5 was conducted in 2023. In October of 2024, Pond R5/S5 was inundated with water from Ravenswood Slough and water quality and fisheries monitoring was conducted within the Pond for the remaining sampling period.

2.0 METHODS

2.1 Sampling Period

Fish and instantaneous water quality monitoring of the Project were conducted during the 2023 sampling period (May 2023 to January 2024) and the 2024 sampling period (April 2024 to January 2025). Each year, sampling began in the spring and continued through summer and fall, concluding in winter. During both years, one sampling event occurred in spring, three during summer, three during fall, and one in winter (eight total). Whenever feasible, otter trawl sampling and paired seine and gillnet

sampling were conducted in close temporal proximity; however, exact sampling dates varied depending on tidal conditions.

One northern location and one southern location at each of the Ravenswood and Flood Slough sites were sampled (four total) across the two years of monitoring. In October and November of 2024 and January of 2025, one eastern location and one western location in Pond R5/S5 were sampled (four total) (Figure 2). In addition, instantaneous and continuous water quality monitoring was conducted by HELIX and Ducks Unlimited Inc. from October 2022 to December 2022, May 2023 to January 2024, and May 2024 to November 2024 in Ravenswood and Flood Sloughs. In Pond R5/S5 continuous water quality monitoring was conducted from October 2024 to December 2024.

2.2 Fish Sampling

2.2.1 Otter Trawl

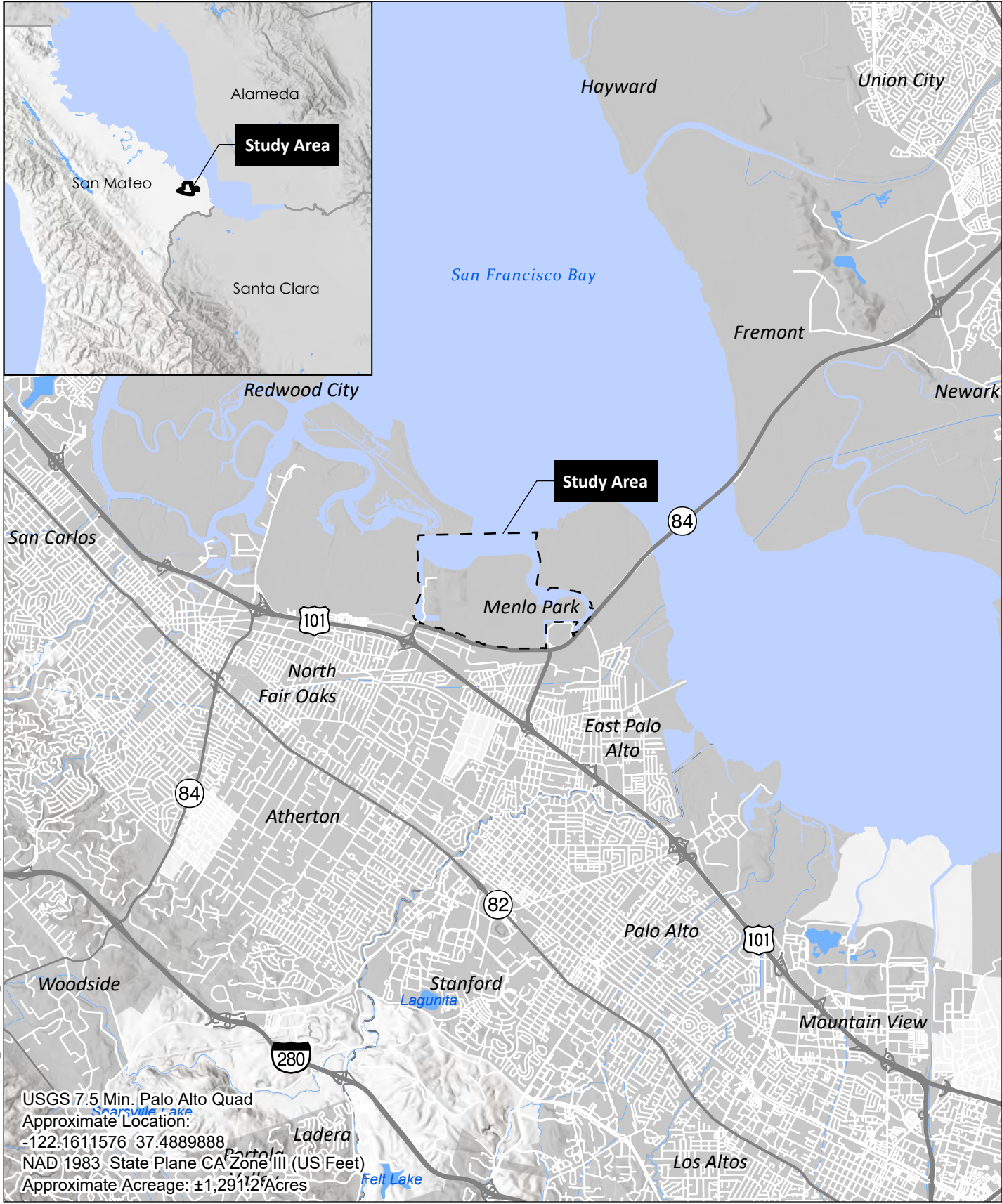
Otter trawl sampling was conducted throughout the two-year sampling period in Flood Slough and Ravenswood Slough. Trawling was done with a four-seam otter trawl approximately 17.5 feet (ft) (5.3 meters [m]) in length with a 5-ft-by-14-ft (1.5-m-by-4.3-m) opening and a mesh size of 1.37 inches (in) (3.5 centimeters [cm]) at the body and 0.23 in (0.6 cm) at the cod end. During sampling, the otter trawl was deployed and towed against prevailing tide at a speed of approximately 1 to 1.5 miles per hour, for a period of five minutes (any longer risks the boat getting stuck in mudflats). The otter trawl was then pulled back into the boat, and the contents were then placed into water-filled trays to facilitate identification and measurement of captures.

2.2.2 Beach Seine

Beach seine sampling was conducted throughout the sampling period in Flood Slough, Ravenswood Slough, and Pond R5/S5 using a 75-ft-by-8-ft (22.8-m-by-2.44-m) net with a 1/16 in (0.16 cm) delta square mesh, a float line, and a lead line. The net was deployed either utilizing a kayak in Flood and Ravenswood Slough, or by walking the net out in Pond R5/S5, then pulled to shore to examine the contents. All fish and invertebrates trapped in the seine were placed into five-gallon buckets filled with water from the sloughs to facilitate identification and measurements of captures. If the catch was particularly muddy, the fish were washed with slough water before measuring. Post-larval captures were collected and identified as young of the year (YOY) due to the difficulty of positively identifying post-larval fish to species. The fish and invertebrates were measured (either fork or total length) and returned to the sampling location. If a large number of a particular species (e.g., Oriental shrimp [*Palaemon macrodactylus*] or topsmelt [*Atherinops affinis*]) were captured, then a representative number of individuals at each site was measured, and the remainder enumerated.

2.2.3 Gillnet

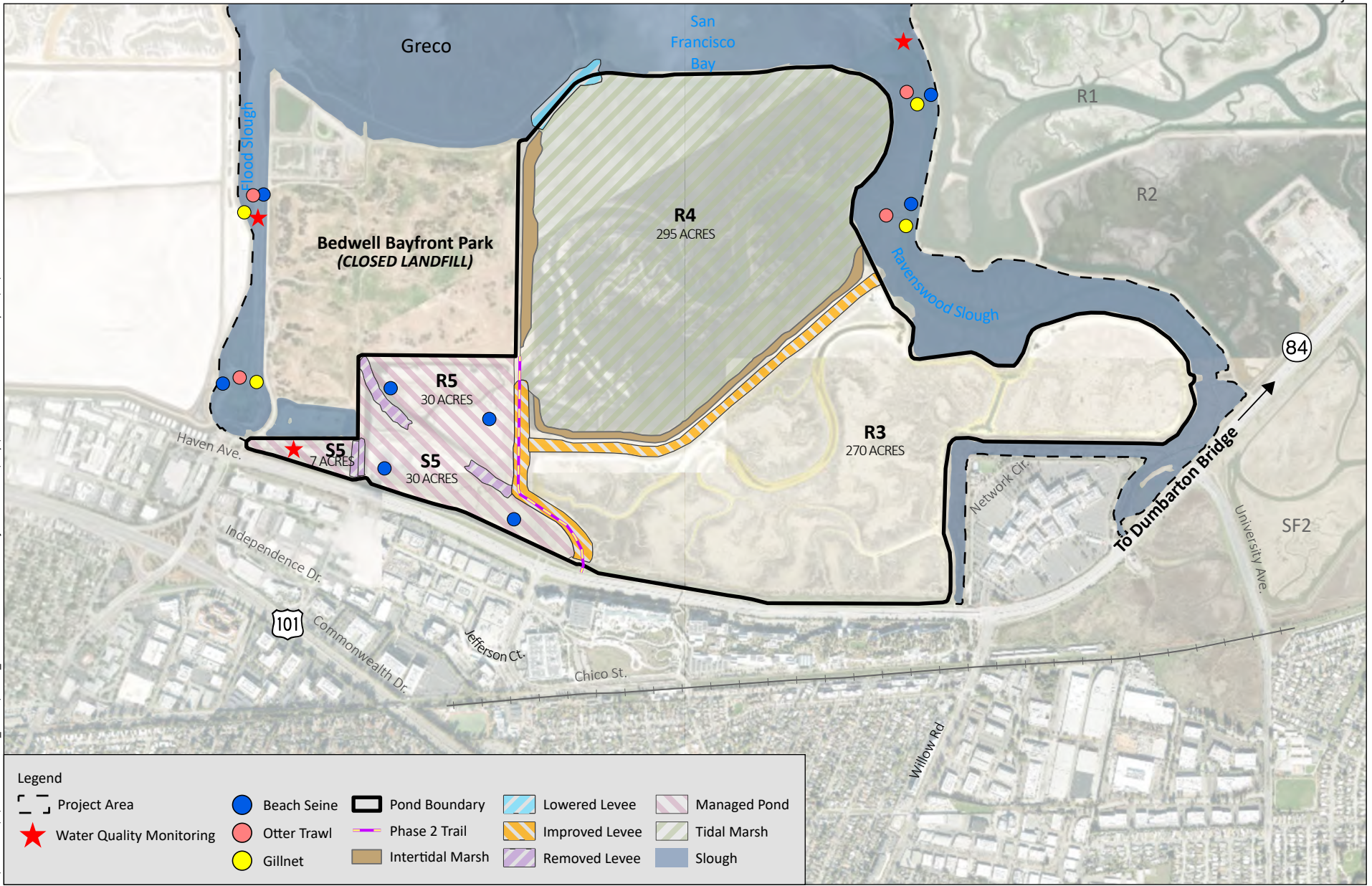
Gillnet surveys were conducted starting in September of 2023 and continued throughout the remaining sampling period in Flood Slough and Ravenswood Slough. Two experimental gillnets were used at each Slough, with the longer net set at the northern site, and the shorter net set at the southern site. The longer net is 80 ft (24.4 m) long by 8 ft (2.44 m) deep, with five 16-ft-long (4.9-m-long) panels composed of 1 in (25 mm), 1.5 in (38 mm), 2 in (51 mm), 2.5 in (64 mm), and 3 in (76 mm) mesh. The shorter net is 50 ft (15.24 m) long by 8 ft (2.44 m) deep, with five 10-ft-long (3.0-m-long) panels with the same mesh sizes as the longer net. These nets became heavily damaged and were replaced in November 2024. The



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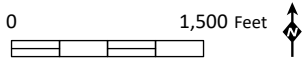
Source: Base Map Layers (Esri, USGS, NGA, NASA)

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Legend

Project Area	Beach Seine	Pond Boundary	Lowered Levee	Managed Pond
Water Quality Monitoring	Otter Trawl	Phase 2 Trail	Improved Levee	Tidal Marsh
Gillnet	Intertidal Marsh	Removed Levee	Slough	



Source: Aerial Imagery (Maxar, 11/19/2022)

experimental gill nets used during sampling from November 2024 through January 2025 had the same overall dimensions as the previous nets; however, the following differences were present. The longer net consisted of five panels: two with 1.5 in (38-mm) mesh, and one each with 2 in (51-mm), 2.5 in (64-mm), and 3 in (76-mm) mesh. The shorter net consisted of the same mesh sizes and the same number of each mesh size as the longer net.

During each sampling event, the gillnets were deployed perpendicular to the channel edge, with the smallest mesh nearest the shore. The sampling duration ranged between 60 to 90 minutes and was timed around mid-tide. The nets were then pulled to shore. All fish trapped in the gillnets were placed into five-gallon buckets filled with water from the sloughs to facilitate identification and measurements of captured organisms. If fish were too large for the five-gallon bucket, they were processed immediately at the shore and returned to the slough. If the catch was particularly muddy, the fish were washed with slough water before measuring. Gill nets were not deployed at Pond R5/S5 due to the lack of deeper tidal channel habitat present within the Pond.

2.3 Slough Comparison

The Shannon Diversity Index (SDI) was calculated to compare species richness and diversity between sampling locations (Shannon and Weaver 1949). The SDI is a widely used metric for biodiversity, which incorporates both species richness (the number of species) and evenness (the distribution of individuals across those species). Higher SDI values indicate greater biodiversity, typically resulting from a high number of species with relatively equal abundances, whereas lower values suggest lower diversity, either due to fewer species or dominance by a few species. The SDI generally ranges from 0 to the natural logarithm of the number of species (S) present, with typical values in ecological studies ranging from 1.5 to 3.5 and is rarely greater than 4. Species Evenness, a complementary measure, was also calculated and used to assess the aquatic communities within sampling locations and provide further insight into SDI values. Species Evenness evaluates how evenly individuals are distributed across species. Values approaching 1 indicate a more even distribution (i.e., no species is dominant), while values closer to 0 suggest dominance by one or a few species.

SDI was calculated using the vegan package (Oksanen et al. 2024) in R (R Core Team 2025). SDI values and Species Evenness were calculated for each season's capture data in Ravenswood and Flood sloughs. Calculations were performed for all fish and invertebrate captures, as well as just for fish. SDI and Species Evenness were not calculated for Pond R5/S5 due to differences in sampling intensity resulting from the number of sampling occasions where the Pond contained water.

2.4 Water Quality

Continuous water quality was assessed using Aqua TROLL 600 and YSI EXO2 units. YSI EXO2 sondes were selected for the water quality monitoring because the units can accommodate multiple sensors and are equipped with pH, dissolved oxygen (DO; milligrams per liter [mg/L] and percent), salinity (Specific Conductivity, micro siemens per centimeter [$\mu\text{S}/\text{cm}$] and parts per thousand [PPT]), turbidity (Formazin Nephelometric Units [FNU]), chlorophyll (Relative Fluorescence Units [RFU]), and temperature (degrees Celsius [$^{\circ}\text{C}$]) sensors. Due to supply chain issues during the onset of water quality monitoring, the YSI EXO2 units were not delivered in time, and Aqua TROLL 600 units had to be rented. The Aqua Troll 600 units were equipped with the same sensors as the YSI EXO2 units aside from the chlorophyll and pH sensors. Aqua TROLL 600's were deployed during 2022, and the YSI EXO2's were used throughout 2023 and 2024. The deployment locations in each slough were approximately 1.5 feet deep at Mean Lower

Low Water (MLLW). Sondes were placed in protective “cages” made from PVC and anchored to the slough bottom to secure their position.

During late spring (May), summer (June/July/August), fall (September/October/November), and winter (December), water quality was collected with readings taken every 15 minutes. Regular cleaning and recalibration were conducted as needed, occurring over a 24-hour period or within the same tidal cycle whenever possible. Higher biofouling rates were observed during the summer months, necessitating more frequent service compared to the cooler fall and winter months. Continuous water quality data were collected in Flood Slough during three deployment periods: October 6 to December 19, 2022; May 25 to December 6, 2023; and May 29 to November 29, 2024. In Ravenswood Slough, continuous measurements were collected over the same periods, except that the sonde was retrieved earlier on November 15, 2024. During the fall of 2024, Pond R5/S5 received water, and a YSI EXO2 unit was deployed within the pond. Continuous water quality measurements in this location were collected from October 18 to December 10, 2024. Water quality data underwent quality control checks, removing erroneous outliers or periods where sensors likely failed (i.e., several days of 0 salinity measurements).

In addition to continuous water quality monitoring, instantaneous measurements were collected during fisheries sampling. Parameters measured included pH, DO, salinity, turbidity, chlorophyll, and temperature. During seine and gill netting, measurements were collected with a YSI Pro 2030 (Temperature, DO, Salinity, Conductivity), an Extech Palm pH reader (pH), and a Turner designs AqualFlor handheld meter (Chlorophyll and Turbidity). During otter trawls, a YSIProDSS and Turner designs AqualFlor handheld meter were used.

2.5 Special-Status Species

To minimize impacts to special-status species, such as salt marsh harvest mouse (*Reithrodontomys raviventris*), western snowy plover (*Anarhynchus nivosus nivosus*), California Ridgway’s rail (*Rallus longirostris obsoletus*), and other nesting birds, crewmembers investigated vegetation along the shoreline for salt marsh harvest mouse and shorebird nests before initiating sampling. Equipment was brought to the shoreline and returned via the same route to minimize impacts to pickleweed habitat.

Before deployment, crewmembers reviewed weekly updates from the San Francisco Bay Bird Observatory (SFBBO) and survey results from Olofson Environmental Inc. (OEI) to assess the presence of western snowy plover and California Ridgway’s rail nests at sampling sites. The SFBBO conducts regular nesting bird surveys for western snowy plover in and around the Bay, and OEI provides maps of rail surveys and results. Updates were reviewed to identify whether any active nest locations were in or around the area to be sampled to minimize the potential for sampling efforts to impact active nests. Any location where nests were previously detected was given a 700-foot buffer to protect the species.

3.0 ANALYSIS

Capture data from otter trawls, seine nets, and gillnets are contained within Appendix A, Table A1. The average, minimum, and maximum water quality measurements for each month of collection for each sampling location, as well as plots of continuous data, are presented in Appendix B.

3.1 Otter Trawl

Across the two-year sampling period, otter trawl surveys were completed on each sampling occasion for a total of 16 sampling events. Trawl surveys captured 14,399 individuals from 36 species, including 22 fish and 14 invertebrates. Invertebrates were the most frequently captured type of organisms in trawl sampling, with California Bay Shrimp (*Crangon franciscorum*) and Oriental Shrimp (*Palaemon macrodactylus*) combined accounting for 92 percent of all individuals captured. The most frequently captured fish in trawl sampling was topsmelt silverside (*Atherinops affinis*), accounting for 1.56 percent of all individuals captured. In the following sections, results from otter trawl surveys in Flood and Ravenswood sloughs from each season of sampling are summarized and compared across years in the sampling period (e.g., Spring 2023 versus Spring 2024).

3.1.1 Spring

Comparing otter trawl captures within Flood and Ravenswood sloughs in Spring 2023 and Spring 2024 revealed an increase in the total number of organisms captured across the two years of sampling (Table 1). Otter trawls conducted in Flood Slough in 2023 captured 591 organisms across four species, whereas trawls in 2024 captured 3,349 organisms across seven species. The SDI and Species Evenness calculated from trawl captures in Flood Slough were higher in 2024 than in 2023, indicating a more even distribution of organisms and reduced dominance of California Bay Shrimp. In 2023, California Bay Shrimp accounted for 95.93 percent of the total species captured, while in 2024, California Bay Shrimp and Oriental Shrimp accounted for 49.45 percent and 49.78 percent of the total, respectively. In both years, relatively low numbers of fish were caught in trawls, with eight individuals captured across two species in 2023, and 17 individuals across four species in 2024. These results indicate that between the 2023 and 2024 spring sampling periods, the composition of organisms within Flood Slough became more diverse and balanced; however, low numbers of fish were present in both years.

Otter trawls in Ravenswood Slough captured fewer organisms than in Flood Slough (Table 1). In 2023, 36 organisms were captured across nine species, whereas in 2024, 223 organisms across seven species were captured. Notably far fewer California Bay Shrimp were captured during 2023 in Ravenswood Slough; 11 individuals accounting for 30.56 percent of the total catch, compared to Flood Slough during the same year. The SDI and Species Evenness calculated from trawl samples in Ravenswood Slough was higher in 2023 than in 2024. The decrease in diversity metrics between years resulted from a higher prevalence of shrimp in 2024, which reduced evenness and diversity metrics despite an increase in total captures. Compared to Flood Slough, Ravenswood Slough had a much lower proportion of shrimp captured in trawls, resulting in the overall lower capture numbers. While 2023 showed greater fish diversity, fish abundances were low (≤ 10 individuals) in both years. The reduction in fish species captured in 2024 compared to 2023 also contributed to the decrease in SDI and Species Evenness.

Table 1. Shannon Diversity Index, species evenness, number of species captured, and total number of organisms captured during spring otter trawl surveys in Flood and Ravenswood sloughs in 2023 and 2024.

Site	Year	Season	Shannon Diversity Index	Species Evenness	Species Captured	Number of Organisms Captured
Flood	2023	Spring	0.201	0.145	4	591
Flood	2024	Spring	0.744	0.382	7	3,349
Ravenswood	2023	Spring	1.79	0.816	9	36
Ravenswood	2024	Spring	0.921	0.473	7	223

3.1.2 Summer

Otter trawl captures in Flood and Ravenswood sloughs between Summer 2023 and Summer 2024 decreased in both the number of species and individuals captured across the two sampling seasons (Table 2). In Flood Slough, otter trawls captured 1,264 organisms across 12 species in 2023, and 850 organisms across 10 species in 2024. Despite the decline, the SDI and Species Evenness slightly increased in Flood Slough between the two years, indicating a more even distribution of organisms and reduced dominance by a few species. In 2023, California Bay Shrimp dominated the catch, accounting for 70.97 percent of all individuals captured, and Oriental Shrimp comprised 21.28 percent. In 2024, California Bay Shrimp accounted for 66.94 percent and Oriental Shrimp for 12.12 percent of the catch. The reduced prevalence of both shrimp species in 2024 contributed to the increased SDI and Species Evenness metrics calculated from summer otter trawl captures. During the 2023 survey period, nine fish species were captured in otter trawl samples. Starry flounder (*Platichthys stellatus*) was the most abundant, with 54 individuals collected, while all other species had fewer than 15 individuals captured. During the 2024 survey period, seven species of fish were captured in trawl surveys. California halibut (*Paralichthys californicus*) were the most abundant, with 24 individuals captured, while all other fish had fewer than 15 individuals captured.

Otter trawl surveys during the summer in Ravenswood Slough exhibited a similar pattern of decreasing abundance and diversity between years as Flood Slough, with 1,185 individuals captured across 16 species in 2023, and 162 individuals captured across 10 species in 2024 (Table 2). The SDI and Species Evenness calculated from trawl captures increased in Ravenswood Slough between 2023 and 2024, indicating a more even distribution of species. In 2023, Oriental Shrimp accounted for 89.03 percent of captures, with California Bay Shrimp comprising an additional 6.67 percent. In 2024, Oriental Shrimp made up 41.36 percent of captures, while California Bay Shrimp made up 38.89 percent. The large decrease in both the number and proportion of the total catch of shrimp between the two years contributed to the increase in diversity and evenness metrics, despite significantly fewer total individuals being captured. During the 2023 survey period, 10 fish species were captured in otter trawl samples. Pacific staghorn sculpin (*Leptocottus armatus*) was the most abundant fish species, with 23 individuals captured, followed by starry flounder with 10 individuals. All other fish species had fewer than four individuals collected in 2023. During the 2024 survey period, seven fish species were captured in trawl samples. California halibut were the most abundant, with 22 individuals captured, while all other fish had less than four individuals captured. During the summer 2024 survey period in both Flood and Ravenswood sloughs, California halibut were the most abundant fish species captured in otter trawls.

Table 2. Shannon Diversity Index, species evenness, number of species captured, and total number of organisms captured during summer otter trawl surveys in Flood and Ravenswood sloughs in 2023 and 2024.

Site	Year	Season	Shannon Diversity Index	Species Evenness	Species Captured	Number of Organisms Captured
Flood	2023	Summer	0.887	0.357	12	1,264
Flood	2024	Summer	1.08	0.470	10	850
Ravenswood	2023	Summer	0.501	0.181	16	1,185
Ravenswood	2024	Summer	1.29	0.560	10	162

3.1.3 Fall

Otter trawl captures in Flood Slough during Fall 2023 and Fall 2024, decreased in both the number of individuals and number of species captured between the two sampling seasons (Table 3). Otter trawls captured 2,701 organisms across 16 species in 2023, and 752 organisms across 14 species in 2024. SDI and Species Evenness in 2023 and 2024 showed a slight increase in both metrics between the two years, indicating that as abundances and species richness decreased between the two years, the distribution of species became more equal. In 2023, California bay shrimp dominated the catch, accounting for 91.34 percent of all individuals captured. In 2024, California bay shrimp were somewhat less prominent, accounting for 84.20 percent of the total catch. In 2023, 121 unidentified gastropods (*Opisthobranchia* sp.) were captured in otter trawls as well as 61 Oriental shrimp. In 2024, the number of Oriental shrimp captured remained similar, with 50 individuals captured in trawl nets. The most common fish captured in 2023 otter trawl samples was starry flounder, with 17 individuals captured. In 2024, topsmelt silverside were the most common fish captured in trawls, with 12 individuals captured. Between years, the prominence of California bay shrimp in otter trawl captures decreased in Flood Slough, resulting in SDI and Species Evenness metrics increasing.

In Ravenswood Slough, otter trawls captured 1,869 individuals across 13 species in 2023, and 443 individuals across 15 species in 2024 (Table 3). The SDI and Species Evenness calculated from trawl samples increased between fall 2023 and fall 2024, indicating that as the total number of individuals captured decreased and the number of species captured increased, the community became more evenly distributed. Similar to Ravenswood Slough, the most common species captured in 2023 was California bay shrimp, accounting for 60.78 percent of the total catch, and Oriental shrimp making up 28.62 percent. In 2024, California bay shrimp were again the most abundant species in trawl surveys accounting for 66.59 percent of the total catch, and Oriental shrimp made up 12.87 percent. The most common fish captured in 2023 was topsmelt silverside, with 124 individuals captured, followed by chameleon goby (*Tridentiger trigonocephalus*) with 34 individuals, and 16 California bat rays (*Myliobatis californica*). In 2024, 35 chameleon goby were captured, along with 15 topsmelt silverside and 14 California halibut. The decrease in the number of shrimp captured as well as the comparatively higher abundances of fish captured compared to previous seasons resulted in SDI and Species Evenness increasing between 2023 and 2024 in Ravenswood Slough.

Table 3. Shannon Diversity Index, species evenness, number of species captured, and total number of organisms captured during fall otter trawl surveys in Flood and Ravenswood sloughs in 2023 and 2024.

Site	Year	Season	Shannon Diversity Index	Species Evenness	Species Captured	Number of Organisms Captured
Flood	2023	Fall	0.423	0.153	16	2,701
Flood	2024	Fall	0.641	0.243	14	752
Ravenswood	2023	Fall	1.03	0.402	13	1,869
Ravenswood	2024	Fall	1.26	0.464	15	443

3.1.4 Winter

Winter otter trawl capture numbers in Flood and Ravenswood sloughs decreased between 2023 and 2024 (Table 4). In Flood Slough, 553 individuals were captured across six species in 2023, and 213 individuals were captured across seven species in 2024. The SDI and Species Evenness increased between 2023 and 2024, indicating that as abundance decreased, the distribution of species became

more even. The most common species captured in 2023 was California bay shrimp, accounting for 95.30 percent of the total catch. In 2024, California bay shrimp were again the most frequently captured species accounting for 88.27 percent of the total catch. The overall decrease in the number of organisms captured and high prevalence of California bay shrimp within the catch total as well as the increase in number of species captured resulted in increased SDI and Species Evenness metrics between 2023 and 2024. Comparing the winter trawl catch to other seasons indicates very low numbers of fish occupy Flood Slough during the winter. In 2023, 15 individuals across three species of fish were captured and in 2024, 18 individuals across two species of fish were captured. Across both years, topsmelt silverside were the most commonly captured fish with 10 individuals captured in 2023, and 17 individuals in 2024.

In Ravenswood Slough, trawls conducted in winter captured 152 organisms across 10 species in 2023, and 56 organisms across seven species in 2024 (Table 4). Although a decrease in the number of individuals and species captured was observed, the SDI and Species Evenness in Ravenswood Slough trawl captures increased between 2023 and 2024. The most common species captured in 2023 was California bay shrimp, accounting for 78.95 percent of the total catch. In 2024, California bay shrimp abundance decreased and only accounted for 42.86 percent of the total catch. Topsmelt silverside abundance increased in 2024, accounting for 37.50 percent of the total catch. The decreased prevalence of California bay shrimp within the catch as well as the increased prevalence of topsmelt silverside contributed to the observed increases in SDI and Species Evenness between 2023 and 2024.

Table 4. Shannon Diversity Index, species evenness, number of species captured, and total number of organisms captured during winter otter trawl surveys in Flood and Ravenswood sloughs in 2023 and 2024.

Site	Year	Season	Shannon Diversity Index	Species Evenness	Species Captured	Number of Organisms Captured
Flood	2023	Winter	0.257	0.144	6	553
Flood	2024	Winter	0.491	0.253	7	213
Ravenswood	2023	Winter	0.883	0.383	10	152
Ravenswood	2024	Winter	1.28	0.657	7	56

3.2 Beach Seine

Across the two-year sampling period, beach seine surveys were conducted in Flood and Ravenswood sloughs on each sampling occasion for a total of 16 sampling events. During three sampling events, two during the fall and one during the winter of 2024, water inundated Pond R5/S5 and beach seining was conducted within this location. Beach seining resulted in the capture of 108,300 individuals from 48 species, including 26 fish species and 22 invertebrate species, during the sampling period. Invertebrates were the most frequently captured type of organisms in seine hauls, with mysid shrimp (*Neomysis kadiakensis*) and reticulate water boatmen (*Trichocorixa reticulata*) accounting for 39.81 percent and 37.09 percent, respectively, of the total catch. While reticulate water boatmen dominated the total catch, this species was almost exclusively captured within Pond R5/S5. Bent-nose Macoma clam (*Macoma nasuta*) were also frequently captured and made up 13.94 percent of the total seine catch. The most frequently captured type of fish in beach seine was silversides, with topsmelt silverside and Mississippi silverside (*Menidia audens*) accounting for 2.97 percent and 1.86 percent of the total catch, respectively. In the following sections, results from beach seining from each season of sampling in Flood and Ravenswood sloughs as well as Pond R5/S5 are summarized and compared across the sampling period.

