Appendix F | **2022 Edwards Aquifer Authority Reports**

Appendix F1 | **Water Quality Monitoring Report**

2022 EAHCP Annual Expanded Water Quality Report

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1 | Introduction

The Edwards Aquifer Habitat Conservation Plan (EAHCP) Expanded Water Quality Monitoring Program was developed to monitor surface water and groundwater quality of the San Marcos and Comal spring systems and act as an early detection mechanism for water impairments that may negatively affect EAHCP Covered Species. From 2013 – 2016, the Expanded Water Quality Program deployed a broad range of sampling activities including surface water (base flow) sampling, groundwater sampling, sediment sampling, real-time water quality monitoring, and stormwater sampling. A Work Group was assembled in 2016 and charged to review the expanded water quality monitoring program and evaluate the recommendations from the National Academies of Sciences review of the EAHCP. The Work Group prepared a final report that included adjustments to the program including the incorporation of fish tissue analysis, reduced sampling frequency of sediment and stormwater sampling, removal of surface water and groundwater sampling, and the addition of one real-time water quality monitoring station per system. More information can be found in the *Report of the 2016 Expanded Water Quality Monitoring Program Work Group*. During the transition from Phase I to Phase II of the EAHCP, a second review of the program was conducted in 2020 that analyzed the results of contaminant detections among stormwater, sediment, and passive diffusion sampling activities and evaluated the parameters monitored in the real-time water quality network. Overall, the number of contaminant detections was low among sampling events 2013-2020. This is in part due to the focus on industrial and commercial contaminants that may not pose substantial risks to the Edwards Aquifer spring communities. Therefore, suggestions from the EAHCP Science Committee were implemented in 2021 that shifted sampling to focus on nutrients and pharmaceutical and personal care products (PPCPs). Additionally, sampling for sucralose, an artificial sweetener, was initiated in 2021 as measure of human and wastewater influence on the San Marcos and Comal spring systems. The current sampling type and activities can be viewed in Table 1-1. Sampling location and activity are displayed in Figure 1-1 for the San Marcos system and Figure 1-2 for the Comal system.

Table 1-1. EAHCP Expanded Water Quality Monitoring Program Sampling Activities

Sample Type	Activities and Sampling Locations
Real-Time Network	Continuous 15-minute interval, telemetered measurements Analytes include temperature, dissolved oxygen, and conductivity Locations include 3 San Marcos and 3 Comal stations
Surface water	Twice annual sampling in conjunction with Biological Monitoring activities Laboratory analyses are focused on nutrients including total phosphorus, orthophosphate, orthophosphate as P, TOC, DOC, DIC, kjeldahl nitrogen, nitrate at N, and ammonia Locations include upper and lower stations at each spring system
Groundwater	Twice annual sampling in conjunction with EAA springs sampling activities Laboratory analyses are focused on geochemical analytes and industrial, commercial, and emerging contaminants. The analytes include cations, anions, nutrients, metals, VOCs, SVOCs, herbicides, pesticides, bacteria, TOC, PCBs, and PPCPs Locations include Spring 1, Spring 3, and Spring 7 (Comal), Hotel, and Deep (San Marcos)
Sediment	Every other year sampling in even numbered years Laboratory analyses are focused on PAHs Locations include 6 San Marcos and 5 Comal stations
Fish Tissue	Every other year sampling in odd numbered years Laboratory analyses are focused on metals and PPCPs in two fish species Locations include upper and lower stations at each spring system

1.1 Real-Time Network

Real-time water quality (RTWQ) instruments have been deployed within the San Marcos and Comal systems for the entirety of the water quality monitoring program. From 2013-2020, real-time instruments consisted of Eureka Manta+ 30s containing five water quality sensors including, dissolved oxygen (mg/l), specific conductivity (μs/cm), turbidity (NTU), water temperature (°C), and pH (SU). Turbidity sensors were discontinued in 2020, excluding Sessom Creek, due to the high rate of malfunction and cost of replacement. In 2021, pH sensors were also discontinued due to the sensor variability being greater than environmental variability. In 2021, Eureka Manta+30s were replaced with InSitu AT 600 real-time instruments. Measurements are recorded every 15 minutes (excluding the Sessom Creek site that is measured every five minutes) and subjected to quality control measures prior to storage in EAHCP and EAA databases. Table 1-2 describes the stations within each river system including station ID, location from headwaters (i.e., Spring Lake Hotel at San Marcos and Headwaters of Landa Lake at Comal River), and period of data record.

Presently, three RTWQ sites are located in the San Marcos system, including Aquarena Springs Drive (ASD), Texas Parks and Wildlife Department (TPWD) hatchery, and Sessom Creek (Figure 1-1). ASD was deployed and brought online by late May 2013, the TPWD hatchery site was installed in January 2016, and the Sessom Creek station began collecting data in January 2018.

Three RTWQ sites are located in the Comal system, including two locations in Landa Lake (i.e., Spring run 3 (SR 3), and Spring run 7 (SR 7)), and one site in the Old Channel (OC, Figure 1-2). Spring run 3 and SR 7 were installed in 2013 whereas the OC station was installed in April 2018.

Table 1-2. EAA real-time water quality station ID, location, and period of record for the San Marcos and Comal spring systems.

River system	Station ID	Location (river km from headwaters)	Period of record
San Marcos	Sessom Creek	0.5 rkm from SMR confluence	1/1/2018 - present
	Aquarena Springs	0.8	5/30/2013 - present
	Rio Vista	1.9	5/30/2013 – 12/31/2020
	TPWD hatchery	4	1/8/2016 - present
Comal	Upper Spring Run	0.1	4/1/2019 – 12/31/2020
	Spring Run 7	1.0	9/10/2013 - present
	Spring Run 3	1.2	4/11/2013 - present
	Landa Lake	1.2	6/10/2013 – 3/31/2018
	Old Channel	1.5	4/20/2018 - present
	New Channel	2.7	5/30/2013 – 12/31/2020

Real-time water quality stations assist in discerning when and what river conditions result in water quality exceeding critical biological standards. One of EAHCP's long-term management objectives is to maintain water quality conditions that do not deviate > 10% from historical water quality conditions recorded during the EAA Variable Flow Study. Additionally, specific EAHCP water quality thresholds include, maintaining water temperature < 25°C as to not inhibit fountain darter reproduction and recruitment rates (McDonald et al. 2007) and maintaining dissolved oxygen concentrations > 4.0 mg/L throughout fountain darter habitat. EAHCP's RTWQ stations are designed to track water quality conditions within the San Marcos and Comal systems to monitor whether river conditions remain within historic conditions and under specific thresholds.

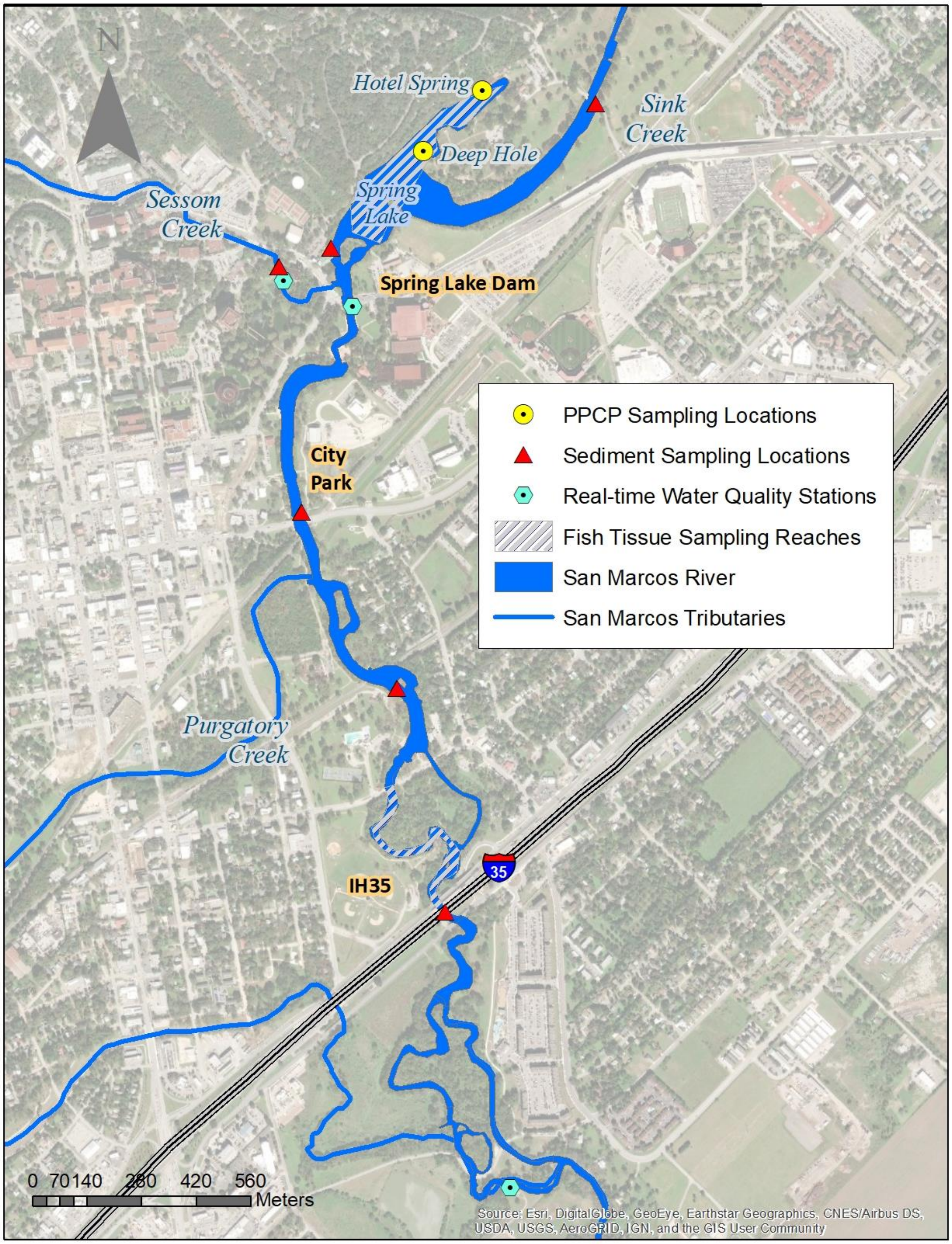

Figure 1-1. Expanded Water Quality Sampling Locations in the San Marcos system.

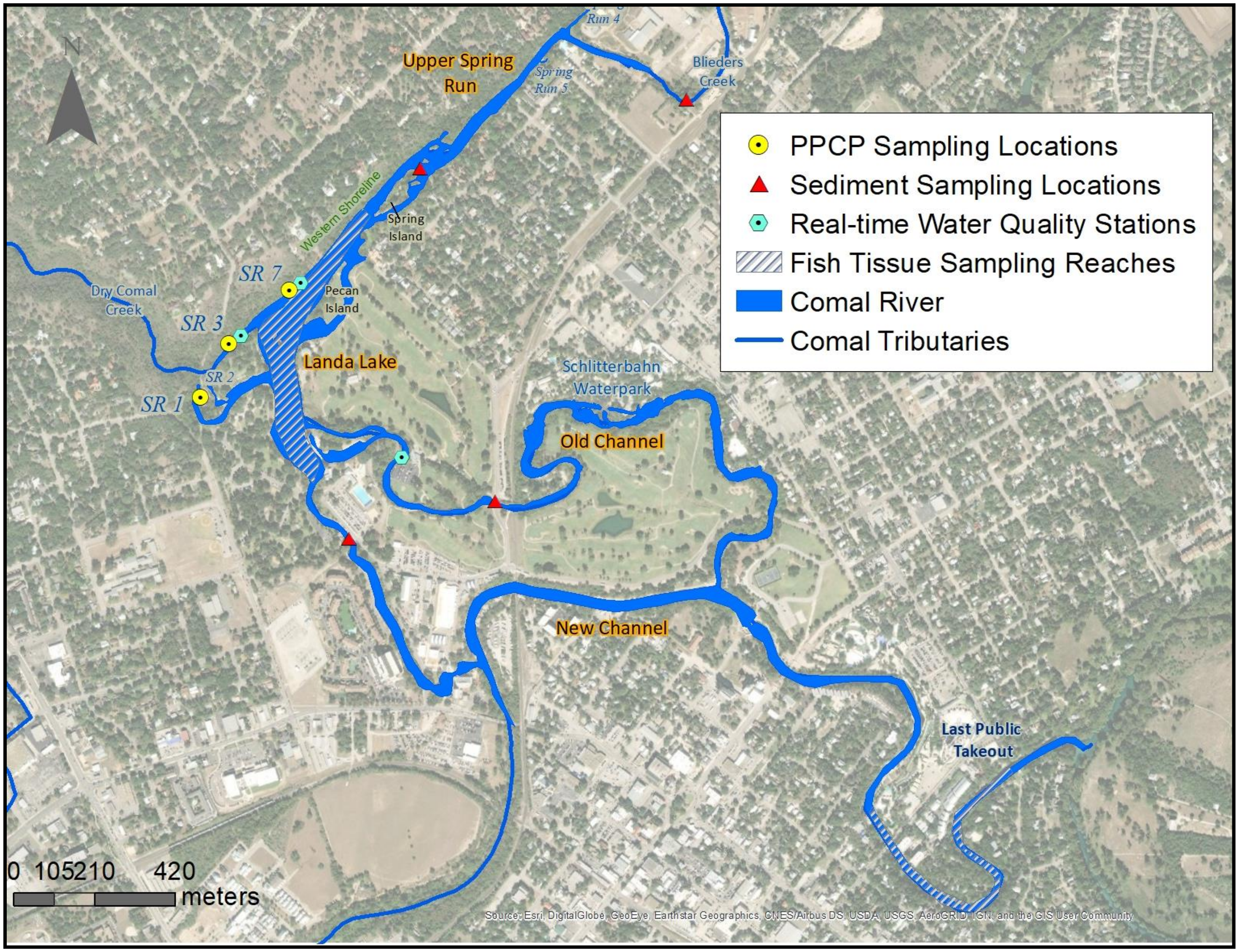

Figure 1-2. Expanded Water Quality Sampling Locations in the Comal system.

1.2 Surface water sampling

Monthly sucralose sampling occurs at one location in each spring system (i.e., Hotel Spring in San Marcos and Spring Run 3 in Comal). Sucralose, an artificial sweetener found in many diet beverages and candies, is not efficiently processed by the body, and subsequently ends up in septic and city wastewater effluent (Whitall et al. 2021). Sucralose has shown minimal degradation when processed through wastewater facilities, is relatively stable in the environment, and has demonstrated reliable detection rates (Oppenheimer et al. 2011). Therefore, monitoring the occurrence and levels of sucralose systems has proven to be a suitable indicator of wastewater input among rivers and groundwater systems.

Additional surface water samples are collected on a biannual basis under normal flow conditions in conjunction with the Biological Monitoring program (Spring and Fall). Sampling locations consist of upper and lower river stations in both systems. For the Comal system, Landa Lake near Spring Island serves as the upper location, and the lower station is located at the last public river take out just upstream of the confluence with the Guadalupe River. In San Marcos, Hotel Spring in Spring Lake serves as the upper location, and the downstream location is located at the most downstream real-time water quality monitoring station (i.e., TPWD hatchery). Samples are submitted to a laboratory for analysis of nutrients (Table 1-3). During the collection event, field parameters are collected that include dissolved oxygen, pH, conductivity, and temperature.

Table 1-3. List of Nutrients Analyzed during Surface Water Sampling

Analyte
Ortho-phosphate
Ortho-phosphate as P
Phosphorus (total)
Dissolved Inorganic Carbon (DIC)
Dissolved Organic Carbon (DOC)
Kjeldahl Nitrogen
Nitrate as N
Ammonia

1.3 Groundwater sampling

Groundwater sampling is conducted by the EAA Aquifer Science Division and is part of their routine water quality monitoring of streams, wells, and springs in the Edwards Aquifer Region (Edwards

Aquifer Water Quality Summary 2020 Report). Two spring orifices in the San Marcos system (i.e., Hotel Spring and Deep Hole) and three springs within the Comal system (ie., Spring Run 1, Spring Run 3, and Spring Run 7) are sampled on a biannual basis in conjunction with the EAHCP Biological Monitoring program (i.e, Spring and Fall). Beginning in 2022, PPCP samples were also collected every other month at Hotel Spring and Spring Run 3 locations. Groundwater samples are submitted to a laboratory for analysis of cations, anions, nutrients, metals, VOCs, SVOCs, herbicides and pesticides, bacteria, TOC, PCBs, and PPCPs. The analyte list for laboratory analyses along with the methods are shown in Table 1-4. During the collection event, field parameters will be collected that include dissolved oxygen, pH, conductivity, temperature, and alkalinity.

Table 1-4. List of Items Analyzed during Groundwater Sampling

Analyte
Volatile Organic Compounds (VOCs)
Semi-volatile Organic Compounds (SVOCs)
Organochlorine Pesticides
Polychlorinated Biphenyls (PCBs)
Organophosphorous Pesticides
Herbicides
Metals (Al, Sb, As, Ba, Be, B, Cd, Cr (total), Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Tl, V, and Zn)
General Chemistry (GWQP) Total Alkalinity (as CaCO3), Bicarbonate Alkalinity (as CaCO3), Carbonate Alkalinity (as CaCO3); (Cl, Br, NO_3, SO_4, Fl, pH, TDS, TSS, Ca, Mg, Na, K, Si, Sr, CO_3,)), and Total Suspended Solids (TSS).
Phosphorus (total)
Total Organic Carbon (TOC),
Dissolved Organic Carbon (DOC)
Kjeldahl Nitrogen
Bacteria Testing (*E coli*)
PPCPs

Method	**Method Description**	**Protocol**
8260B	Volatile Organic Compounds	(GC/MS) SW846
8270C	Semivolatile Organic Compounds	(GC/MS) SW846
8081B	Organochlorine Pesticides	(GC) SW846
8082A	Polychlorinated Biphenyls (PCBs)	by Gas Chromatography SW846
8141A	Organophosphorous Pesticides	(GC) SW846
8151A	Herbicides	(GC) SW846
6010B	Metals	(ICP) SW846
6020	Metals	(ICP/MS) SW846
7470A	Mercury	(CVAA) SW846
300.0	Anions,	Ion Chromatography
340.2	Fluoride	MCAWW
365.4	Phosphorus,	Total EPA
9040C	pH	SW846
9060	Organic Carbon,	Total (TOC) SW846
SM 2320B	Alkalinity	SM
SM 2540C	Solids,	Total Dissolved (TDS) SM
SM 2540D	Solids, Total Suspended (TSS)	SM
351.2	Nitrogen, Total Kjeldahl	MCAWW
1694	PPCPs	LC-MS/MS

Protocol References:
EPA = US Environmental Protection Agency
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

1.4 Sediment and Fish Tissue sampling

Sediment and fish tissue sampling occurs on an every other year basis with sediment sampling completed in even years and fish tissue sampling in odd years. Sampling collections for sediment and fish tissue occur in the Spring during the EAHCP Biological Monitoring surveys.

Collection of sediment samples within in each spring system was included in the program to help determine potential effects on EAHCP covered species via direct or indirect exposure to sediment contaminants. Sediment samples are collected once from four locations within the Comal system and six locations in San Marcos system (Figures 1-1 and 1-2). Samples were collected at each sample site and composited into one sample for analysis. Sediment samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) and other contaminants listed in Table 1-5.

Table 1-5. List of Contaminants Analyzed during Sediment Sampling.

Analyte
Benzo[a]anthracene
Chrysene
Benzo[a]pyrene
Benzo[b]fluoranthene
Benzo[k]fluoranthene
Fluoranthene
Dibenz(a,h)anthracene
Indeno[1,2,3-cd]pyrene
Pyrene
Phenanthrene
Fluorene
Benzo[g,h,i]perylene
Anthracene
Acenaphthene
Acenaphthylene
Benzo[g,h,i]perylene
Carbazole
2-Methylnaphthalene
Naphthalene
Total Organic Carbon (TOC)

Fish tissue sampling within in each spring system was included to the program in 2017 to serve as a direct link between water quality impairments and their potential effects on EAHCP covered species. Prior to 2017, the linkage between contaminants and metals found in the spring systems and their accumulation in EAHCP covered species was unknown. Surrogate species were selected to represent EAHCP covered species and the two species selected for analysis are *Gambusia* (mosquito fish) and *Micropterus salmoides* (largemouth bass). The mosquito fish serves as a short-lived species, similar to the EAHCP covered fountain darter, whereas the largemouth bass represents the longer-lived species. Mosquito fish and largemouth bass were collected from upper and lower sections in both spring systems. In the San Marcos, fish were collected in Spring Lake (i.e., upper section) and in the San Marcos River near IH35 (i.e., lower section). For the Comal, both species were collected from Landa Lake (i.e., upper section) and in the Comal River near the last public take out (i.e., lower section). For each section, whole body organisms were combined to create a mosquito fish composite sample. Composites for largemouth bass were created from individual fillet aliquots from each fish. Tissue samples were submitted to a laboratory and analyzed for metals and PPCP contaminants listed in Table 1-6.

Table 1-6. List of Metals and Contaminants Analyzed among Fish Tissue Samples.