3.2.1 Spring

Within Flood Slough, the number of organisms captured in seine hauls increased between spring 2023 and 2024; however, the diversity of species captured decreased (Table 5). Spring seine hauls captured 448 organisms across 13 species in 2023, and 553 organisms across 11 species in 2024. The SDI and Species Evenness calculated from seine captures decreased between the years, indicating that while the number of organisms captured increased, a few species became more dominant. In 2023, the most common species captured were Young of the Year (YOY) silverside (*Atherinopsidae* sp.) and Mysid shrimp, representing 51.79 percent and 23.67 percent of the total catch, respectively. In 2024, unidentified YOY fish accounted for 63.47 percent of the total catch, which could not be identified to order or family. However, between 2023 and 2024, the representation of YOY fish in the Flood Slough beach seine samples increased, indicating greater prevalence of fishes in early life stages within the sampled community.

Seine netting in Ravenswood Slough in 2023 captured 157 organisms across eight species, whereas in 2024, 830 individuals were captured across 17 species (Table 5). While the number of organisms and species captured increased between the two years, both SDI and Species Evenness decreased during the sampling period. Captures in 2023 did not indicate dominance by a single species, with Oriental shrimp, arrow goby (*Clevelandia ios*), and eastern mudsnail (*Ilyanassa obsoleta*) being the most frequently captured species. In 2024, bent-nose Macoma clam accounted for 72.29 percent of organisms captured, resulting in the decreased SDI and evenness metrics calculated from seine captures.

Table 5. Shannon Diversity Index, species evenness, number of species captured, and total number of organisms captured during spring beach seine surveys in Flood and Ravenswood sloughs in 2023 and 2024.

Site	Year	Season	Shannon Diversity Index	Species Evenness	Species Captured	Number of Organisms Captured
Flood	2023	Spring	1.43	0.558	13	448
Flood	2024	Spring	1.28	0.533	11	553
Ravenswood	2023	Spring	1.57	0.756	8	157
Ravenswood	2024	Spring	1.17	0.414	17	830

3.2.2 Summer

Seine captures within Flood Slough during summer of 2023 and 2024 showed a massive increase in the number of organisms captured during the sampling period (Table 6). In 2023, a total of 5,120 organisms across 25 species were captured while in 2024, 17,695 organisms across 23 species were captured. The SDI and Species Evenness calculated from seine captures decreased between the years, indicating that while the number of organisms increased, a few species became more dominant. In 2023, the most common species captured was Mysid shrimp, which accounted for 58.01 percent of the total capture. Topsmelt silverside, Oriental shrimp and YOY silverside were most frequently captured in seines during the summer 2023 sampling period, accounting for 13.77 percent, 11.48 percent, and 7.83 percent of the species captured, respectively. Seine captures during the 2024 sampling period were dominated by Mysid shrimp, accounting for 90.56 percent of the total capture. Other species captured in 2024 included bent-nose Macoma Clam which made up 5.84 percent of the total catch, and topsmelt silverside which accounted for 1.62 percent of the total catch. The remaining captures in 2024 were spread across 18 separate species, none of which were captured in abundances greater than 100

individuals. Between 2023 and 2024, capture numbers in Flood Slough substantially increased; however, the dominance of Mysid shrimp led to decreases in both SDI and Species Evenness between years.

Seine captures in Ravenswood Slough during summer of 2023 and 2024 showed an opposite pattern as Flood Slough, with less organisms captured in 2024 compared to 2023 (Table 6). In 2023, 17,099 organisms across 21 species were captured, while in 2024, 5,456 organisms across 18 species were captured. The SDI calculated from the two summers of capture data remained approximately the same, and Species Evenness slightly decreased, indicating that as the abundance of organisms captured decreased, the distribution of organisms across species remained relatively similar. Three fewer species were caught in 2024 compared to 2023, resulting in the decrease in Species Evenness between the years of sampling. In 2023, bent-nose Macoma clam was the most frequently captured species, making up 58.49 percent of the total catch. Mysid shrimp and topsmelt silverside were also frequently captured during the summer of 2023, accounting for 31.90 percent and 6.13 percent of the total catch, respectively. In 2024, the overall number of captured organisms decreased; however, the most commonly captured species remained similar to 2023. Mysid shrimp accounted for 68.08 percent of the total catch in 2024 and were the most frequently captured organism. Bent-nose Macoma clam and topsmelt silverside were also commonly captured, accounting for 18.77 percent and 6.48 percent of the total catch, respectively. While the number of organisms captured decreased between summer 2023 and summer 2024, the most commonly captured species as well as the distribution of organisms across species remained similar.

Table 6. Shannon Diversity Index, species evenness, number of species captured, and total number of organisms captured during summer beach seine surveys in Flood and Ravenswood sloughs in 2023 and 2024.

Site	Year	Season	Shannon Diversity Index	Species Evenness	Species Captured	Number of Organisms Captured
Flood	2023	Summer	1.45	0.452	25	5,120
Flood	2024	Summer	0.442	0.141	23	17,695
Ravenswood	2023	Summer	1.03	0.388	21	17,099
Ravenswood	2024	Summer	1.04	0.360	18	5,451

3.2.3 Fall

Within Flood Slough, the number of organisms captured in seine hauls during the fall increased between 2023 and 2024 (Table 7). In 2023, 870 individuals were captured across 19 species whereas in 2024, 3,425 individuals were captured across 19 species. Across both sampling years, species composition was similar, with 19 species occurring in both years. Species detected exclusively in one year were typically present at low abundances, aside from Mysid shrimp in 2024. The SDI and Species Evenness calculated from seine capture data decreased slightly between 2023 and 2024, indicating that as the number of organisms captured increased, a few species became more dominant. In 2023, the most common species captured was topsmelt silverside which accounted for 56.90 percent of the total catch, followed by Mississippi silverside which accounted for 31.03 percent. Fall of 2023 was the first time that two species of fish were the most frequently captured in seine hauls during a sampling period. In the fall of 2024, Mysid shrimp were the most frequently captured species, accounting for 64.82 percent of the total catch. A large number of Mississippi silverside and topsmelt silverside were captured in 2024, accounting for 18.81 percent and 8.79 percent of the total catch, respectively. While Mysid shrimp were the dominant species captured in 2024, Silverside capture numbers were comparable to one another

between sampling years. The high abundance of Mysid shrimp in 2024 seine hauls suggests increased food availability for aquatic invertebrates in Flood Slough that year.

Seine netting in Ravenswood Slough during the fall sampling period had similar results as Flood Slough, with an increased number of organisms captured and decreasing SDI and Species Evenness metrics between the two years of sampling (Table 7). In 2023, 547 organisms were captured across 23 species, whereas in 2024, 4,021 organisms were captured across 15 species. The SDI and Species Evenness metrics decreased between the two years of sampling, indicating that as capture numbers increased, a subset of species became dominant. In 2023, eastern mudsnail, Mississippi silverside, and Oriental shrimp were the dominant species captured, accounting for 23.40 percent, 18.46 percent, and 16.45 percent of captures, respectively. In addition to these species, relatively high numbers of rainwater killifish (*Lucania parva*), California bay shrimp (*Crangon franciscorum*), and topsmelt silverside were also captured. In 2024, Mysid shrimp and bent-nose Macoma clam were the most frequently captured species, accounting for 47.75 percent and 42.77 percent of the total catch, respectively. The increased prevalence of Mysid shrimp in Ravenswood Slough during fall 2024 monitoring mirrored the pattern observed in Flood Slough, indicating a substantial availability of food resources in both sloughs during sampling. In the fall 2024 sampling period at Ravenswood Slough, Mississippi silverside and topsmelt silverside were the most frequently captured fish species, accounting for 3.60 percent and 2.74 percent of the total catch, respectively.

In addition to seine netting in Flood and Ravenswood sloughs, Pond R5/S5 was also sampled on two occasions during the fall 2024 monitoring period (Table 7). A total of 38,538 organisms were captured across 11 species in this location. Although the total number of organisms captured in Pond R5/S5 was high, both the SDI and Species Evenness calculated from the seine captures were low, indicating that the community was dominated by a few species. The most common species captured was reticulate water boatmen, which accounted for 70.06 percent of the total catch. Mysid shrimp were also highly prevalent in seine captures, accounting for 28.54 percent of the total catch, and were captured in abundances similar to that of Flood and Ravenswood sloughs. The most frequently captured fish species within Pond R5/S5 was YOY goby and juvenile Mississippi silversides. The presence of juvenile fishes as well as the high abundance of food resources within Pond R5/S5 indicates that this restored area likely serves as nursery habitat for a variety of fish species.

Table 7. Shannon Diversity Index, species evenness, number of species captured, and total number of organisms captured during fall beach seine surveys in Flood Slough, Ravenswood Slough, and Pond R5/S5 in 2023 and 2024.

Site	Year	Season	Shannon Diversity Index	Species Evenness	Species Captured	Number of Organisms Captured
Flood	2023	Fall	1.23	0.417	19	870
Flood	2024	Fall	1.17	0.397	19	3,425
Ravenswood	2023	Fall	2.21	0.704	23	547
Ravenswood	2024	Fall	1.12	0.424	15	4,021
Pond R5/S5	2024	Fall	0.687	0.287	11	38,538

3.2.4 Winter

Within Flood Slough, the number of organisms captured in seine hauls during the winter decreased between 2023 and 2024 (Table 8). In 2023, 713 individuals were captured across 11 species whereas in 2024, 338 individuals were captured across 10 species. The SDI and Species Evenness calculated from

seine capture data slightly decreased between 2023 and 2024, indicating that as the number of organisms and species captured decreased, a few species became more dominant. In 2023, the most frequently captured species in seine hauls was Mississippi silverside, accounting for 32.40 percent of the total catch, followed by topmelt silverside and larval fish which accounted for 31.70 percent and 15.43 percent of the total catch, respectively. In 2024, Mississippi silverside were again the most frequently captured organism in seine hauls, accounting for 65.09 percent of the total catch. During this period, no other species was captured in abundances greater than 30 individuals. The decrease in overall capture abundance in 2024 as well as the increased prevalence of Mississippi silverside, resulted in the SDI and Species Evenness decreasing between the two years of sampling.

In Ravenswood Slough, seine captures during the winter sampling period were much lower in 2024 than those of 2023 (Table 8). A total of 634 organisms across 10 species were captured in 2023, while only eight organisms across three species were captured in 2024. Both the SDI and Species Evenness metrics calculated from the seine captures increased between 2023 and 2024, resulting from the low capture numbers of eight organisms in 2024 spread across three species. In 2023, the most frequently captured species in Ravenswood Slough was an unidentified species of shrimp, accounting for 72.09 percent of the total catch. The most abundant fish species captured during this period were Mississippi silverside and topmelt silverside, accounting for 4.20 percent and 4.07 percent of the total catch, respectively. In 2024, captures also included three comb Jellyfish (*Ctenophora* sp.), four eastern mud snails, and one yellowfin goby (*Acanthogobius flavimanus*).

In Pond R5/S5 seine captures during the winter sampling period in 2024 captured 11,853 organisms across 11 species (Table 8). Similar to the fall sampling period, reticulate water boatmen was the most common captured organism, accounting for 95.01 percent of the total catch. Mysid shrimp accounted for 4.68 percent of the total catch in Pond R5/S5 and 15 larval fish were captured. No other species were captured in abundances greater than 10 individuals. The SDI and Species Evenness metrics calculated from the winter seine captures were low for Pond R5/S5, resulting from the high proportion of reticulate water boatmen in the catch. The types of organisms captured during the winter were similar to those captured during the fall sampling period, with a large number of potential prey items captured as well as larval and juvenile fishes. These captures indicate that Pond R5/S5 continues to serve as likely nursery habitat through the winter months.

Table 8. Shannon Diversity Index, species evenness, number of species captured, and total number of organisms captured during winter beach seine surveys in Flood Slough, Ravenswood Slough, and Pond R5/S5 in 2023 and 2024.

Site	Year	Season	Shannon Diversity Index	Species Evenness	Species Captured	Number of Organisms Captured
Flood	2023	Winter	1.55	0.645	11	713
Flood	2024	Winter	1.27	0.550	10	338
Ravenswood	2023	Winter	0.777	0.337	10	648
Ravenswood	2024	Winter	0.974	0.887	3	8
Pond R5/S5	2024	Winter	0.215	0.09	11	11,853

3.3 Gillnet

Gillnet surveys in Flood and Ravenswood sloughs began during the first sampling occasion in the fall of 2023 and continued throughout the remaining sampling period. Gillnet surveys resulted in the capture of 112 organisms across six species, including four fish, one invertebrate, and one reptile. Fish were the most frequently captured type of organism from the gillnet surveys accounting for 97.32 percent of the total catch. The most common species of fish captured were California bat ray (*Myliobatis californica*) and leopard shark (*Triakis semifasciata*), accounting for 42 percent and 36 percent of the total catch, respectively. Summarization of gillnet captures within each season and across years in the same season, were done without calculating SDI and Species Evenness metrics due to the relatively low capture numbers and types of organisms captured on each sampling occasion compared to otter trawls and beach seines. Studies have shown that SDI is negatively biased when sample sizes are small (e.g., fewer than 20 individuals), which can lead to skewed results (Konopinski 2020).

3.3.1 Spring

Gillnet surveys were conducted in Flood and Ravenswood sloughs during spring of 2024 (Table 9). In Flood Slough, one striped bass (*Morone saxatilis*) and one red-eared slider (*Trachemys scripta*) were captured. In Ravenswood Slough, one leopard shark and six striped bass were captured. Striped bass were the most frequently captured species during spring surveys, indicating the non-native predators are prevalent within both sloughs during the spring.

Table 9. The number of species captured and total number of organisms captured during spring gillnet surveys in Flood Slough and Ravenswood Slough during 2024.

Site	Year	Season	Species Captured	Number of Organisms Captured
Flood	2024	Spring	2	2
Ravenswood	2024	Spring	2	7

3.3.2 Summer

Gillnet surveys were conducted in Flood and Ravenswood sloughs during the summer of 2024 and resulted in greater capture numbers than spring sampling (Table 10). In Flood Slough, one California bat ray and two European green crabs (*Carcinus maenas*) were captured. In Ravenswood Slough, 33 organisms were captured during the sampling event including 19 California bat rays, nine leopard sharks, and five striped bass. While a greater number of sampling occasions were conducted in the summer of 2024 compared to spring of 2024 (three samples during summer and one in the spring), the captures indicate a shift towards native predatory species (i.e., California bat ray and leopard shark) and away from non-native predators (striped bass) during the summer.

Table 10. The number of species captured and total number of organisms captured during summer gillnet surveys in Flood Slough and Ravenswood Slough during 2024.

Site	Year	Season	Species Captured	Number of Organisms Captured
Flood	2024	Summer	2	3
Ravenswood	2024	Summer	3	33

3.3.3 Fall

Gillnet surveys were conducted in Flood Slough during the fall of 2023 and fall of 2024, allowing for comparison of capture composition between years (Table 11). During 2023, 10 organisms were captured across three species, including three California bat rays, six leopard sharks, and one striped bass. In 2024, 11 organisms were captured across three species, including five California bat rays, five leopard sharks, and one striped bass. Captures in Flood Slough during 2023 and 2024 were similar, indicating a consistent composition of predatory fish between years in the same season, with native species being more prevalent than non-native species.

Gillnet surveys were also conducted in Ravenswood Slough during the fall of 2023 and fall of 2024 (Table 11). During 2023, 32 organisms were captured across four species, including 19 California bat rays, eight leopard sharks, and one starry flounder. A decline in the total number of organisms captured was observed in 2024, with 12 organisms captured across two species including one California bat ray and 11 leopard sharks. Across both years of sampling, native species were more common in gillnet surveys than non-natives. In 2024, although fewer individuals were captured, all were native species.

Table 11. The number of species captured and total number of organisms captured during fall gillnet surveys in Flood Slough and Ravenswood Slough during 2023 and 2024.

Site	Year	Season	Species Captured	Organism Captured
Flood	2023	Fall	3	10
Flood	2024	Fall	3	11
Ravenswood	2023	Fall	4	32
Ravenswood	2024	Fall	2	12

3.3.4 Winter

Winter gillnet surveys resulted in very low capture numbers across both years of sampling in both sloughs (Table 12). Gillnet surveys yielded captures only in Ravenswood Slough during 2023, when one leopard shark and one striped bass were captured. No organisms were captured in Flood Slough during winter surveys in 2023 or 2024, and no organisms were captured in Ravenswood Slough during 2024. Low winter capture numbers in Flood and Ravenswood sloughs were consistent across all sampling methods, indicating a seasonal trend of reduced abundances of higher trophic level species during the winter.

Table 12. The number of species captured and total number of organisms captured during winter gillnet surveys in Flood Slough and Ravenswood Slough during 2023 and 2024.

Site	Year	Season	Species Captured	Number of Organisms Captured
Flood	2023	Winter	0	0
Flood	2024	Winter	0	0
Ravenswood	2023	Winter	2	2
Ravenswood	2024	Winter	0	0

3.4 Slough Comparison

Table 13 compares SDI, Species Evenness, and the number of species and total number of organisms captures across all sampling methods (otter trawl, beach seine, and gillnet) between Flood and Ravenswood sloughs as well as Pond R5/S5 during sampling years.

Table 13. The Shannon Diversity Index, species evenness, number of species captured, and total number of organisms captured across all sampling methods (otter trawl, beach seine, gillnet) for Flood Slough, Ravenswood Slough, and Pond R5/S5 in 2023 and 2024.

Site	Year	Shannon Diversity Index	Species Evenness	Species Captured	Organisms Captured
Flood	2023	1.91	0.526	38	12,270
Flood	2024	1.29	0.350	40	27,191
Ravenswood	2023	1.62	0.439	40	21,713
Ravenswood	2024	1.47	0.424	32	11,246
Pond R5/S5	2024	0.616	0.22	16	50,391

3.4.1 Flood Slough

The diversity and abundance of organisms captured in Flood Slough increased between the two years of sampling (Table 13). In 2023, a total of 12,270 organisms across 38 species were captured during monitoring activities including 25 species of fish and 13 species of invertebrates. Invertebrates were notably more abundant than fish, with 8,875 individuals captured versus 3,395 fish. California bay shrimp was the most prevalent species, accounting for 36.92 percent of the total catch, followed by Mysid shrimp at 25.14 percent. Topsmelt silverside was the most frequently captured fish species, comprising 11.86 percent of the total catch.

In 2024, the total number of organisms captured increased to 27,191 across 40 species, including 24 fish, 15 invertebrates, and one reptile. As observed in the previous year of sampling, invertebrates remained more abundant, with 24,539 individuals compared to 2,651 fish. Mysid shrimp dominated the catch, accounting for 67.28 percent, with California bay shrimp constituting 11.30 percent. The most common fish species in 2024 was Mississippi silverside, representing 3.57 percent of the total catch.

Assessments of the SDI and Species Evenness metrics calculated from each year's captures in Flood Slough revealed a decline in both measures from 2023 to 2024. The SDI decreased from 1.91 in 2023, to 1.29 in 2024, reflecting an increased dominance of a few species in the community between years. Likewise, Species Evenness declined from 0.526 to 0.350, indicating a less balanced distribution among species. Although the number of individual organisms and species captured increased between the two

years, this rise was driven primarily by the dominance of Mysid shrimp in 2024, which comprised 67.28 percent of the total catch. Notably, Mysid shrimp captures alone in 2024 exceeded the total number of organisms caught in 2023, resulting in a notable shift in the distribution of individuals captured. The number of fish captured in Flood Slough decreased between the two years of sampling, indicating a reduction in higher trophic level species within the environment. The marked increase in Mysid shrimp abundance and decline in the number of fish captured contributed to reduced species diversity and evenness, indicating a shift in ecosystem balance towards lower trophic level species in Flood Slough.

3.4.2 Ravenswood Slough

Diversity and overall abundance of organisms captured in Ravenswood Slough declined over the two years of sampling (Table 13). In 2023, sampling efforts resulted in 21,713 organisms captured across 40 species, consisting of 21 fish and 19 invertebrate species. Mirroring the patterns observed in Flood Slough, invertebrates greatly outnumbered fish, with 19,777 individuals captured compared to 1,936 fish. Bent-nose Macoma clam was the dominant species, representing 46.13 percent of the total catch. Other abundant species included Mysid shrimp (25.12 percent), Oriental shrimp (9.42 percent), and California bay shrimp (6.66 percent). Topsmelt silverside were the most frequently captured fish, making up 5.76 percent of the catch.

In 2024, the total catch dropped to 11,246 organisms and species richness decreased to 32, comprised of 19 fish and 13 invertebrate species. Invertebrates remained the most prevalent group, with 9,960 individuals captured, while 1,286 fish were captured. The most frequently captured species remained similar between years, with Mysid shrimp and bent-nose Macoma clam accounting for 50.58 percent and 29.62 percent of the total catch in 2024, respectively. California bay shrimp were also frequently captured accounting for 4.89 percent of the total catch. Topsmelt silverside was again the most frequently captured fish, though its proportion in the total catch slightly declined to 4.57 percent.

The SDI and Species Evenness metrics calculated from each year's captures in Ravenswood Slough revealed a slight decline in both metrics from 2023 to 2024. The SDI decreased from 1.62 in 2023, to 1.47 in 2024, reflecting a decrease in the overall diversity within the community. Species Evenness also declined from 0.439 to 0.424, indicating a shift towards a less balanced distribution of species. The decrease in the abundance and number of species captured between the two years of sampling, as well as the dominant species making up slightly higher proportions of the total catch in 2024 contributed to the decrease in SDI and Species Evenness metrics.

3.4.3 Pond R5/S5

Pond R5/S5 was only sampled during the end of the 2024 sampling period, as this was the only time in which water was present within the restored pond. While a comparison of community composition within the pond cannot be made between years, the available capture data does provide insight into the community of organisms present immediately following the pond's connection with Flood Slough.

Within Pond R5/S5, a total of 50,391 organisms were captured across 16 species, including 10 species of fish and six species of invertebrates (Table 13). Similar to the pattern observed in Flood and Ravenswood sloughs, invertebrates were the dominant group of organisms captured. A total of 49,823 invertebrates were captured within Pond R5/S5 while only 568 fish were captured during the sampling period. The most common species captured was reticulate water boatmen, which accounted for 75.93 percent of the total catch. Mysid shrimp were the second most abundant species within the catch data and

accounted for 22.93 percent of the total catch. The most frequently captured fish within the pond was YOY goby, which made up 0.44 percent of the total catch and were the third most abundant species encountered. The SDI and Species Evenness metrics calculated from the Pond capture totals were low, reflecting the dominance of a few species—primarily reticulate water boatmen and Mysid shrimp—within the catch.

While sampling within Pond R5/S5 was conducted on only three sampling occasions, the total number of organisms captured within the pond was greater than the total captured within a year in Flood and Ravenswood sloughs. The majority of individuals captured (75.93 percent) were reticulate water boatmen, a small invertebrate (2.8-5.2 mm) that feeds on algae (BugGuide 2026). This high capture number is therefore largely driven by the overwhelming abundance of this invertebrate, which may skew the representation of overall ecosystem abundance within the pond when compared to the capture totals from Flood and Ravenswood sloughs.

3.4.4 Comparison Between Sloughs

During the 2023 sampling period, both the SDI and Species Evenness calculated from capture data were higher in Flood Slough compared to Ravenswood Slough (Table 13). Although nearly twice as many organisms were captured in Ravenswood Slough, diversity metrics indicate greater dominance by a few species within Ravenswood compared to Flood Slough. The higher evenness value in Flood Slough during 2023 suggests that while some variation in abundance among species is present, the distribution of individuals was more balanced across species than in Ravenswood Slough. This pattern is consistent with ecological expectations but captures in 2023 clearly indicate that Flood Slough supported a more evenly distributed community.

During the 2024 sampling season, total organism abundance and species richness in Flood Slough increased relative to the previous year. In contrast, Ravenswood Slough exhibited declines in both total abundance and species richness compared to 2023. Despite these opposing trends, SDI and Species Evenness metrics decreased in both sloughs from their previous year's measurements. Analysis of the capture data in Ravenswood Slough resulted in higher SDI and Species Evenness values compared to Flood Slough. These results suggest a shift in community structure within Flood Slough where the distribution of individuals among species became less uniform while in Ravenswood Slough the community remained more balanced despite the decline in species abundance and richness.

In 2024, Pond R5/S5 exhibited much lower SDI and Species Evenness values than those calculated for Flood Slough or Ravenswood Slough during any sampling period. Capture data revealed that the pond supported far greater total organism abundance but much lower species richness compared to both sloughs, resulting in decreased diversity and evenness metrics. The capture data also revealed dominance by a single species within the pond, the reticulate water boatmen, which was captured in abundances exceeding the total combined organism counts from Flood Slough and Ravenswood Slough. This dominance significantly skewed the community distribution, as indicated by the low diversity indices.

3.5 Water Quality

Tables and figures displaying water quality measurement data are included in Appendix B. Monthly averages as well as minimum and maximum measurements for the continuous data for each location are shown in Tables B1, B2, and B3. Monthly averages as well as minimum and maximum measurements

for the instantaneous data for each location are shown in Tables B3, B4, and B5. Figures B1 through B18 display all continuous measurement data. Figures B19 to B24 have Generalized Additive Model trendlines fit to each sampling location dataset to reveal trends throughout the monitoring period for each location.

3.5.1 Temperature

Temporal trends in water temperature measurements throughout the monitoring period in Flood Slough and Ravenswood Slough were similar and expected, exhibiting warming from spring to summer, and cooling during the fall and winter (Figures B1 and B2, Appendix B). Pond R5/S5 exhibited similar trends to the two sloughs from the beginning of the recording period (October 2024) through mid-November 2024. However, from mid-November to the end of the recording period (mid-December), drastic temperature drops and increases were recorded, likely resulting from low water during managed drawdown events for stormwater management (Figure B3, Appendix B).

3.5.1.1 Continuous Data

Across the three-year monitoring period in Flood Slough, the monthly average water temperatures ranged from 10.23 to 23.60°C. The lowest temperature recorded across the deployment was 8.53°C (November 2022), while the highest was 29.22°C (June 2023). The mean temperature for the entire deployment in Flood Slough was 19.00°C and the standard deviation was 4.70°C.

In Ravenswood Slough, the monthly average water temperatures ranged from 10.75 to 24.02°C. The lowest temperature recorded across the deployment was 7.30°C (December 2022), while the highest was 29.22°C (August 2023). The mean temperature for the entire deployment in Ravenswood Slough was 19.20°C and the standard deviation was 4.70°C.

Due to the relatively short deployment period of approximately two months in Pond R5/S5, monthly averages were not calculated and instead the entire data set was examined. Across the two-month deployment period, the lowest water temperature recorded was 4.35°C (November 2024), while the highest was 20.80°C (October 2024). The average temperature throughout the deployment was 13.10°C and the standard deviation was 4.12°C.

3.5.1.2 Instantaneous Data

In Flood Slough, the monthly average water temperatures calculated from instantaneous water quality measurements ranged from 9.61 to 25.36°C. The lowest temperature measured across the sampling period was 8.80°C (January 2025), while the highest was 26.20°C (July 2024). The mean temperature across all instantaneous water quality measurements in Flood Slough was 19.30°C and the standard deviation was 4.75°C.

In Ravenswood Slough, the monthly average water temperatures ranged from 9.15 to 27.15°C. The lowest temperature measured was 7.50°C (January 2025), while the highest was 28.80°C (July 2024). The average temperature across all instantaneous water quality measurements in Ravenswood Slough was 18.63°C and the standard deviation was 5.08°C.

In Pond R5/S5, the lowest water temperature recorded was 10.40°C (January 2025) and the highest was 20.6°C (October 2024). The average temperature across all instantaneous water quality measurements in the pond was 15.16°C and the standard deviation was 3.64°C.

3.5.1.3 Comparison

Instantaneous water quality measurements exhibited a slightly wider range of monthly average temperatures than the continuous measurements in both Flood and Ravenswood sloughs. This difference likely resulted from temporal variability, as instantaneous measurements were collected only during high tide and daylight hours, resulting in far fewer measurements. In contrast, continuous data were collected every 15 minutes and encompassed both the full tidal and diel cycles. This difference may also have been driven by spatial variability, as instantaneous measurements were taken nearer to shore and to the water surface than the continuous measurements. In contrast, the minimum and maximum temperatures recorded in both sloughs from the continuous datasets spanned a wider range than the instantaneous measurements, resulting from a longer period of data collection. Despite differences in the ranges of monthly averages and minimum/maximum values, the overall average temperatures across the entire monitoring period were similar between the two measurement types.

In Pond R5/S5, continuous water temperature observations were generally lower than instantaneous measurements, although the two collection methods had similar measurements at the upper end of the temperature range. This discrepancy likely resulted from continuous data being collected during low tide or managed drawdown events, when the sonde deployment site was in shallow water or temporarily exposed to air, while the instantaneous measurements were collected only when the pond was full. Additionally, the continuous data was collected over the full diel cycle, resulting in lower temperatures within the data set. This pattern is reflected in the overall average temperatures across the monitoring period, with instantaneous measurements showing higher mean values than the continuous records.

Comparison of water temperature trends from continuous and instantaneous measurements revealed similar seasonal trends across both methods. Temperatures increased during spring and summer, then declined through fall, reaching their lowest values in winter. Although the timing of minimum and maximum temperatures differed slightly between the two methods, both data sets exhibited similar trends in water temperature throughout the monitoring period.

3.5.1.4 Dissolved Oxygen

Dissolved oxygen (DO) concentrations within Flood Slough and Ravenswood Slough exhibited similar trends across the monitoring period. During the 2023 and 2024 monitoring periods, DO concentrations remained stable throughout the years, with concentrations increasing during the fall and winter months. During the 2022 monitoring period, concentrations in Ravenswood Slough increased in late November before rapidly declining, while concentrations in Flood Slough remained stable before declining. The declines seen in both sloughs were likely due to instrument biofouling rather than environmental factors (Figures B4 and B5, Appendix B). Flood Slough had an increase in DO beginning in late October 2024, when Pond R5/S5 became operational. Once Pond R5/S5 became operational, DO concentrations within the pond were consistently higher than the sloughs, but also exhibited higher variability (Figure B6, Appendix B). Higher DO concentrations in Pond R5/S5 potentially resulted from higher abundance of photosynthetic organisms as indicated by the chlorophyll levels and lower water volumes in R5/S5 during the monitoring period.

3.5.1.5 Continuous Data

Across the continuous monitoring period in Flood Slough, the monthly average DO concentrations ranged from 2.50 to 8.22 mg/L. The lowest DO concentration recorded was 0.00 mg/L in December of 2022 (likely instrument biofouling). The lowest DO concentration recorded outside of the 2022 period was 0.60 mg/L (July 2024). The highest DO concentration recorded in Flood Slough was 20.33 mg/L (July 2024). The average DO concentration across the entire deployment was 5.70 mg/L and the standard deviation was 2.35 mg/L. During 2023 and 2024, the DO concentration within Flood Slough increased during fall and winter, then decreased during the summer period. In 2024, this increase was greater than the previous year and coincided with Pond R5/S5 becoming operational.