Analyte
Metals (Al, Sb, As, Ba, Be, B, Cd, Cr (total), Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Tl, V, and Zn)
PPCPs

Method	**Method Description**	**Protocol**
6010B	Metals	(ICP) SW846
6020	Metals	(ICP/MS) SW846
7470A	Mercury	(CVAA) SW846
1694	PPCPs	LC-MS/MS

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates

2 | Methods

2.1 Real-Time Network

The near continuous (15-minute interval) raw data collected at San Marcos River and Comal system RTWQ sites underwent a quality assurance review process before being utilized for this assessment. Water quality sonde data was overlayed with river streamflow and precipitation data to verify significant increases and decreases in measured values. The data from each site within the basins were also compared to ensure validity. The multiparameter water quality instruments were switched out at 5 to 6-week intervals, with the unit returned to the EAA office for data download, calibration checks, and cleaning. Data obtained from independent field visit measurements and post-deployment sensor calibration checks were used to determine any necessary adjustments to the near continuous raw data sets. Additional quality control was completed to the data in the Power BI Pro License software.

Turbidity data recorded at Sessom Creek were edited for any values in the continuous raw data interpreted as not being representative of actual ambient water quality conditions. Sporadic spikes in turbidity values without any corresponding change in other parameters (i.e. Specific Conductance, Temperature, or Dissolved Oxygen) were deleted from the finalized continuous data sets before their use in this assessment.

Mean daily, maximum daily, and minimum daily values for water quality parameters at each of the San Marcos River and Comal system RTWQ sites were exported from AQUARIUS database. Hydrographs since the start of the EAHCP (2013) for the two systems were constructed using surface water discharge data (recorded in 15 minute intervals) obtained for the San Marcos River at San Marcos (USGS Station 08170500) and the Comal River at New Braunfels (USGS Station 0816900). Mean daily springflow (cfs) for the San Marcos springs (USGS Station 08178710) and the Comal springs (USGS Station 0816900) were used to construct springflow hydrographs for 2013-2021. Differences in maximum daily temperatures and minimum daily dissolved oxygen among sites and seasons were assessed using boxplots. Seasons were defined as: Winter (January, February, December), Spring (March – May), Summer (June – August), and Fall (September – November). For sites exceeding water temperatures > 25°C, 15-minute interval data (5 minute interval data for Sessom Creek) were used to assess the number of days and percent of day a site exceeded 25°C. Similar analysis was completed for sites that dropped below the 4.0 mg/L dissolved oxygen threshold.

2.2 Surface water sampling

Water samples for sucralose were collected from Hotel Spring in the San Marcos system and Spring run 3 in the Comal system monthly January – December 2022. Prior to water sample collection, an Insitu AquaTroll 600 water quality sonde was placed directly in each location to measure water quality parameters (i.e., pH, specific conductivity, dissolved oxygen, and temperature) for a ten-minute period. Sample bottles were submerged directly into the springs to be filled. Field duplicates and field blanks (i.e., bottles filled with DI water) were also filled following sampling protocols. All sample bottles were kept chilled during transport in an ice chest frozen until later shipment to the laboratory that occurred on a quarterly basis.

Surface water samples for nutrient analysis were collected in May and October 2022 at upper and lower sites in the San Marcos and Comal systems. During sampling collections, water quality parameters were measured following same protocols as monthly sucralose sampling. Filtration for methods 6010B (metals), 6020 (metals), and 7470A (mercury) were performed at the sample locations by using a 0.45 micron high capacity cartridge filter inserted into syringe. Preservatives were placed in the bottles (as appropriate) by the contracted laboratory. Field duplicates and field blanks were also filled following sampling protocols. All sample bottles were kept chilled during transport in an ice chest frozen and immediately shipped to the contract laboratory for analysis.

All water quality data were exported to excel and medians values were calculated for water quality parameters collected during sucralose and bi-annual surface water sampling collections.

2.3 Groundwater sampling

Groundwater samples for PPCPs and other analyses were collected from Hotel and Deep Hole springs in the San Marcos system and from Spring Run 1, 3, and 7 within the Comal Spring system in March and September 2022. Additional PPCP samples were also collected every other month (i.e., January, May, July, and November) at Hotel and Spring Run 3 locations. Prior to groundwater collections, an Insitu AquaTroll 600 water quality sonde was placed directly into the spring orifice to measure water quality parameters (i.e., pH, specific conductivity, dissolved oxygen, turbidity, and temperature). Sample bottles were then submerged directly into the spring to obtain samples, except for Deep Hole Spring where EAA staff utilized a peristaltic pump with 30 feet of sample tubing inserted into the spring orifice to collect field parameters and fill sample bottles. Samples were collected in accordance with the criteria set forth in the *EAA Groundwater Monitoring Plan*.

Filtration for methods 6010B (metals), 6020 (metals), 7470A (mercury) and field alkalinity were performed at the sample locations by utilizing a 0.45 micron high capacity cartridge filter inserted into a weighted single sample disposable bailer or sample tubing (if peristaltic pump was used). Preservatives were placed in the bottles (as appropriate) by the contracted laboratory. Ice was placed into the cooler immediately after sampling and later shipped to the contract laboratory. When not in use or after collection, sampling equipment and/or coolers containing samples were secured inside the EAA vehicles to maintain appropriate sample custody and security.

Analyses for field alkalinity were conducted at EAA's Camden Building using Hach Titralab® AT1000. The method used for field alkalinity is discussed in detail in the *EAA Groundwater Monitoring Plan.*

A full report of groundwater sampling results at Hotel and Deep Hole springs will be available under the Science and Aquifer Protection section on the EAA website and entitled Water Quality Summary Report 2022. Sampling results for PPCPs are reported in Section 3.3.

2.4 Sediment sampling

Sediment samples were collected in August 2022 at six locations in the San Marcos system and four locations in the Comal system (Figures 1-1 and 1-2). At each location, fine sediment was targeted and collected using an aluminum scoop in shallow water depths or a petite ponar grab sampler was used at non-wadeable sites (i.e., water depths >4 ft deep). Once collected, the sediment was sorted to remove as much coarse sediment and other debris as possible before being placed into a 1L glass container. Sample bottles were transported in coolers and frozen before being shipped to contract laboratory.

2.5 Fish Tissue sampling

Fish tissue samples were collected in April-May 2021, but due to laboratory delays, were not shipped until spring 2022. Largemouth bass were collected from the upper and lower sites in the San Marcos system (i.e., Spring Lake and the lower San Marcos River near IH35) and the Comal system (i.e., Landa Lake and Comal River near the last public take out). Largemouth bass were collected via hook and line and humanely euthanized by being placed in a cooler with ice. Collected specimens were frozen until further processing. Largemouth bass composite samples were made by grinding frozen fillets with stainless steel implements and processing implements were cleaned with Liquinox and rinsed with DI prior to use. Composite samples were then shipped off to the contract laboratory.

3 | **Results and Discussion**

3.1 Real-Time Network

3.1.1 San Marcos

Hydrology

Average springflow for the San Marcos Springs calculated from the period of record (i.e., 1956 – present) was 175 cfs. Since 2013, San Marcos springflow ranged from below average in 2013-2014 to above average from mid-2015-2017 (Figure 3-1). During 2013, the San Marcos springflow dropped down to as low as 99 cfs on May 21st. A flow pulse on October 30th, 2013, estimated at 5,400 cfs, resulted in a temporary spike in above average springflow. No substantial rain events occurred in 2014 and consequently, springflow dropped below average. Increased springflow in 2015 occurred following two large precipitation events in late May and October with above average springflow continued into 2016 - 2017. In 2018, springflows dropped below average, reaching 117 cfs in late August. However, several small rain events in the early fall resulted in springflows increasing and becoming above average (~250 cfs). Springflows were largely above average in 2019, but with a lack of large flow pulses (> 500 cfs), springflows lessened throughout the year and dropped just below average beginning in October. With no large flow pulses in 2020, springflows continued to decrease and dropped below 120 cfs by December. Springflow in early 2021 continued to decline and dropped briefly below 100 cfs in April before rain events in late spring resulted in springflow rising to average flows. Springflows dropped slightly during early fall but increased again after significant rain events (i.e., 1,070 cfs pulse on October) to end 2021 at average springflow. No significant rainfall events occurred in 2022 with springflows at critical period monitoring levels during most of the year. Springflows dropped down to ~85 cfs from the end of September-December and is the lowest discharge observed since the start of the EAHCP.

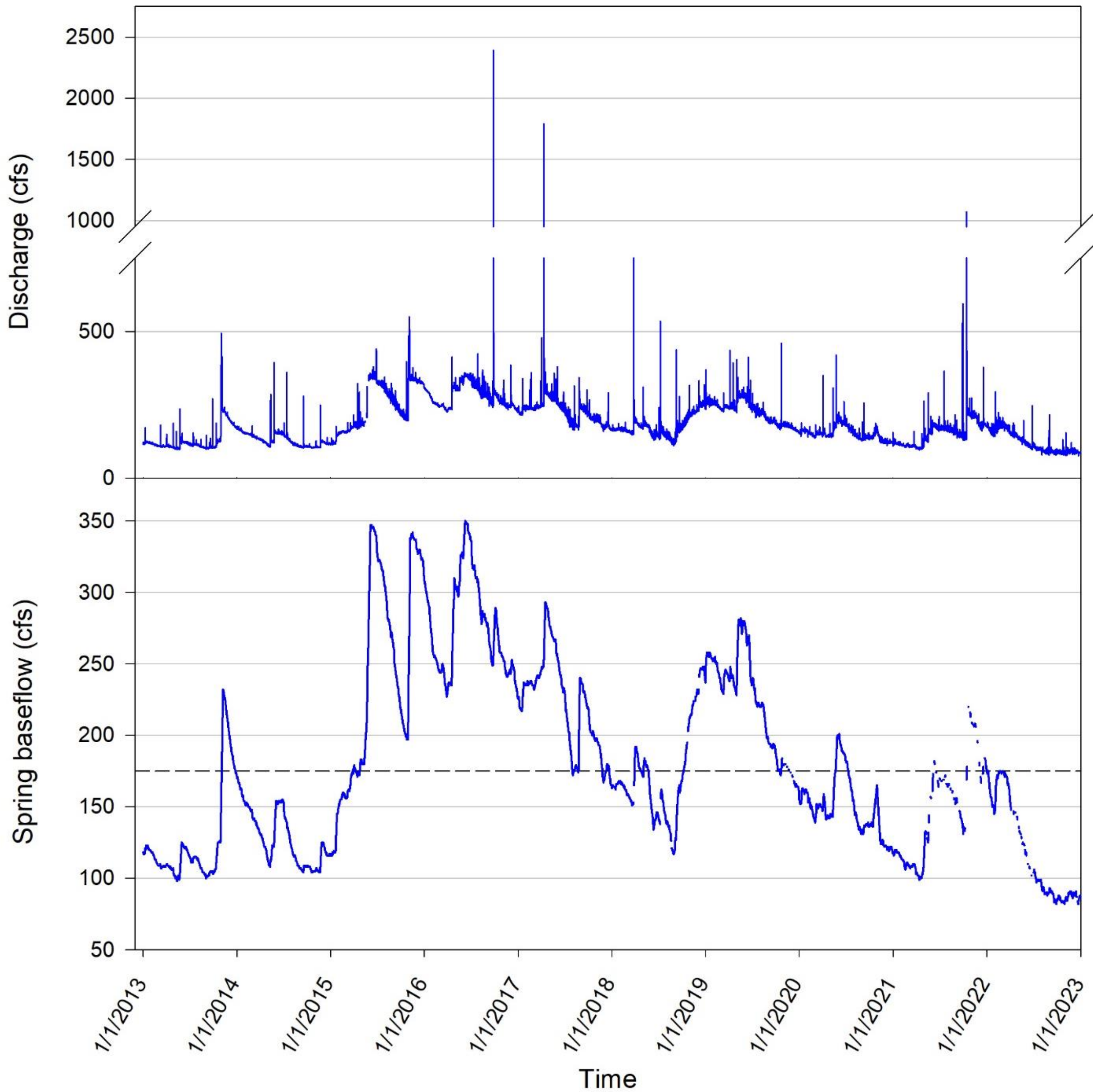

Figure 3.1-1. Hydrographs for the San Marcos River at San Marcos (USGS station 08170500) and mean daily springflow for the San Marcos springs (USGS Station 08170000) 2013 – 2022. Dashed line denotes the long-term average springflow (175 cfs) in the San Marcos River.

Temperature

Table 3.1-1 displays monthly summary statistics (i.e., monthly mean and 15 minute minimum and maximum values reported that month) for water temperatures recorded in 2022 at the San Marcos River RTWQ sites. Slightly more variation in mean water temperatures (~4 °C) was observed this year and is likely attributed to lower than average springflows in the system during 2022. The TPWD hatchery site displayed greater variability in water temperature with minimum daily water temperatures reaching lower temperatures in winter months and warmer maximum daily water temperatures during summer months. Maximum daily water temperatures recorded in 2022 reached the 25°C threshold with the highest temperature (26.00°C) recorded at the TPWD hatchery in July. The lowest temperature (8.31°C) in 2022 was observed at the TPWD hatchery site in February and is associated with a rainfall event on February 3, 2022 that coincided with a cold front that dropped ambient temperatures below freezing.

Table 3.1-1. Monthly mean, minimum, and maximum water temperatures among San Marcos River RTWQ (2022).

	Water temperature (°C) at San Marcos Water Quality Sites					
Month (2022)	**Aquarena Springs**			**TPWD hatchery**		
	Mean	Min	Max	Mean	Min	Max
Jan	20.86	19.73	22.32	20.35	18.64	22.49
Feb	20.90	18.53	23.06	20.18	8.31	23.53
Mar	21.62	20.07	23.37	21.41	18.76	23.78
Apr	22.29	20.92	23.95	22.37	20.26	24.61
May	22.88	21.76	24.27	23.29	21.46	25.21
Jun	23.24	22.17	24.79	23.84	22.28	25.67
Jul	23.57	22.58	25.04	24.19	22.67	26.00
Aug	23.35	22.46	24.85	23.94	22.67	25.98
Sept	23.09	21.34	25.01	23.54	21.17	25.74
Oct	22.11	20.25	24.16	22.07	19.61	24.51
Nov	21.11	17.97	23.63	20.65	15.87	23.56
Dec	20.73	16.83	22.88	20.18	15.45	22.88

Box plots for maximum daily temperatures (i.e., highest 15 minute interval recorded daily) observed at San Marcos RTWQ sites from time of equipment deployment (i.e., 2013 for Aquarena Springs Drive (ASD) and 2016 for TPWD hatchery) through 2022 compared to maximum daily temperature observed in 2022 are shown in Figure 3.1-2. The median of maximum daily temperatures for 2022 were slightly higher than the median of maximum daily temperatures from time of equipment deployment at both San Marcos sites but this was not unexpected with the below average springflow conditions experienced in 2022.

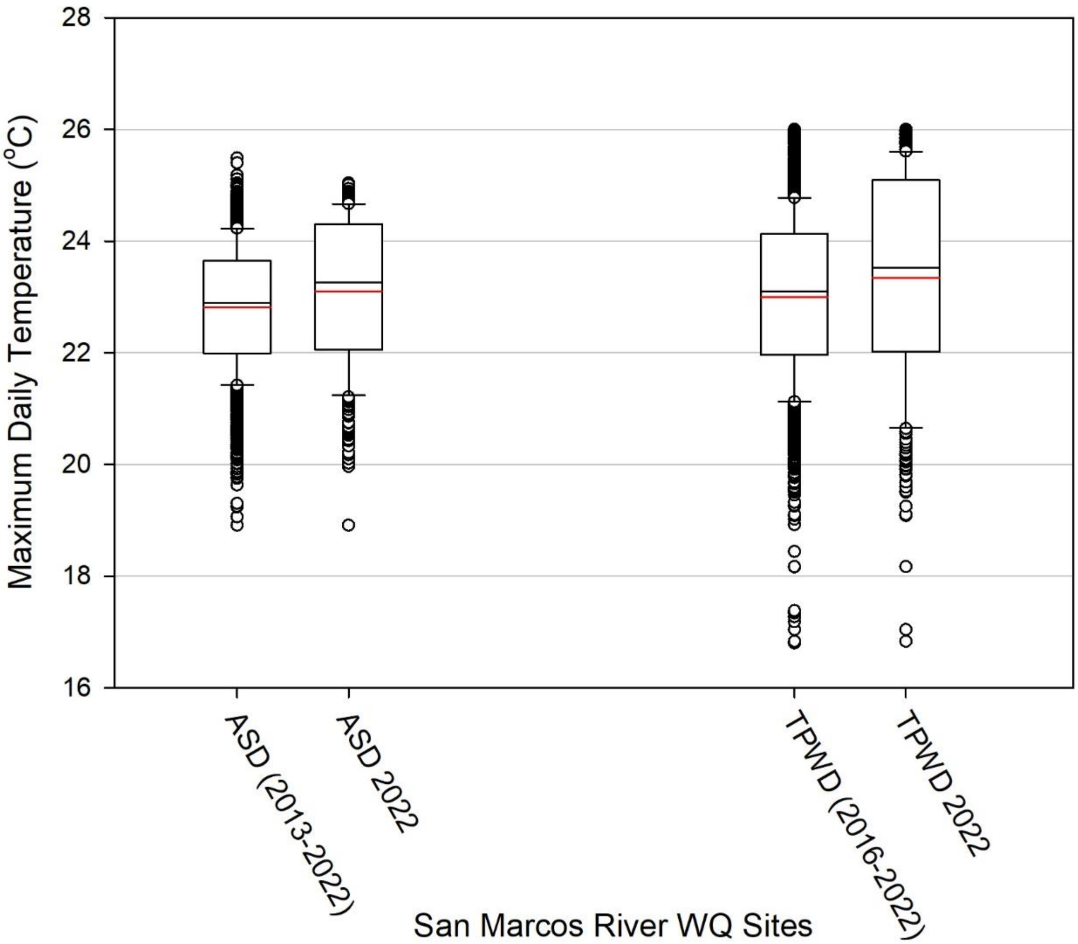

Figure 3.1-2. Box plots of maximum water daily temperatures (°C) among San Marcos River RTWQ sites from time of equipment deployment through 2022 compared to 2022 values. Black lines represent median values and red lines denote mean values. Whiskers represent maximum and minimum temperature values, excluding outliers (open circles).

Maximum daily water temperatures were plotted for San Marcos River RTWQ sites for 2022 (Figure 3.1-3). Throughout 2022, maximum daily temperatures were more variable at the TPWD hatchery site compared to the upstream ASD site. Maximum daily temperatures reached or exceeded 25°C at the TPWD hatchery site for 97 days during the months of May - September in 2022. Among those 97 days, time spent at or above 25°C ranged from 0.5 hr – 8.25 hrs (mean and median = 5.5 hrs). At the Aquarena Springs Drive site, maximum daily water temperature only reached 25°C two days in 2022 (7/1/2022 and 9/20/2022) and for 1.0 hr and 0.25 hr, respectively.

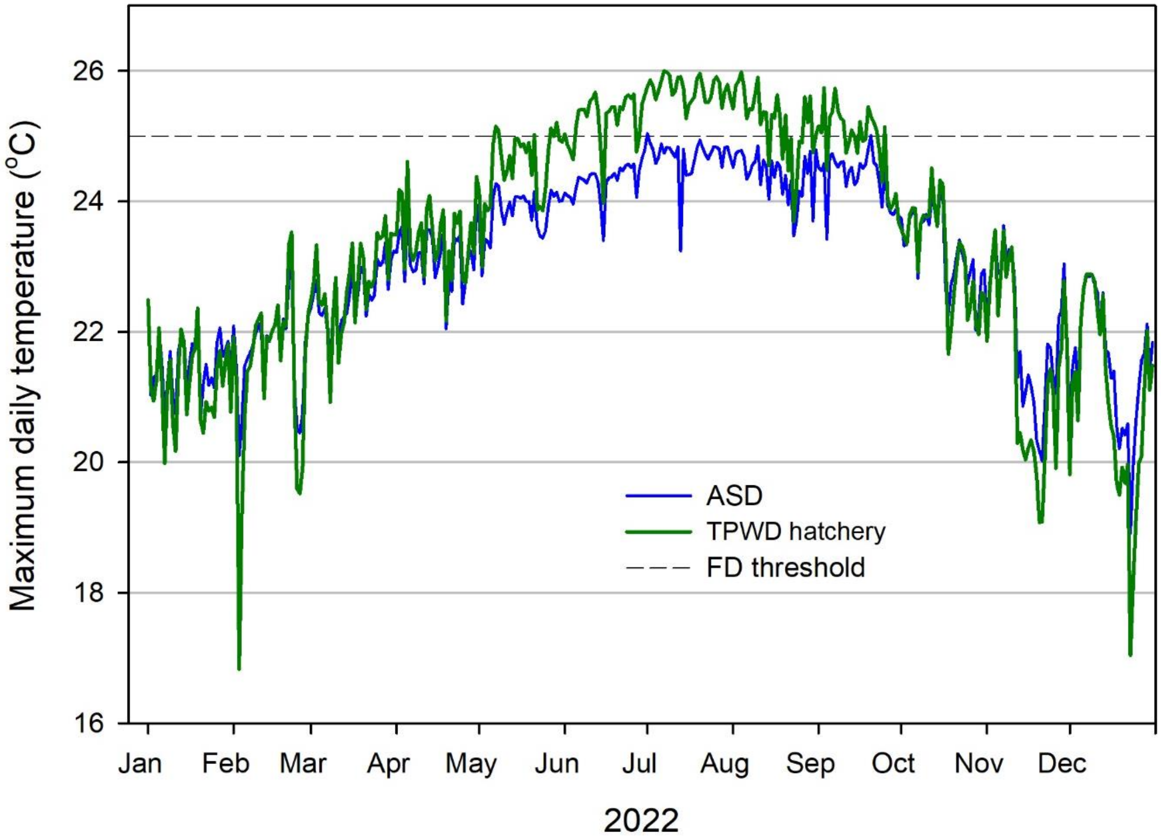

Figure 3.1-3. Maximum daily water temperatures (°C) among San Marcos River RTWQ sites (2022). Dashed line represents temperature threshold for reduced reproduction for the fountain darter (25°C).