In Ravenswood Slough, the monthly average DO concentration ranged from 2.95 to 7.96 mg/L throughout the monitoring period. Similar to Flood Slough, DO concentration of 0.00 mg/L were common in the 2022 recording period (likely instrument biofouling). The lowest DO concentration measured outside of the 2022 period was 0.94 mg/L (July 2023). The highest DO concentration recorded in Ravenswood Slough was 13.48 (June 2024). The average DO concentration across the entire deployment was 5.99 mg/L and the standard deviation was 1.79 mg/L. In Ravenswood Slough, the average DO concentration increased during the fall of 2023 and 2024, but not to the same degree observed in Flood Slough.

Across the three-month monitoring period in Pond R5/S5, the lowest DO concentration recorded was 6.61 mg/L (October 2024), while the highest was 20.56 mg/L (November 2023). The average DO concentration throughout the deployment was 11.50 mg/L and the standard deviation was 2.89 mg/L. During late November and early December, consistently high DO measurements were recorded in the pond.

3.5.1.6 Instantaneous Data

The average monthly DO concentration in Flood Slough calculated from instantaneous measurements ranged from 3.91 to 9.60 mg/L. The lowest concentration measured across the sampling period was 3.24 mg/L (June 2023) while the highest was 11.70 mg/L (November 2024). The average DO concentration across all instantaneous water quality measurements in Flood Slough was 6.90mg/L and the standard deviation was 1.75 mg/L.

In Ravenswood Slough, the average monthly DO concentration calculated from instantaneous measurements ranged from 5.58 to 9.38 mg/L. The lowest concentration measured was 4.08 (August 2023) while the highest was 12.60 mg/L (January 2026). The average concentration across all measurements was 7.30 mg/L and the standard deviation was 1.49 mg/L. Similar to the pattern observed in Flood Slough, the average monthly concentrations tended to be higher in instantaneous measurements compared to the continuous measurements.

In Pond R5/S5, the lowest measured DO concentration was 9.20 mg/L (November 2024) while the highest was 12.60 mg/L (November 2025). The average DO concentration across the three months of measurements was 11.54 mg/L and the standard deviation was 1.23 mg/L.

3.5.1.7 Comparison

Instantaneous measurements exhibited a slightly wider range of monthly average DO measurements compared to the continuous measurements at all sites; however, significant overlap in the ranges

occurred. Similar to trends observed in temperature, the difference in monthly average DO concentrations likely arose from continuous measurements spanning the full tidal cycle and a longer period of monitoring, whereas the instantaneous measurements only encompassed measurements over three days at high tide. Examining minimum and maximum DO measurements emphasizes the larger range of data in continuous measurements, as these values had a wider range compared to the instantaneous values. In Flood and Ravenswood sloughs, the average DO concentration across the entire monitoring period was greater for instantaneous measurements, whereas in Pond R5/S5, the average was nearly identical. Comparison of DO concentrations from continuous and instantaneous measurements revealed similar seasonal trends across both measurement methods. While the continuous measurements exhibited a wider range of values and more pronounced seasonal variation, the instantaneous measurements were within the range of the continuous data.

3.5.2 Salinity

Continuous salinity measurements were recorded in Practical Salinity Units (PSU) whereas instantaneous measurements were collected in Parts Per Thousand (PPT). The oceanographic literature indicates that these units are practically synonyms and therefore can be treated as equivalent (Keddy 2023, Montagna et al. 2013).

Within Ravenswood and Flood sloughs, salinity measurements varied over the course of the day, associated with tidal changes, and across the seasons. During the 2022 monitoring period (October to mid-December) salinity measurements decreased with each month. In the 2023 and 2024 monitoring periods, salinities increased from spring to summer and fall. In the end of the 2024 monitoring period, values began to decrease until the sensor began to give erroneous readings. Variability in daily salinity measurements was greater in Flood Slough than Ravenswood Slough, reflected in the standard deviation of the mean in the following section. Salinity measurements within Pond R5/S5 were higher and more stable than both of the sloughs. Examining salinity trends in Flood Slough after Pond R5/S5 became operational in October 2024, revealed a spike in salinity measurements shortly after the sonde was redeployed in Flood Slough (Figures B7, B8, and B9, Appendix B). Following the spike, salinity returned to earlier 2024 levels but with reduced daily variability, indicating stabilization at elevated concentrations influenced by the pond.

3.5.2.1 Continuous Data

For the sonde deployed in Flood Slough, salinity measurements lower than 5 PSU for prolonged periods of time (<2 days) were excluded from the analysis as these low measurements resulted from sensor error. Salinity measurements less than 5 PSU were removed during the periods of September 15, 2023, to October 15, 2024, and August 21, 2024, to October 2, 2024. Removal of salinities lower than 5 PSU between these two time periods resulted in 58 measurements being removed (3.53 percent of the total data).

In Flood Slough, the monthly average salinity ranged from 15.93 to 31.12 PSU. The lowest salinity value measured was 0.20 in November of 2022, while the highest value was 51.35 PSU in October of 2024. The average salinity across the entire monitoring period was 23.80 PSU. Variability in continuous salinity measurements was higher in Flood Slough compared to Ravenswood Slough and Pond R5/S5, with a standard deviation of 7.09 PSU. Additionally, within a 24-hour period, changes in salinity spanning approximately 20 PSU were commonly observed. The spike in salinity at the beginning of October 2024

was recorded shortly after the sonde was redeployed and coincided with Pond R5/S5 coming online (Figure B7, Appendix B).

For the Ravenswood Slough sonde data, salinity measurements below 20 PSU were excluded for the periods November 1–December 20, 2022; July 25–December 1, 2023; and October 1–November 15, 2024. Two additional measurements below 25 PSU were removed from July 1–August 15, 2024. These measurements were identified as erroneous outliers, typically occurring as isolated low readings or occurring over short temporal periods of less than six hours. Overall, 0.12 percent of the Ravenswood Slough sonde dataset was discarded.

In Ravenswood Slough, salinity measurements were generally more stable and higher throughout the monitoring period compared to Flood Slough. The monthly average salinity ranged from 19.65 PSU to 35.96 PSU. The lowest salinity value measured was 17.65 PSU in May of 2023, while the highest was 41.23 PSU in October of 2022. The average salinity across the entire deployment was 28.30 PSU with a standard deviation 3.51 PSU, indicating that salinity within Ravenswood Slough was higher and remained more stable than in Flood Slough throughout the deployment period.

For the sonde deployed in Pond R5/S5, salinity measurements of less than 27 PSU were removed from the data set as these values likely resulted from instrument error. Salinities of less than 27 PSU occurred at seemingly random instances, and salinity measurements before and after the “low” measurements were almost always greater than 30 PSU. In total, approximately 5.65 percent of the sonde data was removed from the analysis.

Across the three-month monitoring period in Pond R5/S5, the lowest salinity measurement was 28.01 PSU in October 2024, while the highest was 36.01 in December 2024. The average salinity throughout the deployment was 31.60 PSU with a standard deviation of 1.02.

3.5.2.2 Instantaneous Data

The average monthly salinity in Flood Slough calculated from instantaneous measurements ranged from 18.87 to 27.81 PPT. The lowest salinity measured was 7.60 PPT in June 2024, and the highest was 31.10 PSU in September 2024. Throughout the sampling period, salinity values exceeded 15 PPT on all but four occasions—one in June and three in July 2024. The average salinity across all instantaneous measurements was 23.57 PPT and the standard deviation was 5.74 PPT.

In Ravenswood Slough, the average monthly salinity ranged from 20.28 to 28.78 PPT. The lowest salinity measured was 18.44 PPT in November 2023 while the highest was 32.40 PPT in September 2024. Throughout the sampling period, the average salinity across all instantaneous measurements was 25.69 PPT and the standard deviation was 3.61 PPT. Similar to the continuous measurements, Ravenswood Slough had higher and less variable salinities than Flood Slough.

Across the three months of sampling within Pond R5/S5, the lowest salinity measured was 24.70 ppt in January 2025 while the highest was 29.60 PPT in November 2024. The average salinity across the sampling period was 26.75 PPT while the standard deviation was 1.92 PPT. Pond R5/S5 had the highest average salinity measurements out of the three sampling locations as well as the lowest standard deviation between measurements.

3.5.2.3 Comparison

Instantaneous and continuous salinity measurements in Flood Slough were similar to one another throughout the monitoring period. Monthly average salinity values calculated from the instantaneous measurements, along with the minimum and maximum values, fell within the ranges of the continuous measurements' monthly averages and minimum/maximum values. Furthermore, the average salinity calculated across the monitoring period for both measurement types were similar to one another. Instantaneous salinity measurements tended to be on the higher range of daily values for the continuous data; however, this reflects that instantaneous measurements were collected close to high tide. Variability in daily salinity measurements was greater in Flood Slough than Ravenswood Slough, indicating there may be more freshwater input near Flood Slough due to its proximity to a wastewater treatment plant and municipal drainage outflow.

In Ravenswood Slough, instantaneous measurements were slightly lower than the continuous measurements. Monthly average salinities were similar between the two methods at the lower end of the range, though continuous measurements showed higher monthly averages at the upper end. The maximum observed salinity in the continuous dataset was nearly 10 PSU greater than that observed from instantaneous sampling. Average salinity across the full monitoring period was also slightly higher in the continuous data, driven by elevated salinity values (>30 PSU) recorded during the 2022 monitoring period. Comparisons of instantaneous measurements collected on the same days as continuous measurements indicated that instantaneous measurements tended to be lower, while some fell within the range of the continuous data. Variability in daily salinity measurements was lower in Ravenswood Slough compared to Flood Slough, likely resulting from the close proximity of Ravenswood Slough to South San Francisco Bay and less freshwater inputs. Additionally, an outflow from Pond R1 is located in close proximity to the Ravenswood sonde's locations, further contributing to the higher salinity measurements.

In Pond R5/S5, instantaneous salinity measurements were consistently lower than continuous measurements from the sonde. Minimum and maximum values, while only separated by approximately 4 PSU across both measurement types, did not have much overlap. Furthermore, the average salinity across the monitoring period was 4.85 PSU higher in the continuous measurements than the instantaneous. This difference may indicate some spatial variability related to sampling location, as instantaneous measurements were collected along the north shore of the pond whereas as the sonde was placed closer to the Flood Slough outflow in the deepest section of the pond. Salinity measurements within the pond were higher and less variable than the sloughs, suggesting a lower rate of water exchange within the pond as well as lower freshwater input.

3.5.3 Chlorophyll

Chlorophyll concentration was recorded in Relative Fluorescent Units (RFU) by the sondes, and in micrograms per liter ($\mu\text{g}/\text{l}$) by the instantaneous units. In order to make direct comparisons between the chlorophyll concentrations, measurements in RFU were converted to $\mu\text{g}/\text{L}$ based on paired RFU and $\mu\text{g}/\text{L}$ values provided in the YSI EXO Sonde user manual (YSI 2023). A linear regression was fitted to these paired measurements, and the resulting equation was used to convert continuous chlorophyll RFU values to $\mu\text{g}/\text{l}$.

$$\mu\text{g}/\text{l} = 0.1394 + (4.0165 * \text{RFU})$$

In the analysis of chlorophyll measurements, values exceeding 100 µg/L were excluded as these were deemed erroneous. This upper limit was informed by patterns observed in the dataset and supported by thresholds reported in prior South San Francisco Bay studies (Schrage and Cloern 2017).

Chlorophyll concentrations recorded by sondes in Flood and Ravenswood sloughs exhibited similar patterns throughout the monitoring period (Figures B10 and B11, Appendix B). Analysis of continuous measurements revealed both short- and long-term periods of elevated chlorophyll concentrations in each slough; however, these elevated periods did not consistently coincide between the two locations. Notably, November 2024 was the only interval during which both Flood and Ravenswood sloughs experienced a sustained period of elevated chlorophyll concurrently. The increase in chlorophyll seen in Flood Slough was greater than that in Ravenswood Slough and coincided with Pond R5/S5 coming online (Figure B12, Appendix B). Chlorophyll concentrations in Pond R5/S5 were on average higher than Flood and Ravenswood sloughs; however, the levels exhibited much larger swings than what was recorded in the sloughs.

3.5.3.1 Continuous Data

In Flood Slough, the monthly average chlorophyll concentrations ranged from 1.66 to 17.64 µg/l. The lowest chlorophyll concentration measured was 0.00 µg/l in September 2023, November 2023, and December of 2023. The highest chlorophyll concentration measured was 97.78 in June of 2023. The average chlorophyll concentration in Flood Slough across the entire deployment was 7.54 µg/l and the standard deviation was 8.11 µg/l. Chlorophyll concentrations increased towards the end of the monitoring period from October through December 2024, when “spikes” in the concentrations were observed. Prior to this period, spikes in concentrations were also observed from June through August 2023 but did not last long periods of time (Figure B10, Appendix B).

In Ravenswood Slough, the monthly average chlorophyll concentrations ranged from 6.32 to 20.98 µg/l. The lowest chlorophyll concentration measured was 1.83 µg/l in August 2024, while the highest was 96.61 µg/l in August 2023. The average chlorophyll concentration in Ravenswood Slough across the entire deployment was 11.00 µg/l and the standard deviation was 8.01 µg/l. During the fall period in both monitoring years (October through December), chlorophyll concentrations were elevated compared to the spring and summer months. From mid-August to mid-September in 2023, concentrations were elevated compared to earlier in the summer. Similar to observations in Flood Slough, spikes in chlorophyll concentration were captured during spring and summer but did not persist throughout the entire season or over long periods of time (Figure B11, Appendix B).

Across the three-month monitoring period in Pond R5/S5, the lowest chlorophyll measurement of 0.58 µg/l as well as the highest measurement of 97.86 were both documented in November 2024. The average chlorophyll concentration throughout the deployment was 28.70 µg/l with a standard deviation of 21.10. This data indicates that throughout the monitoring period in Pond R5/S5, chlorophyll concentration was higher yet more variable within the pond compared to the sloughs.

3.5.3.2 Instantaneous Data

The average monthly chlorophyll concentration calculated from instantaneous measurements in Flood Slough ranged from 0.37 to 32.98 µg/l. The lowest chlorophyll concentration measured across the sampling period was 0.01 µg/l in July 2023, while the highest was 53.00 µg/l in January 2025. The

average chlorophyll concentration in Flood Slough across all instantaneous water quality measurements was 9.23 µg/l and the standard deviation was 12.14 µg/l.

In Ravenswood Slough, the average monthly chlorophyll concentration ranged from 0.59 to 26.35 µg/l. The lowest chlorophyll concentration measured across the sampling period was 0.39 µg/l in June 2024, while the highest was 52.06 µg/l in November 2024. The average chlorophyll concentration in Ravenswood Slough across all instantaneous water quality measurements was 8.87 µg/l and the standard deviation was 11.73 µg/l.

Across the three months of sampling with in the Pond R5/S5, the lowest chlorophyll concentration measured was 0.61 µg/l in October 2024, while the highest was 27.70 µg/l in January 2025. The average chlorophyll concentration across the sampling period was 14.42 µg/l and the standard deviation was 8.10 µg/l. Similar to the trends seen in the continuous data, chlorophyll concentrations within Pond R5/S5 were higher than in Flood and Ravenswood sloughs.

3.5.3.3 Comparison

Instantaneous chlorophyll concentration measurements in Flood Slough exhibited a wider range of values than the continuous measurements. Monthly average chlorophyll concentrations from the continuous measurements had a narrower range of values than the instantaneous measurements, particularly on the high on the range. Although the maximum value observed in the continuous measurements exceeded that of the instantaneous, the average chlorophyll concentration across the monitoring period was higher for the instantaneous measurements, suggesting that instantaneous chlorophyll measurements tended to be greater. Spikes in chlorophyll concentrations were observed in the continuous data but did not always line up with elevated instantaneous measurements, such as in the October and November 2023 measurements. These results indicate there may have been measurement errors in one of or both of the instruments, or a spatial difference in chlorophyll concentrations between sampling locations.

In Ravenswood Slough, instantaneous chlorophyll measurements were generally more variable than the continuous measurements, though not to the same degree observed in Flood Slough. Monthly average chlorophyll concentrations derived from the instantaneous data spanned a wider range than those from the continuous dataset, while the overall range of minimum and maximum values was greater for the continuous data. The mean chlorophyll concentration across the entire monitoring period was higher for the continuous measurements compared to the instantaneous measurements. When instantaneous and continuous measurements collected on the same day were compared, similar values were observed across both methods; however, the instantaneous measurements tended to be lower. This trend could reflect a spatial difference between sampling locations. The differences in monthly and overall averages also likely reflect the continuous data incorporating a greater number of measurements over longer time periods, capturing intervals of lower productivity. Additionally, because instantaneous measurements were collected during high tide, they may reflect tidal influences on chlorophyll concentrations.

Continuous chlorophyll measurements in Pond R5/S5 were greater than the instantaneous measurements and resulted in the average concentrations across the monitoring period being higher for the continuous measurements. Differences in average concentrations between measurement types likely resulted from the spikes in chlorophyll concentration observed in the continuous data during late fall. These spikes, which did not occur when the instantaneous data was collected, resulted in the

continuous data having elevated averages and higher maximum values. During the November fisheries sampling—the only period when continuous and instantaneous measurements were collected on the same day—chlorophyll measurements from both methods were comparable.

3.5.4 pH

In Flood and Ravenswood sloughs, continuous pH measurements remained relatively stable throughout the monitoring period with small variations over short temporal periods likely associated with the tidal cycle or environmental conditions (e.g., runoff). Throughout most of the monitoring period, pH in Ravenswood Slough was greater than Flood Slough. This changed when Pond R5/S5 came online in October 2024, where a spike in pH measurements was observed in Flood Slough during October and November 2024. However, this effect was fleeting as in late November and early December 2024, pH measurements in Flood Slough decreased and were again lower than the measurements in Ravenswood Slough. Aside from the spikes in June of both years and the increase associated with the watering of Pond R5/S5, pH measurements were relatively stable in both sloughs throughout the monitoring period. Pond R5/S5 was monitored for only three months; however, pH measurements were consistently higher and more variable than those measured in either slough. Notable spikes were also observed within the pond during late November and late December 2024.

3.5.4.1 Continuous Data

In the analysis of continuous pH measurements, the data was inspected to remove outliers that were erroneous and outside of the normal range of the data, presumed to be caused by instrument errors or fouling. For the Ravenswood Slough sonde data, a single measurement of 9.17 was removed from analysis. In Pond R5/S5, pH measurements less than 6.89 were filtered out resulting in 27 measurements being removed (0.71 percent of the data). Chlorophyll measurements from periods with erroneous pH measurements were examined to determine whether the erroneous pH measurements were the result of harmful algal blooms. In Ravenswood Slough, the pH reading of 9.17 occurred immediately after sonde redeployment following cleaning or recalibration and rapidly returned to “normal” values, indicating instrument error. In Pond R5/S5, the low pH measurements did not coincide with elevated chlorophyll measurements and likely resulted from instrument error. In Flood Slough, the monthly average pH concentrations ranged from 7.47 to 7.79. The lowest pH measurement was 7.15 in October 2023, and the highest was 8.55 in November 2024. The average pH throughout the entire deployment of the sonde in Flood Slough was 7.63 with a standard deviation of 0.17. Throughout the monitoring period, pH in Flood Slough remained relatively stable except during the final months of recording. Measurements collected from June through October 2023 showed little variation between months, followed by a slight increase in pH values from November 2023 to June 2024. From July to September 2024, pH values slowly decreased, then rose from October to December 2024, to the highest levels observed during the study, including a spike in mid-November where the highest measurements were observed (Figure B13, Appendix B).

In Ravenswood Slough, monthly average pH concentrations ranged from 7.72 to 8.10. The lowest pH measurement recorded was 7.17 in September 2023, while the highest was 8.83 in June 2023. The average pH throughout the entire deployment period was 7.84 with a standard deviation of 0.18. Throughout the monitoring period, pH measurements in Ravenswood Slough were relatively stable. At the beginning of the monitoring period in June 2023, the highest recorded pH values were observed, with measurements over 8.5 commonly recorded. From July 2023 to December 2023, pH measurements were similar to one another showing little variation. In June 2024, the highest pH values for the 2024

monitoring period were observed, followed by a slight decrease in values and relative stability for the remainder of the monitoring period (Figure B14, Appendix B).

Across the three-month monitoring period in Pond R5/S5, the lowest pH measurement was 6.89 in November 2024, and the highest was 8.78 during the same month. The average pH value throughout the deployment was 8.13, with a standard deviation of 0.20. During October 2024, pH Pond R5/S5 remained relatively stable, with minor variations recorded over short temporal periods; presumably associated with the tidal cycle. Similar trends persisted into November 2024, with early-month measurements marking the lowest pH values recorded. As the month progressed, pH steadily increased, reaching the highest levels observed in the pond (Figure B15, Appendix B). In December 2024, pH measurements started at levels comparable to October and early November but increased steadily thereafter.

3.5.4.2 Instantaneous Data

The average monthly pH calculated from instantaneous water quality measurements in Flood Slough ranged from 6.85 to 8.03. The lowest pH measured across the sampling period was 5.78 in January 2024, while the highest was 8.80 measured in July 2024. The average pH across all instantaneous measurements was 7.52 with a standard deviation of 0.51.

In Ravenswood Slough, the average monthly pH value ranged from 6.89 to 7.99. The lowest pH measured across the sampling period was 6.12 in January 2024, and the highest was 8.40 in July 2024. The average pH across all instantaneous measurements was 7.57 with a standard deviation of 0.50.

Across the three months of sampling within Pond R5/S5, the lowest pH measured was 7.47 in November 2024 and the highest was 8.20 in January 2025. The average pH across the sampling period was 7.82 with a standard deviation of 0.28.

3.5.4.3 Comparison

Comparisons between the continuous and instantaneous pH measurements revealed the low end of monthly averages for instantaneous measurements in Flood and Ravenswood sloughs were lower than the continuous measurements. However, the two lowest monthly averages for instantaneous measurements came from the winter 2024 monitoring period, when no continuous water quality measurements were recorded. The high end of monthly averages between the two water quality measurement types in the sloughs were similar, and overall averages across the monitoring period were also comparable. Similarities in summary metrics between the two collection methods indicate that both approaches produced consistent results. Comparing the instantaneous measurements collected on the same day as continuous measurements revealed that on most occasions the instantaneous measurements fell within the range of the continuous measurements. In some cases, one or two outliers were present in the instantaneous data, but in most cases, overlap was observed.

In Pond R5/S5, monthly averages from continuous and instantaneous water quality measurements were similar to one another. The range of averages for continuous measurements were larger than the instantaneous measurements, and the average across the monitoring period was slightly higher in the continuous measurements. When examining pH measurements, instantaneous measurements were collected in early November 2024, while the continuous measurements recorded the highest and lowest pH values in the monitoring period in late November, explaining the larger range of average values seen in the continuous data. Instantaneous and continuous measurements were collected on the same day

only once. A comparison showed that instantaneous pH values were approximately 0.5 units lower than the continuous measurements. Although this difference was observed, it may reflect spatial variation between the measurement locations.

3.5.5 Turbidity

Turbidity measurements in the continuous data were recorded in Formazin Nephelometric Units (FNU) whereas instantaneous measurements were recorded in Nephelometric Turbidity Units (NTU). Measurements in FNU are conducted with an infrared light source whereas NTU measurements are conducted using a visible “white” light source. These measurements are not synonymous and therefore could not be directly compared to one another; however, the trends between the two data sets can be examined.

In the analysis of turbidity data, measurements greater than 300 FNU were excluded as these readings were considered erroneous outliers resulting from fouling of the sondes optical sensor or the sonde needing recalibration. The limit of 300 FNU was determined by examining previous studies conducted in San Francisco South Bay looking at turbidity measurements and suspended sediment transport. These studies found turbidity measurements of 5 to 100 FNU as being normal conditions within South Bay channels, shoals, and sloughs, while measurements between 100 and 300 FNU were observed during storm and sediment resuspension events (Volaric et al. 2025; Palm et al. 2022; Lee et al. 2021). Specifically, Volaric et al. found that across monitoring stations in the South San Francisco Bay, turbidity ranged from 50-250 FNU in the sloughs.

Elevated turbidity levels in both sloughs may have resulted from construction activities associated with Pond R5/S5. However, elevated turbidity readings greater than 300 FNU resulting from construction could not be parsed from elevated readings caused by biofouling of the sondes. Both causes of elevated turbidity measurements exhibited similar patterns of prolonged elevated readings. In most cases, turbidity gradually increased and then remained elevated for extended periods, returning to normal only after the sonde was retrieved for cleaning and calibration or removed from the field. When sondes were removed for prolonged periods, turbidity could not be evaluated immediately before and after removal, further limiting the ability to isolate construction-related effects. In cases where a single elevated measurement relative to the previous and following measurements was recorded this could clearly be identified as instrument error. Turbidity measurements in Flood and Ravenswood sloughs were variable throughout the monitoring period in the continuous collected data. Differences of 100 FNU were commonly observed over relatively short time periods, likely associated with the tide cycle and runoff. In the 2022 monitoring period, both sondes in both sloughs measured consistently elevated turbidities compared to the later 2023 and 2024 monitoring periods. This elevation may have resulted from construction related activities associated with the operation of Pond R4 and Pond R5/S5; however, it could also be attributed to biofouling of the turbidity sensors. Aside from 2022, periods of prolonged elevated turbidity measurements did not appear to be associated with a particular season and often did not occur during the same time period across either slough. Higher variability in turbidity measurements was recorded in the beginning of the monitoring period in Ravenswood Slough compared to Flood Slough; however, this pattern switched in the later portions of the monitoring period. After imposing the 300 FNU limits, a much higher proportion of measurements was removed from Ravenswood Slough compared to Flood Slough and Pond R5/S5, indicating a higher rate of sensor biofouling at this location. The Ravenswood sonde’s closer proximity to San Francisco Bay likely resulted in a greater proportion of erroneous measurements due to increased fouling or other optical sensor issues caused by debris entering the slough from the Bay.

In Pond R5/S5, turbidity measurements were much lower than in the sloughs and remained relatively more stable compared to the sloughs throughout most of its monitoring period. Lower turbidity measurements within the pond likely resulted from less tidal influence within the pond compared to the sloughs, and a lower chance for the optical sensors to become fouled.

3.5.5.1 Continuous Data

In Flood Slough, the monthly average turbidity ranged from 24.42 to 106.75 FNU. The lowest measurement was 1.54 FNU in September 2023, and the highest was 299.85 FNU in July 2023. The average turbidity throughout the entire monitoring period was 57.90 FNU with a standard deviation of 47.80 FNU. Spikes in turbidity were measured throughout the monitoring period; however, they did not appear to be linked with seasonal trends and they occurred over relatively short temporal periods (Figure B16, Appendix B).

In Ravenswood Slough, the monthly average turbidity ranged from 16.73 to 277.64 FNU. The lowest turbidity measurement was 0.00 FNU in December 2022, while the lowest non-zero value was 2.57 in November 2023. The highest turbidity measurement was 299.91 FNU in December 2022. The average turbidity throughout the entire monitoring period was 53.20 FNU with a standard deviation of 60.80 FNU. Similar to Flood Slough, spikes in turbidity measurements were seen throughout the monitoring period and did not appear to be associated with a particular season. Notably, a prolonged period of elevated turbidity occurred in November of 2022; however, the screening criteria removed the majority of these observations in late November. Another period of prolonged elevated measurements occurred during mid-July to September of 2023 (Figure B17, Appendix B).

Across the three-month monitoring period in Pond R5/S5, the lowest turbidity measurement was 3.09 FNU in November 2024, and the highest was 296.06 FNU during the same month. The average turbidity value throughout the deployment was 9.74 FNU, with a standard deviation of 25.7 FNU. Turbidity measurements were lower in the pond compared to either slough. During two periods, late October and mid-November, elevated turbidity measurements were recorded. These elevated measurements were sporadic, and normal low readings were also recorded during these periods, indicating that these spikes may have resulted from issues related to the sondes optical sensor (Figure B18, Appendix B).

3.5.5.2 Instantaneous Data

The average monthly turbidity measurement in Flood Slough ranged from 9.86 to 80.0 NTU. The lowest turbidity measurement across the monitoring period was 5.05 in October 2023, and the highest was 139.50 NTU in October 2024. The average turbidity throughout the monitoring period was 32.0 NTU and the standard deviation was 26.4 NTU.

In Ravenswood Slough, the average monthly turbidity ranged from 13.38 to 56.74 NTU. The lowest turbidity measurement across the monitoring period was 4.82 in October 2023, and the highest was 94.35 NTU in August 2023. The average turbidity measurement throughout the monitoring period was 31.70 NTU, and the standard deviation was 19.80 NTU.

Across the three months of sampling within Pond R5/S5, the lowest turbidity measurement was 3.80 NTU in January 2025 and the highest was 42.15 in October 2024. The average turbidity measurement throughout the monitoring period was 10.00 NTU, and the standard deviation was 10.32 NTU.

3.5.5.3 Comparison

Turbidity measurements from the continuous and instantaneous measurements cannot be directly compared due to differences in measurement units; however, the trends revealed by both measurement types document conditions within the sampling locations and the conditions can be compared to one another. Both measurement types show Pond R5/S5 had lower turbidity and less variability amongst measurements compared to the sloughs. Comparison of both measurement types in Flood and Ravenswood sloughs showed differing patterns. Continuous measurements in Flood Slough were on average lower than Ravenswood Slough, and there was less variability amongst measurements. Instantaneous measurements had similar averages between the two sloughs; however, variability was higher in Flood Slough. Differences in the trends between measurement types may have resulted from a much larger range of measurements collected in the continuous data, as well as the sonde sensor being continuously deployed and subject to fouling or debris covering the optical sensor.

4.0 DISCUSSION

4.1 Fisheries Sampling

4.1.1 Comparison of Species Composition to Previous Studies

Species assemblages captured in Flood Slough, Ravenswood Slough, and Pond R5/S5 align closely with prior studies from South San Francisco Bay (Hobbs et al. 2012; Mooi et al. 2007). Hobbs et al. (2012) conducted fisheries sampling via otter trawling and seine netting across similar habitats, including Ravenswood Slough and Bair Island Marsh, located just north of the Ravenswood Restoration Project.

Invertebrate compositions were also comparable between studies, with high abundances of Mysid shrimp, California bay shrimp, and Oriental shrimp captured. This pattern is consistent with Hobbs et al. and provides an emphasis on the importance of mysids and shrimps as dominant forage in restored tidal habitats. One key difference between Hobbs et al. and this study is the absence of reticulate water boatmen in Hobbs et al.'s capture data. Almost all reticulate water boatmen were captured within Pond R5/S5 in shallow water, nearshore habitats, which were not sampled as intensively in Hobbs et al. and thus may have had much lower probability of capture.