Box plots for seasonal maximum daily water temperatures at San Marcos RTWQ sites for 2022 are shown in Figure 3.1-4. Across seasons, median maximum daily temperatures varied by ~3-4°C among San Marcos River WQ sites with some more outlier temperatures observed in winter. Greater variability in temperatures across seasons corresponds with the decrease of springflow during the summer months that resulted in warmer maximum daily temperatures. Fall showed the greatest range in maximum daily temperatures for San Marcos WQ sites.

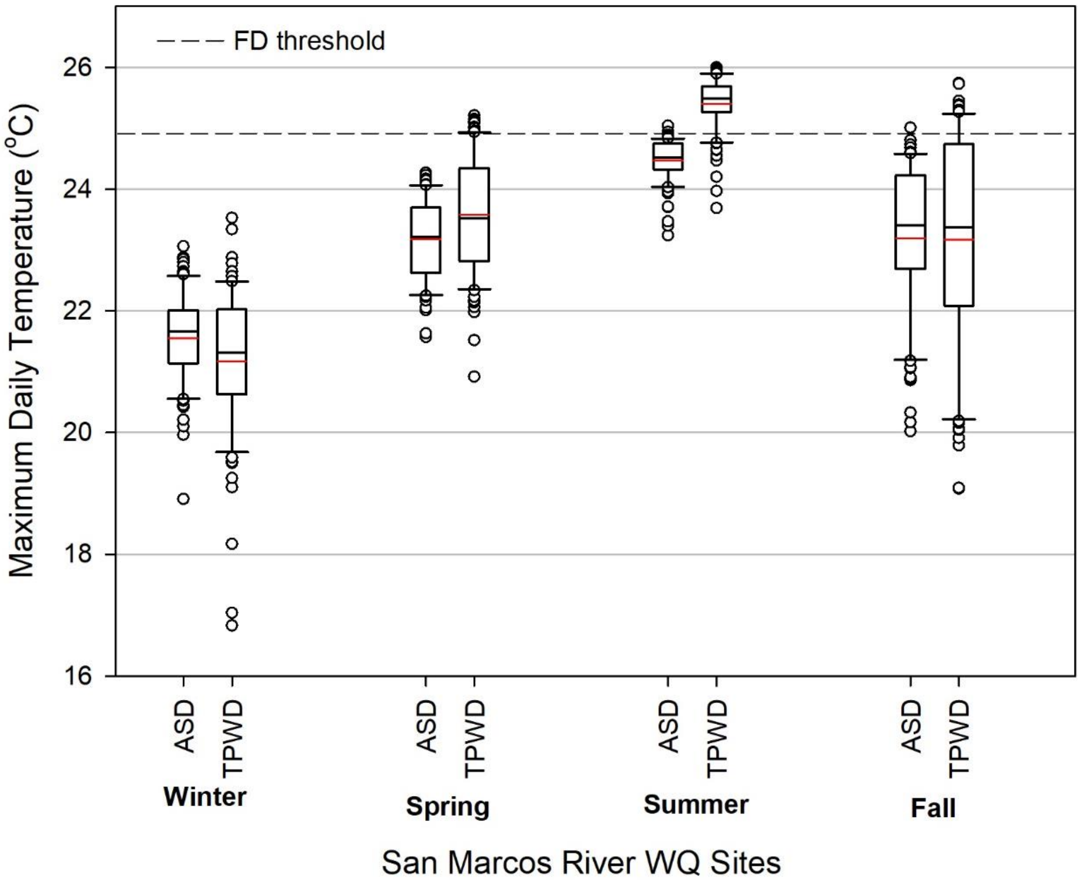

Figure 3.1-4. Box plots of maximum daily water temperatures (°C) among seasons at San Marcos River RTWQ sites in 2022. Black lines represent median values and red lines denote mean values. Whiskers represent maximum and minimum temperature values, excluding outliers (open circles).

Dissolved Oxygen

Table 3.1-2 displays monthly summary statistics for dissolved oxygen (DO) recorded in 2022 at the San Marcos River RTWQ sites. Mean monthly DO remained relatively consistent with variations averaging 1 mg/l within a site and did not vary greatly between the two sites. The TWPD hatchery site demonstrated greater variability in DO in 2022 with minimum DO at ~6 mg/l and maximum DOs slightly higher than 11 mg/l. The highest DO recorded in 2022 was 11.64 mg/l at TPWD hatchery in February, and the lowest DO (6.73mg/l) also occurred in June.

Table 3.1-2. Monthly mean, minimum, and maximum DO (mg/l) among San Marcos River RTWQ sites (2022).

	Dissolved oxygen (mg/l) at San Marcos Water Quality Sites					
Month (2022)	**Aquarena Springs**			**TPWD hatchery**		
	Mean	Min	Max	Mean	Min	Max
Jan	8.21	7.21	9.38	8.67	7.56	10.20
Feb	8.19	7.19	9.50	8.83	7.49	11.64
Mar	8.05	7.00	9.34	8.70	7.23	11.05
Apr	7.78	6.90	9.25	8.26	7.20	10.47
May	7.72	6.88	8.99	8.05	7.14	9.43
Jun	7.72	6.81	8.98	7.87	6.73	9.18
Jul	7.81	6.92	9.00	7.91	7.06	9.35
Aug	7.65	6.87	8.85	8.03	6.81	9.50
Sept	7.71	6.82	9.01	8.10	6.76	9.53
Oct	7.92	6.96	9.41	8.36	7.07	9.80
Nov	8.04	6.87	9.70	8.45	7.03	9.94
Dec	7.98	6.88	9.88	8.55	7.37	10.72

Box plots for minimum daily DO (i.e., lowest DO reported for one 15 minute interval in a 24 hour period) observed at San Marcos RTWQ sites from time of equipment deployment (i.e., 2013 for ASD and 2016 for TPWD hatchery) through 2022 compared to minimum daily DO observed in 2022 are shown in Figure 3.1-5. The medians of minimum daily DO for 2022 were lower than the medians of minimum daily DO from time of equipment deployment for San Marcos River RTWQ sites, dropping below the 25th percentile for to the comprehensive minimum daily DO dataset.

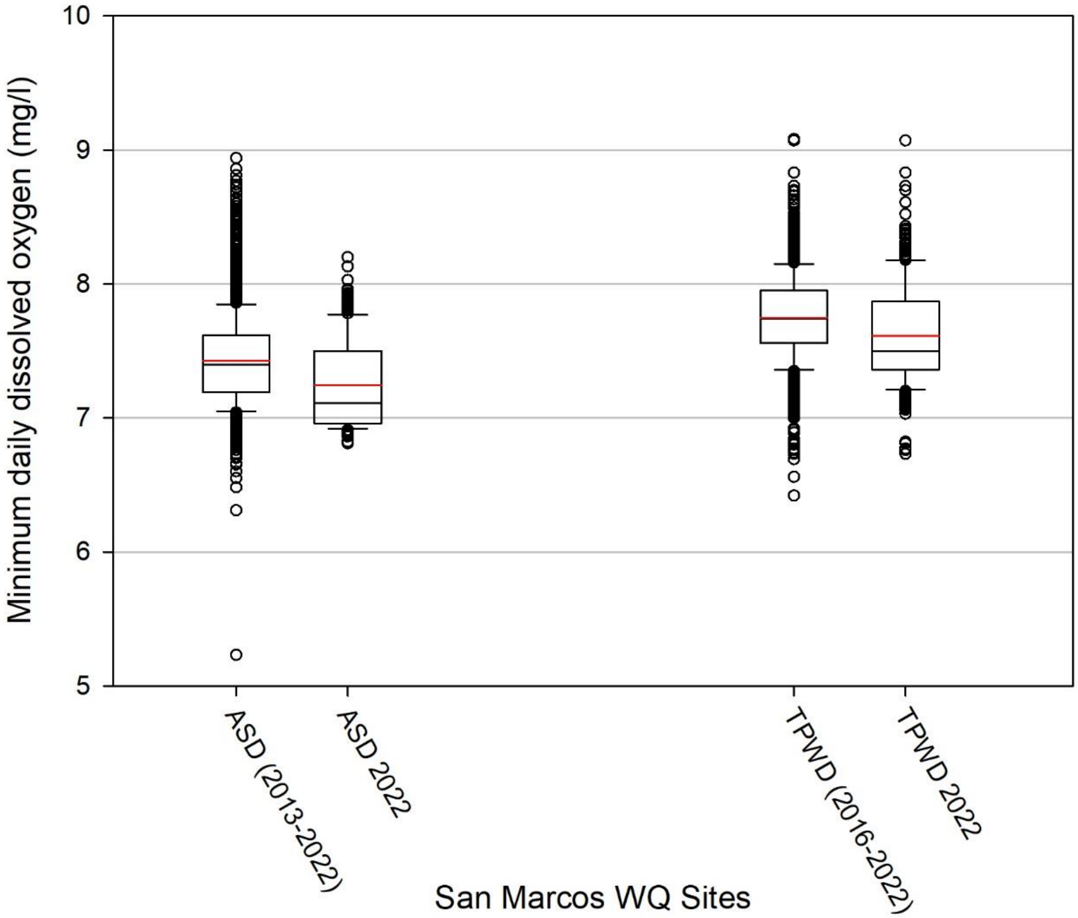

Figure 3.1-5. Box plots of minimum daily DO (mg/l) among RTWQ sites in the San Marcos River from time of equipment deployment through 2022 compared to 2022 only. Black lines represent median values and red lines denote mean values. Whiskers represent maximum and minimum DO values, excluding outliers (open circles).

Minimum daily DO recorded in 2022 were plotted for San Marcos River RTWQ sites (Figure 3.1-6). Similar to previous years, the TPWD hatchery site maintained higher minimum daily DO levels compared to the ASD site. The minimum DO threshold (4 mg/l) was not reached at either San Marcos River RTWQ site in 2022.

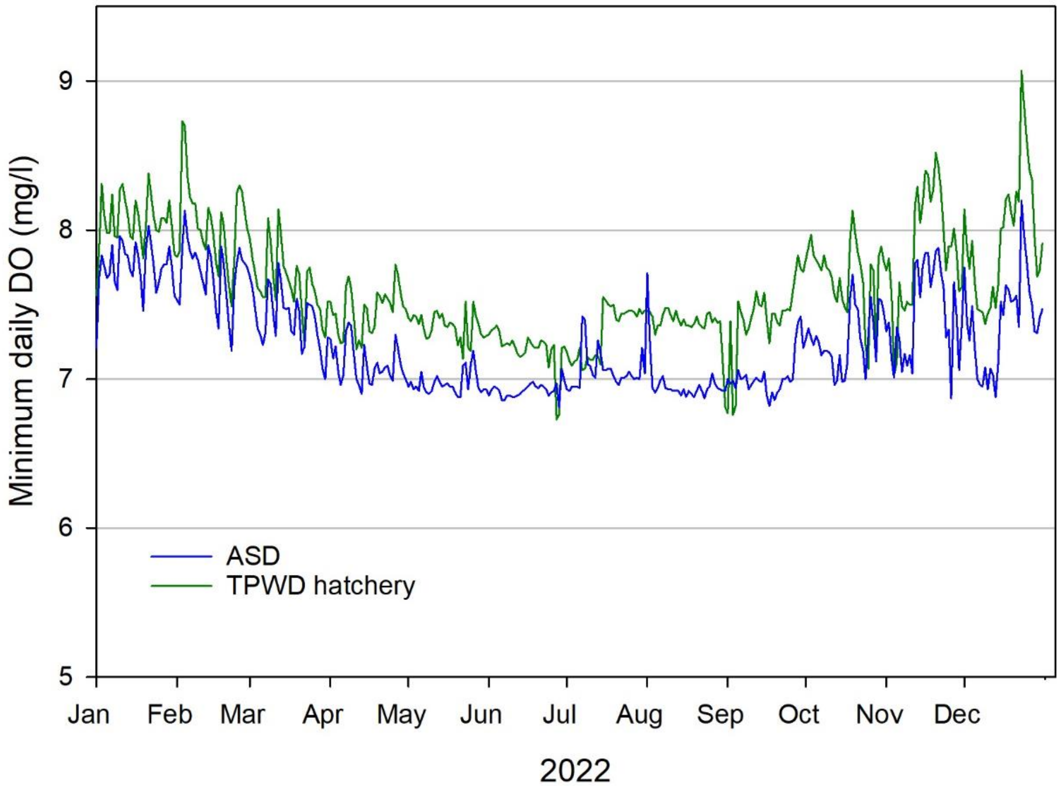

Figure 3.1-6. Minimum daily DO (mg/l) among San Marcos River water quality stations (2022).

Conductivity

Table 3.1-3 displays monthly summary statistics for conductivity (µs/cm) recorded in 2022 at the San Marcos River RTWQ sites. Mean monthly conductivity remained consistent among sites and throughout the year. The highest conductivity in 2022 was recorded at the TPWD hatchery in January (637 µs/cm) and the lowest conductivity (202 µs/cm) was also at the TPWD hatchery recorded in February.

San Marcos River discharge and mean daily conductivity were plotted for San Marcos River RTWQ sites for 2022 (Figure 3.1-7). Mean daily conductivity was influenced by rain events in the San Marcos River with decreases in conductivity corresponding with influxes of run-off entering the river. Outside of rain events, mean conductivity generally ranged between 610-625 µs/cm at the two San Marcos RTWQ sites.

Table 3.1-3. Monthly mean, minimum, and maximum conductivity (µs/cm) among San Marcos River RTWQ sites (2022).

	Conductivity (µs/cm) at San Marcos Water Quality Sites					
Month (2022)	**Aquarena Springs**			**TPWD hatchery**		
	Mean	Min	Max	Mean	Min	Max
Jan	619	591	623	624	537	637
Feb	619	567	625	618	202	632
Mar	621	603	625	629	589	633
Apr	621	606	624	632	624	636
May	619	553	622	630	379	635
Jun	616	479	622	621	226	633
Jul	613	602	619	618	612	624
Aug	614	482	624	615	316	623
Sept	617	479	625	613	229	626
Oct	617	503	625	620	439	630
Nov	614	480	627	612	281	630
Dec	620	536	627	625	624	626

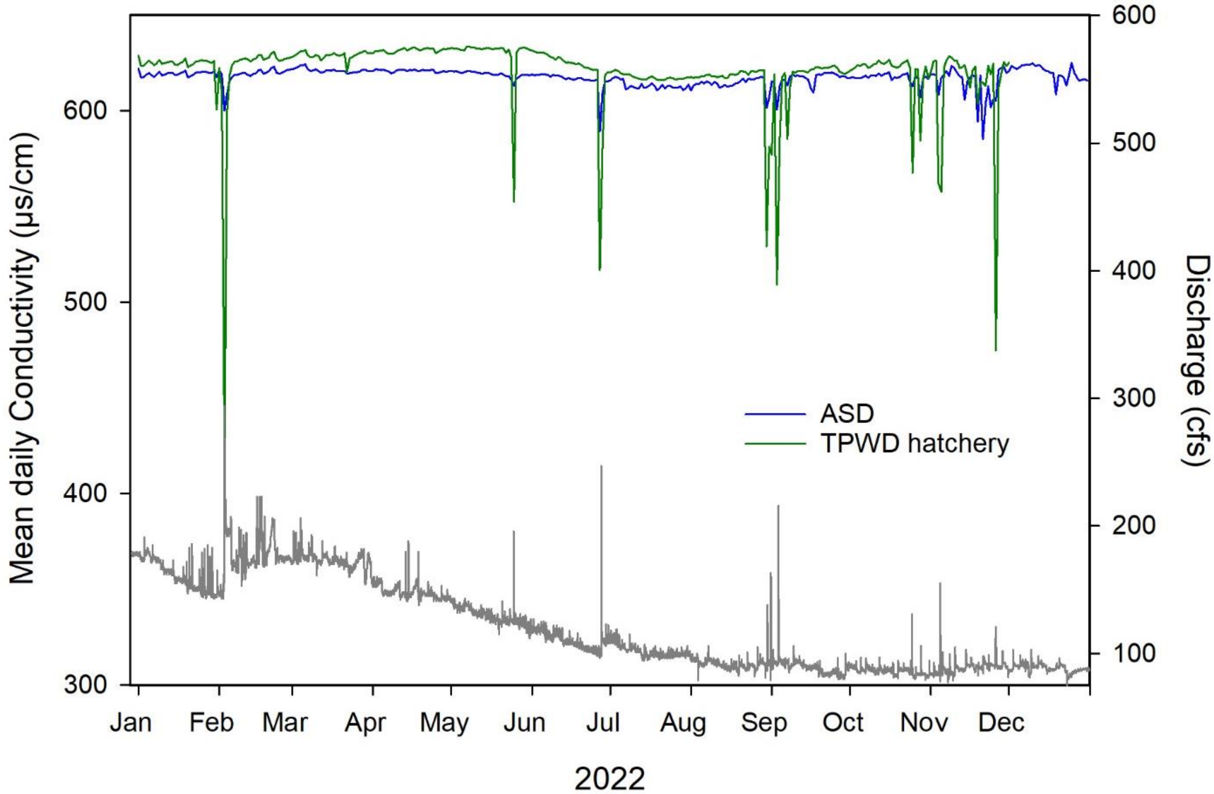

Figure 3.1-7. Mean daily conductivity (µs/cm) among San Marcos River RTWQ sites and San Marcos River discharge (USGS Gage#08170500) in 2022.

Sessom Creek Water Quality Characterization

Table 3.1-4 displays monthly summary statistics for water quality parameters measured in Sessom Creek for 2022. Figures 3.1-8 to 3.1-10 illustrate the daily values for water quality parameters in Sessom Creek (maximum daily temperature, minimum daily DO, mean daily turbidity and conductivity, respectively). Sessom Creek displayed more variability in water quality conditions than the San Marcos River RTWQ sites. Similar to the downstream San Marcos River site, a drop in minimum daily temperature (5.20°C) was observed during a cold weather rain event in February. The highest maximum daily water temperature reported in Sessom Creek for 2022 was 31.41°C in August. Maximum daily water temperatures exceeded 25°C for 92 days (May – September) in 2022, ranging from 0.1 hours – 18.8 hours (mean = 4.1 hours, median = 3.5 hours) at or above 25°C during those 92 days. DO dropped below 4.0 mg/l in Sessom Creek for 52 days in May – December ranging from 0.1 hours – 23.1 hours (median = 10.25 hours, mean = 10.29 horus). The lower minimum daily DOs observed in Sessom Creek corresponded mainly with rainfall events during months when instream springflow was minimal and run-off dominated creek water volume. However, once the run-off dissipated, the minimum daily DO returned to levels close to 4.0 mg/l. Spikes in mean daily turbidity were observed with corresponding drops in conductivity, indicating an influx of run-off from a rain event (Figure 3.1-10).

Table 3.1-4. Monthly mean, minimum, and maximum for water quality parameters in Sessom Creek (2022).

Month (2022)	**Temperature (°C)**			**DO (mg/l)**			**Conductivity (µs/cm)**			**Turbidity (NTU)**		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Jan	20.06	13.08	22.46	6.90	5.51	10.31	634	76	658	13.47	0.00	2794.30
Feb	19.83	5.20	22.70	7.31	5.73	12.63	643	56	705	10.93	0.25	1079.60
Mar	21.43	19.21	23.00	6.60	4.57	8.53	650	89	666	3.92	0.48	1073.80
Apr	22.19	20.61	23.74	5.58	4.16	7.19	657	206	669	4.02	0.99	532.58
May	22.94	20.27	26.73	5.33	3.54	9.20	653	56	670	14.15	1.53	879.33
Jun	23.51	22.50	27.74	6.11	4.71	10.94	647	50	686	9.12	1.80	590.03
Jul	23.89	22.94	26.40	6.56	4.79	13.08	658	633	671	7.91	2.44	523.26
Aug	24.32	23.09	30.41	5.68	0.73	13.18	623	43	682	29.57	1.77	1728.20
Sept	23.76	20.62	29.41	5.28	0.95	10.58	620	45	679	17.22	0.23	1934.10
Oct	21.23	17.44	24.65	5.41	1.55	9.82	608	48	656	23.91	0.00	1855.60
Nov	18.47	9.13	23.75	5.84	2.83	11.13	538	17	655	41.82	0.72	1818.90
Dec	18.21	10.40	22.69	4.24	2.46	10.06	638	109	682	5.79	0.00	237.68

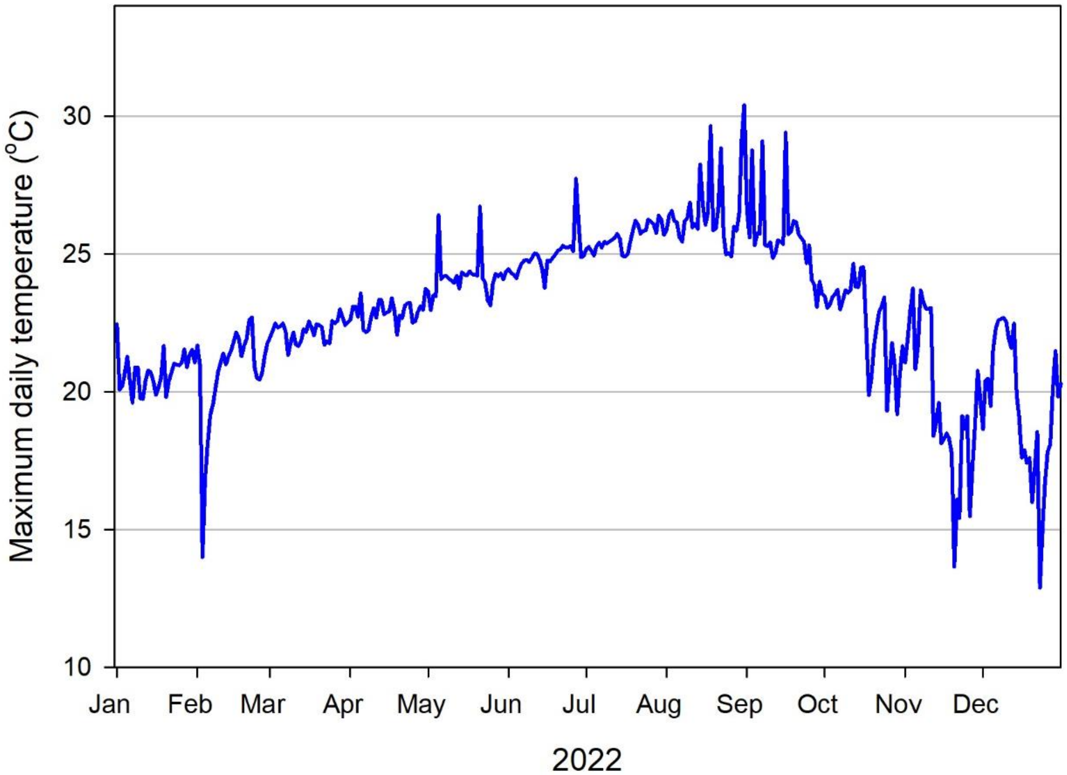

Figure 3.1-8. Maximum daily water temperatures (°C) in Sessom Creek (2022).