Fish assemblage between studies exhibited both similarities and differences. Hobbs et al. captured 10 fish species in Ravenswood Slough, with 9 overlapping this project. Staghorn sculpin and yellowfin goby dominated Hobbs' Ravenswood captures, whereas topsmelt silverside and Mississippi silverside dominated captures in this study. It should be noted, sampling in Ravenswood Slough for the Hobbs study was conducted before the breaching of the R4 Pond, and the sampling locations were in salt ponds not subject to full tidal influence, which likely contributed to the greater number of species captured in this project. At Bair Island Marsh, 17 out of 28 of the fish species captured were shared with capture data from this project. The most abundant species at Bair Island within the Hobbs data were not the most abundant species captured for this project and may reflect differences in habitat between locations as well as changing conditions within the Bay between the sampling periods. Redwood Creek Channel, sampled in the Hobbs study, is larger than Flood and Ravenswood sloughs and is regularly dredged for shipping. The larger, deeper channel may provide more stable, open-water conditions favoring a different assemblage of species compared to the shallower, more variable sloughs sampled here (Williams and Zedler 1999, Hobbs et al. 2012). Two of the most common species captured in

Redwood Creek – Pacific herring and northern anchovy – were much scarcer in Flood and Ravenswood sloughs. The most common fish species captured – topsmelt silverside and Mississippi silverside – have a preference for shallower waters which are present in Flood and Ravenswood sloughs.

4.1.2 Gear Types

Certain gear types were specifically selected to capture aquatic organisms, while others unintentionally resulted in greater capture numbers of particular species. Gillnets were selected to capture larger predatory species that would otherwise evade seine nets and otter trawls. This is reflected in the capture data, as 56.47 percent of California bat rays, 82.00 percent of leopard sharks, and 79.17 percent of striped bass were captured in gillnets. Seine netting and otter trawls were less selective and shared 24 unique species; however, distinct patterns still emerged. Otter trawls captured 11 unique species, while seine netting captured 23. Otter trawling resulted in the highest capture of California bay shrimp and Oriental shrimp (97.41 percent and 77.05 percent of totals, respectively). Seine netting captured all Mysid shrimp and 99.99 percent of bent-nose Macoma clams, along with nearly all silversides (94.27 percent of topsmelt silversides, 100 percent of Mississippi silversides, and 100 percent of YOY silversides). Each gear type captured unique species assembles—gillnets for larger predators, otter trawls for most shrimps, and seines for silversides—providing a more complete picture of the Flood and Ravenswood slough communities than any single method alone.

4.1.3 Native and Non-Native Organism Comparison

Captures across Flood Slough, Ravenswood Slough, and Pond R5/S5 were a mixture of native and non-native species of San Francisco Bay (Table 14). Native organisms were captured far more frequently than non-native organisms. Native invertebrates were the most commonly captured organism throughout sampling (Table 15), with reticulate water boatmen, Mysid shrimp and bent-nose mascoma clam accounting for the majority of the total catch. Oriental shrimp, a non-native species, were the most commonly captured non-native species across both years of sampling and were frequently captured in both years; however, a slight decline in capture abundance was seen in 2024. While this species has potential to compete against other native shrimp species, capture data does not indicate it has displaced native shrimp within Flood and Ravenswood sloughs, and it may provide a food resource for higher trophic level species. Eastern mudsnail was another commonly captured non-native species and has been documented preying upon mollusks in tidal mudflats and competing for food resources (NEMESIS 2018). Eastern mudsnail were the most commonly captured snail species during sampling, indicating they have displaced native mollusk species within the Ravenswood Restoration Project. Other non-native invertebrates were captured at low abundances, indicating they are not abundant within the sampling area.

Table 14. Summary of capture data between native and non-native organisms in Flood Slough, Ravenswood Slough, and the R5/S5 Pond. The table is separated by status (native vs. non-native) and includes the number of species captured, the percentage of the total species captured, the number of organisms captured and the percentage of organisms captured.

Status	Number of Species Captured	Percentage of Species Captured	Number of Organisms Captured	Percentage of Organisms Captured
Native	48	80%	114,957	94%
Non-native	12	20%	7,854	6%

Table 15. Summary of capture data between native and non-native organisms separated by type of species (fish and invertebrate) in Flood Slough, Ravenswood Slough, and the R5/S5 Pond. The table is separated by status (native vs. non-native), type and includes the number of species captured, the percentage of the total species captured, the number of organisms captured and the percentage of organisms captured. Note, this table excludes one observation, a red-eared slider (*Trachemys scripta*), captured in spring of 2024.

Status	Type of Organism	Number of Species Captured	Percentage of Species Captured	Number of Organisms Captured	Percentage of Organism Captured
Native	Fish	23	38.30%	7,487	6.10
Native	Invert	25	41.70%	107,470	87.5
Non-native	Fish	7	11.70%	2,349	1.191
Non-native	Invert	4	6.67%	5,504	4.48

The most commonly captured fish species within both sloughs and Pond R5/S5 was topsmelt silverside, a native species, followed by Mississippi silverside, a non-native species. These species occupy the same trophic level and compete for the same food resources. Capture data suggested that topsmelt silverside remain more abundant within the environment than Mississippi silverside; however, this distribution may shift over the coming years depending on recruitment success for each species. Two non-native goby species — yellowfin goby and chameleon goby were captured in both Flood and Ravenswood sloughs, but native gobies, primarily arrow goby and bay goby, outnumbered non-native gobies in capture data.

Pond R5/S5 supported high numbers of YOY gobies, indicating this habitat provides ideal shallow-water rearing conditions. Non-native gobies, with high reproductive rates and broad tolerances, pose a risk of dominating this newly available habitat over time. Lastly, striped bass, a high trophic-level non-native predator, were captured within both sloughs. The presence of striped bass suggests that adequate prey items are present within the sloughs in the pre- and post-breach periods; however, striped bass have the potential to outcompete native predators—leopard shark and California bat ray—as well as predate upon lower trophic level native species.

4.2 Effect of the Breach

4.2.1 Fish Sampling

Capture patterns of aquatic organisms before and after the December 2023 breach differed between Flood Slough and Ravenswood Slough. In Flood Slough, both species richness and total catch increased between sampling periods, with more than twice as many organisms captured in 2024 compared to 2023. The SDI and Species Evenness metrics declined, indicating that a few species became much more dominant. Fish abundance and richness decreased between periods, whereas invertebrate abundance nearly tripled and invertebrate richness also increased. In Ravenswood Slough, species richness and total catch decreased between the pre- and post-breach periods. Unlike Flood Slough, both the abundance and richness of fishes and invertebrates captured in Ravenswood Slough decreased between 2023 and 2024. The SDI and Species Evenness also declined, though to a lesser degree than in Flood Slough.

Comparing total organisms captured between sites showed a post-breach increase in aquatic organism abundance in Flood Slough and a decrease in Ravenswood Slough. This pattern reveals that following the breach, a net increase in aquatic organisms in Flood Slough occurred relative to the reference site –

Ravenswood Slough. When captures were separated by taxonomic group, both sites showed declines in fish abundance and richness, but invertebrates diverged with an increase in abundance seen in Flood Slough and a decrease seen in Ravenswood Slough. Increases in total abundance seen in Flood Slough were driven by invertebrates, indicating that post-breach conditions were more favorable for invertebrates, particularly for Mysid shrimp which accounted for 67.28 percent of the post-breach catch. Previous reports from the South Bay Salt Restoration Project (Hobbs et al. 2012) noted an increase in Mysid shrimp abundance in salt pond restoration projects, presumably linked to increases in organic matter in the sediments. This increase in prey item availability within Flood Slough did not result in an increase in the abundance of fish present in the year following the breach (Dean et al. 2005).

Pond R5/S5 was sampled during late fall and winter of 2024, a year following the December 2023 breach. In the months after watering of the pond, high abundances of key prey items—Mysid shrimp and reticulate water boatmen—were captured, along with YOY gobies and silversides. This pattern aligns with prior salt pond restoration studies around the South San Francisco Bay, which documented elevated densities of juvenile fishes and invertebrates in restored ponds, often exceeding those in surrounding habitats (Hobbs et al. 2012). Breaching of the adjacent R4 Pond and subsequent R5/S5 Pond has established shallow-water habitat, fostering YOY recruitment and boosting prey availability. Enhanced juvenile rearing habitat has the potential to increase recruitment of fishes into the nearby sloughs in coming years if conditions within the pond remain hospitable.

4.2.2 Community Composition

The number and composition of species present in each slough changed between the pre- and post-breach periods. In Flood Slough, 31 species were captured across both periods, whereas 19 species were captured in only one period. In Ravenswood Slough, 29 species were captured across both periods, and 17 species were captured in only one period. Species that were captured in both periods were generally captured at higher abundances and were common across all seasons (e.g., Mysid shrimp, California bay shrimp, topsmelt silverside). Species captured in only one period generally occurred at lower abundances relative to those captured in both periods. This suggests that single-period species are less abundant in the environment, may occupy the slough only briefly, and are thus less likely to be detected. Additionally, on several sampling occasions, individuals could not be identified to species due to their early life-history stages (e.g., larval fish or juvenile goby), contributing to observed differences in community composition between years. Lastly, certain sessile species (e.g., mussels and barnacles) unlikely to be captured by the employed methods were occasionally detected, contributing to single-period captures. Comparing community composition between pre- and post-breach periods indicates that the structure of the community remained relatively similar, and differences arose from species that are relatively scarce within the environment or were in life stages where positive identification to species could not be made.

4.2.3 Water Quality

Examining water quality in Flood and Ravenswood sloughs prior to the breach on December 13, 2023, revealed some comparable water quality parameters between the two time periods, while some showed a clear difference between pre- and post-breach. Temperature trends across the 2023 and 2024 monitoring periods remained similar to one another within and across sloughs, exhibiting trends strongly associated with seasonal changes. Between years, monthly average water temperatures were similar to one another, often varying by only 1°C. Any differences between years may have been driven by changes in atmospheric conditions between years, as opposed to changes brought on by the breach.

Dissolved oxygen in Ravenswood Slough remained similar between 2023 and 2024, with monthly averages varying by 1 mg/L or less and the same seasonal trends being captured. Within Flood Slough, DO measurements exhibited higher variability; however, this trend was observed in both monitoring periods. Patterns in DO concentrations in Flood Slough began to diverge between years after Pond R5/S5 became operational in October 2024, with higher concentrations observed during late fall and winter monitoring periods compared to 2023. This elevation was likely driven by the operation of Pond R5/S5 for storm water management, as high chlorophyll concentrations were measured within the pond during this period which produced elevated DO concentrations within the pond, which eventually entered into Flood Slough.

Salinity conditions reflected diverse ranges within each slough, indicating varying degrees of influence from daily tidal cycles and seasonal trends, as well as freshwater inputs. Within Ravenswood Slough, most salinity readings were between 20 and 30 PSU and remained relatively stable throughout the entire monitoring period. In Flood Slough, salinity measurements were more variable, often ranging between 5 and 30 PSU over short time periods, indicating a higher level of freshwater inputs. No significant change in salinity measurements occurred between 2023 and 2024, aside from the operation of Pond R5/S5. Once the pond became operational in October 2024, unusually high salinity levels were recorded in Flood Slough from late October through early November. Salinity in Pond R5/S5 consistently exceeded 30 PSU—higher than in either slough—and its outflow elevated salinity in Flood Slough for the remainder of the monitoring period. Overall, the breaching of Pond R4 did not result in long-term negative impacts to Flood or Ravenswood Slough.

Chlorophyll concentrations in both sloughs were more variable during the 2023 monitoring period compared to 2024. Average monthly chlorophyll concentrations were higher in Ravenswood Slough during the 2023 monitoring period compared to Flood Slough and Ravenswood Slough during 2024. These higher averages were driven by prolonged periods of elevated concentrations and may reflect interannual differences in San Francisco Bay conditions, as well as the closer proximity of the Ravenswood sonde to the Bay relative to Flood Slough. Short-term spikes in concentrations were observed in both sloughs; however, these events seldom occurred simultaneously, suggesting that site-specific factors influenced the elevated concentrations. Conditions within each slough that resulted in spikes in chlorophyll concentrations could also support harmful algal blooms and should be considered with the ongoing management of the Ravenswood Restoration Project. Although concentrations were variable within each slough, concentrations remained within the ranges seen in previous studies in South San Francisco Bay (Schrage and Cloern 2017). Once Pond R5/S5 became operational, chlorophyll concentrations in Flood Slough increased to some of the highest concentrations observed during the entire monitoring period. Chlorophyll within Pond R5/S5 was regularly higher than the sloughs across both occasions, and its outflow into Flood Slough resulted in its elevated concentrations. A similar pattern was seen in DO concentrations during the same time period.

Measured pH was stable in both sloughs across most of the monitoring period, varying by approximately 1 pH in each slough. In Ravenswood Slough, pH concentrations remained between 7.25 and 8.5 throughout the monitoring period aside from a spike observed over a short temporal period during June 2023. In Flood Slough, pH remained lower than Ravenswood Slough throughout most of the monitoring period with monthly averages around 7.5 until the operation of Pond R5/S5. Once the pond came online, elevated pH levels, greater than 8 and peaking above 8.5, were measured. The pH in the pond was regularly greater than both sloughs, remaining near or above 8 throughout the monitoring period. During the spike in pH measured in Flood Slough, values in Pond R5/S5 were reaching above pH 8.5. This points to the outflow from R5/S5 as the most likely cause of the increase in pH levels seen in Flood

Slough during late October and early November. Towards the end of the recording period in Flood Slough, during late November, pH measurements returned to levels observed prior to operation of Pond R5/S5. This pattern suggests that runoff from the initial watering of the pond was basic but subsequently stabilized to typical conditions seen in the sloughs.

Turbidity measurements in both sloughs were variable, exhibiting values spanning both typical values seen in South San Francisco Bay as well as elevated values associated with storms and runoff events (Volaric et al. 2025; Palm et al. 2022; Lee et al. 2021). Turbidity measurements were prone to error due to fouling of the sensors, and the dataset required more QA/QC than any other water quality parameter, particularly in Ravenswood Slough. Changes in turbidity occurred over short temporal periods and across all seasons in 2023 and 2024, indicating conditions remained similar between the pre- and post-breach periods.

Water quality measurements collected in Flood and Ravenswood sloughs generally fell within the ranges expected for a dynamic estuarine environment (Schraga and Cloern 2017, Volaric et al. 2025; Palm et al. 2022; Lee et al. 2021, Hobbs et al. 2012). Conditions in the two sloughs were broadly similar, while still reflecting site-specific processes at each location. Comparisons of conditions in Flood and Ravenswood sloughs before and after the R4 Pond breach indicated that no major shifts in water quality occurred. The most pronounced changes following the breach were associated with the onset of R5/S5 Pond operations in October 2023, which affected DO, salinity, chlorophyll, and pH in Flood Slough. Although watering of Pond R5/S5 produced short-term changes in water quality in Flood Slough, measurements collected at the end of 2024 suggested that conditions were returning to levels observed prior to pond operation.

5.0 CONCLUSION

Comparing fish and invertebrate captures across the pre- and post-breach periods revealed diverging patterns: fish abundance and diversity decreased between years, while invertebrate abundance increased in Flood Slough but decreased in Ravenswood Slough. The increase of invertebrates in Flood Slough was primarily driven by higher numbers of prey items (e.g., mysid shrimp), suggesting that the breach may have created more favorable conditions for lower trophic-level species. Similar patterns in fish abundance and diversity between the two sloughs indicate that interannual variability, rather than the R4 Pond breach, was the main driver of year-to-year differences of fish abundance in Flood Slough.

The most significant ecological effect of the breach was the inundation of water into Pond R5/S5. Watering of Pond R5/S5 provided additional shallow-water habitat within the Ravenswood Restoration Project area, and captures of juvenile fishes and invertebrates within the pond revealed that this habitat was quickly utilized by a variety of species. These results indicate that the breach and subsequent pond operation increased rearing habitat and prey availability at the project site, with the potential to enhance recruitment within the sloughs in future years.

Water quality parameters within the sloughs remained mostly similar between the pre- and post-breach periods. The most pronounced changes between years were shifts in DO, salinity, chlorophyll, and pH in Flood Slough associated with the initial operation of Pond R5/S5. Although pond outflow temporarily altered ambient conditions in Flood Slough, these effects were short-lived, and water quality parameters returned to typical levels within approximately one month of pond watering. Overall, water quality in both sloughs remained comparable between years and reflected patterns typical of estuarine systems. No evidence was found of sustained changes in water quality within Flood Slough linked to the

R4 Pond breach. Similarly, no evidence was found that habitat conditions for fish and invertebrate species were negatively impacted over time related to the R4 Pond breach. Flood Slough, Pond R5/S5, and Ravenswood Slough exhibited species assemblages typical of the South San Francisco Bay area throughout the monitoring period, and certain shallow water habitats may provide increased rearing habitat as a result of the breach.

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Appendix A

Fish Capture Data

Table A1. Table containing all aquatic organisms captured during monitoring at the Ravenswood Restoration Project. The data is separated by species captured, the type of organism, species status (native or non-native) year or capture, season of capture, sampling occasion within each season, and sample location. The seine, otter, and gillnet columns contain the number of individuals of each organism captured by each sampling method at the sample location during the sampling occasion.

Species	Type	Status	Year	Season	Sample Occasion	Sample Location	Seine	Otter	Gillnet
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Spring	1	Flood Slough North	16	0	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Spring	1	Flood Slough North	1	263	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2023	Spring	1	Flood Slough North	115	0	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Spring	1	Flood Slough North	2	0	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Spring	1	Flood Slough North	12	1	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Spring	1	Flood Slough North	8	1	NA
Speckled Sanddab (<i>Citharichthys stigmaeus</i>)	Fish	Native	2023	Spring	1	Flood Slough North	1	0	NA
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Spring	1	Flood Slough North	5	2	NA
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Spring	1	Flood Slough North	220	0	NA
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Spring	1	Flood Slough South	14	0	NA
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2023	Spring	1	Flood Slough South	1	0	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Spring	1	Flood Slough South	0	304	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Spring	1	Flood Slough South	28	0	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Spring	1	Flood Slough South	0	15	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Spring	1	Flood Slough South	1	0	NA
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Spring	1	Flood Slough South	0	5	NA
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Spring	1	Flood Slough South	1	0	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Spring	1	Flood Slough South	10	0	NA
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Spring	1	Flood Slough South	12	0	NA
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Spring	1	Flood Slough South	1	0	NA
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Spring	1	Ravenswood Slough North	5	0	NA
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Spring	1	Ravenswood Slough North	0	3	NA
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Spring	1	Ravenswood Slough North	4	0	NA
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Spring	1	Ravenswood Slough North	7	0	NA

Appendix A: Fish and Invertebrate Data for the Ravenswood Restoration Project Final Report

Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Spring	1	Ravenswood Slough North	17	0	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Spring	1	Ravenswood Slough North	1	0	NA
Tunicate (<i>Tunicata sp.</i>)	Invert	Native	2023	Spring	1	Ravenswood Slough North	0	1	NA
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Spring	1	Ravenswood Slough North	1	0	NA
Amphipod (<i>Amphipoda sp.</i>)	Invert	Native	2023	Spring	1	Ravenswood Slough South	1	0	NA
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Spring	1	Ravenswood Slough South	37	0	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Spring	1	Ravenswood Slough South	0	1	NA
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Spring	1	Ravenswood Slough South	7	2	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Spring	1	Ravenswood Slough South	0	11	NA
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Spring	1	Ravenswood Slough South	25	0	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Spring	1	Ravenswood Slough South	39	9	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Spring	1	Ravenswood Slough South	7	7	NA
Shiner Perch (<i>Cymatogaster aggregate</i>)	Fish	Native	2023	Spring	1	Ravenswood Slough South	0	1	NA
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Spring	1	Ravenswood Slough South	6	1	NA
Annelid (<i>Annelida sp.</i>)	Invert	Native	2023	Summer	1	Flood Slough North	1	0	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Summer	1	Flood Slough North	8	0	NA
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2023	Summer	1	Flood Slough North	5	0	NA
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Summer	1	Flood Slough North	1	0	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	1	Flood Slough North	0	334	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2023	Summer	1	Flood Slough North	60	0	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	1	Flood Slough North	18	8	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Summer	1	Flood Slough North	0	1	NA
Reticulate Water Boatmen (<i>Trichocorixa reticulata</i>)	Invert	Native	2023	Summer	1	Flood Slough North	8	0	NA
Speckled Sanddab (<i>Citharichthys stigmaeus</i>)	Fish	Native	2023	Summer	1	Flood Slough North	0	1	NA
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Summer	1	Flood Slough North	2	13	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Summer	1	Flood Slough North	57	0	NA
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Summer	1	Flood Slough South	82	0	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Summer	1	Flood Slough South	5	0	NA
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Summer	1	Flood Slough South	1	0	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	1	Flood Slough South	0	265	NA

Jacksmelt (<i>Atherinopsis californiensis</i>)	Fish	Native	2023	Summer	1	Flood Slough South	2	0	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2023	Summer	1	Flood Slough South	310	0	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	1	Flood Slough South	61	19	NA
Pacific Halibut (<i>Hippoglossus stenolepis</i>)	Fish	Native	2023	Summer	1	Flood Slough South	0	1	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Summer	1	Flood Slough South	2	3	NA
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Summer	1	Flood Slough South	2	11	NA
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Summer	1	Flood Slough South	1	0	NA
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Summer	1	Flood Slough South	391	0	NA
Annelid (<i>Annelida sp.</i>)	Invert	Native	2023	Summer	1	Ravenswood Slough North	1	0	NA
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough North	7	0	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough North	1	0	NA
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough North	0	1	NA
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Summer	1	Ravenswood Slough North	3	0	NA
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2023	Summer	1	Ravenswood Slough North	1	0	NA
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough North	0	1	NA
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Summer	1	Ravenswood Slough North	8	0	NA
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Summer	1	Ravenswood Slough North	1	0	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2023	Summer	1	Ravenswood Slough North	140	0	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	1	Ravenswood Slough North	16	19	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough North	0	1	NA
Scale Worm (<i>Polynoidae sp.</i>)	Invert	Native	2023	Summer	1	Ravenswood Slough North	0	1	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough North	346	0	NA
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough South	4	0	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough South	5	0	NA
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Summer	1	Ravenswood Slough South	1	0	NA
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough South	0	1	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	1	Ravenswood Slough South	0	79	NA
English Sole (<i>Parophrys vetulus</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough South	1	0	NA
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Summer	1	Ravenswood Slough South	1	0	NA
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Summer	1	Ravenswood Slough South	1	0	NA

Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2023	Summer	1	Ravenswood Slough South	165	0	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough South	1	0	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	1	Ravenswood Slough South	38	125	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough South	2	18	NA
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Summer	1	Ravenswood Slough South	0	4	NA
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Summer	2	Flood Slough North	1	0	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Summer	2	Flood Slough North	96	0	NA
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Summer	2	Flood Slough North	2	0	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	2	Flood Slough North	21	195	NA
English Sole (<i>Parophrys vetulus</i>)	Fish	Native	2023	Summer	2	Flood Slough North	0	6	NA
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Summer	2	Flood Slough North	4	0	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2023	Summer	2	Flood Slough North	2600	0	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Summer	2	Flood Slough North	6	1	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	2	Flood Slough North	420	40	NA
Pacific Halibut (<i>Hippoglossus stenolepis</i>)	Fish	Native	2023	Summer	2	Flood Slough North	1	0	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Summer	2	Flood Slough North	4	3	NA
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Summer	2	Flood Slough North	2	0	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Summer	2	Flood Slough North	66	0	NA
Western Mosquito Fish (<i>Gambusia affinis</i>)	Fish	Non-native	2023	Summer	2	Flood Slough North	1	0	NA
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	2023	Summer	2	Flood Slough North	50	0	NA
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Summer	2	Flood Slough North	10	0	NA
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Summer	2	Flood Slough North	2	0	NA
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	1	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	2	Flood Slough South	NA	55	NA
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Jacksmelt (<i>Atherinopsis californiensis</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Longjaw Mudsucker (<i>Gillichthys mirabilis</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Summer	2	Flood Slough South	NA	0	NA

Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	2	Flood Slough South	NA	46	NA
Pacific Halibut (<i>Hippoglossus stenolepis</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Pacific Herring (<i>Clupea pallasii</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	4	NA
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	15	NA
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Western Mosquito Fish (<i>Gambusia affinis</i>)	Fish	Non-native	2023	Summer	2	Flood Slough South	NA	0	NA
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Summer	2	Flood Slough South	NA	0	NA
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Summer	2	Flood Slough South	NA	0	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough North	4	0	NA
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Summer	2	Ravenswood Slough North	4	0	NA
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2023	Summer	2	Ravenswood Slough North	1	0	NA
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough North	0	1	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	2	Ravenswood Slough North	8	0	NA
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Summer	2	Ravenswood Slough North	3	0	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2023	Summer	2	Ravenswood Slough North	4150	0	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough North	24	0	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	2	Ravenswood Slough North	47	145	NA
Pacific Herring (<i>Clupea pallasii</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough North	1	0	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough North	0	4	NA
Purple Shore Crab (<i>Hemigrapsus nudus</i>)	Invert	Native	2023	Summer	2	Ravenswood Slough North	0	2	NA
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough North	0	3	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough North	177	0	NA
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough North	72	0	NA
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Summer	2	Ravenswood Slough North	1	2	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough South	29	0	NA
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Summer	2	Ravenswood Slough South	4	0	NA

Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2023	Summer	2	Ravenswood Slough South	10000	0	NA
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough South	1	0	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	2	Ravenswood Slough South	9	0	NA
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2023	Summer	2	Ravenswood Slough South	0	1	NA
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Summer	2	Ravenswood Slough South	1	0	NA
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough South	0	1	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2023	Summer	2	Ravenswood Slough South	1000	0	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough South	3	0	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	2	Ravenswood Slough South	130	325	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough South	1	0	NA
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough South	16	0	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Summer	2	Ravenswood Slough South	331	1	NA
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Summer	3	Flood Slough North	4	0	NA
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Summer	3	Flood Slough North	0	1	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	3	Flood Slough North	2	34	NA
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Summer	3	Flood Slough North	0	4	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Summer	3	Flood Slough North	30	1	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	3	Flood Slough North	1	56	NA
Speckled Sanddab (<i>Citharichthys stigmaeus</i>)	Fish	Native	2023	Summer	3	Flood Slough North	1	0	NA
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Summer	3	Flood Slough North	1	6	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Summer	3	Flood Slough North	268	0	NA
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Summer	3	Flood Slough South	0	3	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	3	Flood Slough South	30	14	NA
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Summer	3	Flood Slough South	2	4	NA
Jacksmelt (<i>Atherinopsis californiensis</i>)	Fish	Native	2023	Summer	3	Flood Slough South	0	1	NA
Longjaw Mudsucker (<i>Gillichthys mirabilis</i>)	Fish	Native	2023	Summer	3	Flood Slough South	1	0	NA
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Summer	3	Flood Slough South	16	0	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Summer	3	Flood Slough South	11	4	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	3	Flood Slough South	88	100	NA
Pacific Herring (<i>Clupea pallasii</i>)	Fish	Native	2023	Summer	3	Flood Slough South	0	1	NA

Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Summer	3	Flood Slough South	3	4	NA
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Summer	3	Flood Slough South	3	9	NA
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Summer	3	Flood Slough South	10	0	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Summer	3	Flood Slough South	314	0	NA
Western Mosquito Fish (<i>Gambusia affinis</i>)	Fish	Non-native	2023	Summer	3	Flood Slough South	31	0	NA
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Summer	3	Flood Slough South	1	0	NA
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Summer	3	Ravenswood Slough North	0	1	NA
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2023	Summer	3	Ravenswood Slough North	0	1	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	3	Ravenswood Slough North	16	0	NA
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Summer	3	Ravenswood Slough North	6	0	NA
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Summer	3	Ravenswood Slough North	1	0	NA
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2023	Summer	3	Ravenswood Slough North	0	1	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	3	Ravenswood Slough North	21	147	NA
Pacific Herring (<i>Clupea pallasii</i>)	Fish	Native	2023	Summer	3	Ravenswood Slough North	0	1	NA
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Summer	3	Ravenswood Slough North	15	0	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Summer	3	Ravenswood Slough North	86	0	NA
Western Mosquito Fish (<i>Gambusia affinis</i>)	Fish	Non-native	2023	Summer	3	Ravenswood Slough North	2	0	NA
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Summer	3	Ravenswood Slough North	1	0	NA
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Summer	3	Ravenswood Slough South	1	0	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Summer	3	Ravenswood Slough South	16	0	NA
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2023	Summer	3	Ravenswood Slough South	0	1	NA
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Summer	3	Ravenswood Slough South	1	0	NA
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Summer	3	Ravenswood Slough South	2	0	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Summer	3	Ravenswood Slough South	7	1	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Summer	3	Ravenswood Slough South	32	294	NA
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Summer	3	Ravenswood Slough South	1	0	NA
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Summer	3	Ravenswood Slough South	0	3	NA
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Summer	3	Ravenswood Slough South	17	0	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Summer	3	Ravenswood Slough South	109	0	NA
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Summer	3	Ravenswood Slough South	5	0	NA

Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Fall	1	Flood Slough North	1	0	0
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Fall	1	Flood Slough North	0	1	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2023	Fall	1	Flood Slough North	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Fall	1	Flood Slough North	0	0	1
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	1	Flood Slough North	1	140	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Fall	1	Flood Slough North	1	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2023	Fall	1	Flood Slough North	0	0	3
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	1	Flood Slough North	21	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Fall	1	Flood Slough North	0	1	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	1	Flood Slough North	1	44	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Fall	1	Flood Slough North	4	1	0
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Fall	1	Flood Slough North	2	2	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Fall	1	Flood Slough North	323	4	0
Western Mosquito Fish (<i>Gambusia affinis</i>)	Fish	Non-native	2023	Fall	1	Flood Slough North	1	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Fall	1	Flood Slough North	3	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Fall	1	Flood Slough North	1	1	0
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Fall	1	Flood Slough South	1	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Fall	1	Flood Slough South	1	1	0
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Fall	1	Flood Slough South	4	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Fall	1	Flood Slough South	0	1	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	1	Flood Slough South	5	181	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2023	Fall	1	Flood Slough South	0	1	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	1	Flood Slough South	98	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	1	Flood Slough South	5	10	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Fall	1	Flood Slough South	0	3	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2023	Fall	1	Flood Slough South	1	0	0
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Fall	1	Flood Slough South	6	5	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Fall	1	Flood Slough South	51	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Fall	1	Flood Slough South	4	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Fall	1	Flood Slough South	3	0	0

Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Fall	1	Ravenswood Slough North	1	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2023	Fall	1	Ravenswood Slough North	5	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Fall	1	Ravenswood Slough North	1	2	1
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	1	Ravenswood Slough North	12	0	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2023	Fall	1	Ravenswood Slough North	0	12	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Fall	1	Ravenswood Slough North	1	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2023	Fall	1	Ravenswood Slough North	0	1	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	1	Ravenswood Slough North	23	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	1	Ravenswood Slough North	1	19	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Fall	1	Ravenswood Slough North	19	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Fall	1	Ravenswood Slough North	1	0	0
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Fall	1	Ravenswood Slough South	3	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Fall	1	Ravenswood Slough South	3	0	0
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Fall	1	Ravenswood Slough South	1	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2023	Fall	1	Ravenswood Slough South	6	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Fall	1	Ravenswood Slough South	1	4	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	1	Ravenswood Slough South	12	138	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2023	Fall	1	Ravenswood Slough South	0	5	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Fall	1	Ravenswood Slough South	1	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2023	Fall	1	Ravenswood Slough South	0	0	3
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	1	Ravenswood Slough South	59	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	1	Ravenswood Slough South	3	337	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Fall	1	Ravenswood Slough South	0	2	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2023	Fall	1	Ravenswood Slough South	0	0	1
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Fall	1	Ravenswood Slough South	13	1	0
Western Mosquito Fish (<i>Gambusia affinis</i>)	Fish	Non-native	2023	Fall	1	Ravenswood Slough South	4	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Fall	1	Ravenswood Slough South	0	1	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2023	Fall	2	Flood Slough North	0	3	0
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Fall	2	Flood Slough North	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Fall	2	Flood Slough North	0	1	1

California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	2	Flood Slough North	1	526	0
English Sole (<i>Parophrys vetulus</i>)	Fish	Native	2023	Fall	2	Flood Slough North	0	1	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2023	Fall	2	Flood Slough North	0	0	3
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	2	Flood Slough North	20	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	2	Flood Slough North	0	2	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Fall	2	Flood Slough North	0	2	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2023	Fall	2	Flood Slough North	3	0	0
Speckled Sanddab (<i>Citharichthys stigmaeus</i>)	Fish	Native	2023	Fall	2	Flood Slough North	0	1	0
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Fall	2	Flood Slough North	0	2	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2023	Fall	2	Flood Slough North	0	0	1
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Fall	2	Flood Slough North	1	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Fall	2	Flood Slough North	25	0	0
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Fall	2	Flood Slough South	1	0	0
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2023	Fall	2	Flood Slough South	0	1	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Fall	2	Flood Slough South	0	0	1
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	2	Flood Slough South	3	179	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	2	Flood Slough South	59	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	2	Flood Slough South	0	1	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Fall	2	Flood Slough South	0	2	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2023	Fall	2	Flood Slough South	24	0	0
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Fall	2	Flood Slough South	0	3	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Fall	2	Flood Slough South	2	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Fall	2	Flood Slough South	25	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Fall	2	Flood Slough South	1	0	0
Barnacle (<i>Crustacea sp.</i>)	Invert	Native	2023	Fall	2	Ravenswood Slough North	1	0	0
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Fall	2	Ravenswood Slough North	1	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2023	Fall	2	Ravenswood Slough North	3	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Fall	2	Ravenswood Slough North	0	7	5
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	2	Ravenswood Slough North	18	0	0
Chameleon Goby (<i>Tridentiger trigonocephalus</i>)	Fish	Non-native	2023	Fall	2	Ravenswood Slough North	1	12	0

Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Fall	2	Ravenswood Slough North	108	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Fall	2	Ravenswood Slough North	21	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2023	Fall	2	Ravenswood Slough North	0	1	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	2	Ravenswood Slough North	17	0	0
Mussel (<i>Mytilus sp.</i>)	Invert	Native	2023	Fall	2	Ravenswood Slough North	1	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	2	Ravenswood Slough North	34	13	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2023	Fall	2	Ravenswood Slough North	2	0	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2023	Fall	2	Ravenswood Slough North	0	0	1
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Fall	2	Ravenswood Slough North	12	0	0
Unidentified Gastropod (<i>Opisthobranchia sp.</i>)	Invert	Native	2023	Fall	2	Ravenswood Slough North	1	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Fall	2	Ravenswood Slough North	0	1	0
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Fall	2	Ravenswood Slough South	1	1	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Fall	2	Ravenswood Slough South	0	3	9
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	2	Ravenswood Slough South	5	354	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Fall	2	Ravenswood Slough South	3	0	0
European Green Crab (<i>Carcinus maenas</i>)	Invert	Non-native	2023	Fall	2	Ravenswood Slough South	1	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2023	Fall	2	Ravenswood Slough South	0	1	2
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	2	Ravenswood Slough South	1	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	2	Ravenswood Slough South	2	17	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2023	Fall	2	Ravenswood Slough South	1	3	0
Sand Flea (<i>Megalorchestia sp.</i>)	Invert	Native	2023	Fall	2	Ravenswood Slough South	1	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Fall	2	Ravenswood Slough South	8	6	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2023	Fall	2	Ravenswood Slough South	0	1	0
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Fall	3	Flood Slough North	0	1	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	3	Flood Slough North	1	819	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Fall	3	Flood Slough North	0	2	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	3	Flood Slough North	9	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Fall	3	Flood Slough North	2	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	3	Flood Slough North	0	1	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Fall	3	Flood Slough North	1	0	0

Speckled Sanddab (<i>Citharichthys stigmaeus</i>)	Fish	Native	2023	Fall	3	Flood Slough North	0	1	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Fall	3	Flood Slough North	1	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Fall	3	Flood Slough North	62	1	0
Unidentified Gastropod (<i>Opisthobranchia sp.</i>)	Invert	Native	2023	Fall	3	Flood Slough North	0	114	0
Western Mosquito Fish (<i>Gambusia affinis</i>)	Fish	Non-native	2023	Fall	3	Flood Slough North	1	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2023	Fall	3	Flood Slough North	1	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	3	Flood Slough South	6	622	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2023	Fall	3	Flood Slough South	1	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Fall	3	Flood Slough South	1	1	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	3	Flood Slough South	63	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2023	Fall	3	Flood Slough South	1	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	3	Flood Slough South	0	3	0
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Fall	3	Flood Slough South	0	5	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Fall	3	Flood Slough South	4	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Fall	3	Flood Slough South	9	4	0
Unidentified Gastropod (<i>Opisthobranchia sp.</i>)	Invert	Native	2023	Fall	3	Flood Slough South	0	7	0
Western Mosquito Fish (<i>Gambusia affinis</i>)	Fish	Non-native	2023	Fall	3	Flood Slough South	2	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Fall	3	Ravenswood Slough North	0	0	3
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	3	Ravenswood Slough North	1	0	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2023	Fall	3	Ravenswood Slough North	0	4	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Fall	3	Ravenswood Slough North	10	0	0
Masking Crab (<i>Loxoryhynchus crispatus</i>)	Invert	Native	2023	Fall	3	Ravenswood Slough North	0	1	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	3	Ravenswood Slough North	1	20	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2023	Fall	3	Ravenswood Slough North	7	3	0
Scale Worm (<i>Polynoidae sp.</i>)	Invert	Native	2023	Fall	3	Ravenswood Slough North	0	2	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2023	Fall	3	Ravenswood Slough North	0	0	1
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Fall	3	Ravenswood Slough North	2	0	0
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2023	Fall	3	Ravenswood Slough South	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2023	Fall	3	Ravenswood Slough South	0	0	1
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Fall	3	Ravenswood Slough South	2	644	0

Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2023	Fall	3	Ravenswood Slough South	0	1	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Fall	3	Ravenswood Slough South	5	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2023	Fall	3	Ravenswood Slough South	0	0	3
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Fall	3	Ravenswood Slough South	1	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Fall	3	Ravenswood Slough South	49	129	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2023	Fall	3	Ravenswood Slough South	49	4	0
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Fall	3	Ravenswood Slough South	0	0	1
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2023	Fall	3	Ravenswood Slough South	0	0	1
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Fall	3	Ravenswood Slough South	3	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Fall	3	Ravenswood Slough South	3	118	0
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2023	Winter	1	Flood Slough North	1	0	0
Barnacle (<i>Crustacea sp.</i>)	Invert	Native	2023	Winter	1	Flood Slough North	1	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Winter	1	Flood Slough North	1	168	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Winter	1	Flood Slough North	7	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Winter	1	Flood Slough North	18	0	0
Larval Fish	Fish	Native	2023	Winter	1	Flood Slough North	34	0	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Winter	1	Flood Slough North	30	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Winter	1	Flood Slough North	1	0	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Winter	1	Flood Slough North	1	0	0
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Winter	1	Flood Slough North	0	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Winter	1	Flood Slough North	40	7	0
Unidentified Opisthobranch	Invert	Native	2023	Winter	1	Flood Slough North	0	5	0
Unidentified Shrimp (<i>Crustacea sp.</i>)	Invert	Native	2023	Winter	1	Flood Slough North	80	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Winter	1	Flood Slough South	0	359	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Winter	1	Flood Slough South	16	0	0
Larval Fish	Fish	Native	2023	Winter	1	Flood Slough South	76	0	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Winter	1	Flood Slough South	201	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Winter	1	Flood Slough South	0	6	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Winter	1	Flood Slough South	3	0	0
Speckled Sanddab (<i>Citharichthys stigmaeus</i>)	Fish	Native	2023	Winter	1	Flood Slough South	0	1	0

Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	2023	Winter	1	Flood Slough South	0	3	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Winter	1	Flood Slough South	186	3	0
Unidentified Shrimp (<i>Crustacea sp.</i>)	Invert	Native	2023	Winter	1	Flood Slough South	17	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Winter	1	Ravenswood Slough North	0	20	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2023	Winter	1	Ravenswood Slough North	1	1	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Winter	1	Ravenswood Slough North	21	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Winter	1	Ravenswood Slough North	1	0	0
Larval Fish	Fish	Native	2023	Winter	1	Ravenswood Slough North	1	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2023	Winter	1	Ravenswood Slough North	0	0	1
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Winter	1	Ravenswood Slough North	4	5	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2023	Winter	1	Ravenswood Slough North	0	2	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Winter	1	Ravenswood Slough North	0	1	0
Unidentified Gastropod (<i>Opisthobranchia sp.</i>)	Invert	Native	2023	Winter	1	Ravenswood Slough North	0	1	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2023	Winter	1	Ravenswood Slough South	1	100	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2023	Winter	1	Ravenswood Slough South	23	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2023	Winter	1	Ravenswood Slough South	3	1	0
Larval Fish	Fish	Native	2023	Winter	1	Ravenswood Slough South	1	0	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2023	Winter	1	Ravenswood Slough South	30	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2023	Winter	1	Ravenswood Slough South	4	4	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2023	Winter	1	Ravenswood Slough South	0	1	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2023	Winter	1	Ravenswood Slough South	0	1	1
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2023	Winter	1	Ravenswood Slough South	1	5	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2023	Winter	1	Ravenswood Slough South	29	10	0
Unidentified Shrimp (<i>Crustacea sp.</i>)	Invert	Native	2023	Winter	1	Ravenswood Slough South	514	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Spring	1	Flood Slough North	0	838	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Spring	1	Flood Slough North	0	9	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Spring	1	Flood Slough North	1	3	0
Jacksmelt (<i>Atherinopsis californiensis</i>)	Fish	Native	2024	Spring	1	Flood Slough North	67	0	0
Larval Fish	Fish	Native	2024	Spring	1	Flood Slough North	23	0	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Spring	1	Flood Slough North	3	0	0

Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Spring	1	Flood Slough North	14	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Spring	1	Flood Slough North	0	844	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Spring	1	Flood Slough North	0	2	0
Red-eared Slider Turtle (<i>Trachemys scripta</i>)	Reptile	Non-native	2024	Spring	1	Flood Slough North	0	0	1
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Spring	1	Flood Slough North	50	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Spring	1	Flood Slough South	0	1	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Spring	1	Flood Slough South	2	818	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Spring	1	Flood Slough South	0	1	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Spring	1	Flood Slough South	9	6	0
Jacksmelt (<i>Atherinopsis californiensis</i>)	Fish	Native	2024	Spring	1	Flood Slough South	2	0	0
Larval Fish	Fish	Native	2024	Spring	1	Flood Slough South	328	0	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Spring	1	Flood Slough South	17	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Spring	1	Flood Slough South	10	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Spring	1	Flood Slough South	12	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Spring	1	Flood Slough South	4	823	0
Pacific Herring (<i>Clupea pallasii</i>)	Fish	Native	2024	Spring	1	Flood Slough South	1	0	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Spring	1	Flood Slough South	1	0	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2024	Spring	1	Flood Slough South	0	0	1
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Spring	1	Flood Slough South	9	4	0
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough North	1	0	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough North	0	3	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2024	Spring	1	Ravenswood Slough North	0	3	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2024	Spring	1	Ravenswood Slough North	12	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Spring	1	Ravenswood Slough North	1	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Spring	1	Ravenswood Slough North	50	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Spring	1	Ravenswood Slough North	2	4	0
Purple Shore Crab (<i>Hemigrapsus nudus</i>)	Invert	Native	2024	Spring	1	Ravenswood Slough North	0	1	0
Sandworm (<i>Phragmatopoma californica</i>)	Invert	Native	2024	Spring	1	Ravenswood Slough North	1	0	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2024	Spring	1	Ravenswood Slough North	0	1	1
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough North	1	0	0

Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough North	15	0	0
Unidentified Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough North	2	0	0
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough South	5	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough South	1	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Spring	1	Ravenswood Slough South	600	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough South	1	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Spring	1	Ravenswood Slough South	65	100	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough South	0	2	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2024	Spring	1	Ravenswood Slough South	6	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Spring	1	Ravenswood Slough South	4	0	0
Larval Fish	Fish	Native	2024	Spring	1	Ravenswood Slough South	18	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough South	0	0	1
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Spring	1	Ravenswood Slough South	7	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough South	17	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Spring	1	Ravenswood Slough South	11	108	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough South	3	1	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2024	Spring	1	Ravenswood Slough South	0	0	5
Unidentified Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Spring	1	Ravenswood Slough South	7	0	0
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2024	Summer	1	Flood Slough North	1	0	0
Basket Cockle (<i>Clinocardium nuttalli</i>)	Invert	Native	2024	Summer	1	Flood Slough North	4	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	1	Flood Slough North	23	0	0
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2024	Summer	1	Flood Slough North	1	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Summer	1	Flood Slough North	9	0	0
Blacktail Bay Shrimp (<i>Crangon nigricauda</i>)	Invert	Native	2024	Summer	1	Flood Slough North	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Summer	1	Flood Slough North	0	0	1
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Summer	1	Flood Slough North	5	162	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	1	Flood Slough North	2	3	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2024	Summer	1	Flood Slough North	1	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Summer	1	Flood Slough North	11	2	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Summer	1	Flood Slough North	1	0	0

Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Summer	1	Flood Slough North	16	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Summer	1	Flood Slough North	4	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Summer	1	Flood Slough North	18	10	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Summer	1	Flood Slough North	2	1	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Summer	1	Flood Slough North	1	0	0
Speckled Sanddab (<i>Citharichthys stigmaeus</i>)	Fish	Native	2024	Summer	1	Flood Slough North	2	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	1	Flood Slough North	29	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Summer	1	Flood Slough North	54	0	0
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2024	Summer	1	Flood Slough South	1	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	1	Flood Slough South	25	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Summer	1	Flood Slough South	2	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Summer	1	Flood Slough South	0	0	NA
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Summer	1	Flood Slough South	0	229	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	1	Flood Slough South	0	2	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Summer	1	Flood Slough South	4	119	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Summer	1	Flood Slough South	2	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Summer	1	Flood Slough South	8	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Summer	1	Flood Slough South	6	3	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Summer	1	Flood Slough South	3	27	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Summer	1	Flood Slough South	0	4	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	1	Flood Slough South	48	0	0
Unidentified Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Summer	1	Flood Slough South	22	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Summer	1	Flood Slough South	43	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Summer	1	Flood Slough South	2	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Summer	1	Ravenswood Slough North	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough North	0	2	3
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Summer	1	Ravenswood Slough North	0	1	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough North	0	5	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2024	Summer	1	Ravenswood Slough North	0	1	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2024	Summer	1	Ravenswood Slough North	1	0	0

Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Summer	1	Ravenswood Slough North	0	1	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough North	0	0	3
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Summer	1	Ravenswood Slough North	8	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough North	1	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Summer	1	Ravenswood Slough North	0	7	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Summer	1	Ravenswood Slough North	1	0	0
Speckled Sanddab (<i>Citharichthys stigmaeus</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough North	0	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough North	1	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough North	168	0	0
Annelid (<i>Annelida sp.</i>)	Invert	Native	2024	Summer	1	Ravenswood Slough South	1	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough South	4	0	0
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2024	Summer	1	Ravenswood Slough South	1	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Summer	1	Ravenswood Slough South	1021	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough South	0	0	1
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Summer	1	Ravenswood Slough South	3	38	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough South	0	5	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Summer	1	Ravenswood Slough South	0	1	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Summer	1	Ravenswood Slough South	503	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Summer	1	Ravenswood Slough South	0	11	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2024	Summer	1	Ravenswood Slough South	0	1	1
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough South	0	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough South	78	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Summer	1	Ravenswood Slough South	6	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	2	Flood Slough North	14	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Summer	2	Flood Slough North	17	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Summer	2	Flood Slough North	0	13	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	2	Flood Slough North	0	5	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Summer	2	Flood Slough North	1	0	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Summer	2	Flood Slough North	6	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Summer	2	Flood Slough North	8000	0	0

Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Summer	2	Flood Slough North	15	6	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Summer	2	Flood Slough North	2	21	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Summer	2	Flood Slough North	1	1	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Summer	2	Flood Slough North	1	0	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Summer	2	Flood Slough North	1	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	2	Flood Slough North	64	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Summer	2	Flood Slough North	0	5	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	2	Flood Slough South	1	0	0
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2024	Summer	2	Flood Slough South	2	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Summer	2	Flood Slough South	5	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Summer	2	Flood Slough South	0	1	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Summer	2	Flood Slough South	0	3	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	2	Flood Slough South	0	6	0
European Green Crab (<i>Carcinus maenas</i>)	Invert	Non-native	2024	Summer	2	Flood Slough South	0	0	2
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Summer	2	Flood Slough South	1	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Summer	2	Flood Slough South	8000	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Summer	2	Flood Slough South	5	33	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Summer	2	Flood Slough South	0	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	2	Flood Slough South	104	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Summer	2	Flood Slough South	3	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Summer	2	Flood Slough South	0	1	0
Annelid (<i>Annelida sp.</i>)	Invert	Native	2024	Summer	2	Ravenswood Slough North	1	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough North	1	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Summer	2	Ravenswood Slough North	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough North	0	0	5
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2024	Summer	2	Ravenswood Slough North	1	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Summer	2	Ravenswood Slough North	1	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough North	0	0	4
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Summer	2	Ravenswood Slough North	2000	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Summer	2	Ravenswood Slough North	4	4	0

Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Summer	2	Ravenswood Slough North	3	0	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2024	Summer	2	Ravenswood Slough North	0	0	2
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough North	70	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough North	11	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Summer	2	Ravenswood Slough North	1	1	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough South	5	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough South	0	0	1
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough South	0	4	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Summer	2	Ravenswood Slough South	18	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Summer	2	Ravenswood Slough South	1000	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough South	7	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Summer	2	Ravenswood Slough South	4	26	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Summer	2	Ravenswood Slough South	1	0	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough South	4	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	2	Ravenswood Slough South	106	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	3	Flood Slough North	2	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Summer	3	Flood Slough North	1	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Summer	3	Flood Slough North	0	152	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	3	Flood Slough North	1	6	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Summer	3	Flood Slough North	1	0	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Summer	3	Flood Slough North	30	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Summer	3	Flood Slough North	3	4	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Summer	3	Flood Slough North	3	9	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	3	Flood Slough North	42	1	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Summer	3	Flood Slough North	9	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Summer	3	Flood Slough North	0	1	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	3	Flood Slough South	1	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Summer	3	Flood Slough South	1000	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Summer	3	Flood Slough South	0	10	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	3	Flood Slough South	0	2	0

Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Summer	3	Flood Slough South	4	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Summer	3	Flood Slough South	0	2	0
Oriental Shrimp (<i>Palaemon macrrodactylus</i>)	Invert	Non-native	2024	Summer	3	Flood Slough South	2	3	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Summer	3	Flood Slough South	0	1	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Summer	3	Flood Slough South	1	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Summer	3	Flood Slough South	1	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Summer	3	Flood Slough South	0	1	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough North	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough North	0	1	5
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough North	0	1	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Summer	3	Ravenswood Slough North	1	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough North	0	0	2
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Summer	3	Ravenswood Slough North	8	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Summer	3	Ravenswood Slough North	200	0	0
Oriental Shrimp (<i>Palaemon macrrodactylus</i>)	Invert	Non-native	2024	Summer	3	Ravenswood Slough North	6	2	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Summer	3	Ravenswood Slough North	1	0	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2024	Summer	3	Ravenswood Slough North	0	0	2
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough North	1	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough North	1	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough South	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough South	0	0	4
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Summer	3	Ravenswood Slough South	0	24	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough South	0	7	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Summer	3	Ravenswood Slough South	35	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough South	30	0	0
Oriental Shrimp (<i>Palaemon macrrodactylus</i>)	Invert	Non-native	2024	Summer	3	Ravenswood Slough South	21	17	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough South	2	0	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Summer	3	Ravenswood Slough South	3	0	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough South	1	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Summer	3	Ravenswood Slough South	97	0	0

Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Summer	3	Ravenswood Slough South	5	0	0
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2024	Fall	1	Flood Slough North	1	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	1	Flood Slough North	0	2	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Fall	1	Flood Slough North	0	0	1
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	1	Flood Slough North	0	123	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Fall	1	Flood Slough North	0	2	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2024	Fall	1	Flood Slough North	29	3	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Fall	1	Flood Slough North	1	0	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	1	Flood Slough North	9	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Fall	1	Flood Slough North	1100	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Fall	1	Flood Slough North	27	3	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	1	Flood Slough North	22	9	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	1	Flood Slough North	1	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	1	Flood Slough North	90	0	0
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Fall	1	Flood Slough North	60	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Fall	1	Flood Slough North	12	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	1	Flood Slough South	2	1	0
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2024	Fall	1	Flood Slough South	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Fall	1	Flood Slough South	0	0	1
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	1	Flood Slough South	2	37	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Fall	1	Flood Slough South	0	1	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2024	Fall	1	Flood Slough South	0	2	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	1	Flood Slough South	44	0	0
Mud Shrimp (<i>Upogebia pugettensis</i>)	Invert	Native	2024	Fall	1	Flood Slough South	0	1	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Fall	1	Flood Slough South	100	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Fall	1	Flood Slough South	2	2	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	1	Flood Slough South	11	5	0
Purple Shore Crab (<i>Hemigrapsus nudus</i>)	Invert	Native	2024	Fall	1	Flood Slough South	0	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	1	Flood Slough South	96	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough North	0	1	0

California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	1	Ravenswood Slough North	0	3	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough North	0	4	0
Chameleon Goby (<i>Tridentiger trigonocephalus</i>)	Fish	Non-native	2024	Fall	1	Ravenswood Slough North	9	5	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	1	Ravenswood Slough North	19	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Fall	1	Ravenswood Slough North	500	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough North	12	2	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	1	Ravenswood Slough North	0	6	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	1	Ravenswood Slough North	1	0	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough North	0	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough North	4	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough North	6	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Fall	1	Ravenswood Slough South	1000	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough South	0	1	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	1	Ravenswood Slough South	0	86	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough South	0	2	0
Chameleon Goby (<i>Tridentiger trigonocephalus</i>)	Fish	Non-native	2024	Fall	1	Ravenswood Slough South	0	5	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Fall	1	Ravenswood Slough South	1	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough South	0	0	3
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	1	Ravenswood Slough South	39	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Fall	1	Ravenswood Slough South	1120	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	1	Ravenswood Slough South	6	30	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough South	0	1	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	1	Ravenswood Slough South	1	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough South	103	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Fall	1	Ravenswood Slough South	21	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	2	Flood Slough North	13	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	2	Flood Slough North	0	143	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Fall	2	Flood Slough North	0	4	0
Cheekspot Goby (<i>Ilypnus gilberti</i>)	Fish	Native	2024	Fall	2	Flood Slough North	0	1	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Fall	2	Flood Slough North	1	0	0

Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	2	Flood Slough North	34	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Fall	2	Flood Slough North	1000	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	2	Flood Slough North	8	21	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	2	Flood Slough North	50	1	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Fall	2	Flood Slough North	4	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	2	Flood Slough South	2	0	0
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2024	Fall	2	Flood Slough South	0	1	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	2	Flood Slough South	0	80	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2024	Fall	2	Flood Slough South	0	1	0
Cheekspot Goby (<i>Ilypnus gilberti</i>)	Fish	Native	2024	Fall	2	Flood Slough South	0	4	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2024	Fall	2	Flood Slough South	0	0	1
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	2	Flood Slough South	395	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	2	Flood Slough South	5	12	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	2	Flood Slough South	13	0	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2024	Fall	2	Flood Slough South	0	0	1
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Fall	2	Flood Slough South	2	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	2	Flood Slough South	24	1	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Fall	2	Flood Slough South	4	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Fall	2	Ravenswood Slough North	0	2	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	2	Ravenswood Slough North	0	1	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Fall	2	Ravenswood Slough North	0	2	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2024	Fall	2	Ravenswood Slough North	0	4	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2024	Fall	2	Ravenswood Slough North	6	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Fall	2	Ravenswood Slough North	0	2	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2024	Fall	2	Ravenswood Slough North	0	4	0
Masking Crab (<i>Loxoryhynchus crispatus</i>)	Invert	Native	2024	Fall	2	Ravenswood Slough North	0	1	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	2	Ravenswood Slough North	13	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	2	Ravenswood Slough North	4	1	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	2	Ravenswood Slough North	1	0	0
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2024	Fall	2	Ravenswood Slough South	0	2	0

California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Fall	2	Ravenswood Slough South	0	1	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	2	Ravenswood Slough South	0	41	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Fall	2	Ravenswood Slough South	0	3	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2024	Fall	2	Ravenswood Slough South	0	2	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	2	Ravenswood Slough South	26	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	2	Ravenswood Slough South	2	18	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	2	Ravenswood Slough South	1	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	2	Ravenswood Slough South	0	3	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	2	Pond R5 East	4	NA	NA
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	2	R5_West	1	NA	NA
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	2	Pond S5 East	1	NA	NA
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	2	Pond S5 East	2	NA	NA
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	2	Pond S5 West	39	NA	NA
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	2	Pond S5 West	6	NA	NA
American Shad (<i>Alosa sapidissima</i>)	Fish	Non-native	2024	Fall	3	Flood Slough North	1	0	0
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	2024	Fall	3	Flood Slough North	2	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	3	Flood Slough North	20	0	0
Blacktail Bay Shrimp (<i>Crangon nigricauda</i>)	Invert	Native	2024	Fall	3	Flood Slough North	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Fall	3	Flood Slough North	0	1	3
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	3	Flood Slough North	0	129	0
Chameleon Goby (<i>Tridentiger trignocephalus</i>)	Fish	Non-native	2024	Fall	3	Flood Slough North	0	1	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Fall	3	Flood Slough North	1	0	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2024	Fall	3	Flood Slough North	0	0	4
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	3	Flood Slough North	54	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Fall	3	Flood Slough North	20	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	3	Flood Slough North	0	2	0
Pacific Herring (<i>Clupea pallasii</i>)	Fish	Native	2024	Fall	3	Flood Slough North	0	2	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Fall	3	Flood Slough North	1	1	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	3	Flood Slough North	6	0	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Fall	3	Flood Slough North	1	0	0

Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	3	Flood Slough North	28	7	0
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Fall	3	Flood Slough North	1	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Fall	3	Flood Slough North	1	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Fall	3	Flood Slough South	0	1	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	3	Flood Slough South	0	138	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Fall	3	Flood Slough South	0	3	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	3	Flood Slough South	108	0	0
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Fall	3	Flood Slough South	0	1	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	3	Flood Slough South	0	1	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Fall	3	Flood Slough South	0	1	0
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	3	Flood Slough South	2	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	3	Flood Slough South	13	3	0
Atlantic Oyster Drill (<i>Urosalpinx cinerea</i>)	Invert	Non-native	2024	Fall	3	Ravenswood Slough North	1	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	3	Ravenswood Slough North	1	0	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Fall	3	Ravenswood Slough North	1	1	0
Chameleon Goby (<i>Tridentiger trigonocephalus</i>)	Fish	Non-native	2024	Fall	3	Ravenswood Slough North	6	15	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2024	Fall	3	Ravenswood Slough North	12	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Fall	3	Ravenswood Slough North	8	5	0
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2024	Fall	3	Ravenswood Slough North	0	0	6
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	3	Ravenswood Slough North	7	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Fall	3	Ravenswood Slough North	200	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	3	Ravenswood Slough North	2	0	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2024	Fall	3	Ravenswood Slough North	0	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	3	Ravenswood Slough North	0	1	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	3	Ravenswood Slough South	23	0	0
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	2024	Fall	3	Ravenswood Slough South	708	0	0
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	2024	Fall	3	Ravenswood Slough South	0	0	1
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Fall	3	Ravenswood Slough South	0	164	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Fall	3	Ravenswood Slough South	0	2	0
Chameleon Goby (<i>Tridentiger trigonocephalus</i>)	Fish	Non-native	2024	Fall	3	Ravenswood Slough South	0	4	0

Appendix A: Fish and Invertebrate Data for the Ravenswood Restoration Project Final Report

Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	2024	Fall	3	Ravenswood Slough South	0	0	2
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	3	Ravenswood Slough South	41	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Fall	3	Ravenswood Slough South	100	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	3	Ravenswood Slough South	6	2	0
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	2024	Fall	3	Ravenswood Slough South	0	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	3	Ravenswood Slough South	3	11	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Fall	3	Ravenswood Slough South	5	0	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Fall	3	Ravenswood Slough South	2	2	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	3	Pond R5 East	11	NA	NA
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	3	Pond R5 East	32	NA	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Fall	3	Pond R5 East	1000	NA	NA
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	3	Pond R5 East	4	NA	NA
Reticulate Water Boatmen (<i>Trichocorixa reticulata</i>)	Invert	Native	2024	Fall	3	Pond R5 East	20000	NA	NA
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Fall	3	Pond R5 East	203	NA	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	3	R5_West	56	NA	NA
Chameleon Goby (<i>Tridentiger trigonocephalus</i>)	Fish	Non-native	2024	Fall	3	R5_West	1	NA	NA
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	3	R5_West	69	NA	NA
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Fall	3	R5_West	3	NA	NA
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	3	R5_West	3	NA	NA
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Fall	3	R5_West	72	NA	NA
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Fall	3	R5_West	8	NA	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	3	Pond S5 East	2	NA	NA
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	2024	Fall	3	Pond S5 East	1	NA	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Fall	3	Pond S5 East	10000	NA	NA
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	2024	Fall	3	Pond S5 East	1	NA	NA
Reticulate Water Boatmen (<i>Trichocorixa reticulata</i>)	Invert	Native	2024	Fall	3	Pond S5 East	5000	NA	NA
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Fall	3	Pond S5 East	5	NA	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Fall	3	Pond S5 West	10	NA	NA
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Fall	3	Pond S5 West	1	NA	NA
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Fall	3	Pond S5 West	3	NA	NA

Reticulate Water Boatmen (<i>Trichocorixa reticulata</i>)	Invert	Native	2024	Fall	3	Pond S5 West	2000	NA	NA
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	2024	Winter	1	Flood Slough North	0	1	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Winter	1	Flood Slough North	0	44	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Winter	1	Flood Slough North	0	1	0
Comb Jellyfish (<i>Ctenophora sp.</i>)	Invert	Native	2024	Winter	1	Flood Slough North	7	1	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2024	Winter	1	Flood Slough North	5	0	0
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Winter	1	Flood Slough North	1	0	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Winter	1	Flood Slough North	60	0	0
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Winter	1	Flood Slough North	26	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Winter	1	Flood Slough North	0	1	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Winter	1	Flood Slough North	2	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Winter	1	Flood Slough North	1	7	0
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Winter	1	Flood Slough North	2	0	0
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	2024	Winter	1	Flood Slough North	1	0	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Winter	1	Flood Slough South	0	144	0
Comb Jellyfish (<i>Ctenophora sp.</i>)	Invert	Native	2024	Winter	1	Flood Slough South	11	1	0
Crown Jellyfish (<i>Coronatae sp.</i>)	Invert	Native	2024	Winter	1	Flood Slough South	0	1	0
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Winter	1	Flood Slough South	160	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Winter	1	Flood Slough South	0	2	0
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	2024	Winter	1	Flood Slough South	2	0	0
Reticulate Water Boatmen (<i>Trichocorixa reticulata</i>)	Invert	Native	2024	Winter	1	Flood Slough South	29	0	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Winter	1	Flood Slough South	28	10	0
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Winter	1	Flood Slough South	3	0	0
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	2024	Winter	1	Ravenswood Slough North	0	1	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2024	Winter	1	Ravenswood Slough North	3	0	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Winter	1	Ravenswood Slough North	0	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Winter	1	Ravenswood Slough North	0	7	0
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	2024	Winter	1	Ravenswood Slough South	0	24	0
Comb Jellyfish (<i>Ctenophora sp.</i>)	Invert	Native	2024	Winter	1	Ravenswood Slough South	3	1	0
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	2024	Winter	1	Ravenswood Slough South	1	0	0

Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Winter	1	Ravenswood Slough South	0	1	0
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	2024	Winter	1	Ravenswood Slough South	0	6	0
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Winter	1	Ravenswood Slough South	0	1	0
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	2024	Winter	1	Ravenswood Slough South	0	14	0
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	2024	Winter	1	Ravenswood Slough South	1	0	0
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Winter	1	Pond R5 East	5	NA	NA
Isopod (<i>Isopoda sp.</i>)	Invert	Native	2024	Winter	1	Pond R5 East	1	NA	NA
Larval Fish	Fish	Native	2024	Winter	1	Pond R5 East	14	NA	NA
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	2024	Winter	1	Pond R5 East	6	NA	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Winter	1	Pond R5 East	205	NA	NA
Reticulate Water Boatmen (<i>Trichocorixa reticulata</i>)	Invert	Native	2024	Winter	1	Pond R5 East	3332	NA	NA
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Winter	1	Pond R5 East	2	NA	NA
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	2024	Winter	1	R5_West	1	NA	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Winter	1	R5_West	150	NA	NA
Reticulate Water Boatmen (<i>Trichocorixa reticulata</i>)	Invert	Native	2024	Winter	1	R5_West	5430	NA	NA
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	2024	Winter	1	R5_West	1	NA	NA
Unidentified Parasite	Invert	Native	2024	Winter	1	R5_West	1	NA	NA
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	2024	Winter	1	R5_West	2	NA	NA
Comb Jellyfish (<i>Ctenophora sp.</i>)	Invert	Native	2024	Winter	1	Pond S5 East	1	NA	NA
Larval Fish	Fish	Native	2024	Winter	1	Pond S5 East	1	NA	NA
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	2024	Winter	1	Pond S5 East	200	NA	NA
Reticulate Water Boatmen (<i>Trichocorixa reticulata</i>)	Invert	Native	2024	Winter	1	Pond S5 East	1500	NA	NA
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	2024	Winter	1	Pond S5 West	1	NA	NA
Reticulate Water Boatmen (<i>Trichocorixa reticulata</i>)	Invert	Native	2024	Winter	1	Pond S5 West	1000	NA	NA

Table A2. Table containing the total number of each aquatic organism captured during monitoring at the Ravenswood Restoration Project. The data is separated by species captured, the type of organism, species status (native or non-native) and total capture number across sampling methods (seine, otter trawl, gillnet).