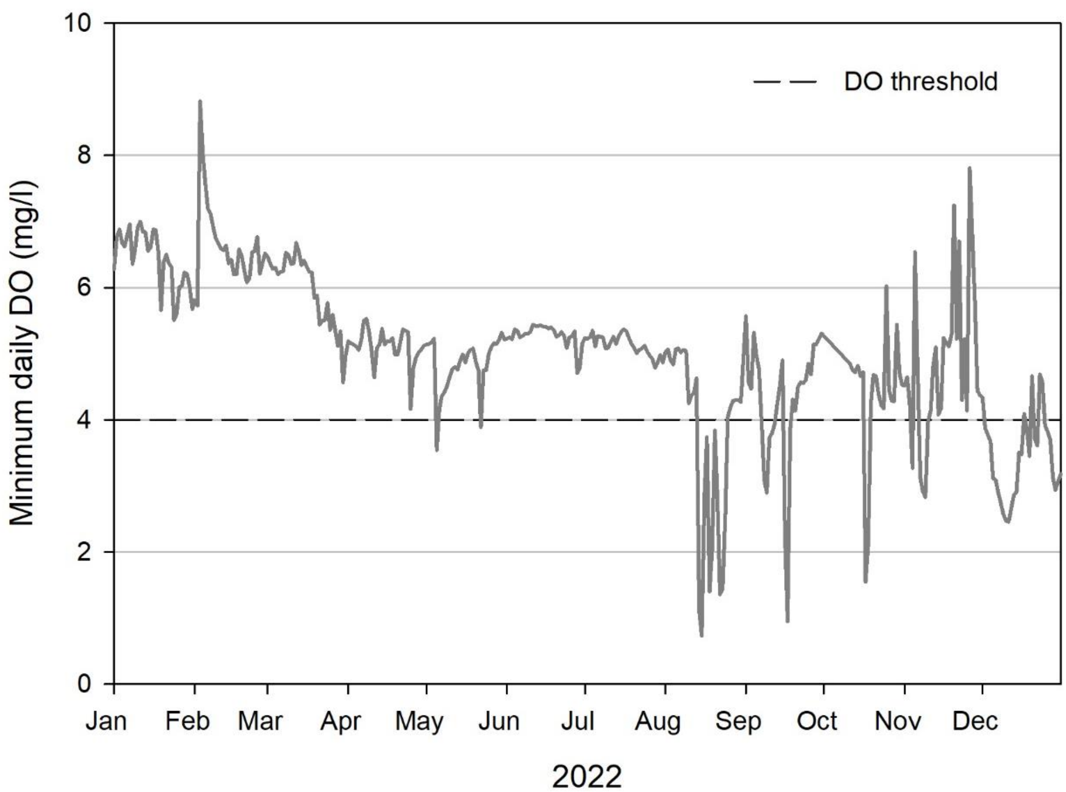

Figure 3.1-9. Minimum daily DO (mg/l) in Sessom Creek (2022).

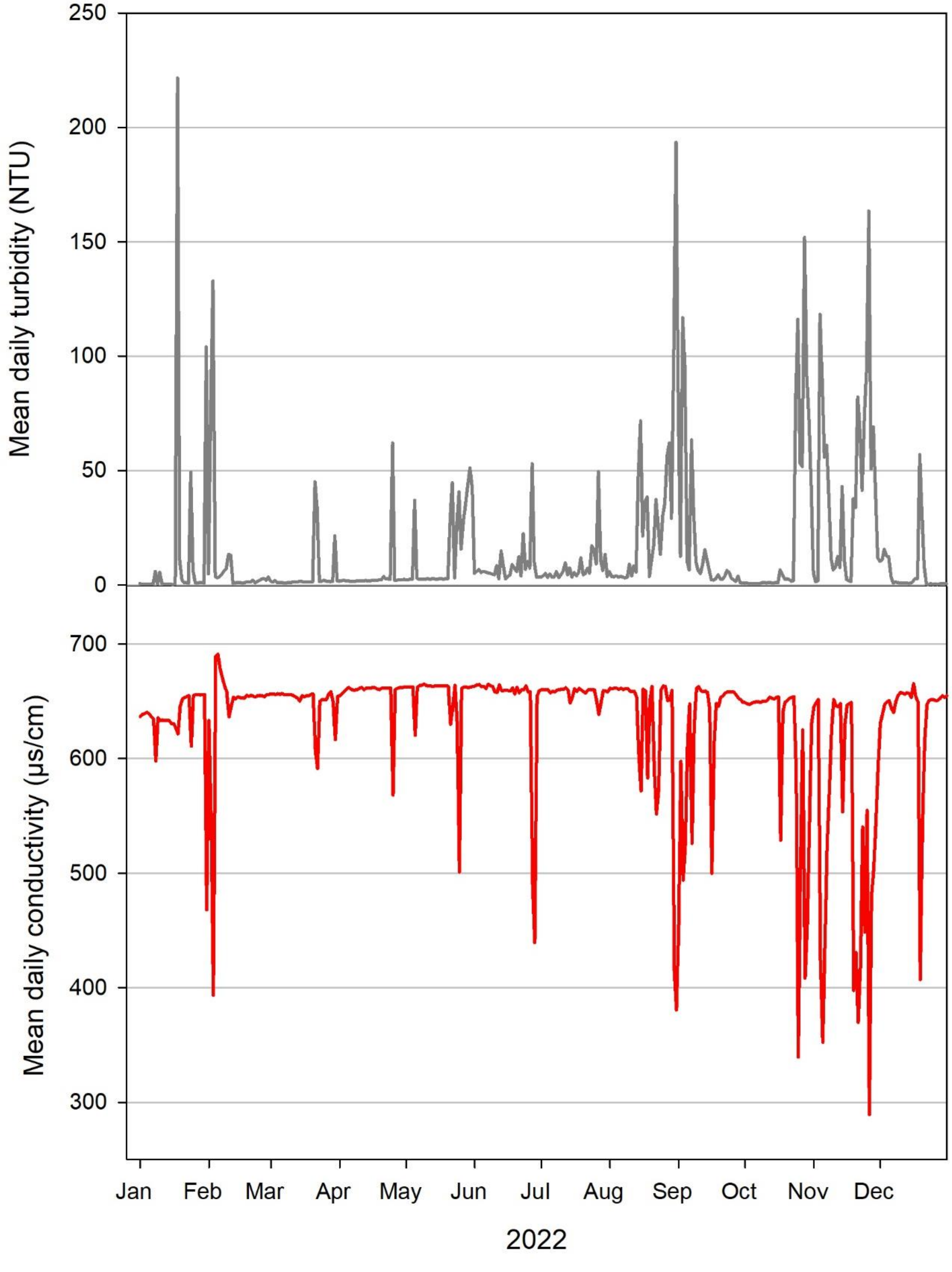

Figure 3.1-10. Mean daily turbidity (NTU) and mean daily conductivity (µs/cm) in Sessom Creek (2022).

3.1.2 Comal

Hydrology

Average springflow at Comal Springs for the period of record (i.e., 1927 – present) was 288 cfs. Since 2013, Comal springflow ranged from below average in 2013-2014 to above average from mid-2015-2017 (Figure 3.1-11). Extended low flow conditions occurred in 2014 and Comal springflow dropped down to as low as 65 cfs on August 29, 2014. In 2015, rainfall throughout the course of the year, particularly two large precipitation events in late May and October, resulted in above average springflow. The large flood pulse on October 30, 2015 had a peak discharge reaching 14,100 cfs. Springflows remained above average in 2016 through 2017 due to several moderate rain events. In 2018, springflow dropped below average, reaching 161 cfs in late August. However, multiple rain events in the early fall resulted in increased springflow and subsequent above average springflow rates. Springflow in 2019 was generally above 350 cfs until July when springflow decreased to average by mid-August but rose above 300 cfs before the end of the year. No substantial flow events occurred in 2019. The absence of large flow event continued into 2020 and springflows continued to decrease, dropping below the long-term average from May to December. Sprinflows continued to decline in early 2021 to just below 200 cfs in April, but rain events in late spring resulted in sprinflows increasing to above average. Additional rain events in fall (i.e., 5,030 cfs pulse in October) helped maintain near average springflows through December 2021. Springflows decreased and remained below average during 2022, dropping below 100 cfs in July and hitting 90 cfs in mid-August. Similar to the San Marcos system, no major run-off events occurred in 2022.

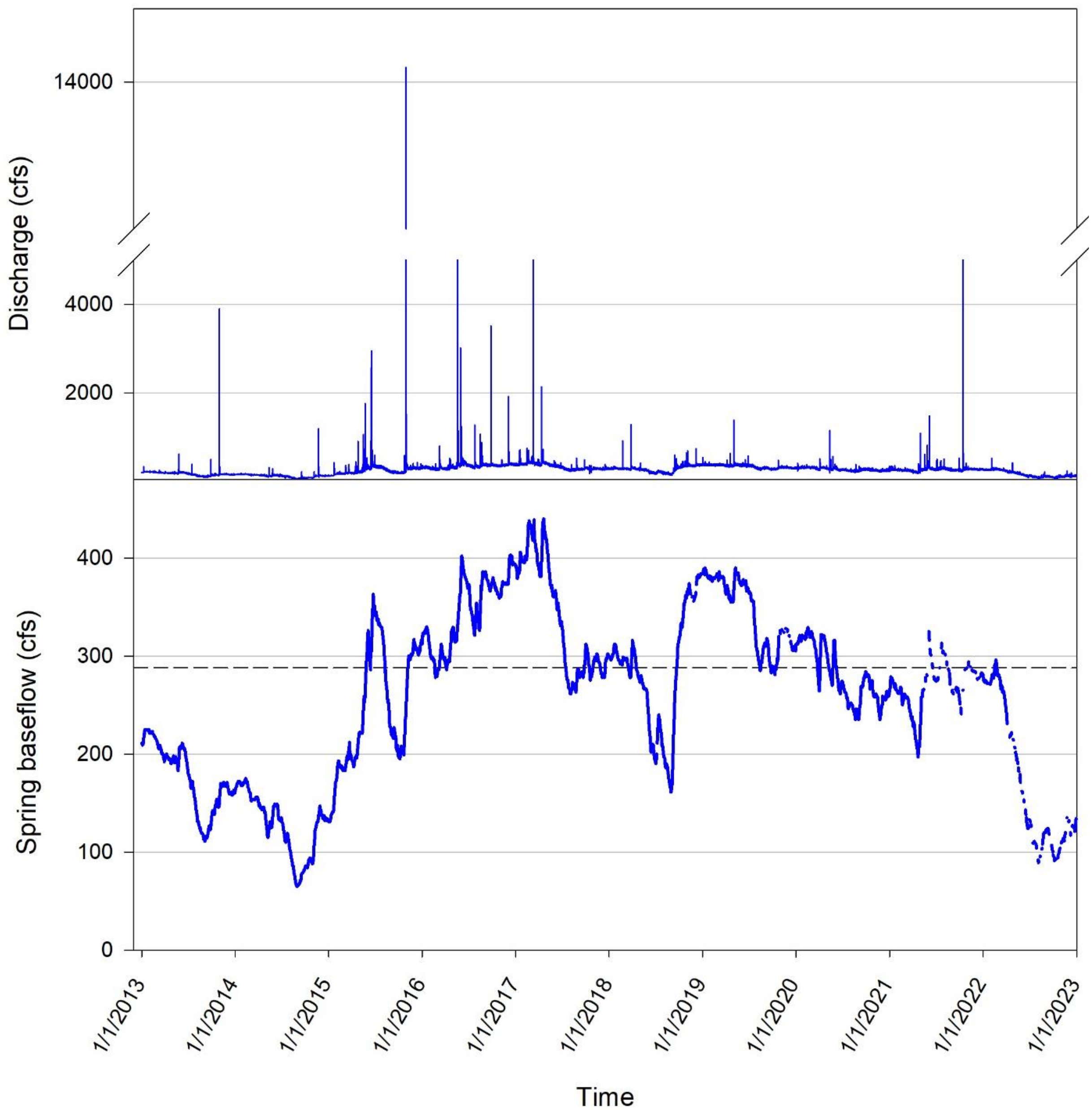

Figure 3.1-11. Hydrographs for th Comal River at New Braunfels (USGS station 08169000) and mean daily springflow for Comal springs (USGS Station 08168710) 2013 – 2022. Dashed line denotes long term average springflow (288 cfs) in the Comal River.

Temperature

Table 3.1-5 displays monthly summary statistics for water temperature at Comal RTWQ sites for 2022. In general, mean monthly water temperatures remained fairly stable within a site with deviations averaging ~1-2 °C and did not vary greatly among sites. Between Spring Run sites, water temperature at SR 7 continued to be slightly warmer than SR 3. Outside the direct influx of spring runs, the Old Channel (OC) exhibited more variability in minimum and maximum monthly water temperatures. The highest water temperature recorded in 2022 was 26.69°C in the OC during July whereas the lowest temperature (19.56°C) occurred in the OC during December.

Table 3.1-5. Monthly mean, minimum, and maximum water temperatures (°C) among Comal RTWQ (2022).

Month (2022)	Spring Run 3			Spring Run 7			Old Channel		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Jan	23.56	23.52	23.60	23.85	23.83	23.85	22.63	21.21	24.17
Feb	23.53	22.97	23.62	23.85	23.84	23.86	22.63	20.60	24.81
Mar	23.57	23.52	23.65	23.85	23.84	23.86	23.15	21.24	25.19
Apr	23.58	23.54	23.65	23.85	23.84	23.85	23.65	22.15	25.61
May	23.59	23.53	23.65	23.84	23.81	23.87	24.26	22.83	26.26
Jun	23.58	23.53	23.65	23.83	23.73	23.85	24.66	23.34	26.60
Jul	23.58	23.53	23.68	23.84	23.81	23.86	24.78	23.61	26.69
Aug	23.57	23.53	23.71	23.84	23.81	23.85	24.58	23.62	26.64
Sept	23.55	23.47	23.64	23.86	23.83	23.90	24.37	22.67	26.20
Oct	23.51	23.34	23.65	23.83	23.81	23.85	23.61	21.97	25.79
Nov	23.48	23.37	23.60	23.82	23.79	23.84	22.86	21.14	24.76
Dec	23.47	23.34	23.56	23.83	23.80	23.84	22.61	19.56	24.36

Box plots for maximum daily water temperatures observed at Comal RTWQ sites from time of sensor deployment (i.e., 2013 for SR 3, SR 7 and 2018 for OC) through 2022 compared to maximum daily water temperatures observed in 2022 are shown in Figure 3.1-12. The medians of maximum daily temperatures for 2022 were slightly higher than t the medians of maximum daily temperatures from time of equipment deployment at Comal RTWQ sites.

Maximum daily temperatures were plotted for Comal system RTWQ sites for 2022 (Figure 3.1-13). Throughout 2022, maximum daily water temperatures were more variable at the OC river site whereas little variation in maximum daily water temperature was observed at SR 3 and SR 7. Similar to previous years, maximum daily water temperatures in 2022 consistently reached and exceeded 25°C at the OC site in April through early October.

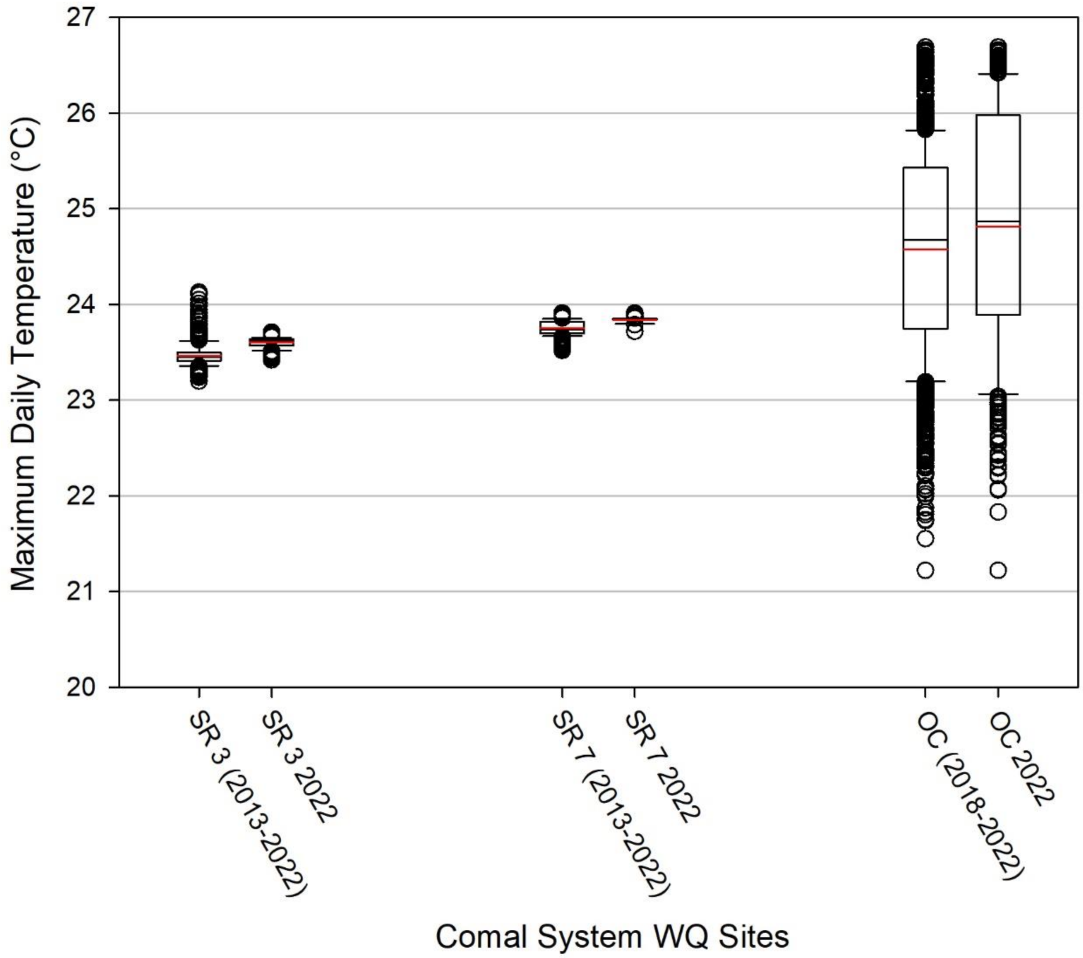

Figure 3.1-12. Box plots of maximum water daily temperatures (°C) among Comal system RTWQ sites from time of deployment through 2022 compared to 2022. Black lines represent median values and red lines denote mean values. Whiskers represent maximum and minimum temperature values, excluding outliers (open circles).

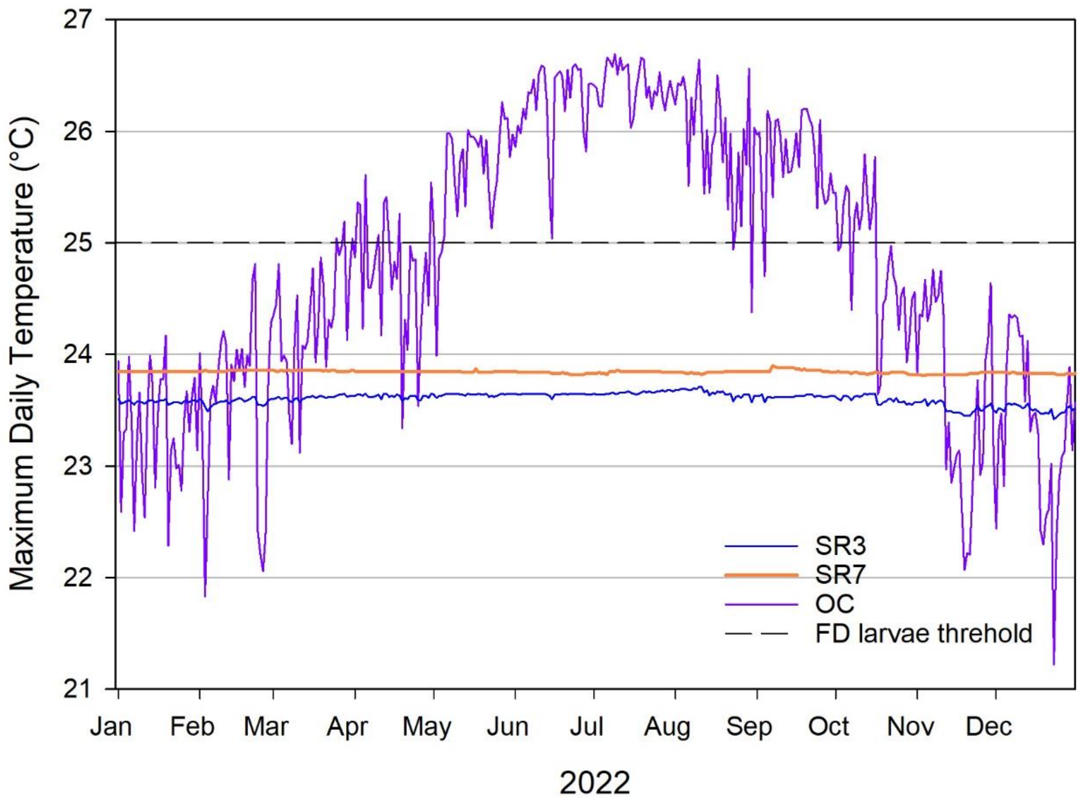

Figure 3.1-13. Maximum daily water temperature (°C) among Comal RTWQ sites (2022).