Species	Type	Status	Total Capture Number
American Shad (<i>Alosa sapidissima</i>)	Fish	Non-native	1
Amphipod (<i>Amphipoda sp.</i>)	Invert	Native	1
Annelid (<i>Annelida sp.</i>)	Invert	Native	4
Arrow Goby (<i>Clevelandia ios</i>)	Fish	Native	187
Atlantic Oyster Drill (<i>Urosalpinx cinerea</i>)	Invert	Non-native	1
Barnacle (<i>Crustacea sp.</i>)	Invert	Native	2
Basket Cockle (<i>Clinocardium nuttalli</i>)	Invert	Native	4
Bay Goby (<i>Lepidogobius lepidus</i>)	Fish	Native	387
Bay Pipefish (<i>Syngnathus leptorhynchus</i>)	Fish	Native	23
Bay Shore Crab (<i>Hemigrapsus oregonensis</i>)	Invert	Native	40
Bent-nose Macoma Clam (<i>Macoma nasuta</i>)	Invert	Native	14389
Blacktail Bay Shrimp (<i>Crangon nigricauda</i>)	Invert	Native	2
California Bat Ray (<i>Myliobatis californica</i>)	Fish	Native	85
California Bay Shrimp (<i>Crangon franciscorum</i>)	Invert	Native	9598
California Halibut (<i>Paralichthys californicus</i>)	Fish	Native	91
Chameleon Goby (<i>Tridentiger trigonocephalus</i>)	Fish	Non-native	133
Cheekspot Goby (<i>Ilypnus gilberti</i>)	Fish	Native	5
Comb Jellyfish (<i>Ctenophora sp.</i>)	Invert	Native	25
Crown Jellyfish (<i>Coronatae sp.</i>)	Invert	Native	1
Eastern Mud Snail (<i>Ilyanassa obsoleta</i>)	Invert	Non-native	275
English Sole (<i>Parophrys vetulus</i>)	Fish	Native	8
European Green Crab (<i>Carcinus maenas</i>)	Invert	Non-native	3
Isopod (<i>Isopoda sp.</i>)	Invert	Native	274

Jacksmelt (<i>Atherinopsis californiensis</i>)	Fish	Native	72
Larval Fish	Fish	Native	496
Leopard Shark (<i>Triakis semifasciata</i>)	Fish	Native	50
Longjaw Mudsucker (<i>Gillichthys mirabilis</i>)	Fish	Native	1
Masking Crab (<i>Loxoryhynchus crispatus</i>)	Invert	Native	2
Mississippi Silverside (<i>Menidia audens</i>)	Fish	Non-native	1935
Mud Shrimp (<i>Upogebia pugettensis</i>)	Invert	Native	1
Mussel (<i>Mytilus sp.</i>)	Invert	Native	1
Mysid Shrimp (<i>Neomysis kadiakensis</i>)	Invert	Native	44077
Northern Anchovy (<i>Engraulis mordax</i>)	Fish	Native	283
Oriental Shrimp (<i>Palaemon macrodactylus</i>)	Invert	Non-native	5225
Pacific Halibut (<i>Hippoglossus stenolepis</i>)	Fish	Native	2
Pacific Herring (<i>Clupea pallasii</i>)	Fish	Native	6
Pacific Staghorn Sculpin (<i>Leptocottus armatus</i>)	Fish	Native	123
Purple Shore Crab (<i>Hemigrapsus nudus</i>)	Invert	Native	4
Rainwater Killifish (<i>Lucania parva</i>)	Fish	Non-native	157
Red-eared Slider Turtle (<i>Trachemys scripta</i>)	Reptile	Non-native	1
Reticulate Water Boatmen (<i>Trichocorixa reticulata</i>)	Invert	Native	38299
Sand Flea (<i>Megalorchestia sp.</i>)	Invert	Native	1
Sandworm (<i>Phragmatopoma californica</i>)	Invert	Native	1
Scale Worm (<i>Polynoidae sp.</i>)	Invert	Native	3
Shiner Perch (<i>Cymatogaster aggregate</i>)	Fish	Native	1
Speckled Sanddab (<i>Citharichthys stigmaeus</i>)	Fish	Native	9
Starry Flounder (<i>Platichthys stellatus</i>)	Fish	Native	114
Striped Bass (<i>Morone saxatilis</i>)	Fish	Non-native	24
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	Fish	Native	98
Topsmelt Silverside (<i>Atherinops affinis</i>)	Fish	Native	4001
Tunicate (<i>Tunicata sp.</i>)	Invert	Native	1
Unidentified Gastropod (<i>Opisthobranchia sp.</i>)	Invert	Native	123
Unidentified Goby (<i>Gobiidae sp.</i>)	Fish	Native	31

Unidentified Opisthobranch	Invert	Native	5
Unidentified Parasite	Invert	Native	1
Unidentified Shrimp (<i>Crustacea sp.</i>)	Invert	Native	611
Western Mosquito Fish (<i>Gambusia affinis</i>)	Fish	Non-native	42
YOY Goby (<i>Gobiidae sp.</i>)	Fish	Native	336
YOY Silverside (<i>Atherinopidae sp.</i>)	Fish	Native	1078
Yellowfin Goby (<i>Acanthogobius flavimanus</i>)	Fish	Non-native	57

Appendix B

Water Quality Figures and Data

This appendix contains water quality figures and tables for the continuous and instantaneous water quality measurements in Flood Slough, Ravenswood Slough, and the R5/S5 Pond, as well as a correlation matrix for continuous water quality measurements. All data presented within the figures and tables has undergone QA/QC described in Sections 2.4 and 3.5 of the Ravenswood Restoration Project Final Report.

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Temperature

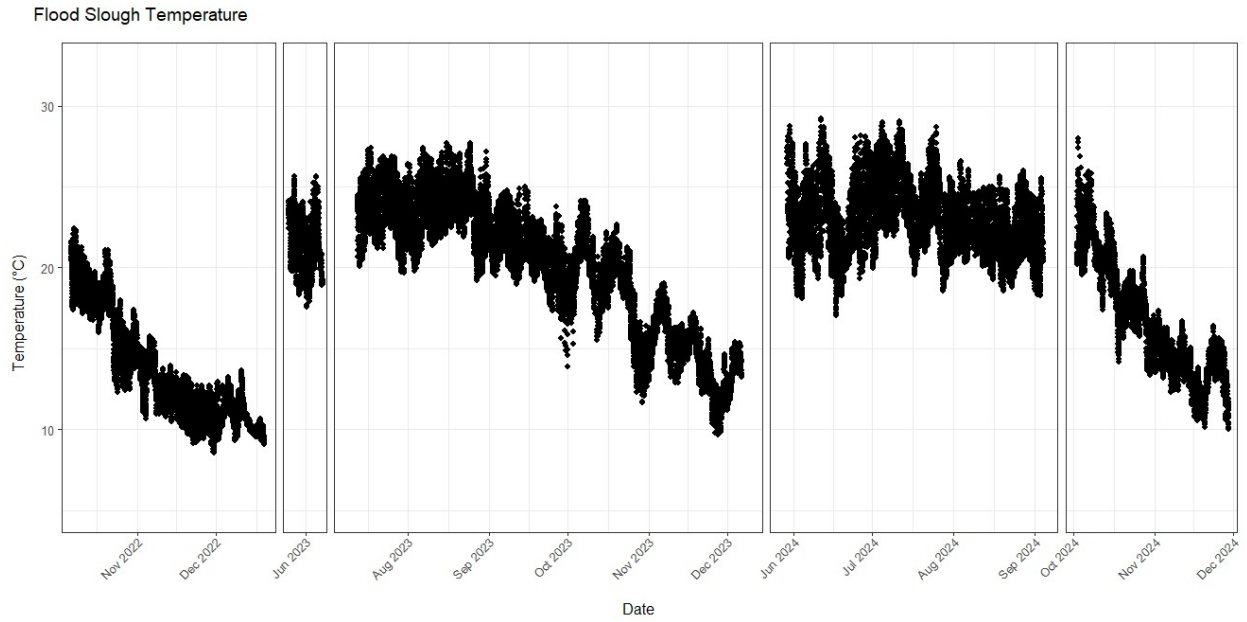


Figure B1. Continuous temperature measurements (°C) in Flood Slough throughout the monitoring period.

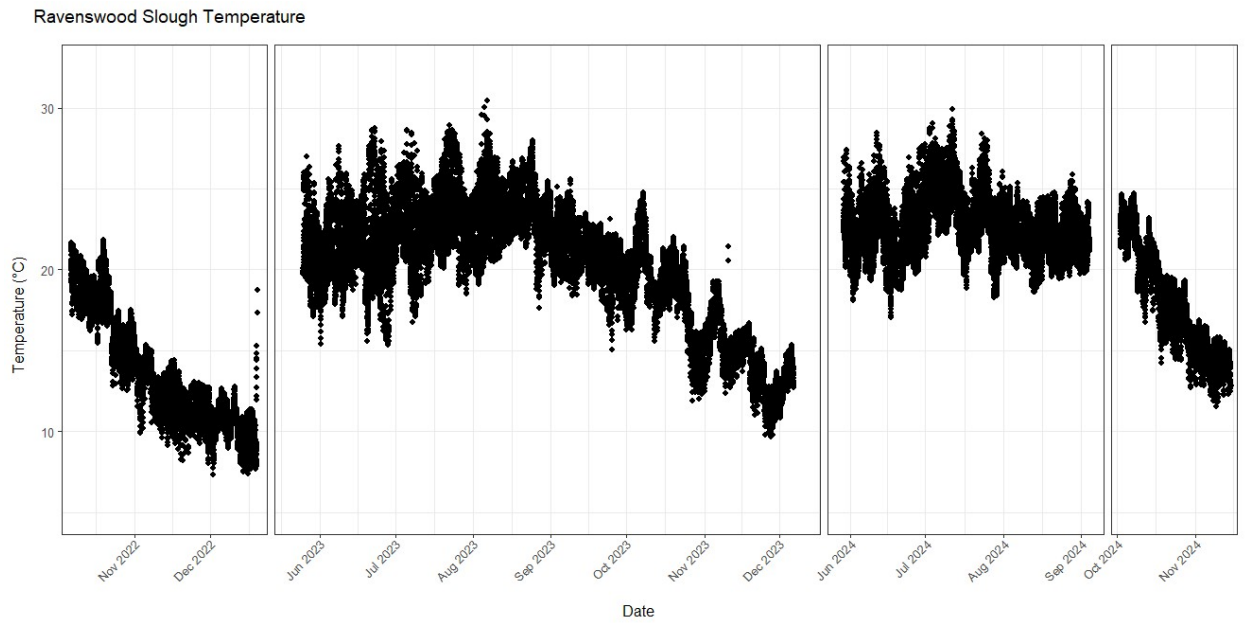


Figure B2. Continuous temperature measurements (°C) in Ravenswood Slough throughout the monitoring period.

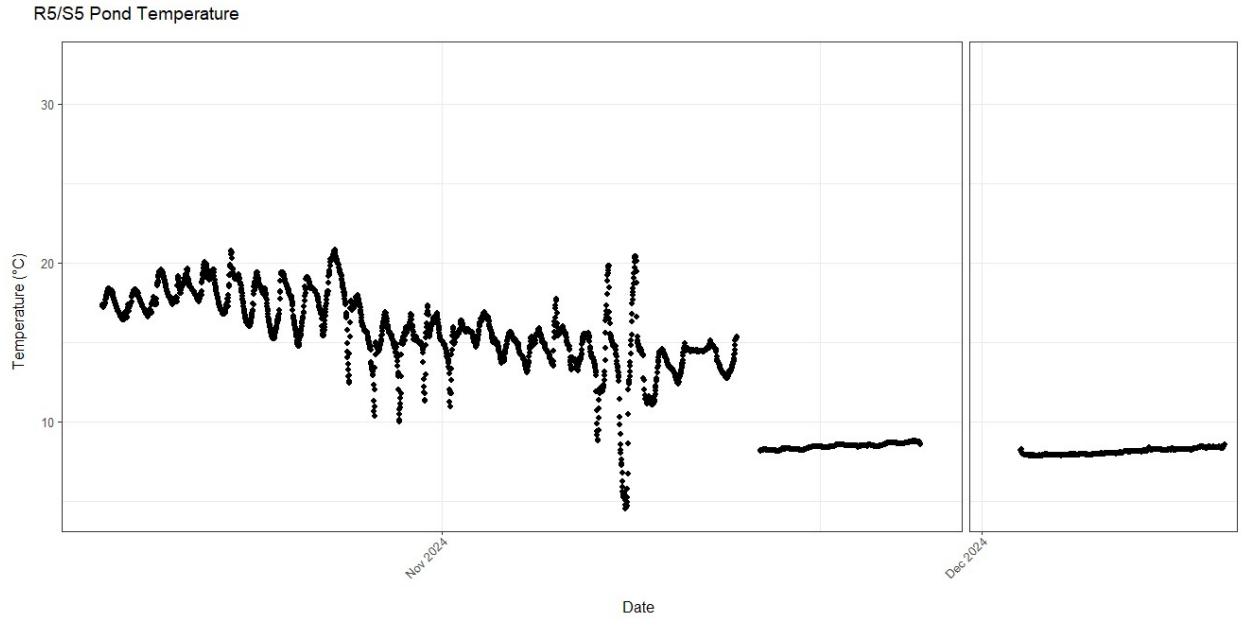


Figure B3. Continuous temperature measurements (°C) in the R5/S5 Pond throughout the monitoring period.

Dissolved Oxygen

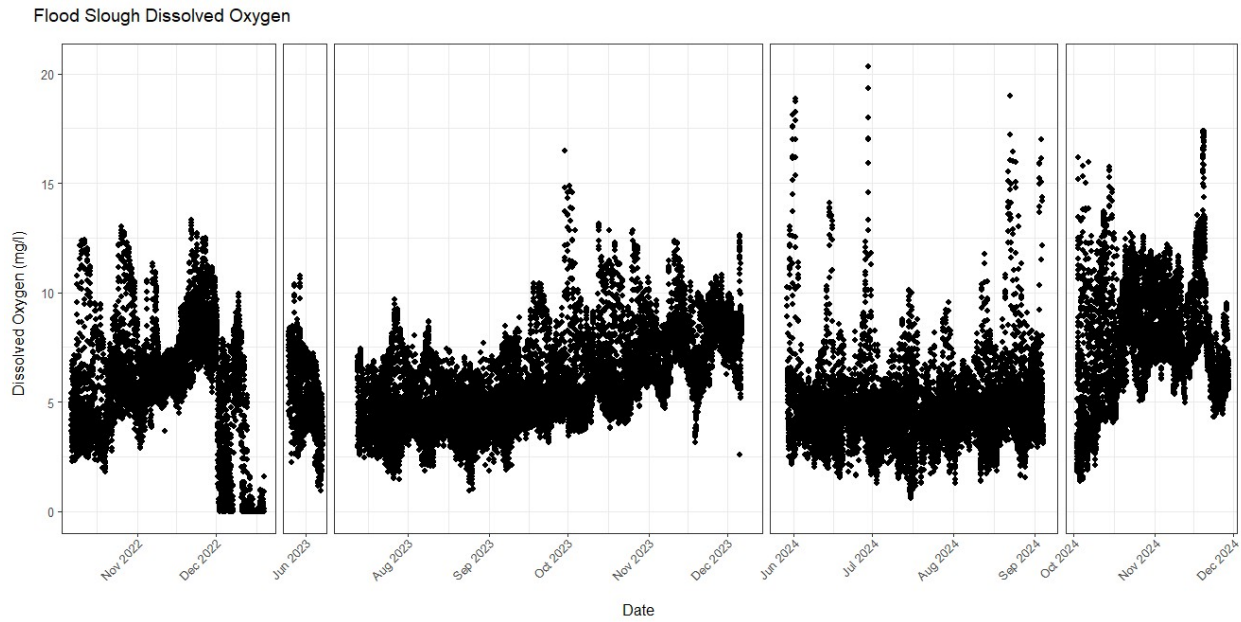


Figure B4. Continuous dissolved oxygen measurements (mg/l) in Flood Slough throughout the monitoring period.

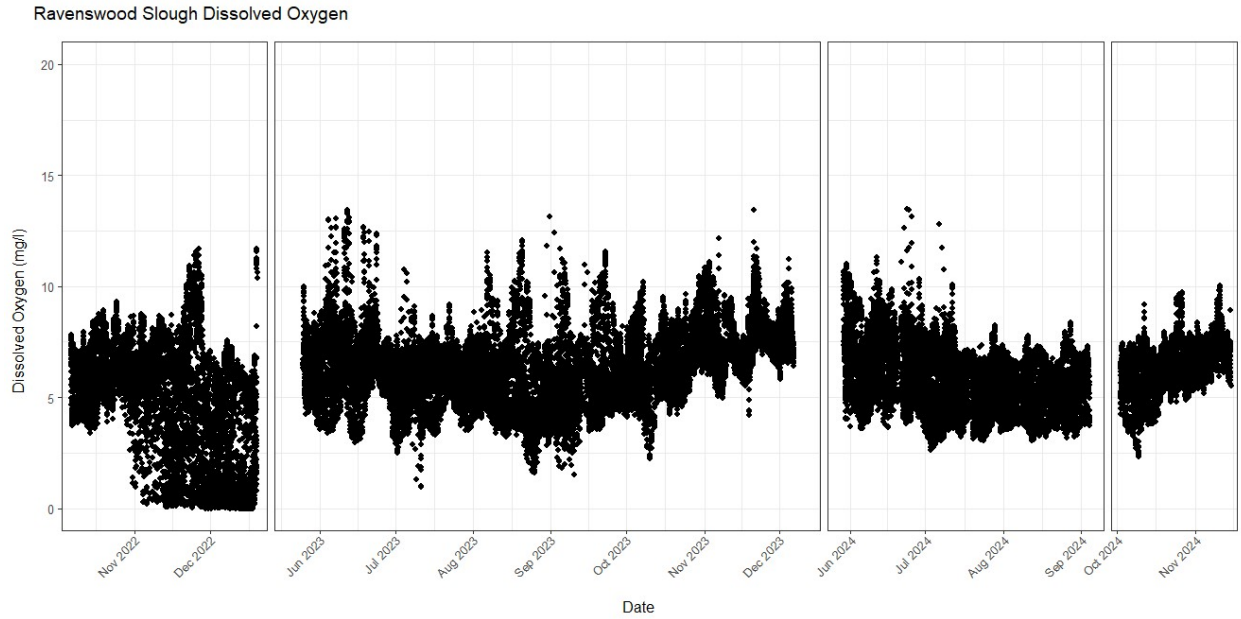


Figure B5. Continuous dissolved oxygen measurements (mg/l) in Ravenswood Slough throughout the monitoring period.

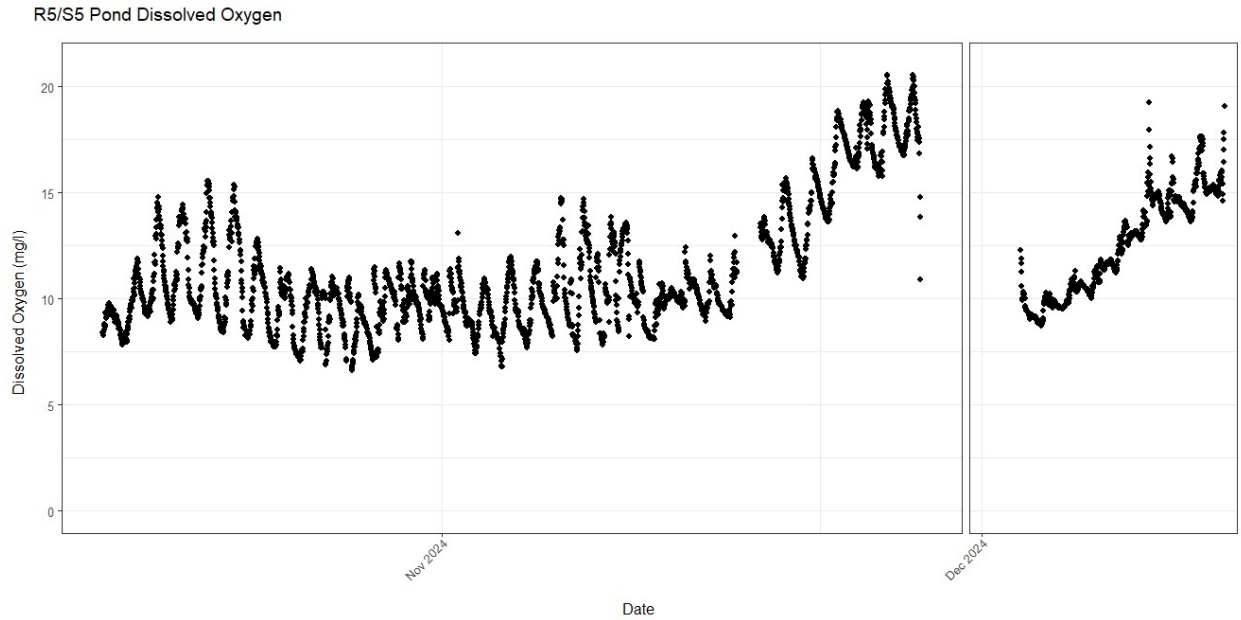


Figure B6. Continuous dissolved oxygen measurements (mg/l) in the R5/S5 Pond throughout the monitoring period.

Salinity

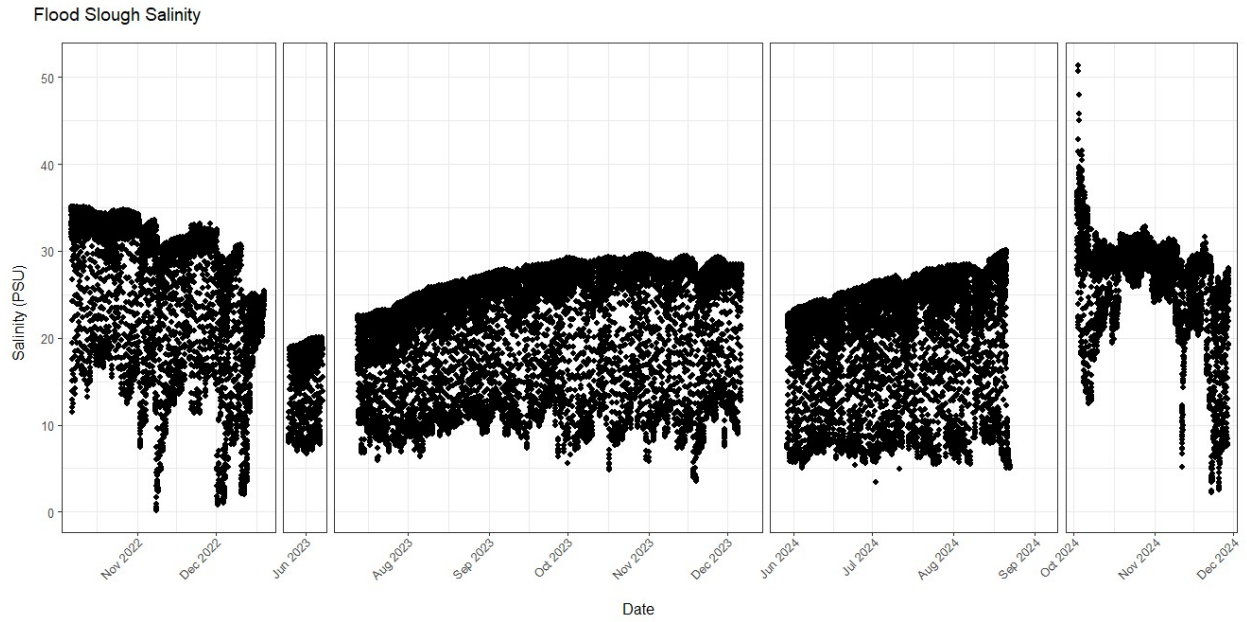


Figure B7. Continuous salinity measurements (PSU) in Flood Slough throughout the monitoring period.

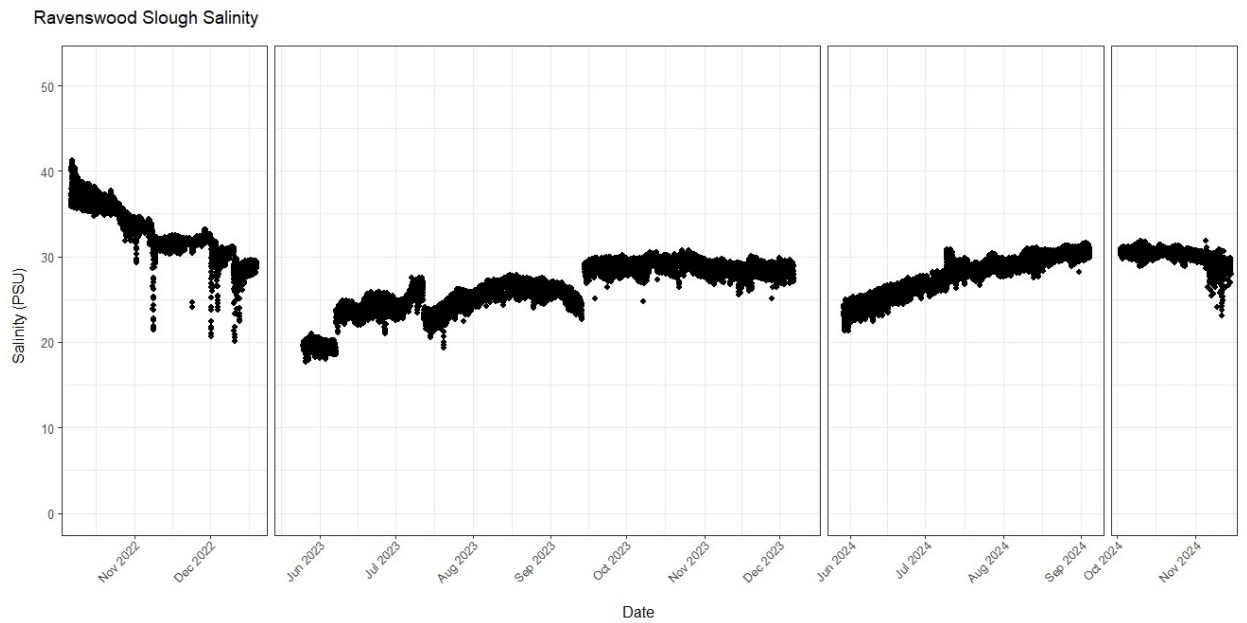


Figure B8. Continuous salinity measurements (PSU) in Ravenswood Slough throughout the monitoring period

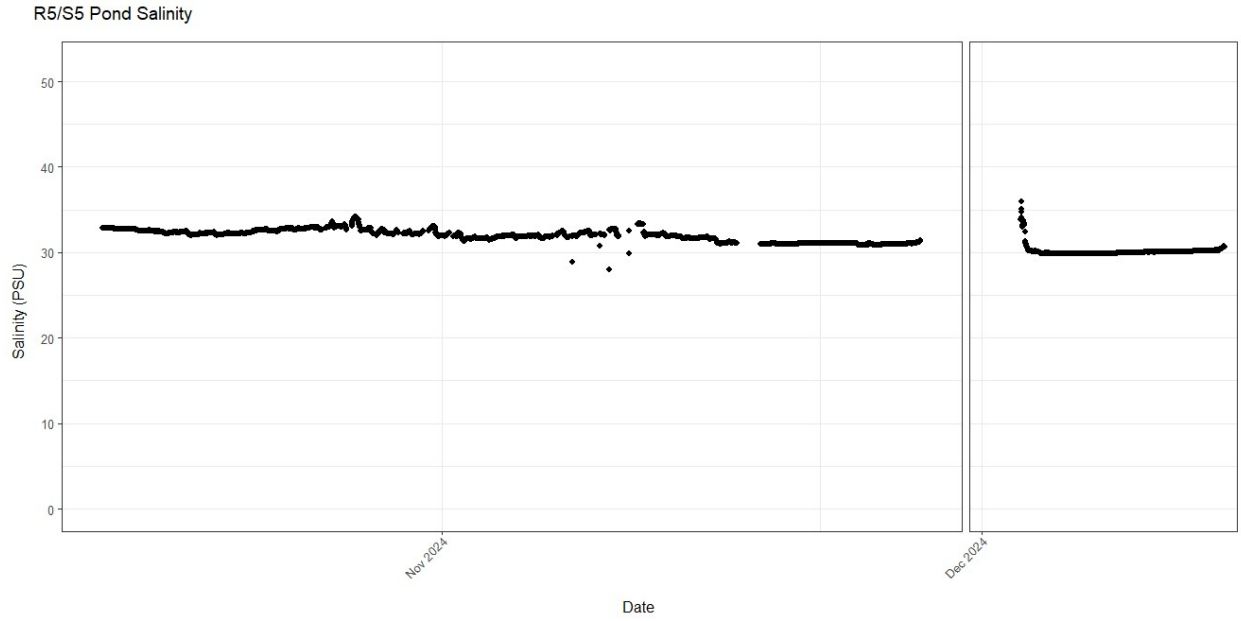


Figure B9. Continuous salinity measurements (PSU) in the R5/S5 Pond throughout the monitoring period.

Chlorophyll

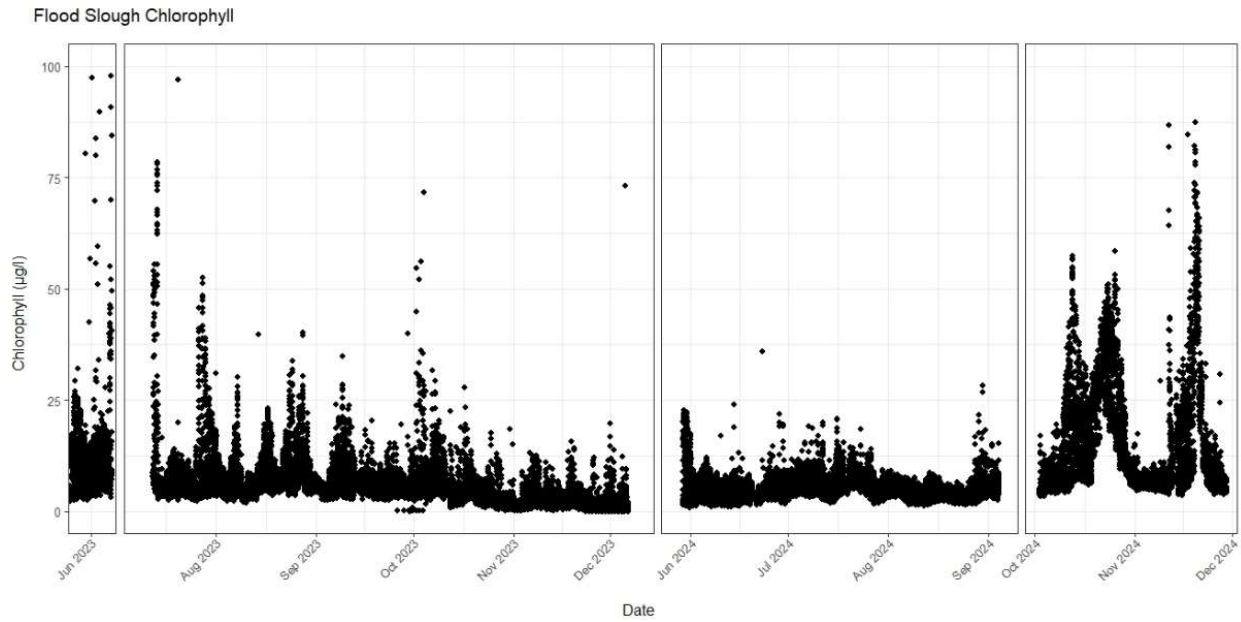


Figure B10. Continuous chlorophyll measurements ($\mu\text{g/l}$) in Flood Slough throughout the monitoring period.

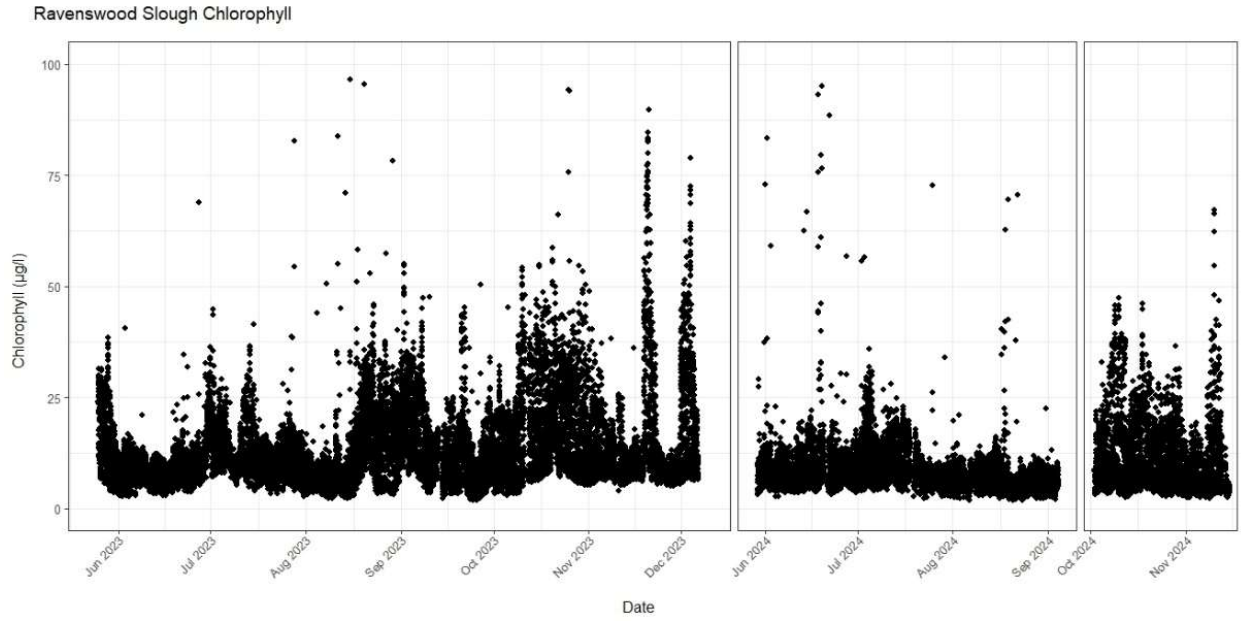


Figure B11. Continuous chlorophyll measurements (µg/l) in Ravenswood Slough throughout the monitoring period.

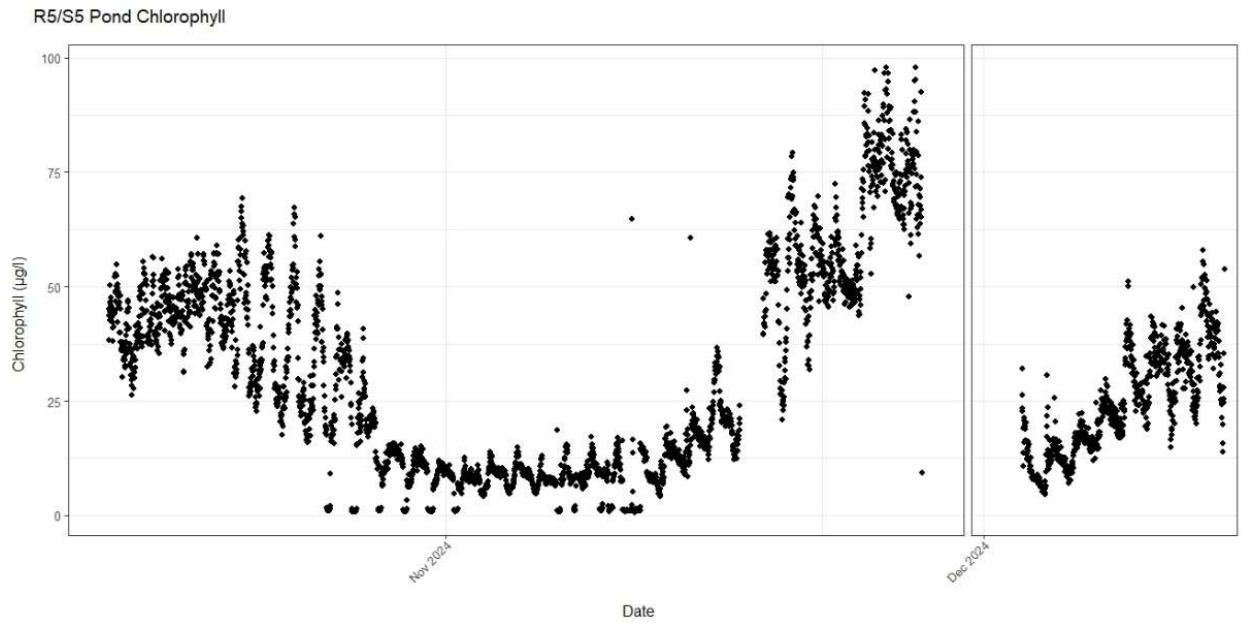


Figure B12. Continuous chlorophyll measurements (µg/l) in the R5/S5 Pond throughout the monitoring period.

pH

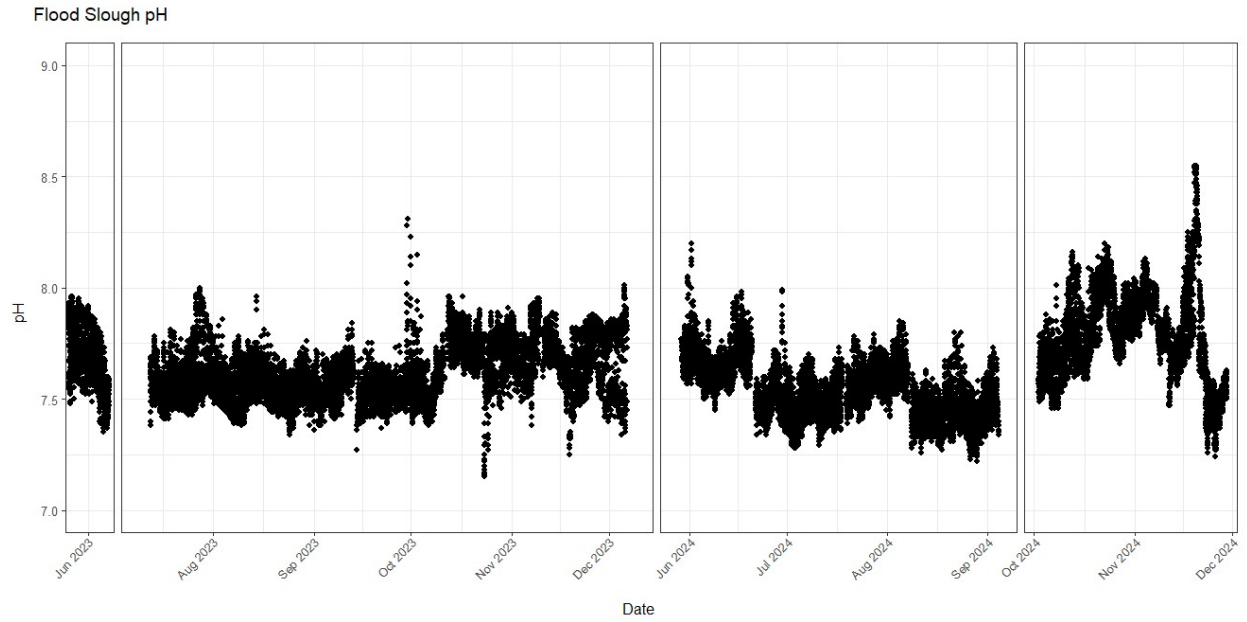


Figure B13. Continuous pH measurements in Flood Slough throughout the monitoring period.

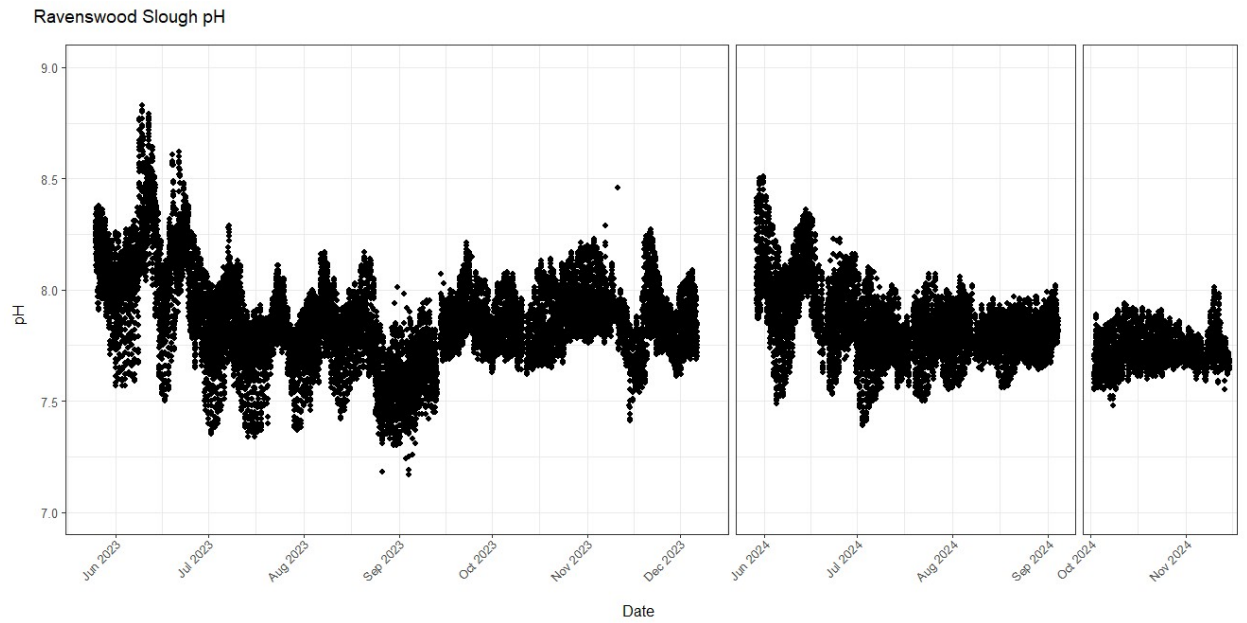


Figure B14. Continuous pH measurements Ravenswood Slough throughout the monitoring period.

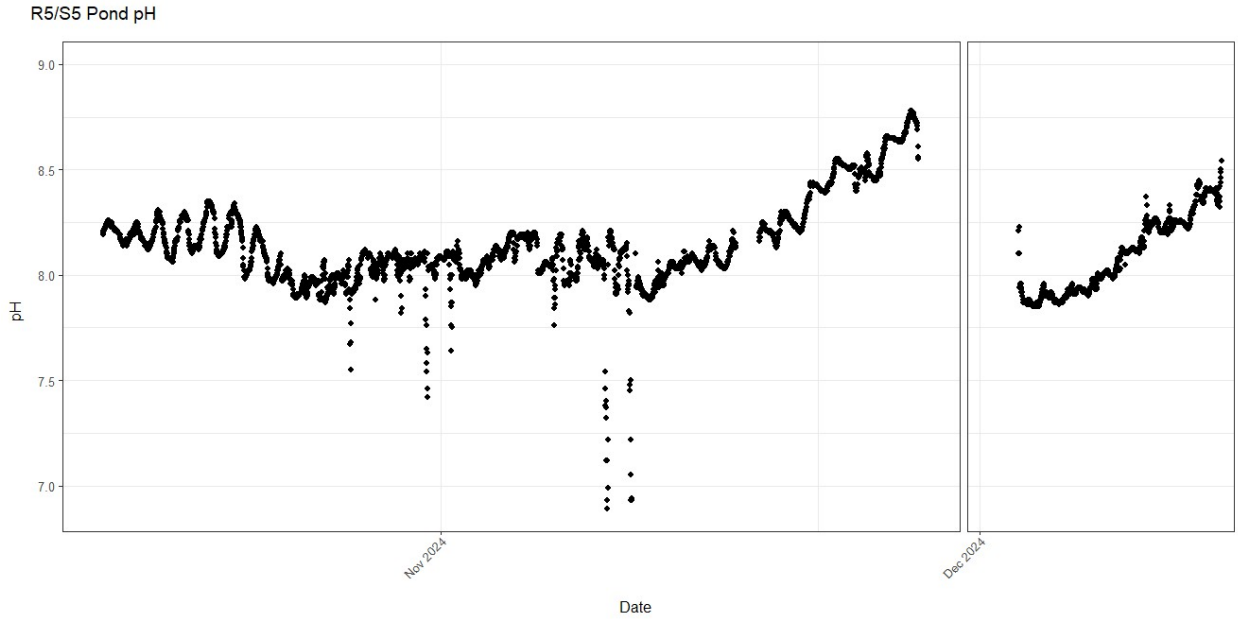


Figure B15. Continuous pH measurements in the R5/S5 Pond throughout the monitoring period.

Turbidity

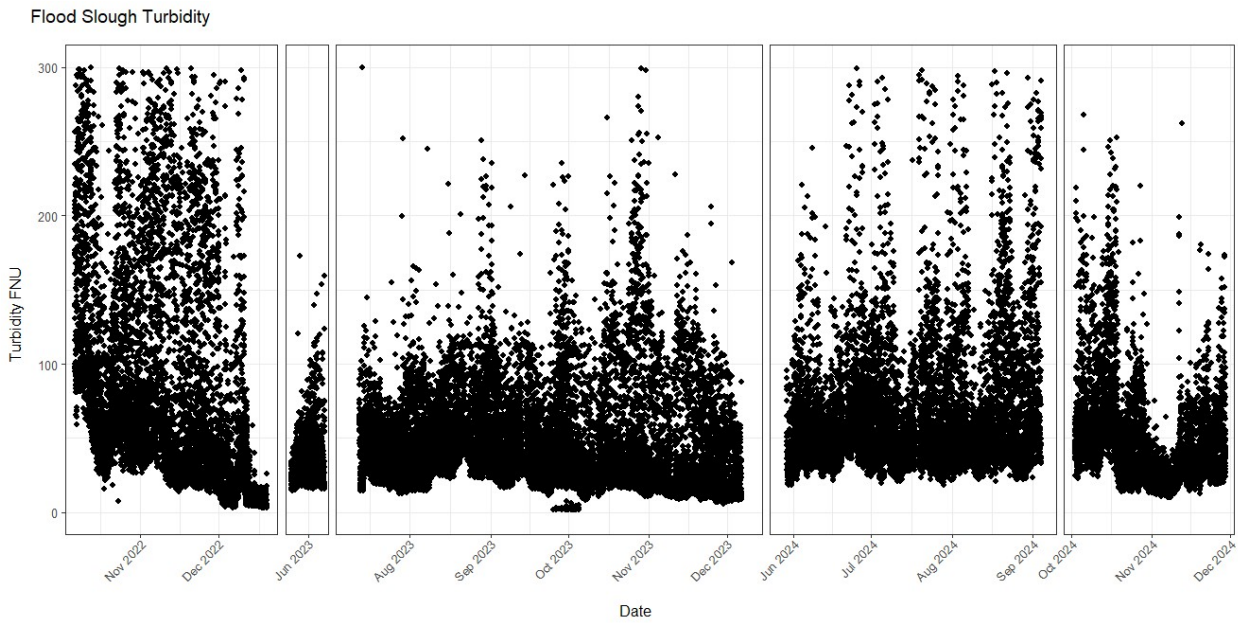


Figure B16. Continuous turbidity measurements (FNU) in Flood Slough throughout the monitoring period.

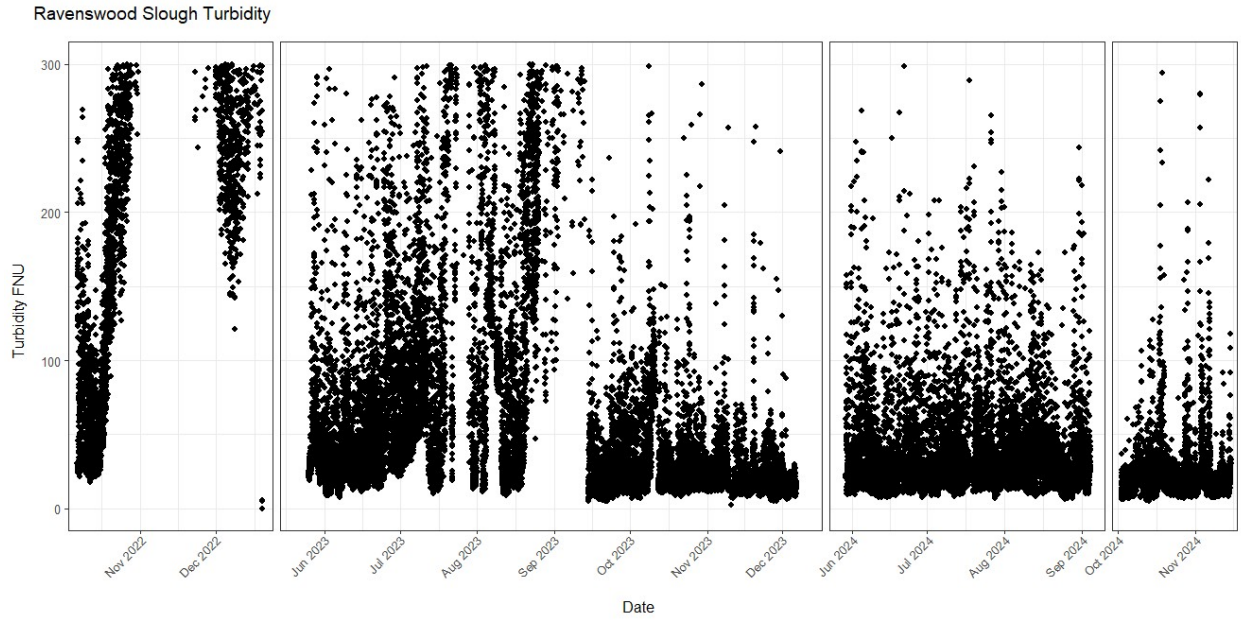


Figure B17. Continuous turbidity measurements (FNU) in Ravenswood Slough throughout the monitoring period.

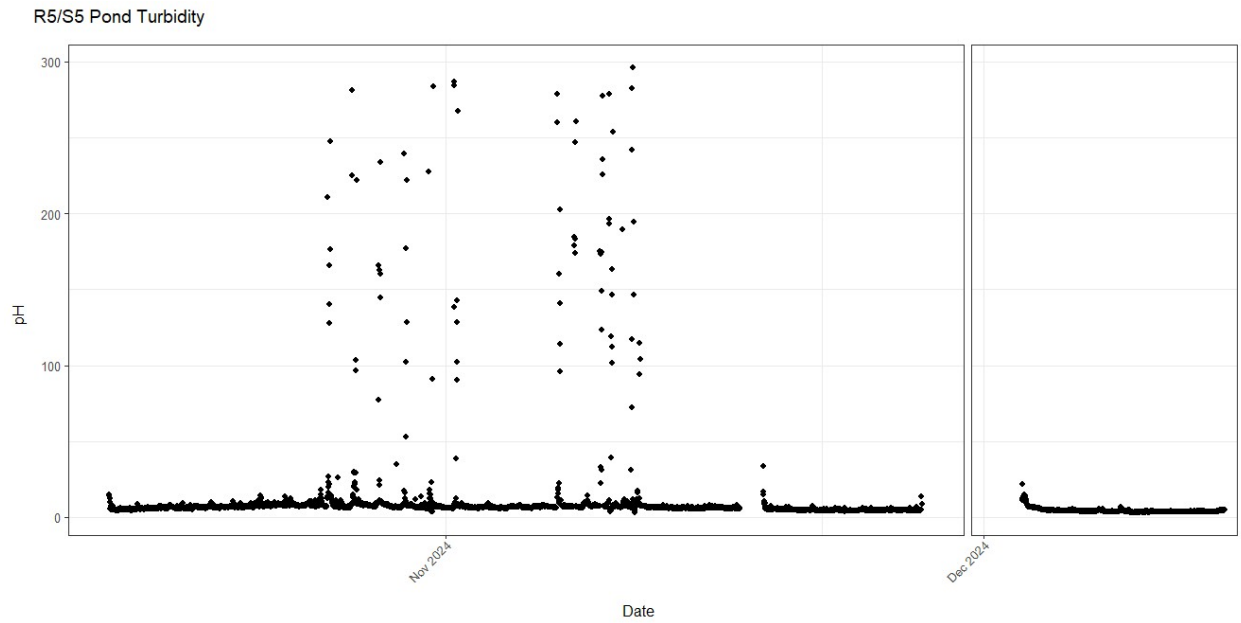


Figure B18. Continuous turbidity measurements (FNU) in the R5/S5 Pond throughout the monitoring period.

Flood Slough

Table B1. Monthly average, minimum, and maximum water quality values derived from QA/QC'd continuous monitoring data collected in Flood Slough. Water quality parameters include temperature (°C), dissolved oxygen (mg/l), salinity (PSU), chlorophyll (µg/l), pH, and turbidity (FNU).

Year	Month	Temperature (°C)			Dissolved Oxygen (mg/l)			Salinity (PSU)			Chlorophyll (µg/l)			pH			Turbidity (FNU)		
		Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.
2022	10	17.19	12.31	22.42	5.27	1.79	13.01	31.12	11.51	35.13	NA	NA	NA	NA	NA	NA	106.75	7.34	299.67
2022	11	12.13	8.53	15.75	7.23	2.88	13.32	27.34	0.20	34.23	NA	NA	NA	NA	NA	NA	95.68	12.68	299.41
2022	12	10.75	9.06	13.63	2.50	0.00	9.94	21.16	0.80	32.47	NA	NA	NA	NA	NA	NA	30.90	2.90	298.04
2023	5	21.72	18.31	25.63	6.00	2.24	10.77	15.93	6.97	19.70	10.24	2.19	80.31	7.74	7.48	7.96	32.52	14.14	172.98
2023	6	20.98	17.56	25.67	4.62	0.94	7.25	16.60	6.70	20.10	12.98	3.15	97.78	7.61	7.35	7.88	42.46	15.47	159.14
2023	7	23.58	19.65	27.43	4.70	1.44	9.69	18.81	5.96	24.60	9.27	2.35	97.06	7.60	7.38	8.00	43.67	12.25	299.85
2023	8	23.63	19.22	27.71	4.51	0.95	8.70	21.86	6.33	27.34	7.88	1.87	40.22	7.55	7.34	7.96	55.14	14.18	250.47
2023	9	21.00	13.88	24.99	5.29	1.84	16.49	23.72	5.56	29.19	6.03	0.00	39.98	7.55	7.27	8.31	50.10	1.54	235.64
2023	10	18.77	11.64	24.13	6.26	3.45	14.86	24.74	4.81	29.72	4.98	0.02	71.63	7.66	7.15	8.15	49.67	1.55	299.58
2023	11	14.57	9.66	19.03	7.42	3.16	12.35	24.13	3.49	29.47	2.26	0.00	19.74	7.71	7.25	7.95	37.22	5.60	252.59
2023	12	13.51	11.21	15.39	8.22	2.56	12.64	24.63	8.98	28.50	1.66	0.00	73.24	7.72	7.34	8.01	24.42	7.33	168.48
2024	5	24.02	20.62	28.72	5.90	2.15	18.11	18.34	5.70	23.20	10.88	0.86	22.59	7.72	7.57	8.05	37.80	18.14	102.42
2024	6	22.76	17.02	29.22	4.72	1.54	20.33	19.75	5.09	26.36	4.60	0.90	35.85	7.62	7.34	8.20	61.15	21.26	299.50
2024	7	23.95	18.56	29.05	4.34	0.60	10.09	21.82	3.45	28.41	5.95	1.71	20.82	7.52	7.28	7.79	64.18	18.38	298.22
2024	8	22.27	18.57	26.59	4.86	1.30	19.00	22.10	5.07	30.15	4.12	1.26	28.17	7.47	7.22	7.85	68.95	21.00	297.64
2024	9	21.41	18.27	25.55	5.59	2.92	17.00	NA	NA	NA	5.32	2.39	15.32	7.49	7.34	7.73	96.76	23.54	291.27
2024	10	19.33	13.33	27.97	7.32	1.35	16.19	28.91	12.43	51.35	17.64	3.23	58.38	7.79	7.46	8.20	59.17	13.10	268.21
2024	11	13.65	9.98	17.33	8.05	4.30	17.39	24.87	2.27	31.64	12.82	3.59	87.50	7.78	7.24	8.55	35.13	10.12	262.20

Ravenswood Slough

Table B2. Monthly average, minimum, and maximum water quality values derived from QA/QC'd continuous monitoring data collected in Ravenswood Slough. Water quality parameters include temperature (°C), dissolved oxygen (mg/l), salinity (PSU), chlorophyll (µg/l), pH, and turbidity (FNU).