Box plots for seasonal maximum daily temperatures at the Comal system RTWQ sites for 2022 are shown in Figure 3.1-14. Little seasonal variation in maximum daily temperature (i.e., <0.05°C) was observed at the two spring run sites. However, the OC river site exhibited a wider range in seasonal variation with median values differing ~3 °C. Spring and fall also showed variability in maximum daily temperature at the OC site while summer months showed less variability but recorded the highest maximum daily temperatures. In the OC, water temperature exceeded 25°C for 172 days in 2022, and of those 172 days, approximately 30% (mean = 6.8 hours, range = 0.5 – 9.8 hours) of the 24-hour day exceeded 25°C.

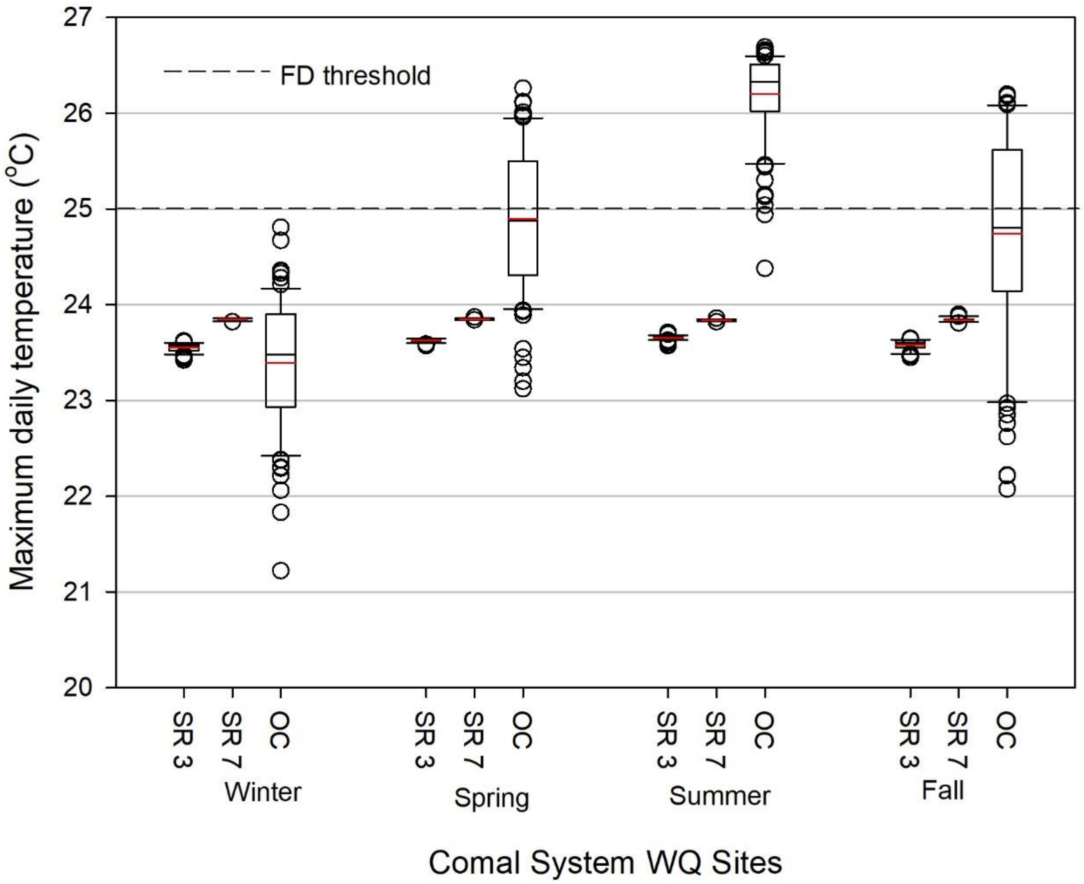

Figure 3.1-14. Box plots of maximum daily water temperatures (°C) among seasons at Comal system RTWQ sites in 2022. Black lines represent median values and red lines denotes mean values. Whiskers represent maximum and minimum temperature values, excluding outliers (open circles).

Dissolved Oxygen

Table 3.1-6 displays monthly summary statistics for dissolved oxygen (DO) recorded for Comal RTWQ sites in 2022. Mean monthly dissolved oxygen remained consistent within a site with variations averaging ~ 1 mg/l. Similar to previous years, mean monthly DO was lower in the spring run sites than the OC river site. The highest DO recorded in 2022 was 10.21 mg/l in the OC during March and the lowest DO (4.97 mg/l) occurred at SR 3 in March.

Table 3.1-6. Monthly mean, minimum, and maximum DO (mg/l) among Comal system RTWQ sites (2022).

Month (2022)	Spring Run 3			Spring Run 7			Old Channel		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Jan	5.07	5.00	5.20	5.09	5.07	5.10	7.36	6.08	9.35
Feb	5.08	5.00	5.51	5.08	5.06	5.09	7.51	6.06	9.72
Mar	5.07	4.98	5.22	5.09	5.01	5.23	7.58	5.86	10.21
Apr	5.07	4.97	5.25	5.13	5.06	5.18	7.23	5.57	10.13
May	5.08	5.00	5.25	5.07	5.03	5.11	7.35	5.74	9.97
Jun	5.15	5.02	5.41	5.18	5.08	5.21	7.20	5.66	9.82
Jul	5.20	5.09	5.46	5.14	5.09	5.17	7.24	5.54	9.81
Aug	5.21	5.07	5.56	5.12	5.09	5.15	7.03	5.49	9.46
Sept	5.18	5.09	5.47	5.10	5.08	5.12	7.19	5.81	9.46
Oct	5.25	5.10	5.56	5.10	5.07	5.12	7.32	5.76	9.63
Nov	5.20	5.09	5.42	5.09	5.06	5.10	7.31	5.72	9.64
Dec	5.17	5.07	5.34	5.07	5.06	5.09	7.40	6.06	10.08

Box plots for minimum daily DO observed at Comal system RTWQ sites from time of equipment deployment (i.e., 2013 for SR3, SR7 and 2018 for OC) through 2022 compared to minimum daily DO observed in 2022 are shown in Figure 3.1-15. The medians of minimum daily DO for 2022 were generally consistent with medians of minimum daily DO since time of sensor deployment at Comal system RTWQ sites. However, the median minimum daily DO in Spring Run 3 for 2022 was slightly lower than minimum daily DO observed since 2013, and the median minimum daily DO in Spring Run 7 was slightly higher.

Minimum daily DO was plotted for Comal RTWQ sites in 2022. (Figure 3.1-16). Spring run 3, and SR 7 demonstrated relatively constant DO whereas the OC river site was more variable in DO with seasonally drops in minimum daily DO during the summer months. Although greater in variability, the OC maintained higher minimum daily DO compared to the spring run sites and no sites recorded a minimum daily DO below 4.0 mg/l in 2022.

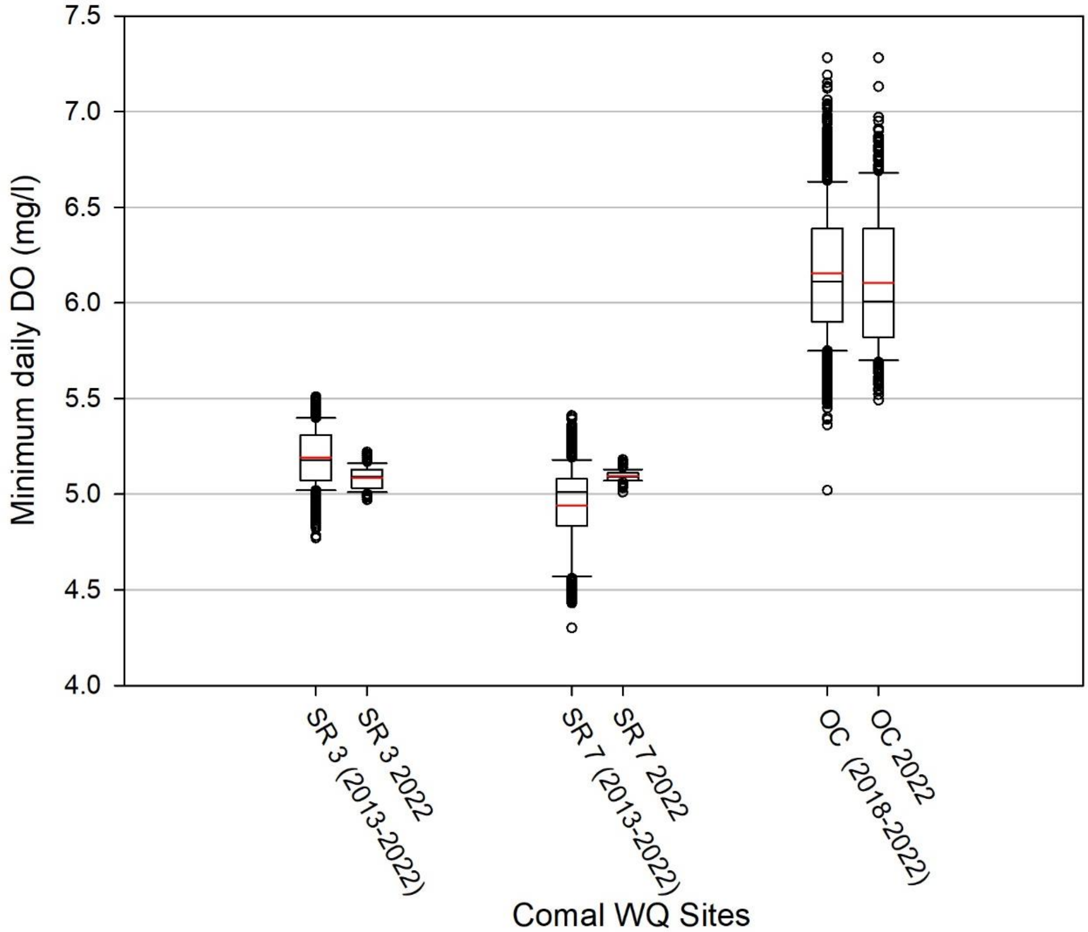

Figure 3.1-15. Box plots of minimum daily DO (mg/l) among Comal system RTWQ sites from time of equipment deployment through 2022 compared to 2022. Black lines represent median values and red lines denotes mean values. Whiskers represent maximum and minimum DO values, excluding outliers (open circles).

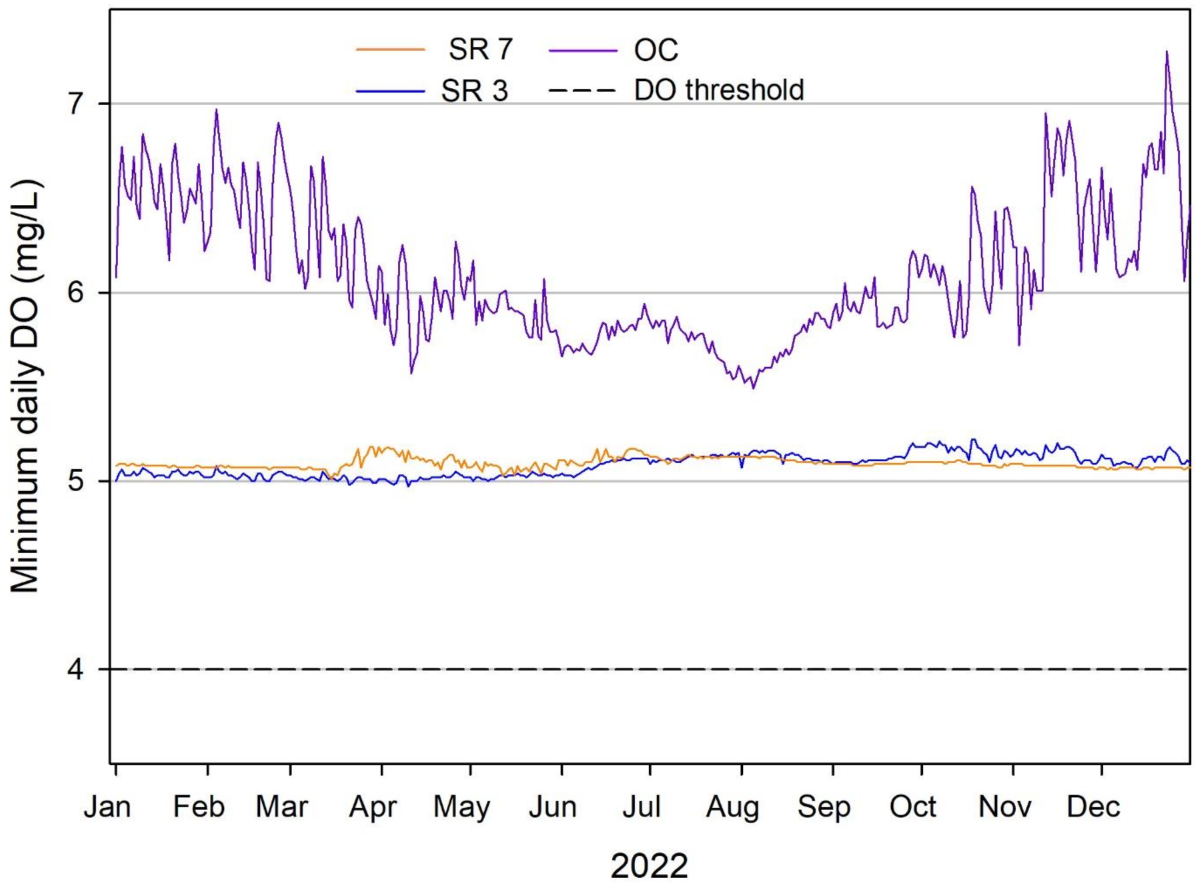

Figure 3.1-16. Minimum daily DO (mg/l) among Comal RTWQ sites (2022).

Conductivity

Table 3.1-7 displays monthly summary statistics for conductivity (µs/cm) recorded at Comal system RTWQ sites during 2022. Mean monthly conductivity remained consistent at the three WQ sites throughout the year with little variability between sites. In general, mean conductivity ranged between 565-598 µs/cm among all Comal system RTWQ sites. The lowest conductivity in 2022 was recorded in the OC in August (180 µs/cm) during a run-off event (Figure 3.1-17).

Comal River discharge (cfs) and mean daily conductivity were plotted for Comal system RTWQ sites for 2022 (Figure 3.1-17). Little variation in mean daily conductivity for spring run sites occurred in 2022. However, mean daily conductivity in the OC was influenced by rain events with drops in conductivity values corresponding with influxes of run-off. Since the Comal discharge gage location is located downstream from the confluence of the Old and New Channel of the Comal, some rain events in the system do not result in conductivity drops in the Old Channel. Additionally, the Comal River has slightly lower conductivity than the San Marcos River.

Table 3.1-7. Monthly mean, minimum, and maximum conductivity (µs/cm) among Comal system RTWQ sites (2022).

Month (2022)	Spring Run 3			Spring Run 7			Old Channel		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Jan	588	588	589	571	569	573	566	549	582
Feb	588	548	590	569	567	571	563	535	579
Mar	590	586	591	567	565	570	563	527	587
Apr	593	585	597	566	563	567	562	525	580
May	594	585	595	564	557	566	554	456	586
Jun	595	552	599	564	560	565	553	323	595
Jul	595	530	599	565	562	566	558	450	588
Aug	597	565	599	566	565	567	543	180	596
Sept	598	593	600	567	566	568	569	546	580
Oct	599	579	601	568	561	569	566	495	573
Nov	598	586	600	569	568	569	568	533	575
Dec	598	594	600	568	568	569	567	531	575

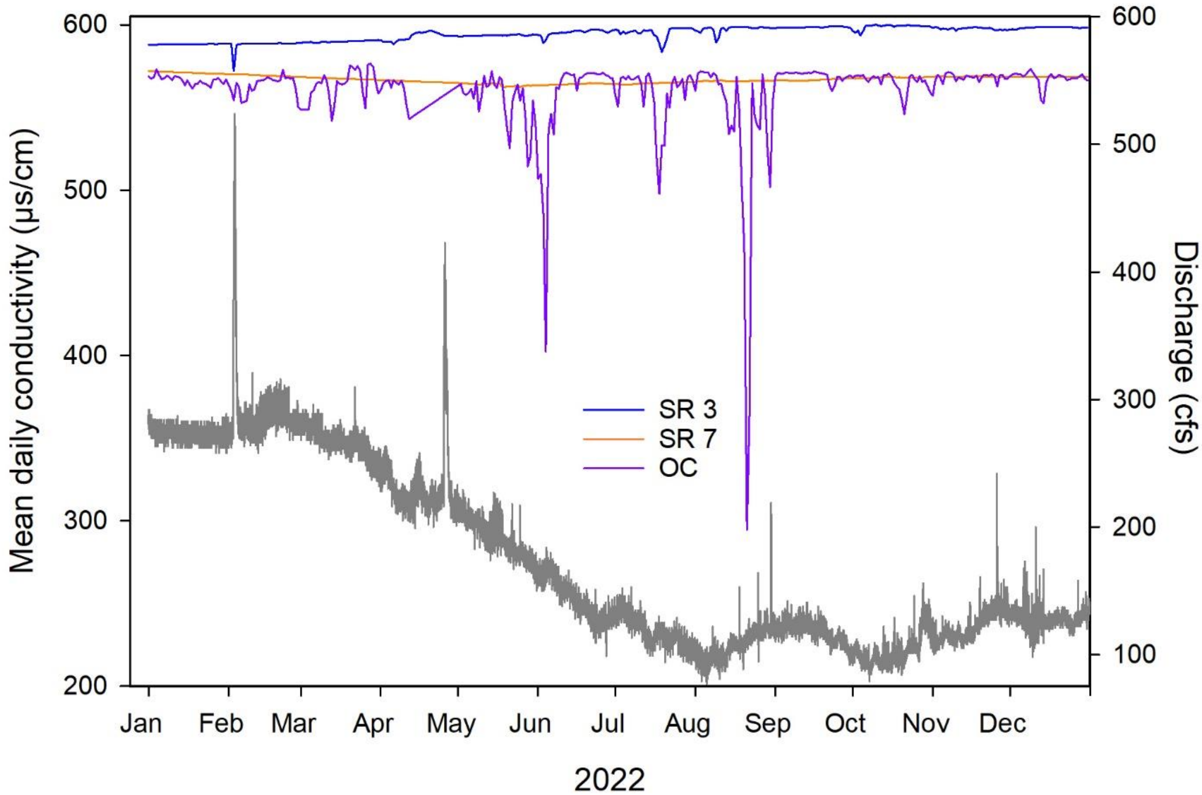

Figure 3.1-17. Mean daily conductivity (µs/cm) among Comal system RTWQ sites and Comal River discharge (Gage#08169000) in 2022.

3.2 Surface water sampling

3.2.1 San Marcos

Table 3.2-1 denotes the water quality parameters collected at Hotel Spring during monthly sucralose collections. Water quality parameters measured during monthly sampling events were consistent with measurements collected by the RTWQ network station at Aquarena Springs.

Table 3.2-1. Monthly (2022) water quality parameters measured at Hotel Spring (Spring Lake, San Marcos).

Month	Conductivity (µs/cm)	DO (mg/l)	pH (SU)	Temperature (°C)
Jan	567	4.09	6.98	21.93
Feb	573	4.23	6.96	21.86
Mar	578	4.22	7.11	21.75
Apr	583	4.55	7.10	21.71
May	582	4.64	7.09	21.69
Jun	586	4.62	7.11	21.82
Jul	594	4.65	7.13	21.80
Aug	591	4.68	7.21	21.92
Sep	600	4.70	7.16	21.96
Oct	600	4.74	7.14	22.18
Nov	598	4.54	6.99	22.58
Dec	630	4.54	7.00	22.61

A total of 12 sucralose samples were collected during monthly collections at Hotel Spring in 2022, including one DI (i.e., deionized water) blank. Sucralose was detected in seven separate samples at Hotel Spring in 2022 (Table 3.2-2) with concentrations reported in February (17.3 ng/L), March (18.1 ng/L), (April (9.48 ng/L), June (11.4 ng/L , July (9.32 ng/L), August (44.0 ng/L), and September (11.9 ng/L). Quality control spike recoveries for all sampling events were between 79.6 – 120.0 %. A full table including duplicate samples, field and laboratory blanks can be found in Table A-1 in appendix A.

Table 3.2-2. Sucralose concentrations (ng/L) measured at Hotel Springs in Spring Lake (2022). Samples with detectable concentrations denoted in bold.

Month	Sample (ng/L)
January	8.08[U]
February	**17.3**
March	**18.1**[A]
April	**9.5**
May	8.31[U]
June	**11.4**
July	**9.3**
August	**44.0**[B]
September	**11.9**
October	NA
November	NA
December	NA

[U] Non-detect at reporting limit

[A] Not detected in DI blank

[B] Dilution data

During Spring and Fall sampling events, nutrient samples and one duplicate sample per site per season (i.e., upper in Spring and lower in Fall) were taken. Nutrient concentrations measured at the upper and lower sites (i.e., Hotel Springs and near the TPWD hatchery) in the San Marcos system during Spring and Fall are denoted in Table 3.2-3. In Spring, no detections for total phosphorous, orthophosphate, or orthophosphate as P were reported in 2022. Among nutrients detected, dissolved inorganic carbon and nitrate as N were reported among each sampling event in 2022. Total organic carbon was detected at the lower site in Spring and both sites in Fall. Other nutrients detected were total organic carbon at the lower site in Spring and both the upper and lower sites in Fall. Kjeldahl nitrogen was detected during the Fall but was also detected in the equipment or DI blank. Ammonia was detected in both upper and lower sites in the Spring and in the lower site during the Fall; however, during the Spring sampling events, ammonia was also detected in the equipment or DI blank and suggests a false positive. Additional results for duplicate samples, percent difference between sample and duplicate samples, and field and laboratory blank values can be found in Table A-3 and A-4 in appendix A.

Table 3.2-3. Nutrient concentrations measured at the upper and lower sites in the San Marcos system during Spring and Fall (2022). Samples with detectable concentrations denoted in bold.

		Spring		Fall	
Nutrients	**Units**	**Upper**	**Lower**	**Upper**	**Lower**
Total Phosphorus	ug/L	**50**[HAD]	25[UH]	25[U]	25[UA]
Orthophosphate	mg/L	**1.47**[HBD]	0.02[UH]	0.02[UH]	0.02[UHBD]
Orthophosphate as P	mg/L	**1.47**[HBD]	0.02[UH]	0.02[UH]	0.02[UHBD]
Total Organic Carbon	mg/L	**0.65**[JHBCD]	**0.77**[JC]	0.29[UC]	0.29[UBCD]
Dissolved Inorganic Carbon	mg/L	**66.4**[B]	**64.9**	**73.0**[HC]	**67**[HBC]
Dissolved Organic Carbon	mg/L	**0.59**[J]	NA	**0.88**[HC]	**0.55**[JHBCD]
Kjeldahl Nitrogen	mg/L	0.1[UBD]	0.1[U]	0.1[U]	**0.125**[JBD]
Nitrate as N	mg/L	**0.85**[HBC]	**1.09**[HC]	**1.37**	**1.41**[B]
Ammonia	ug/L	**74**[JBCD]	29[UC]	**250**[C]	**322**[BCD]

[U] Non-detect

[H] Sample was prepped and analyzed past holding time

[F1] MS and/or MSD recovery exceeds control limits

[J] Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

[A] Not detected in duplicate sample

[B] Detected in duplicate sample

[C] Detected in laboratory or field blank

[D] Greater than 20% Relative Percent Difference between sample and duplicate

3.2.2 Comal

Table 3.2-4 denotes the water quality parameters collected at Spring Run 3 in Landa Lake during monthly sucralose collections in 2022. Water quality parameters measured during monthly sampling events were consistent with measurements collected by the RTWQ network station in Spring Run 3.

Table 3.2-4. Monthly (2022) water quality parameters measured at Spring Run 3 (Landa Lake).

Month	Conductivity (µs/cm)	DO (mg/l)	pH (SU)	Temperature (°C)
Jan	563	5.12	6.98	23.61
Feb	572	5.18	6.91	23.49
Mar	571	5.21	7.05	23.59
Apr	572	5.25	7.09	23.45
May	573	5.27	7.09	23.33
Jun	575	5.27	7.09	23.41
Jul	578	5.33	7.15	23.28
Aug	561	5.35	7.19	23.32
Sep	576	5.29	7.20	23.35
Oct	574	5.40	7.12	23.46
Nov	567	5.14	7.01	23.91
Dec	595	5.17	7.02	23.96

A total of 12 sucralose samples were collected during monthly collections at Spring Run 3 in 2022, including one field duplicate samples and two DI blanks. Among monthly collections, sucralose was detected during six sampling events at Spring Run 3 with a concentration of 11.8 ng/L recorded in January, 13.5 ng/L in March, 13.4 ng/L in April, 9.76 ng/L in June, 9.65 ng/L in August, and 8.76 ng/L in September (Table 3.2-5). Quality control spike recoveries for all sampling events were between 81.3 – 115.0 %. A full table including duplicate samples, field and laboratory blanks can be found in Table A-2 appendix A.

Table 3.2-5. Sucralose concentrations (ng/L) measured at Spring Run 3 in Landa Lake (2022). Samples with detectable concentrations denoted in bold.

Month	Sample (ng/L)
January	**11.8**
February	8.24[U]
March	**13.5**
April	**13.4**[A]
May	8.1[U]
June	**9.76**[B]
July	8.32[U]
August	**9.65**[A]
September	**8.76**
October	NA
November	NA
December	NA

[U] Non-detect at reporting limit

[A] Non detected in DI blank

[B] Detected in duplicate sample

During Spring and Fall sampling events, nutrient samples and one duplicate sample for each season (i.e., upper in Spring and lower in Fall) were taken. Nutrient concentrations measured at the upper and lower sites (i.e., Spring Run 3 and at the last public exit) in the Comal system during Spring and Fall are denoted in Table 3.2-6. No detections for total phosphorous, orthophosphate, and orthophosphate as P were reported in 2022. Among nutrients detected, dissolved inorganic carbon, dissolved organic carbon, nitrate as N, and ammonia were reported at both sites for the two sampling events in 2022. Total organic carbon was detected at both sites during the Spring and at the lower site in the Fall. Nitrogen was detected at the lower site during the Fall. Total organic carbon and ammonia in both seasons, dissolved inorganic carbon and dissolved organic carbon in Fall, and nitrate as N in Spring were detected in the laboratory or field blank that suggests a false positive. Results for duplicate samples, percent difference between sample and duplicate samples, and field and laboratory blank values can be found in Table A-5 and A-6 in appendix A.

Table 3.2-6. Nutrient concentrations measured at the upper and lower sites in the Comal system during Spring and Fall (2022). Samples with detectable concentrations denoted in bold.

		Spring		Fall	
Nutrients	**Units**	**Upper**	**Lower**	**Upper**	**Lower**
Total Phosphorus	ug/L	40[UA]	NA	25[U]	25[UA]
Orthophosphate	mg/L	0.02[UA]	0.02[UH]	0.02[UH]	0.02[UHA]
Orthophosphate as P	mg/L	0.02[UA]	0.02[UH]	0.02[UH]	0.02[UHA]
Total Organic Carbon	mg/L	**0.66**[JHBC]	**0.78**[JHC]	0.29[UC]	**0.75**[JACD]
Dissolved Inorganic Carbon	mg/L	**63.4**[B]	**61.1**	**68.0**[HC]	**65.0**[HBC]
Dissolved Organic Carbon	mg/L	**0.65**[J]	**0.78**[J]	**0.55**[JHC]	**0.78**[JHBCD]
Kjeldahl Nitrogen	mg/L	0.1[UF1A]	0.1[U]	0.1[UA]	**0.14**[JBD]
Nitrate as N	mg/L	**1.60**[HBC]	**1.65**[HC]	**1.8**	**1.7**[B]
Ammonia	ug/L	**184**[BC]	**154**[C]	**83**[JC]	**193**[BCD]

[U] Non-detect

[H] Sample was prepped and analyzed past holding time

[F1] MS and/or MSD recovery exceeds control limits

[J] Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

[A] Not detected in duplicate sample

[B] Detected in duplicate sample

[C] Detected in laboratory or field blank

[D] Greater than 20% Relative Percent Difference between sample and duplicate

3.3 Groundwater sampling

3.3.1 San Marcos

A total of six PPCP samples (i.e., one sample at each sampling site and event) were collected during 2022, including two blanks (i.e., one equipment blank in Spring at Deep Hole and one DI blank at Hotel in Fall). Samples were taken at Hotel in the months of January, March, May, July, September, and November. Deep Hole was only sampled in March and September. Results for PPCP sampling during the regular Spring (March) and Fall sampling (September) events are denoted in Table 3.3-1 and 3.3-2. Results for PPCP sampling at Hotel for January, May, July, and September are denoted in Table 3.3-3 and Table 3.3-4. Overall, few PPCP detections at the reporting limit occurred in 2022 sampling events. DEET was detected at during each sampling event for Hotel and Deep Hole; however, it is likely a false positive because it was found in the blank in all sampling events. Cocaine was detected at Hotel and Deep Hole Springs in Spring and Hotel in January, but it was also detected in the blank. Flumequine, Oxolinic acid, and Penicillin G were detected during the Spring sampling event at Deep Hole but were flagged as "B", indicating that a concentration was also detected in the lab blank and the sample concentration was 10x less than the blank concentration. Flumequine and Oxolinic acid were also detected at Hotel during the January sampling event. Other PPCP detections at Hotel included Ciprofloxacin in May and Virginiamycin M1 in July. Results for samples and the equipment, DI, and laboratory blank values can be found in Table A-7 through A-10 in appendix A.

Table 3.3-1. PPCP concentrations (ng/L) measured at Hotel and Deep Hole Spring (Spring Lake, San Marcos) during Spring and Fall sampling events (2022). Samples with detectable concentrations denoted in bold.

	Spring		Fall	
PPCP list	Hotel spring	Deep Hole	Hotel spring	Deep Hole
Acetaminophen	17.4[U]	18.1[U]	2.98[U]	2.98[U]
Azithromycin	1.74[U]	1.81[U]	1.49[U]	1.49[U]
Caffeine	17.4[U]	18.1[U]	5.97[U]	5.96[U]
Carbadox	1.74[U]	1.81[U]	3.98[U]	3.97[U]
Carbamazepine	1.74[U]	1.81[U]	0.298[U]	0.298[U]
Cefotaxime	6.96[U]	7.23[U]	5.91[U]	5.90[U]
Ciprofloxacin	6.96[U]	7.23[U]	1.49[U]	1.49[U]
Clarithromycin	1.74[U]	1.81[U]	0.298[U]	0.298[U]
Clinafloxacin	6.96[U]	10.2[U]	1.99[U]	1.98[U]
Cloxacillin	3.48[UH]	17.9[UH]	2.98[UH]	2.98[UH]
Dehydronifedipine	0.696[U]	0.723[U]	0.298[U]	0.298[U]
Diphenhydramine	0.696[U]	0.723[U]	0.597[U]	0.596[U]
Diltiazem	0.348[U]	0.362[U]	0.149[U]	0.149[U]
Digoxin	6.96[U]	7.23[U]	5.97[U]	5.96[U]
Digoxigenin	6.96[U]	7.23[U]	1.49[U]	1.49[U]
Enrofloxacin	3.48[U]	3.62[U]	0.597[U]	0.596[U]
Erythromycin-H2O	2.67[U]	2.77[U]	1.49[U]	1.49[U]
Flumequine	1.74[UC]	**3.71[BC]**	0.298[U]	0.298[U]
Fluoxetine	1.74[U]	1.81[U]	0.149[U]	0.149[U]
Lincomycin	3.48[U]	3.62[U]	0.597[U]	0.596[U]
Lomefloxacin	3.48[U]	3.62[U]	0.597[U]	0.596[U]
Miconazole	1.74[U]	1.81[U]	0.298[U]	0.298[U]
Norfloxacin	17.4[U]	24.3[U]	1.99[U]	1.98[U]
Norgestimate	3.48[U]	3.62[U]	1.49[U]	1.49[U]
Ofloxacin	1.74[U]	1.81[U]	0.597[U]	0.596[U]
Ormetoprim	0.696[U]	0.723[U]	0.149[U]	0.149[U]
Oxacillin	3.48[UH]	3.62[UH]	1.49[UH]	1.49[UH]
Oxolinic Acid	0.696[UC]	**1.12[BC]**	0.597[U]	0.596[U]
Penicillin G	3.48[UHC]	**105[HC]**	2.98[UH]	2.98[UH]
Penicillin V	3.48[U]	6.5[U]	1.49[U]	1.49[U]
Roxithromycin	0.348[U]	0.362[U]	0.149[U]	0.149[U]
Sarafloxacin	17.4[U]	18.1[U]	2.98[U]	2.98[U]
Sulfachloropyridazine	1.74[U]	1.81[U]	0.597[U]	0.596[U]
Sulfadiazine	1.74[U]	1.81[U]	0.597[U]	0.596[U]
Sulfadimethoxine	0.348[U]	0.362[U]	0.298[U]	0.298[U]
Sulfamerazine	0.77[U]	0756[U]	0.597[U]	0.596[U]
Sulfamethazine	0.696[U]	0.723[U]	0.597[U]	0.596[U]
Sulfamethizole	0.696[U]	0.723[U]	0.597[U]	0.596[U]
Sulfamethoxazole	0.696[U]	0.723[U]	0.597[U]	0.596[U]
Sulfanilamide	17.4[U]	18.1[U]	5.97[U]	5.96[U]
Sulfathiazole	1.74[U]	1.81[U]	1.49[U]	1.49[U]
Thiabendazole	1.74[U]	1.81[U]	0.298[U]	0.298[U]
Trimethoprim	1.74[U]	1.81[U]	0.298[U]	0.298[U]
Tylosin	6.96[U]	7.23[U]	0.597[U]	0.596[U]
Virginiamycin M1	3.48[U]	3.62[U]	0.597[U]	0.596[U]
1,7-Dimethylxanthine	69.6[U]	72.3[U]	5.97[U]	5.96[U]

[U] Non-detect at reporting limit
[H] Concentration is estimated
[B] Detected in lab blank and concentration in sample is less than 10x the blank concentration
[C] Detected in DI/lab blanks

Table 3.3-2. PPCP concentrations (ng/L) measured at Hotel and Deep Hole Spring (Spring Lake, San Marcos) during Spring and Fall sampling events (2022). Samples with detectable concentrations denoted in bold.

	Spring		Fall	
PPCP List Continued	Hotel Spring	Deep Hole	Hotel Spring	Deep Hole
Alprazolam	0.348^{U}	0.362^{U}	0.298^{U}	0.298^{U}
Amitriptyline	0.348^{U}	0.362^{U}	0.298^{U}	0.298^{U}
Amlodipine	1.17^{U}	1.21^{U}	1.0^{U}	0.999^{U}
Benzoylecgonine	0.174^{U}	0.181^{U}	0.149^{U}	0.149^{U}
Benztropine	0.812^{U}	0.844^{U}	0.696^{U}	0.695^{U}
Betamethasone	1.74^{U}	1.81^{U}	1.49^{U}	1.49^{U}
Cocaine	**0.821^{BC}**	**0.196^{BC}**	0.149^{U}	0.149^{U}
DEET	**4.13^{BC}**	**3.65^{BC}**	**2.37^{BC}**	**8.16^{BC}**
Desmethyldiltiazem	0.122^{U}	0.127^{U}	0.104	0.104
Diazepam	0.582^{U}	0.605^{U}	0.499^{U}	0.498^{U}
Fluocinonide	2.33^{U}	2.42^{U}	2.0^{U}	2.0^{U}
Fluticasone propionate	2.33^{U}	2.42^{U}	2.0^{U}	2.0^{U}
Hydrocortisone	6.96^{U}	7.23^{U}	5.97^{U}	5.96^{U}
10-hydroxy-amitriptyline	0.174^{U}	0.181^{U}	0.149^{U}	0.149^{U}
Meprobamate	1.74^{U}	1.81^{U}	1.49^{U}	1.49^{U}
Methylprednisolone	4.64^{U}	4.82^{U}	3.98^{U}	3.97^{U}
Metoprolol	0.582^{U}	0.605^{U}	0.499^{U}	0.498^{U}
Norfluoxetine	0.582^{U}	0.605^{U}	0.499^{U}	0.498^{U}
Norverapamil	0.174^{U}	0.181^{U}	0.149^{U}	0.149^{U}
Paroxetine	1.17^{U}	1.21^{U}	1.0^{U}	0.999^{U}
Prednisolone	4.64^{U}	4.82^{U}	3.98^{U}	3.97^{U}
Prednisone	6.96^{U}	7.23^{U}	5.97^{U}	5.96^{U}
Promethazine	0.348^{U}	0.362^{U}	0.298^{U}	0.298^{U}
Propoxyphene	0.348^{U}	0.362^{U}	0.298^{U}	0.298^{U}
Propranolol	0.348^{U}	0.362^{U}	0.298^{U}	0.298^{U}
Sertraline	0.348^{U}	0.362^{U}	0.298^{U}	0.298^{U}
Simvastatin	2.33^{U}	2.42^{U}	2.0^{U}	2.0^{U}
Theophylline	6.96^{U}	7.23^{U}	5.97^{U}	5.96^{U}
Trenbolone	2.33^{U}	2.42^{U}	2.0^{U}	2.0^{U}
Trenbolone acetate	0.348^{U}	0.362^{U}	0.298^{U}	0.298^{U}
Valsartan	4.64^{U}	4.82^{U}	3.98^{U}	3.97^{U}
Verapamil	0.174^{U}	0.181^{U}	0.149^{U}	0.149^{U}

^{U} Non-detect at reporting limit

^{H} Concentration is estimated

^{B} Detected in lab blank and concentration in sample is less than 10x the blank concentration

^{C} Detected in DI and laboratory blank

Table 3.3-3. PPCP concentrations (ng/L) measured at Hotel (Spring Lake, San Marcos) during January, May, and July sampling events (2022). Samples with detectable concentrations denoted in bold.

PPCP list	January	May	July
Acetaminophen	15.9[U]	3.22[U]	3.23[U]
Azithromycin	1.59[U]	1.61[U]	1.62[U]
Caffeine	15.9[U]	6.44[U]	6.47[U]
Carbadox	1.59[U]	4.29[U]	4.31[U]
Carbamazepine	1.59[U]	0.332[U]	0.323[U]
Cefotaxime	8.33[U]	6.38[U]	6.40[U]
Ciprofloxacin	6.34[U]	**6.95**	1.62[U]
Clarithromycin	1.59[U]	0.322[U]	0.323[U]
Clinafloxacin	6.34[U]	2.15[A]	2.15[A]
Cloxacillin	3.17[UH]	3.22[UH]	3.23[UH]
Dehydronifedipine	0.634[U]	0.322[U]	0.323[U]
Diphenhydramine	0.634[U]	0.644[U]	0.647[U]
Diltiazem	0.317[U]	0.161[U]	0.162[U]
Digoxin	6.34[U]	6.44[U]	6.47[U]
Digoxigenin	6.34[U]	1.61[U]	1.62[U]
Enrofloxacin	3.17[U]	0.644[U]	0.647[U]
Erythromycin-H2O	2.43[U]	1.61[U]	1.62[U]
Flumequine	**1.91**[B]	0.322[U]	0.323[U]
Fluoxetine	1.59[U]	0.161[U]	0.162[U]
Lincomycin	3.17[U]	0.644[U]	0.647[U]
Lomefloxacin	3.17[U]	0.644[U]	0.647[U]
Miconazole	1.59[U]	0.322[U]	0.323[U]
Norfloxacin	16.6[U]	2.15[U]	2.15[U]
Norgestimate	3.17[U]	1.61[U]	1.62[U]
Ofloxacin	1.59[U]	0.644[U]	0.647[U]
Ormetoprim	0.634[U]	0.161[U]	0.162[U]
Oxacillin	3.17[UH]	1.61[UH]	1.62[UH]
Oxolinic Acid	**0.651**[B]	0.644[U]	0.647[U]
Penicillin G	3.17[UH]	3.22[UH]	3.23[UH]
Penicillin V	3.17[U]	1.61[U]	1.62[U]
Roxithromycin	0.317[U]	0.161[U]	0.162[U]
Sarafloxacin	15.9[U]	3.22[U]	3.23[U]
Sulfachloropyridazine	1.59[U]	0.644[U]	0.647[U]
Sulfadiazine	1.59[U]	0.644[U]	0.647[U]
Sulfadimethoxine	0.317[U]	0.322[U]	0.323[U]
Sulfamerazine	0.634[U]	0.644[U]	0.647[U]
Sulfamethazine	0.634[U]	0.644[U]	0.647[U]
Sulfamethizole	0.634[U]	0.644[U]	0.647[U]
Sulfamethoxazole	0.634[U]	0.644[U]	0.647[U]
Sulfanilamide	15.9[U]	6.44[U]	6.47[U]
Sulfathiazole	1.59[U]	1.61[U]	1.62[U]
Thiabendazole	1.59[U]	0.322[U]	0.323[U]
Trimethoprim	1.59[U]	0.322[U]	0.323[U]
Tylosin	6.34[U]	0.644[U]	0.647[U]
Virginiamycin M1	3.17[U]	0.644[U]	**1.25**
1,7-Dimethylxanthine	63.4[U]	6.44[U]	6.47[U]

[U] Non-detect at reporting limit
[H] Concentration is estimated
[B] Detected in lab blank and concentration in sample is less than 10x the blank concentration

Table 3.3-4. PPCP concentrations (ng/L) measured at Hotel (Spring Lake, San Marcos) during January, May, and July sampling events (2022). Samples with detectable concentrations denoted in bold.