Year	Month	Temperature (°C)			Dissolved Oxygen (mg/l)			Salinity (PSU)			Chlorophyll (µg/l)			pH			Turbidity (FNU)		
		Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.
2022	10	17.40	12.50	21.82	6.13	1.14	9.30	35.96	31.89	41.23	NA	NA	NA	NA	NA	NA	120.88	17.92	299.89
2022	11	12.15	8.00	15.33	5.24	0.00	11.70	32.06	21.46	34.58	NA	NA	NA	NA	NA	NA	277.64	243.86	297.36
2022	12	10.23	7.30	18.75	2.95	0.00	11.67	29.46	20.09	32.63	NA	NA	NA	NA	NA	NA	240.02	0.00	299.91
2023	5	21.11	17.10	27.02	6.34	3.79	10.00	19.65	17.65	21.00	14.47	3.55	38.38	8.11	7.71	8.38	54.31	16.54	291.40
2023	6	21.30	15.36	28.75	6.70	2.97	13.43	23.06	18.00	25.88	8.53	2.63	68.82	8.09	7.46	8.83	60.90	7.67	296.80
2023	7	22.78	16.74	28.93	5.98	0.94	10.74	24.65	19.36	27.55	11.51	2.75	82.72	7.79	7.34	8.29	91.21	10.21	299.41
2023	8	23.34	17.62	30.43	5.70	1.58	13.15	26.38	24.02	27.89	11.58	2.19	96.61	7.76	7.18	8.17	118.15	8.59	299.68
2023	9	20.83	15.07	25.59	5.75	1.53	12.41	27.60	22.64	30.15	13.03	1.83	55.12	7.77	7.17	8.21	38.82	4.70	298.91
2023	10	18.65	11.88	24.75	6.49	2.26	10.52	29.42	24.77	30.74	16.52	2.95	94.33	7.86	7.62	8.21	33.92	6.92	298.95
2023	11	14.53	9.66	21.44	7.57	4.21	13.42	28.87	25.08	30.02	12.54	3.91	89.83	7.86	7.41	8.46	20.99	2.57	257.52
2023	12	13.33	10.85	15.35	7.96	5.82	11.23	28.84	26.80	29.83	20.98	5.88	78.90	7.86	7.62	8.09	16.73	6.32	90.18
2024	5	22.97	20.15	27.38	7.43	4.01	11.02	23.09	21.27	24.99	8.58	3.11	72.96	8.11	7.87	8.51	39.43	9.59	217.86
2024	6	22.10	17.03	28.49	6.62	3.62	13.48	25.01	22.36	27.72	8.59	2.63	95.05	7.95	7.49	8.42	35.74	7.27	298.79
2024	7	23.60	18.27	29.93	5.53	2.62	12.78	27.99	25.30	30.83	9.55	2.35	72.72	7.78	7.39	8.10	40.50	6.67	289.07
2024	8	22.05	18.62	25.90	5.20	3.03	8.36	29.74	27.54	31.34	6.53	1.83	70.55	7.79	7.56	8.06	36.94	5.99	243.61
2024	9	21.50	19.79	24.20	5.44	3.71	7.32	30.54	29.52	31.59	6.32	1.99	13.07	7.83	7.67	8.02	36.05	9.64	185.63
2024	10	19.30	12.70	24.69	6.05	2.34	9.74	30.47	28.83	31.80	10.90	2.43	47.45	7.73	7.48	7.94	24.20	5.13	294.27
2024	11	14.58	11.55	16.88	7.10	5.17	10.03	29.36	23.12	31.83	8.14	2.15	67.09	7.72	7.55	8.01	25.96	7.46	279.93

R5/S5 Pond

Table B3. Monthly average, minimum, and maximum water quality values derived from QA/QC'd continuous monitoring data collected in the R5/S5 Pond. Water quality parameters include temperature (°C), dissolved oxygen (mg/l), salinity (PSU), chlorophyll (µg/l), pH, and turbidity (FNU).

Year	Month	Temperature (°C)			Dissolved Oxygen (mg/l)			Salinity (PSU)			Chlorophyll (µg/l)			pH			Turbidity (FNU)		
		Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.
2024	10	17.20	9.99	20.80	10.10	6.61	15.57	32.56	31.89	34.21	32.08	0.78	69.34	8.09	7.42	8.35	10.86	3.96	283.49
2024	11	12.19	4.35	20.41	12.08	6.77	20.56	31.56	28.01	33.41	28.16	0.58	97.86	8.19	6.89	8.78	11.29	3.09	296.06
2024	12	8.09	7.85	8.54	12.50	8.73	19.25	30.11	29.82	36.00	24.30	4.60	57.82	8.09	7.85	8.54	4.45	3.13	21.87

Flood Slough

Table B4. Monthly average, minimum, and maximum water quality values derived from QA/QC'd instantaneous data collected in Flood Slough. Water quality parameters include temperature (°C), dissolved oxygen (mg/l), salinity (PPT), chlorophyll (µg/l), pH and turbidity (NTU).

Year	Month	Temperature (°C)			Dissolved Oxygen (mg/l)			Salinity (PPT)			Chlorophyll (µg/l)			pH			Turbidity (NTU)		
		Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.
2023	6	20.69	19.53	21.96	3.91	3.24	4.63	NA	NA	NA	8.01	0.49	18.55	7.54	7.45	7.63	34.82	24.71	43.84
2023	7	22.88	21.70	23.66	5.76	3.77	7.67	NA	NA	NA	0.37	0.02	0.77	8.03	7.45	8.62	65.27	31.02	114.21
2023	8	22.74	22.23	23.42	4.21	3.41	5.24	NA	NA	NA	0.63	0.37	0.90	7.52	7.45	7.59	28.12	18.71	36.94
2023	9	23.49	22.00	25.40	6.77	6.50	7.10	27.28	25.86	29.47	3.28	2.94	3.48	7.74	7.74	7.74	27.72	26.28	29.56
2023	10	22.40	21.30	24.00	7.27	6.90	7.80	25.58	19.30	28.00	32.99	23.87	44.72	8.03	7.89	8.23	9.86	5.05	11.35
2023	11	14.67	12.30	16.10	8.17	7.50	8.71	27.81	27.20	28.92	18.59	17.54	19.98	7.45	6.56	8.07	20.15	10.43	25.28
2023	12	13.25	12.40	13.70	8.89	8.29	10.30	20.23	18.70	22.70	NA	NA	NA	6.85	5.78	7.47	54.23	30.44	97.19
2024	4	18.74	16.30	22.50	8.10	6.30	9.00	18.87	17.20	20.50	2.51	1.48	4.76	7.04	6.50	7.70	19.10	14.72	28.03
2024	6	23.29	22.20	24.80	6.42	5.60	7.10	19.51	7.60	23.70	2.17	0.44	4.27	7.50	7.30	7.70	80.00	37.61	123.00
2024	7	25.36	24.50	26.20	5.88	5.00	8.70	20.53	8.10	28.50	2.70	2.12	4.13	7.79	7.00	8.80	26.96	16.43	45.38
2024	8	22.73	22.00	24.00	5.76	5.00	6.40	25.70	18.80	30.10	2.24	1.71	3.33	7.39	7.30	7.60	41.18	24.97	101.60
2024	9	20.08	18.20	22.40	6.21	5.80	6.50	24.80	16.20	31.10	1.94	0.27	2.40	7.62	7.45	7.75	21.16	17.62	24.76
2024	10	19.30	17.60	20.60	6.10	5.80	6.80	27.40	23.50	31.10	4.54	3.24	7.24	7.36	7.07	7.50	61.72	28.47	139.50
2024	11	14.91	13.90	16.50	9.60	7.80	11.70	27.15	24.20	29.50	21.67	11.99	52.06	7.55	7.47	7.60	21.85	6.61	43.94
2024	12	9.61	8.80	10.80	9.03	7.60	10.40	21.90	18.10	23.40	24.03	13.10	53.00	7.71	7.62	7.88	18.96	11.94	26.00

Ravenswood Slough

Table B5. Monthly average, minimum, and maximum water quality values derived from QA/QC'd instantaneous data collected in Ravenswood Slough. Water quality parameters include temperature (°C), dissolved oxygen (mg/l), salinity (PPT), chlorophyll (µg/l), pH, and turbidity (NTU).

Year	Month	Temperature (°C)			Dissolved Oxygen (mg/l)			Salinity (PPT)			Chlorophyll (µg/l)			pH			Turbidity (NTU)		
		Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.
2023	6	19.38	17.99	20.74	6.56	5.82	7.29	NA	NA	NA	0.81	0.44	1.11	7.80	7.62	7.96	18.35	11.31	30.26
2023	7	23.42	23.10	23.73	6.55	6.54	6.55	NA	NA	NA	1.06	0.94	1.18	7.69	7.67	7.70	38.33	31.15	45.50
2023	8	22.31	21.28	23.85	6.06	4.08	8.86	NA	NA	NA	0.59	0.43	0.72	7.77	7.66	7.87	48.79	11.33	94.35
2023	9	22.93	20.56	24.61	7.85	7.10	8.60	28.79	28.10	29.47	4.73	2.94	6.52	NA	NA	NA	29.40	29.24	29.56
2023	10	20.73	19.70	21.50	7.36	6.87	8.30	26.05	21.56	28.50	22.68	17.55	35.13	7.99	7.72	8.08	13.38	4.82	16.42
2023	11	14.48	11.30	16.20	8.01	7.00	8.60	26.39	18.44	28.57	19.19	15.66	25.92	7.53	6.45	8.08	20.66	10.43	29.02
2023	12	13.22	12.20	14.00	9.37	7.25	11.10	22.62	21.20	24.39	NA	NA	NA	6.89	6.12	7.66	40.56	31.38	53.02
2024	4	16.64	15.10	18.30	7.94	6.90	8.80	20.28	19.30	21.30	4.09	1.11	6.53	7.00	6.60	7.60	36.52	15.73	59.67
2024	6	23.64	22.50	24.50	7.45	6.81	8.16	23.26	20.80	24.70	1.86	0.39	3.33	7.70	7.50	8.00	56.74	43.47	70.79
2024	7	27.15	25.50	28.80	6.68	5.90	7.70	28.33	26.60	29.30	2.30	1.87	3.23	7.85	6.70	8.40	32.31	11.36	68.29
2024	8	22.60	20.40	24.70	6.21	4.90	8.20	26.33	23.40	30.50	2.32	1.61	3.53	7.60	7.40	7.90	37.32	21.61	85.56
2024	9	18.10	16.60	19.80	5.79	4.90	6.50	27.90	24.30	32.40	2.70	1.82	4.16	7.27	7.00	7.53	35.45	10.74	73.38
2024	10	18.04	16.00	19.40	5.58	5.10	6.00	27.80	24.20	31.40	2.66	1.84	3.48	7.12	7.12	7.12	45.96	20.99	73.55
2024	11	13.76	12.20	15.50	9.38	7.80	12.60	28.68	27.90	29.60	24.62	12.24	52.06	7.57	7.57	7.57	22.72	6.33	43.94
2024	12	9.15	7.50	10.70	8.29	6.80	10.30	24.03	23.80	24.30	26.36	11.20	44.70	7.82	7.56	8.23	17.78	14.45	20.13

R5/S5 Pond Monthly averages

Table B6. Monthly average, minimum, and maximum water quality values derived from QA/QC'd instantaneous data collected in the R5/S5 Pond. Water quality parameters include temperature (°C), dissolved oxygen (mg/l), salinity (PPT), chlorophyll (µg/l), pH and turbidity (NTU).

Year	Month	Temperature (°C)			Dissolved Oxygen (mg/l)			Salinity (PPT)			Chlorophyll (µg/l)			pH			Turbidity (NTU)		
		Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.
2024	10	18.73	17.90	20.60	NA	NA	NA	26.03	25.70	26.20	5.28	0.61	7.13	7.64	7.64	7.64	16.93	6.43	42.15
2024	11	16.15	15.40	17.20	10.90	9.20	12.60	29.25	28.60	29.60	15.04	11.99	18.58	7.52	7.47	7.57	7.39	6.33	9.04
2024	12	10.60	10.00	10.80	12.18	11.80	12.50	24.98	24.70	25.10	22.95	18.60	27.70	8.02	7.82	8.20	5.65	3.80	9.30

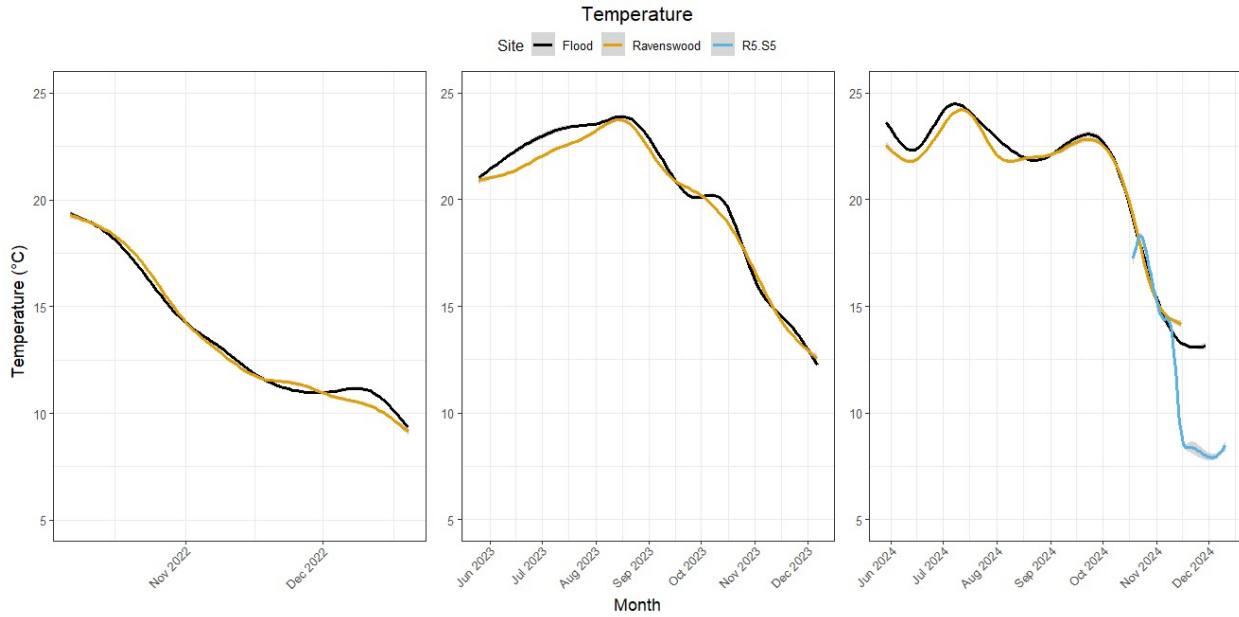


Figure B19. Generalized Additive Model trendlines fit to continuous temperature measurements (°C) from Flood Slough, Ravenswood Slough and the R5/S5 Pond.

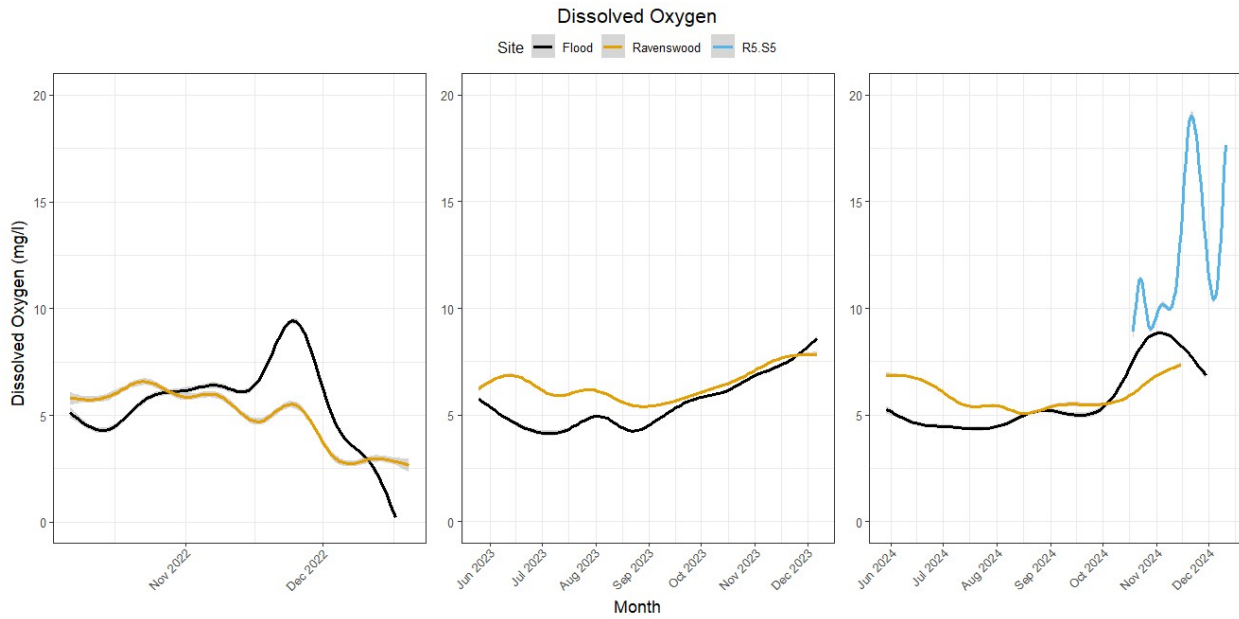


Figure B20. Generalized Additive Model trendlines fit to continuous dissolved oxygen measurements (mg/l) from Flood Slough, Ravenswood Slough and the R5/S5 Pond.

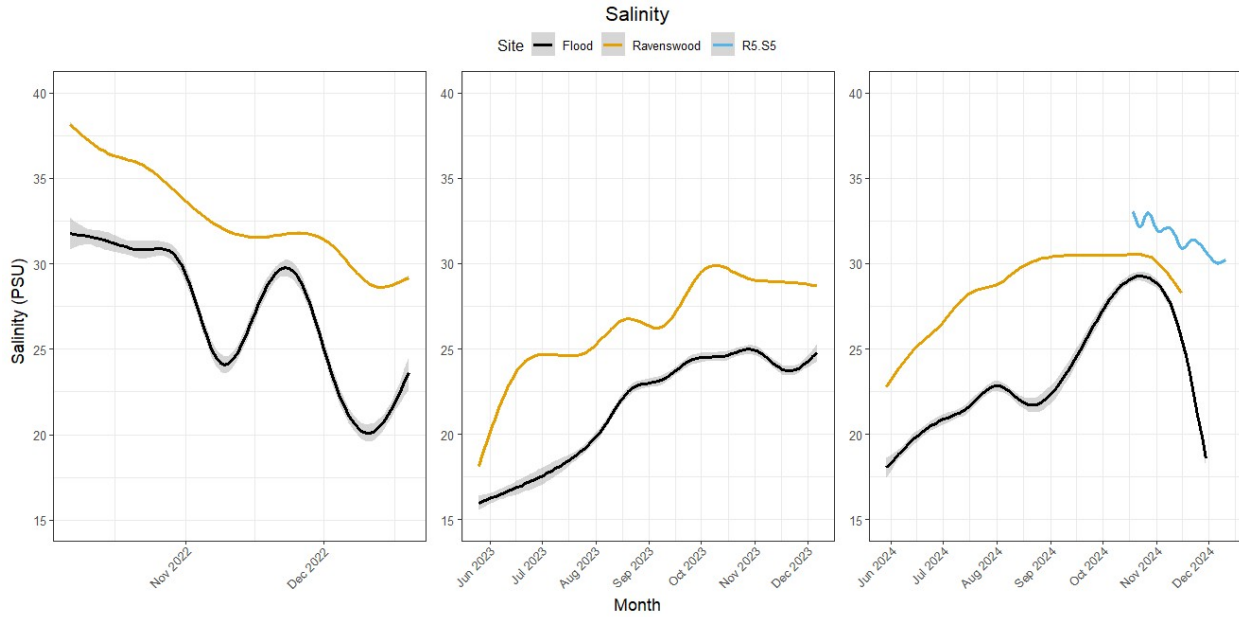


Figure B21. Generalized Additive Model trendlines fit to continuous salinity measurements (PSU) from Flood Slough, Ravenswood Slough and the R5/S5 Pond.

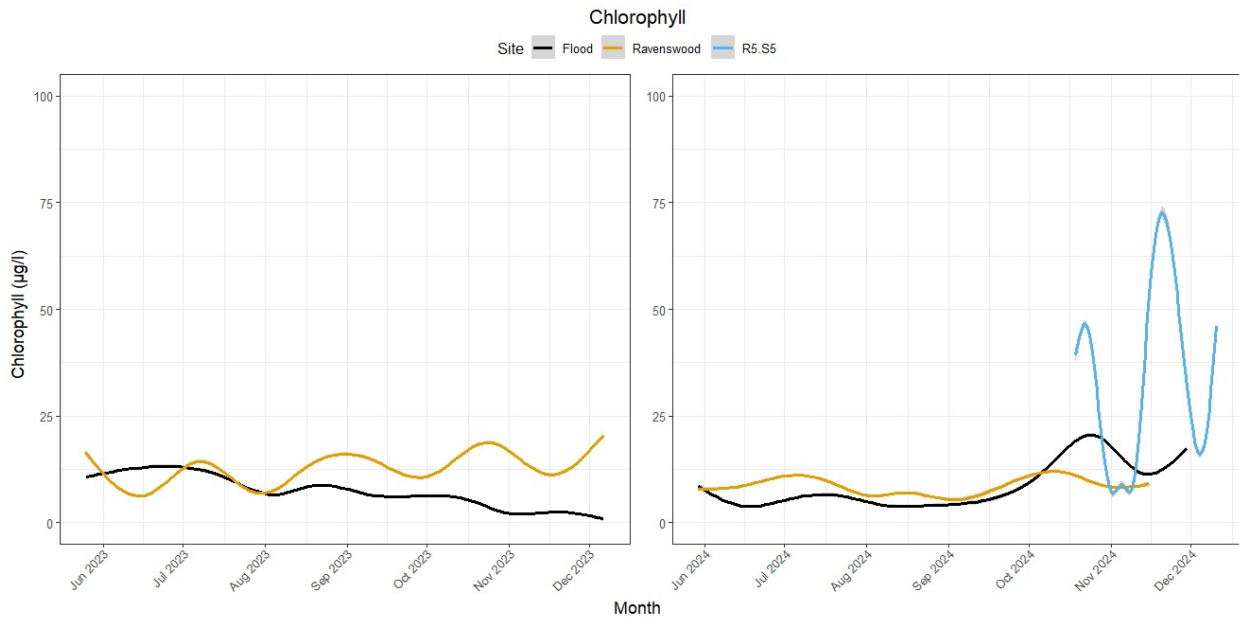


Figure B22. Generalized Additive Model trendlines fit to continuous chlorophyll measurements ($\mu\text{g/l}$) from Flood Slough, Ravenswood Slough and the R5/S5 Pond.

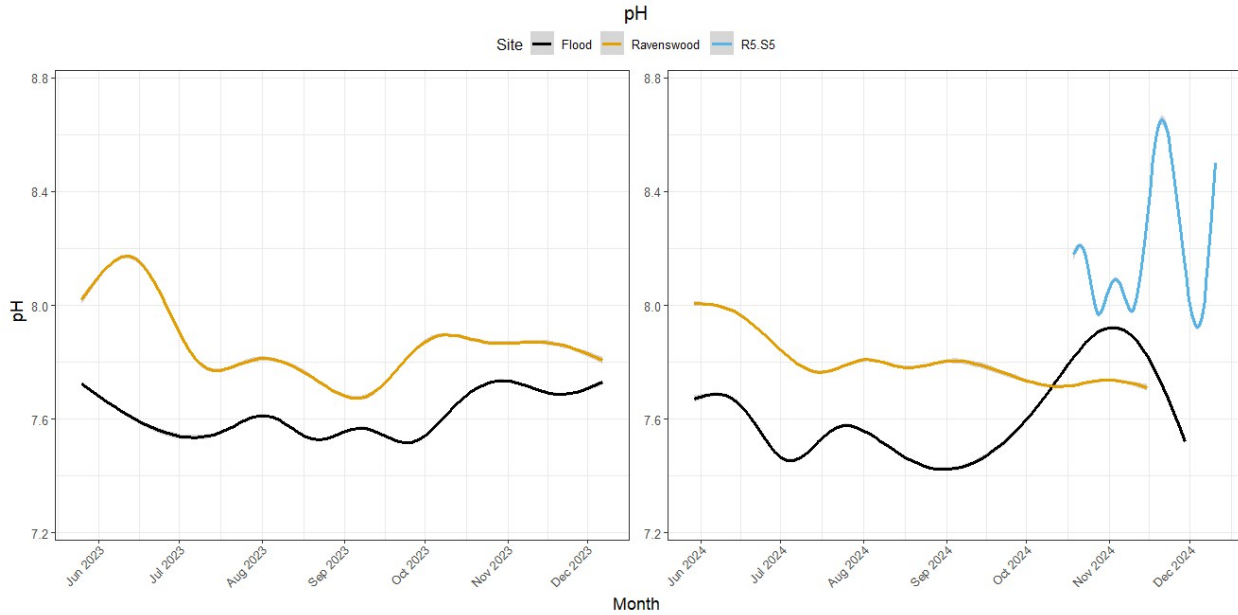


Figure B23. Generalized Additive Model trendlines fit to pH measurements from Flood Slough, Ravenswood Slough and the R5/S5 Pond.

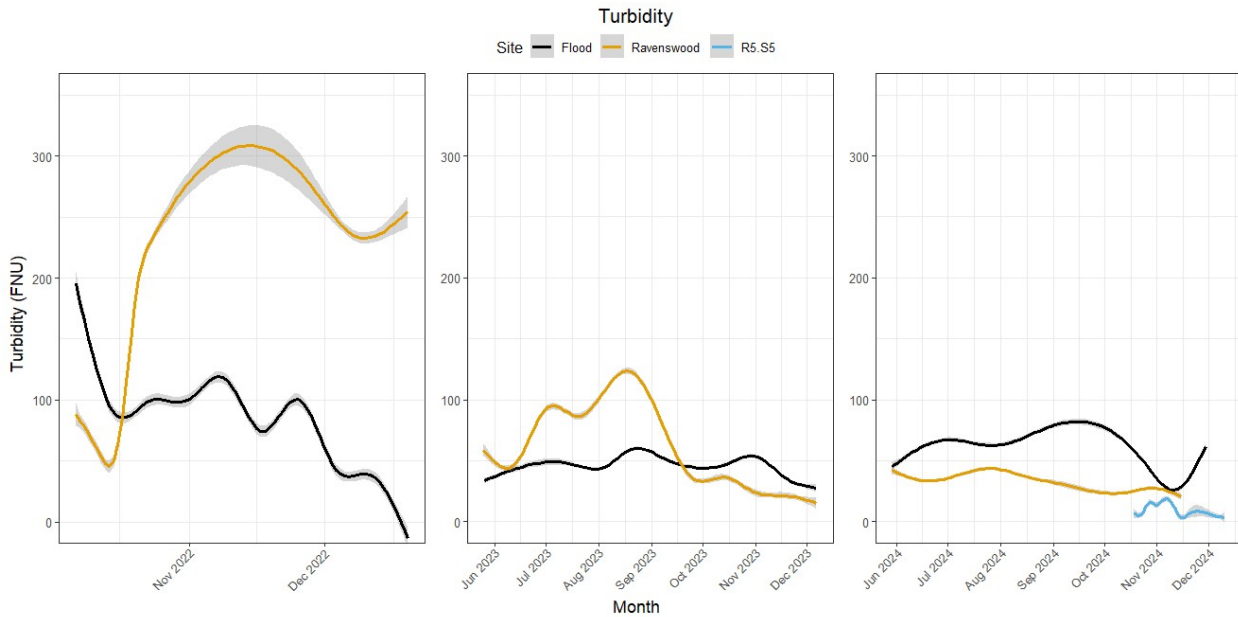


Figure B24. Generalized Additive Model trendlines fit to continuous turbidity measurements (FNU) from Flood Slough, Ravenswood Slough and the R5/S5 Pond.

Correlation Matrix

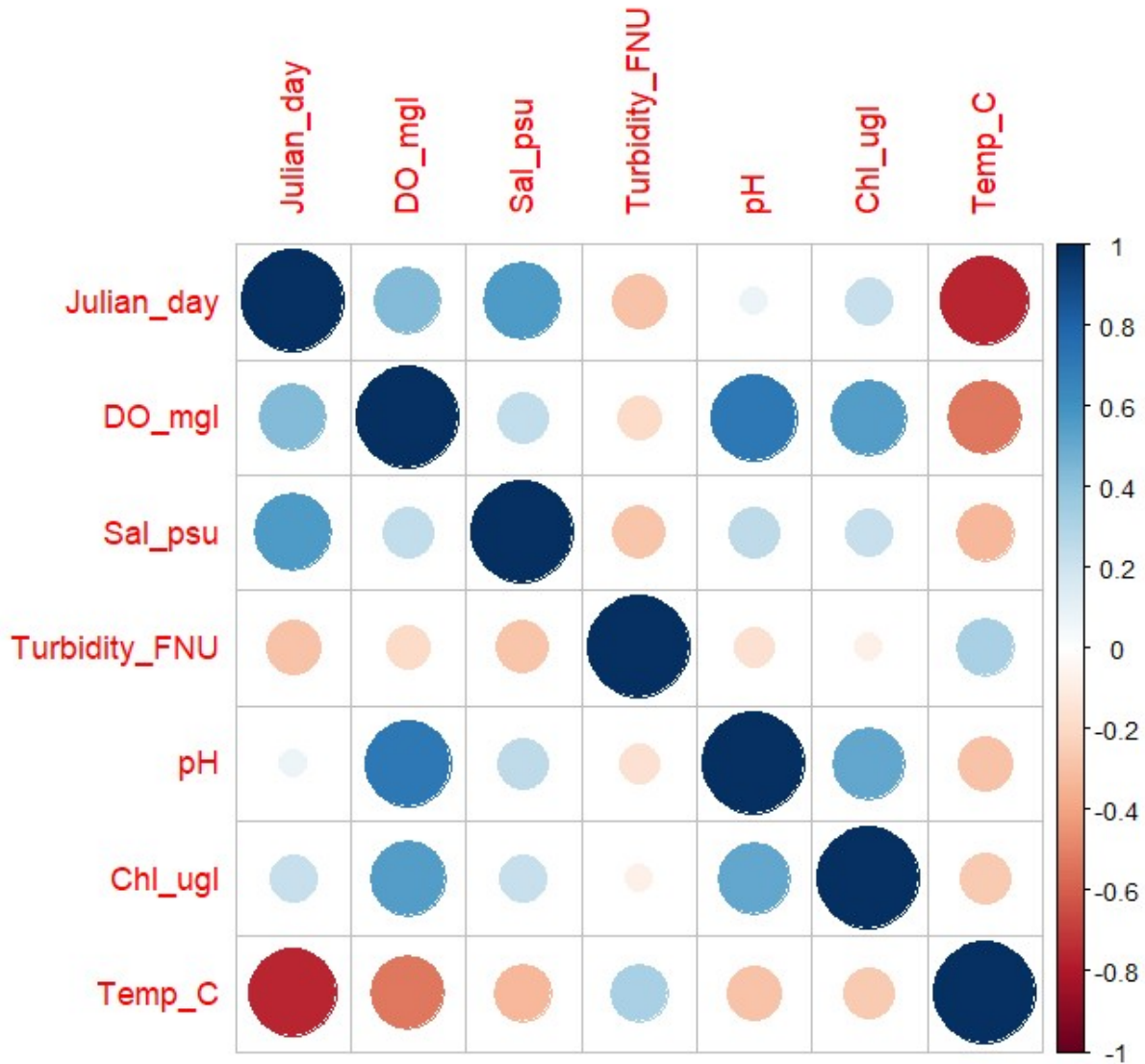


Figure B25. Correlation Matrix of the following parameters collected in Flood Slough, Ravenswood Slough and the R5/S5 Pond: Julian Day (Julian_day), dissolved oxygen (DO_mgl), salinity (Sal_psu), turbidity (Turbidity_FNU), pH, chlorophyll (Chl_ugl) and temperature (Temp_C).