PPCP List Continued	January	May	July
Alprazolam	0.317[U]	0.322[U]	0.323[U]
Amitriptyline	0.317[U]	0.322[U]	0.323[U]
Amlodipine	1.06[U]	1.08[U]	1.08[U]
Benzoylecgonine	0.159[U]	0.161[U]	0.162[U]
Benztropine	0.74[U]	0.752[U]	0.755[U]
Betamethasone	1.59[U]	1.61[U]	1.62[U]
Cocaine	**0.233[B]**	0.161[U]	0.162[U]
DEET	**4.16[B]**	**4.72[B]**	**3.20[B]**
Desmethyldiltiazem	0.111[U]	0.113[U]	0.113[U]
Diazepam	0.531[U]	0.539[U]	0.541[U]
Fluocinonide	2.13[U]	2.16[U]	2.17[U]
Fluticasone propionate	2.13[U]	2.16[U]	2.17[U]
Hydrocortisone	6.34[U]	6.44[U]	6.47[U]
10-hydroxy-amitriptyline	0.159[U]	0.161[U]	0.162[U]
Meprobamate	1.59[U]	1.61[U]	1.62[U]
Methylprednisolone	4.23[U]	4.29[U]	4.31[U]
Metoprolol	0.531[U]	0.539[U]	0.541[U]
Norfluoxetine	0.531[U]	0.539[U]	0.541[U]
Norverapamil	0.159[U]	0.161[U]	0.162[U]
Paroxetine	1.06[U]	1.08[U]	1.08[U]
Prednisolone	4.23[U]	4.29[U]	4.31[U]
Prednisone	6.34[U]	6.44[U]	6.47[U]
Promethazine	0.317[U]	0.322[U]	0.323[U]
Propoxyphene	0.317[U]	0.322[U]	0.323[U]
Propranolol	0.317[U]	0.322[U]	0.323[U]
Sertraline	0.317[U]	0.322[U]	0.323[U]
Simvastatin	2.13[U]	2.16[U]	2.17[U]
Theophylline	6.34[U]	6.44[U]	6.47[U]
Trenbolone	2.13[U]	2.16[U]	2.17[U]
Trenbolone acetate	0.317[U]	0.322[U]	0.323[U]
Valsartan	4.23[U]	4.29[U]	4.31[U]
Verapamil	0.159[U]	0.161[U]	0.162[U]

[U] Non-detect at reporting limit

[B] Detected in lab blank and concentration in sample is less than 10x the blank concentration

3.3.2 Comal

A total of ten PPCP samples were collected during Spring and Fall collections in 2022, including one field duplicate sample during the Fall at Spring Run 3 and one DI blank taken at Spring Run 1 in the Spring. Samples were collected at Spring Run 3 during the months of January, March, May, July, September, and November. Samples were taken at Spring Run 1 and Spring Run 7 during the standard Spring (March) and Fall (September) sampling events. Results for the Spring and Fall PPCP sampling at Spring Runs 1, 3, and 7 are denoted in Table 3.3-5 and 3.3-6 and PPCP results for Spring Run 3 for January, May, and July are noted in Tables 3.3-7 and 3.3-8. Overall, few PPCP detections at the reporting limit occurred in 2022 sampling events. DEET was detected at all three sampling sites in Spring and Fall sampling events; however, it is likely a false positive because it was also found in the blank in all sampling events. Cocaine was detected at all three Spring Runs in the Spring but was also detected in the DI and laboratory blanks. Sulfamethoxazole was detected at Spring Run 3 and Spring Run 7 during the Spring and only at Spring Run 7 during the Fall. Oxolinic Acid was detected at Spring Run 3 during the Spring. Acetaminophen, Diphenhydramine, Diltiazem, Caffeine, Benzoylecgonine, Desmethyldiltiazem, 1,7-Dimethylxanthine, Theophylline, and Thiabendazole were detected at Spring Run 1 during the Fall. Thiabendazole was also detected at Spring Runs 1 and 7 during the Fall; however, it was detected in the DI blank. Enrofloxacin and Ofloxacin were detected at Spring Run 7 in the Fall. A few PPCPs were detected at Spring Run 3 in the May sample including Theophylline, Caffeine, and Ciprofloxacin. Results for samples, duplicate samples, equipment blank, DI blank, and laboratory blank values can be found in Table A-11 through A-14 in appendix A.

Table 3.3-5. PPCP concentrations (ng/L) measured at Spring Run 1, Spring Run 3, and Spring Run 7 (Landa Lake) during Spring and Fall sampling events (2022). Samples with detectable concentrations denoted in bold.

	Spring			Fall		
PPCP list	Spring run 1	Spring run 3	Spring run 7	Spring run 1	Spring run 3	Spring run 7
Acetaminophen	17.1[U]	16.4[U]	16.2[U]	**454**	3.33[UA]	2.99[U]
Azithromycin	1.71[U]	1.64[U]	1.62[U]	1.45[U]	1.67[UA]	1.49[U]
Caffeine	17.1[U]	16.4[U]	16.2[U]	**111**	6.66[UA]	5.97[U]
Carbadox	1.71[U]	1.64[U]	1.62[U]	3.86[U]	4.44[UA]	3.98[U]
Carbamazepine	1.71[U]	1.64[U]	1.62[U]	0.29[U]	0.333[UA]	0.299[U]
Cefotaxime	6.85[U]	6.55[U]	6.5[U]	5.74[U]	6.66[UA]	5.91[U]
Ciprofloxacin	6.85[U]	6.55[U]	6.5[U]	1.45[U]	1.67[UA]	**2.28**
Clarithromycin	1.71[U]	1.64[U]	1.62[U]	0.29[U]	0.333[UA]	0.299[U]
Clinafloxacin	6.85[U]	6.9[U]	6.5[U]	1.93[U]	2.22[A]	1.99[U]
Cloxacillin	3.43[UH]	3.27[UH]	3.25[UH]	2.9[UH]	3.33[UHA]	2.99[UH]
Dehydronifedipine	0.685[U]	0.655[U]	0.65[U]	0.29[U]	0.333[UA]	0.299[U]
Diphenhydramine	0.685[U]	0.655[U]	0.65[U]	**0.866**	0.666[UA]	0.597[U]
Diltiazem	0.343[U]	0.327[U]	0.372[U]	**0.904**	0.167[UA]	0.149[U]
Digoxin	6.85[U]	6.55[U]	6.5[U]	5.8[U]	6.66[UA]	5.97[U]
Digoxigenin	6.85[U]	6.55[U]	6.5[U]	1.45[U]	1.67[UA]	1.49[U]
Enrofloxacin	3.43[U]	3.27[U]	3.25[U]	0.58[U]	0.666[UA]	**0.598**
Erythromycin-H2O	2.63[U]	2.51[U]	2.49[U]	1.45[U]	1.67[UA]	1.49[U]
Flumequine	1.71[U]	1.64[U]	1.62[U]	0.29[U]	0.333[UA]	0.299[U]
Fluoxetine	1.71[U]	1.64[U]	1.62[U]	0.145[U]	0.167[UA]	0.149[U]
Lincomycin	3.43[U]	3.27[U]	3.25[U]	0.58[U]	0.666[UA]	0.597[U]
Lomefloxacin	3.43[U]	3.27[U]	3.25[U]	0.58[U]	0.666[UA]	0.597[U]
Miconazole	1.74[U]	1.64[U]	1.62[U]	0.29[U]	0.333[UA]	0.299[U]
Norfloxacin	17.4[U]	19.9[U]	16.5[U]	1.98[U]	2.22[UA]	1.99[U]
Norgestimate	3.43[U]	3.27[U]	3.25[U]	1.45[U]	1.67[UA]	1.49[U]
Ofloxacin	1.71[U]	1.64[U]	1.62[U]	0.58[U]	0.666[UA]	**0.654**
Ormetoprim	0.696[U]	0.655[U]	0.65[U]	0.145[U]	0.167[UA]	0.149[U]
Oxacillin	3.43[UH]	3.27[UH]	3.25[UH]	1.45[UH]	1.67[UHA]	1.49[UH]
Oxolinic Acid	0.685[U]	**0.659[B]**	0.65[U]	0.58[U]	0.666[UA]	0.597[U]
Penicillin G	3.43[UH]	3.27[UH]	3.25[UH]	2.9[UH]	3.33[UHA]	2.99[UH]
Penicillin V	3.43[U]	3.27[U]	3.25[U]	1.45[U]	1.67[UA]	1.49[U]
Roxithromycin	0.343[U]	0.327[U]	0.325[U]	0.145[U]	0.167[UA]	0.149[U]
Sarafloxacin	17.1[U]	16.4[U]	16.2[U]	2.9[U]	3.33[UA]	2.99[U]
Sulfachloropyridazine	1.71[U]	1.64[U]	1.62[U]	0.58[U]	0.666[UA]	0.597[U]
Sulfadiazine	1.71[U]	1.64[U]	1.62[U]	0.58[U]	0.666[UA]	0.597[U]
Sulfadimethoxine	0.343[U]	0.327[U]	0.325[U]	0.29[U]	0.333[UA]	0.299[U]
Sulfamerazine	0.707[U]	0.655[U]	0.682[U]	0.58[U]	0.666[UA]	0.597[U]
Sulfamethazine	0.685[U]	0.655[U]	0.65[U]	0.58[U]	0.666[UA]	0.597[U]
Sulfamethizole	0.685[U]	0.655[U]	0.65[U]	0.58[U]	1.67[UA]	0.597[U]
Sulfamethoxazole	0.685[U]	**0.809**	**0.723**	0.58[U]	0.666[UA]	**0.673**
Sulfanilamide	17.1[U]	16.4[U]	16.2[U]	5.8[U]	6.66[UA]	5.97[U]
Sulfathiazole	1.71[U]	1.64[U]	1.62[U]	1.45[U]	1.67[UA]	1.49[U]
Thiabendazole	1.71[U]	1.64[U]	1.62[U]	**0.367[C]**	**0.469[AC]**	**0.692[C]**
Trimethoprim	1.71[U]	1.64[U]	1.62[U]	0.29[U]	0.333[UA]	0.299[U]
Tylosin	6.85[U]	6.55[U]	6.5[U]	0.58[U]	0.666[UA]	0.597[U]
Virginiamycin M1	3.43[U]	3.27[U]	3.25[U]	0.58[U]	0.666[UA]	0.597[U]
1,7-Dimethylxanthine	68.5[U]	65.5[U]	65.0[U]	**33.2**	6.66[UA]	5.97[U]

[U] Non-detect at reporting limit

[H] Concentration is estimated

[B] Detected in lab blank and concentration in sample is less than 10x the blank concentration

[C] Detected in DI blank

Table 3.3-6. PPCP concentrations (ng/L) measured at Spring Run 1, Spring Run 3, and Spring Run 7 (Landa Lake) during Spring and Fall sampling events (2022). Samples with detectable concentrations denoted in bold.

	Spring			Fall		
PPCP List Continued	Spring run 1	Spring run 3	Spring run 7	Spring run 1	Spring run 3	Spring run 7
Alprazolam	0.343[U]	0.327[U]	0.325[U]	0.29[U]	0.333[UA]	0.299[U]
Amitriptyline	0.343[U]	0.327[U]	0.327[U]	0.29[U]	0.333[UA]	0.299[U]
Amlodipine	1.15[U]	1.10[U]	1.09[U]	0.972[U]	1.12[UA]	1.0[U]
Benzoylecgonine	0.171[U]	0.164[U]	0.162[U]	**0.485**	0.167[UA]	0.149[U]
Benztropine	0.8[U]	0.764[U]	0.758[U]	0.676[U]	0.777[UA]	0.697[U]
Betamethasone	1.71[U]	1.64[U]	1.62[U]	1.45[U]	1.67[UA]	1.49[U]
Cocaine	**0.336[B]**	**0.264[B]**	**0.349[B]**	**0.207**	0.167[UA]	0.149[U]
DEET	**1.07[B]**	**1.15[B]**	**0.992[B]**	**2.35[B]**	**2.51[B]**	**2.25[B]**
Desmethyldiltiazem	0.12[U]	0.115[U]	0.114[U]	**0.196**	0.117[UA]	0.105[U]
Diazepam	0.573[U]	0.548[U]	0.544[U]	0.485[U]	0.558[UA]	0.5[U]
Fluocinonide	2.3[U]	2.19[U]	2.18[U]	1.94[U]	2.23[UA]	2.0[U]
Fluticasone propionate	2.3[U]	2.19[U]	2.18[U]	1.94[U]	2.23[UA]	2.0[U]
Hydrocortisone	6.85[U]	6.55[U]	6.50[U]	5.8[U]	6.66[UA]	5.97[U]
10-hydroxy-amitriptyline	0.171[U]	0.164[U]	0.162[U]	0.145[U]	0.167[UA]	0.149[U]
Meprobamate	1.71[U]	1.64[U]	1.62[U]	1.45[U]	1.67[UA]	1.49[U]
Methylprednisolone	4.57[U]	4.36[U]	4.33[U]	3.86[U]	4.44[UA]	3.98[U]
Metoprolol	0.573[U]	0.548[U]	0.544[U]	0.485[U]	0.558[UA]	0.5[U]
Norfluoxetine	0.573[U]	0.548[U]	0.544[U]	0.485[U]	0.558[UA]	0.5[U]
Norverapamil	0.171[U]	0.164[U]	0.162[U]	0.145[U]	0.167[UA]	0.149[U]
Paroxetine	1.15[U]	1.10[U]	1.09[U]	0.972[U]	1.12[UA]	1.0[U]
Prednisolone	4.57[U]	4.36[U]	4.33[U]	3.86[U]	4.44[UA]	3.98[U]
Prednisone	6.85[U]	6.55[U]	6.50[U]	5.80[U]	6.66[UA]	5.97[U]
Promethazine	0.343[U]	0.327[U]	0.325[U]	0.29[U]	0.333[UA]	0.299[U]
Propoxyphene	0.343[U]	0.327[U]	0.325[U]	0.29[U]	0.333[UA]	0.299[U]
Propranolol	0.343[U]	0.327[U]	0.325[U]	0.29[U]	0.333[UA]	0.299[U]
Sertraline	0.343[U]	0.327[U]	0.325[U]	0.29[U]	0.333[UA]	0.299[U]
Simvastatin	2.3[U]	2.19[U]	2.18[U]	1.94[U]	2.23[UA]	2.0[U]
Theophylline	6.85[U]	6.55[U]	6.50[U]	**65.6**	6.66[UA]	5.97[U]
Trenbolone	2.3[U]	2.19[U]	2.18[U]	1.94[U]	2.23[UA]	2.0[U]
Trenbolone acetate	0.343[U]	0.327[U]	0.327[U]	0.29[U]	0.333[UA]	0.299[U]
Valsartan	4.57[U]	4.36[U]	4.33[U]	3.86[U]	4.44[UA]	3.98[U]
Verapamil	0.171[U]	0.164[U]	0.162[U]	0.145[U]	0.167[UA]	0.149[U]

[U] Non-detect at reporting limit
[A] Not detected in duplicate sample
[B] Detected in lab blank and concentration in sample is less than 10x the blank concentration

Table 3.3-7. PPCP concentrations (ng/L) measured at Spring Run3 (Landa Lake, New Braunfels) during January, May, and July sampling events (2022). Samples with detectable concentrations denoted in bold.

PPCP list	January	May	July
Acetaminophen	16.3[U]	3.52[U]	3.19[U]
Azithromycin	1.63[U]	1.76[U]	1.60[U]
Caffeine	16.3[U]	**25.3**	6.39[U]
Carbadox	1.63[U]	4.69[U]	4.26[U]
Carbamazepine	1.63[U]	0.352[U]	0.319[U]
Cefotaxime	6.5[U]	6.97[U]	6.32[U]
Ciprofloxacin	6.5[U]	**4.35**	**2.03**
Clarithromycin	1.63[U]	0.352[U]	0.319[U]
Clinafloxacin	6.5[U]	2.34[U]	2.13[U]
Cloxacillin	3.25[UH]	3.52[UH]	3.19[UH]
Dehydronifedipine	0.65[U]	0.352[U]	0.319[U]
Diphenhydramine	0.65[U]	0.704[U]	0.639[U]
Diltiazem	0.325[U]	0.176[U]	0.16[U]
Digoxin	6.5[U]	7.04[U]	6.39[U]
Digoxigenin	6.5[U]	1.76[U]	1.60[U]
Enrofloxacin	3.25[U]	0.704[U]	0.639[U]
Erythromycin-H2O	2.49[U]	0.176[U]	1.60[U]
Flumequine	**4.28[B]**	0.352[U]	0.319[U]
Fluoxetine	1.63[U]	0.176[U]	0.16[U]
Lincomycin	3.25[U]	0.704[U]	0.639[U]
Lomefloxacin	3.25[U]	0.704[U]	0.639[U]
Miconazole	1.63[U]	0.352[U]	0.319[U]
Norfloxacin	16.8[U]	2.34[U]	2.13[U]
Norgestimate	3.25[U]	1.76[U]	1.60[U]
Ofloxacin	1.63[U]	**0.892**	0.639[U]
Ormetoprim	0.65[U]	0.176[U]	0.16[U]
Oxacillin	3.25[UH]	1.76[UH]	1.60[UH]
Oxolinic Acid	**1.16[B]**	0.704[U]	0.639[U]
Penicillin G	3.25[UH]	3.52[UH]	3.19[UH]
Penicillin V	3.25[U]	1.76[U]	1.60[U]
Roxithromycin	0.325[U]	0.176[U]	0.16[U]
Sarafloxacin	16.3[U]	3.52[U]	3.19[U]
Sulfachloropyridazine	1.63[U]	0.704[U]	0.639[U]
Sulfadiazine	1.62[U]	0.704[U]	0.639[U]
Sulfadimethoxine	0.325[U]	0.352[U]	0.319[U]
Sulfamerazine	0.682[U]	0.704[U]	0.639[U]
Sulfamethazine	0.65[U]	0.704[U]	0.639[U]
Sulfamethizole	0.65[U]	0.704[U]	0.639[U]
Sulfamethoxazole	0.65[U]	0.704[U]	0.639[U]
Sulfanilamide	16.3[U]	7.04[U]	6.39[U]
Sulfathiazole	1.63[U]	1.76[U]	1.60[U]
Thiabendazole	1.63[U]	0.352[U]	0.319[U]
Trimethoprim	1.63[U]	0.352[U]	0.319[U]
Tylosin	6.5[U]	0.704[U]	0.639[U]
Virginiamycin M1	3.25[U]	0.704[U]	0.639[U]
1,7-Dimethylxanthine	65.0[U]	**11.5**	6.39[U]

[U] Non-detect at reporting limit
[H] Concentration is estimated
[B] Detected in lab blank and concentration in sample is less than 10x the blank concentration

Table 3.3-7. PPCP concentrations (ng/L) measured at Spring Run3 (Landa Lake, New Braunfels) during January, May, and July sampling events (2022). Samples with detectable concentrations denoted in bold.

PPCP List Continued	January	May	July
Alprazolam	0.325[U]	0.352[U]	0.319[U]
Amitriptyline	0.325[U]	0.352[U]	0.319[U]
Amlodipine	1.09[U]	1.18[U]	1.07[U]
Benzoylecgonine	0.163[U]	0.176[U]	0.16[U]
Benztropine	0.759[U]	0.821[U]	0.745[U]
Betamethasone	1.63[U]	1.76[U]	1.6[U]
Cocaine	**0.233[BC]**	0.176[U]	0.16[U]
DEET	**4.18[BC]**	**4.65[BC]**	**2.17[BC]**
Desmethyldiltiazem	0.114[U]	0.123[U]	0.112[U]
Diazepam	0.544[U]	0.589[U]	0.534[U]
Fluocinonide	2.18[U]	2.36[U]	2.14[U]
Fluticasone propionate	2.18[U]	2.36[U]	2.14[U]
Hydrocortisone	6.50[U]	7.04[U]	6.39[U]
10-hydroxy-amitriptyline	0.163[U]	0.176[U]	0.16[U]
Meprobamate	1.63[U]	1.76[U]	1.6[U]
Methylprednisolone	4.34[U]	4.69[U]	4.26[U]
Metoprolol	0.544[U]	0.544[U]	0.534[U]
Norfluoxetine	0.544[U]	0.544[U]	0.534[U]
Norverapamil	0.163[U]	0.176[U]	0.16[U]
Paroxetine	1.09[U]	1.18[U]	1.07[U]
Prednisolone	4.34[U]	4.69[U]	4.26[U]
Prednisone	6.50[U]	7.04[U]	6.39[U]
Promethazine	0.325[U]	0.325[U]	0.319[U]
Propoxyphene	0.325[U]	0.352[U]	0.319[U]
Propranolol	0.325[U]	0.352[U]	0.319[U]
Sertraline	0.325[U]	0.352[U]	0.319[U]
Simvastatin	2.18[U]	2.36[U]	2.14[U]
Theophylline	6.50[U]	**19.9**	6.39[U]
Trenbolone	2.18[U]	2.36[U]	2.14[U]
Trenbolone acetate	0.325[U]	0.352[U]	0.319[U]
Valsartan	4.34[U]	4.69[U]	4.26[U]
Verapamil	0.163[U]	0.176[U]	0.16[U]

[U] Non-detect at reporting limit

[B] Detected in lab blank and concentration in sample is less than 10x the blank concentration

[C] Detected in laboratory or field blank

3.4 Sediment sampling

3.4.1 San Marcos

Table 3.4-1 denotes the contaminant results for sediment samples collected in 2022 at the San Marcos system sites. Overall, most of the contaminants were detected at each site and many of the contaminants are associated with being a byproduct from combustion engines or is a product in dyes, insecticides, or preservatives. Among sites, City Park, Spring Lake, Sessom Creek, and Rio Vista sites had the greatest number of detectable contaminants. Sessom Creek sample results had some of the highest values for detectable contaminants whereas Sink Creek and IH35 had some of the lower values of contaminant detections.

Table 3.4-1. Contaminant concentrations (μg/Kg) measured in sediment samples collected from the San Marcos system in August 2022. Samples with detectable concentrations are denoted in bold.

Analyte	Sink Creek	Spring Lake	Sessom Creek	City Park	Rio Vista	IH35	IH35[2]	Lab Blank
Acenaphthene	3.98 U H H3	**48.2** J H H3	**134** H H3	**152** H H3	**12.8** J H H3	5.53 U H H3	5.69 U H H3	2.86 U
Acenaphthylene	5.58 U H H3	**45.3** J H H3	**46.0** J H H3	**112** H H3	**24.5** J H H3	7.75 U H H3	7.97 U H H3	4.01 U
Anthracene	**13.8** J H H3	**240** H H3	**375** H H3	**281** H H3	**37.3** H H3	**18.9** J H H3	4.79 U H H3	2.41 U
Benzo[a]anthracene	**133** H H3	**1580** H H3	**3710** H H3	**1910** H H3	**240** H H3	**187** H H3	**29.1** J H H3	3.41 U
Benzo[b]fluoranthene	**334** H H3 *3	**3730** H H3 *3	**8690** H H3	**5140** H H3	**658** H H3	**569** H H3 *3	**82.5** H H3	6.50 U
Benzo[k]fluoranthene	**113** H H3 *3	**1570** H H3 *3	**3280** H H3	**1650** H H3	**224** H H3	**241** H H3 *3	**22.0** J H H3	6.93 U
Benzo[g,h,i]perylene	**88.5** H H3 *3	**816** H H3 *3	**1530** H H3	**722** H H3	**115** H H3	**153** H H3 *3	**36.6** H H3	7.10 U
Benzo[a]pyrene	**176** H H3 *3	**2030** H H3 *3	**4260** H H3	**2480** H H3	**319** H H3	**283** H H3 *3	**29.1** J H H3	9.34 U
Carbazole	26.5 U H H3	**134** J H H3	**821** H H3	**275** H H3	41.8 U H H3	36.7 U H H3	37.8 U H H3	19.0 U
Chrysene	**187** H H3	**2060** H H3	**5630** H H3	**2800** H H3	**408** H H3	**311** H H3	**64.4** H H3	1.49 U
Dibenz(a,h)anthracene	**27.0** H H3 *3	**220** H H3 *3	**505** H H3	**239** H H3	**32.6** J H H3	**41.4** H H3 *3	13.8 U H H3	6.92 U
Fluoranthene	**295** H H3	**3020** H H3	**10000** H H3	**5190** H H3	**548** H H3	**410** H H3	**73.3** H H3	4.45 U
Fluorene	3.82 U H H3	**144** H H3	**130** J H H3	**121** H H3	**16.1** J H H3	**8.22** J H H3	5.45 U H H3	2.74 U
Indeno[1,2,3-cd]pyrene	**76.2** H H3 *3	**800** H H3 *3	**1710** H H3	**783** H H3	**127** H H3	**144** H H3 *3	**16.7** J H H3	7.36 U
2-Methylnaphthalene	2.73 U H H3	**37.9** J H H3	17.2 U H H3	**50.5** J H H3	4.31 U H H3	3.79 U H H3	**7.77** J H H3	1.96 U
Naphthalene	3.36 U H H3	**33.4** J H H3	**49.3** J H H3	**70.2** H H3	**8.50** J H H3	4.66 U H H3	4.79 U H H3	2.41 U
Phenanthrene	**83.8** H H3	**952** H H3	**3500** H H3	**1940** H H3	**167** H H3	**103** H H3	**69.3** H H3	2.23 U
Pyrene	**342** H H3	**3000** H H3	**7790** H H3	**4340** H H3	**549** H H3	**502** H H3	**76.2** H H3	2.14 U

U non-detect at MDL (Method Detection Limit)
H Sample was prepped or analyzed beyond the specified holding time
H3 Sample was received and analyzed past holding time
J Result is less than the RL (reporting limit) but greater than the MDL
*3 ISTD response or retention time outside of acceptable limits
2 duplicate sample for IH35 site

3.4.2 Comal

Table 3.4-2 denotes the contaminant results for sediment samples collected in 2022 at the Comal system sites. Many of the contaminants were detected at each of the Comal system sites but, in general, the Comal system reported fewer detections and lower values than the San Marcos system. Among sites, the Old Channel had the greatest number of detectable contaminants and some of the highest values for detectable contaminants whereas Bleiders Creek and Spring Island in Landa Lake reported some of the lower values of contaminant detections.

Table 3.4-2 Contaminant concentrations (µg/Kg) measured in sediment samples collected from the Comal system in August 2022. Samples with detectable concentrations are denoted in bold.

Analyte	Bleiders Creek	Spring Island	Old Channel	Old Channel[2]	New Channel	Lab Blank
Acenaphthene	7.08 U H H3	4.12 U H H3	**15.8** J H H3	**15.1** J H H3	4.22 U H H3	2.86 U
Acenaphthylene	9.92 U H H3	5.77 U H H3	**60.4** H H3	**40.9** H H3	5.92 U H H3	4.01 U
Anthracene	**8.47** J H H3	3.47 U H H3	**451** H H3	**152** H H3	**6.13** J H H3	2.41 U
Benzo[a]anthracene	**19.8** J H H3	**11.0** J H H3	**1130** H H3	**359** H H3	**34.7** H H3	3.41 U
Benzo[b]fluoranthene	**63.6** H H3 *3	**20.0** J H H3	**1090** H H3	**799** H H3	**79.0** H H3	6.50 U
Benzo[k]fluoranthene	**35.6** J H H3 *3	9.97 U H H3	**618** H H3	**279** H H3	**32.0** H H3	6.93 U
Benzo[g,h,i]perylene	**17.8** J H H3 *3	**10.2** J H H3	**161** H H3	**100** H H3	**21.4** J H H3	7.10 U
Benzo[a]pyrene	**27.3** J H H3 *3	13.4 U H H3	**646** H H3	**374** H H3	**47.8** H H3	9.34 U
Carbazole	47.0 U H H3	27.3 U H H3	51.3 U H H3	**37.5** J H H3	28.1 U H H3	19.0 U
Chrysene	**26.3** J H H3	**12.9** J H H3	**3440** H H3	**685** H H3	**45.5** H H3	1.49 U
Dibenz(a,h)anthracene	17.1 U H H3 *3	9.96 U H H3	**71.5** H H3	**31.8** H H3	10.2 U H H3	6.92 U
Fluoranthene	**41.3** H H3	**18.9** J H H3	**698** H H3	**768** H H3	**61.3** H H3	4.45 U
Fluorene	6.78 U H H3	3.94 U H H3	**118** H H3	**18.8** J H H3	4.05 U H H3	2.74 U
Indeno[1,2,3-cd]pyrene	18.2 U H H3 *3	10.6 U H H3	**182** H H3	**121** H H3	**18.2** J H H3	7.36 U
2-Methylnaphthalene	4.85 U H H3	**16.2** J H H3	**10.4** J H H3	**7.55** J H H3	2.90 U H H3	1.96 U
Naphthalene	**8.49** J H H3	**9.79** J H H3	**9.88** J H H3	**10.0** J H H3	3.56 U H H3	2.41 U
Phenanthrene	**14.1** J H H3	**11.5** J H H3	**477** H H3	**124** H H3	**36.1** H H3	2.23 U
Pyrene	**52.9** H H3	**18.3** J H H3	**646** H H3	**688** H H3	**64.6** H H3	2.14 U

U non-detect at MDL (Method Detection Limit)
H Sample was prepped or analyzed beyond the specified holding time
H3 Sample was received and analyzed past holding time
J Result is less than the RL (reporting limit) but greater than the MDL
*3 ISTD response or retention time outside of acceptable limits
2 duplicate sample for Old Channel site

4 | References

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Appendix A – Laboratory Quality Control Results

Table A-1. Sucralose concentrations (ng/L) for samples, DI blanks, lab blanks, and spiked matrices measured at Hotel Springs in Spring Lake (2022). Quality control spike recoveries (%) are reported to the right of each sample and samples with detectable concentrations are denoted in bold.

Month	Sample (ng/L)	QC Spike Recovery (%)	DI Blank (ng/L)	QC Spike Recovery (%)	Lab Blank (ng/L)	QC Spike Recovery (%)	Spiked Matrix (ng/L)	Spiked Recovery (%)
January	8.08[U]	106.0	NA	NA	8.08[U]	126	1.01	109
February	**17.3**	102.0	NA	NA	8.08[U]	126	1.01	109
March	**18.1**[A]	79.6	8.46	85.2	8.08[U]	126	1.01	109
April	**9.5**	111.0	NA	NA	10.1[U]	88.6	1.01	94.6
May	8.31[U]	93.3	NA	NA	10.1[U]	88.6	1.01	94.6
June	**11.4**	94.8	NA	NA	10.1[U]	88.6	1.01	94.6
July	**9.3**	99.7	NA	NA	10.1[U]	88.6	1.01	94.6
August	**44.0**[B]	120.0	NA	NA	10.1[U]	88.6	1.01	94.6
September	**11.9**	103.0	NA	NA	10.1[U]	88.6	1.01	94.6
October	NA	NA	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA	NA	NA

[U] Non-detect at reporting limit

Table A-2. Sucralose concentrations (ng/L) for samples, duplicate samples, DI blanks, lab blanks, and spiked matrices measured for Spring Run 3 in Landa Lake (2022). Quality control spike recoveries (%) are reported to the right of each sample and samples with detectable concentrations are denoted in bold.

Month	Sample (ng/L)	QC Spike Recovery (%)	Duplicate (ng/L)	QC Spike Recovery (%)	DI Blank (ng/L)	QC Spike Recovery (%)	Lab Blank (ng/L)	QC Spike Recovery (%)	Spiked Matrix (ng/L)	QC Spiked Recovery (%)
January	**11.8**	98.1	NA	NA	NA	NA	8.08[U]	126	1.01	109
February	8.24[U]	115.0	NA	NA	NA	NA	8.08[U]	126	1.01	109
March	**13.5**	81.3	NA	NA	NA	NA	8.08[U]	126	1.01	109
April	**13.4**	96.8	NA	NA	9.71[U]	114	10.1[U]	88.6	1.01	94.6
May	8.1[U]	93.5	NA	NA	NA	NA	10.1[U]	88.6	1.01	94.6
June	**9.76**	104.0	**10.2**	102	NA	NA	10.1[U]	88.6	1.01	94.6
July	8.32[U]	105.0	NA	NA	NA	NA	10.1[U]	88.6	1.01	94.6
August	**9.65**	100.0	NA	NA	8.22[U]	103	10.1[U]	88.6	1.01	94.6
September	**8.76**	99.1	NA	NA	NA	NA	10.1[U]	88.6	1.01	94.6
October	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
November	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
December	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[U] Non-detect at reporting limit

Table A-3. Nutrient concentrations reported for samples, duplicate samples, lab blanks, and field blanks, and the relative percent difference between sample and duplicate sample concentrations (%) at the San Marcos River upper and lower sites for Spring 2022. Samples with detectable concentrations denoted in bold.

Nutrients	**Units**	**Upper**	**Upper Duplicates**	**Relative Percent Difference**	**Laboratory Blank**	**Field Blank**
Total Phosphorus	ug/L	**50**^{H}	25^{U}	66.67%	25^{U}	25^{U}
Orthophosphate	mg/L	**1.47**^{H}	**0.03**^{JH}	192.00%	0.02^{UH}	0.02^{UH}
Orthophosphate as P	mg/L	**1.47**^{H}	**0.03**^{JH}	192.00%	0.02^{UH}	0.02^{UH}
Total Organic Carbon	mg/L	**0.65**^{JH}	**1.43**^{B}	75.00%	0.29^{U}	**0.5**^{J}
Dissolved Inorganic Carbon	mg/L	**66.4**	**58**	13.50%	0.29^{U}	0.29^{U}
Dissolved Organic Carbon	mg/L	**0.59**^{JH}	NA	NA	NA	NA
Kjeldahl Nitrogen	mg/L	0.1^{U}	0.34	109.09%	0.1^{U}	0.1^{U}
Nitrate as N	mg/L	**0.85**^{H}	**0.85**^{H}	0.00%	**0.08**^{JH}	**0.08**^{JH}
Ammonia	ug/L	**74**^{J}	**262**	111.90%	**296**	29^{U}
Nutrients	**Units**	**Lower**	**Lower Duplicates**	**Relative Percent Difference**	**Laboratory Blank**	**Field Blank**
Total Phosphorus	ug/L	25^{U}	NA	NA	25^{U}	25^{U}
Orthophosphate	mg/L	0.02^{UH}	NA	NA	0.02^{UH}	0.02^{UH}
Orthophosphate as P	mg/L	0.02^{UH}	NA	NA	0.02^{UH}	0.02^{UH}
Total Organic Carbon	mg/L	**0.78**^{J}	NA	NA	0.29^{U}	**0.5**^{J}
Dissolved Inorganic Carbon	mg/L	**64.9**	NA	NA	0.29^{U}	0.29^{U}
Dissolved Organic Carbon	mg/L	NA	NA	NA	NA	NA
Kjeldahl Nitrogen	mg/L	0.1^{U}	NA	NA	0.1^{U}	0.1^{U}
Nitrate as N	mg/L	**1.09**^{H}	NA	NA	**0.08**^{JH}	**0.08**^{JH}
Ammonia	ug/L	29^{U}	NA	NA	**296**	29^{U}

^{U} Non-detect at reporting limit

^{H} Sample was prepped and analyzed past holding time

^{J} Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table A-4. Nutrient concentrations reported for samples, duplicate samples, lab blanks, and field blanks, and the relative percent difference between sample and duplicate sample concentrations (%) at the San Marcos upper and lower sites for Fall 2022. Samples with detectable concentrations denoted in bold.

Nutrients	**Units**	**Upper**	**Upper Duplicates**	**Relative Percent Difference**	**Laboratory Blank**	**Field Blank**
Total Phosphorus	ug/L	25[U]	NA	NA	25[U]	25[U]
Orthophosphate	mg/L	0.02[UH]	NA	NA	0.02[UH]	0.02[UH]
Orthophosphate as P	mg/L	0.02[UH]	NA	NA	0.02[UH]	0.02[UH]
Total Organic Carbon	mg/L	0.29[U]	NA	NA	**0.88**[J]	0.29[U]
Dissolved Inorganic Carbon	mg/L	**73**[H]	NA	NA	0.5[U]	**0.7**[JH]
Dissolved Organic Carbon	mg/L	**.88**[JH]	NA	NA	**0.72**[JH]	**1.43**[H]
Kjeldahl Nitrogen	mg/L	0.1[U]	NA	NA	0.1[U]	0.1[U]
Nitrate as N	mg/L	**1.37**	NA	NA	0.1[U]	0.1[U]
Ammonia	ug/L	**250**	NA	NA	**284**	**192**
Nutrients	**Units**	**Lower**	**Lower Duplicates**	**Relative Percent Difference**	**Laboratory Blank**	**Field Blank**
Total Phosphorus	ug/L	25[U]	25[U]	0.00%	25[U]	25[U]
Orthophosphate	mg/L	0.02[UH]	**0.04**[JH]	66.67%	0.02[UH]	0.02[UH]
Orthophosphate as P	mg/L	0.02[UH]	**0.04**[JH]	66.67%	0.02[UH]	0.02[UH]
Total Organic Carbon	mg/L	0.29[U]	**1.05**	113.43%	**0.88**[J]	0.29[U]
Dissolved Inorganic Carbon	mg/L	**67**	**67**	0.00%	0.5[U]	**0.7**[JH]
Dissolved Organic Carbon	mg/L	**0.55**[JH]	**1.02**[H]	59.87%	**0.72**[JH]	**1.43**[H]
Kjeldahl Nitrogen	mg/L	**0.13**[J]	**0.1**[J]	26.09%	0.1[U]	0.1[U]
Nitrate as N	mg/L	**1.41**	**1.41**	0.00%	0.1[U]	0.1[U]
Ammonia	ug/L	**322**	**159**	67.78%	**284**	**192**

[U] Non-detect at reporting limit

[H] Sample was prepped and analyzed past holding time

[J] Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table A-5. Nutrient concentrations reported for samples, duplicate samples, lab blanks, and field blanks, and the relative percent difference between sample and duplicate sample concentrations (%) at the Comal upper and lower sites for Spring 2022. Samples with detectable concentrations denoted in bold.

Nutrients	Units	Upper	Upper Duplicates	Relative Percent Difference	Laboratory Blank	Field Blank
Total Phosphorus	ug/L	40[U]	40[U]	0.00%	25[U]	25[U]
Orthophosphate	mg/L	0.02[UH]	0.02[UH]	0.00%	0.02[UH]	0.02[UH]
Orthophosphate as P	mg/L	0.02[UH]	0.02[UH]	0.00%	0.02[UH]	0.02[UH]
Total Organic Carbon	mg/L	**0.66[JH]**	**0.52[J]**	23.73%	0.29[U]	**0.5[J]**
Dissolved Inorganic Carbon	mg/L	**63.4**	**64.4**	1.56%	0.29[U]	0.29[U]
Dissolved Organic Carbon	mg/L	**0.65[J]**	NA	NA	NA	NA
Kjeldahl Nitrogen	mg/L	0.1[UF1]	0.1[U]	0.00%	0.1[U]	0.1[U]
Nitrate as N	mg/L	**1.60[H]**	**1.59[H]**	0.63%	**0.08[JH]**	**0.08[JH]**
Ammonia	ug/L	**184**	**172**	6.74%	**296**	29[U]
Nutrients	**Units**	**Lower**	**Lower Duplicates**	**Relative Percent Difference**	**Laboratory Blank**	**Field Blank**
Total Phosphorus	ug/L	NA	NA	NA	25[U]	25[U]
Orthophosphate	mg/L	0.02[UH]	NA	NA	0.02[UH]	0.02[UH]
Orthophosphate as P	mg/L	0.02[UH]	NA	NA	0.02[UH]	0.02[UH]
Total Organic Carbon	mg/L	**0.78[JH]**	NA	NA	0.29[U]	**0.5[J]**
Dissolved Inorganic Carbon	mg/L	**61.1**	NA	NA	0.29[U]	0.29[U]
Dissolved Organic Carbon	mg/L	**0.78[J]**	NA	NA	NA	NA
Kjeldahl Nitrogen	mg/L	0.1[U]	NA	NA	0.1[U]	0.1[U]
Nitrate as N	mg/L	**1.65[H]**	NA	NA	**0.08[JH]**	**0.08[JH]**
Ammonia	ug/L	**154**	NA	NA	**296**	29[U]

[U] Non-detect at reporting limit

[H] Sample was prepped and analyzed past holding time

[J] Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table A-6. Nutrient concentrations reported for samples, duplicate samples, lab blanks, and field blanks, and the relative percent difference between sample and duplicate sample concentrations (%) at the Comal upper and lower sites for Fall 2022. Samples with detectable concentrations denoted in bold.

Nutrients	**Units**	**Upper**	**Upper Duplicates**	**Relative Percent Difference**	**Laboratory Blank**	**Field Blank**
Total Phosphorus	ug/L	25[U]	NA	NA	25[U]	25[U]
Orthophosphate	mg/L	0.02[UH]	NA	NA	0.02[UH]	0.02[UH]
Orthophosphate as P	mg/L	0.02[UH]	NA	NA	0.02[UH]	0.02[UH]
Total Organic Carbon	mg/L	0.29[U]	NA	NA	**0.88**[J]	0.29[U]
Dissolved Inorganic Carbon	mg/L	**68.0**[H]	NA	NA	0.5[U]	**0.7**[JH]
Dissolved Organic Carbon	mg/L	**0.5**[JH]	NA	NA	**0.72**[JH]	**1.43**[H]
Kjeldahl Nitrogen	mg/L	0.10[U]	NA	NA	0.1[U]	0.1[U]
Nitrate as N	mg/L	**1.8**	NA	NA	0.1[U]	0.1[U]
Ammonia	ug/L	**83**[J]	NA	NA	**284**	**192**

Nutrients	**Units**	**Lower**	**Lower Duplicates**	**Relative Percent Difference**	**Laboratory Blank**	**Field Blank**
Total Phosphorus	ug/L	25[U]	25[U]	0.00%	25[U]	25[U]
Orthophosphate	mg/L	0.02[UH]	0.02[UH]	0.00%	0.02[UH]	0.02[UH]
Orthophosphate as P	mg/L	0.02[UH]	0.02[UH]	0.00%	0.02[UH]	0.02[UH]
Total Organic Carbon	mg/L	**0.75**[J]	0.29[U]	88.46%	**0.88**[J]	0.29[U]
Dissolved Inorganic Carbon	mg/L	**65**[H]	**64**[H]	1.55%	0.5[U]	**0.7**[JH]
Dissolved Organic Carbon	mg/L	**0.78**[JH]	**0.57**[JH]	31.11%	**0.72**[JH]	**1.43**[H]
Kjeldahl Nitrogen	mg/L	**0.14**[J]	**0.11**[J]	24.00%	0.1[U]	0.1[U]
Nitrate as N	mg/L	**1.7**	**1.69**	0.59%	0.1[U]	0.1[U]
Ammonia	mg/L	**193**	**153**	23.12%	**284**	**192**

[U] Non-detect at reporting limit

[H] Sample was prepped and analyzed past holding time

[J] Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table A-7. PPCP concentrations reported for samples, equipment blank, DI blank, and lab blank at the San Marcos groundwater sites (i.e., Hotel and Deep Hole springs) in Spring. Samples with detectable concentrations denoted in bold.

PPCP list	Hotel spring	Deep Hole	Equipment Blank	DI Blank	Lab Blank
Acetaminophen	17.4[U]	18.1[U]	17.1[U]	16.1[U]	16.7[U]
Azithromycin	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Caffeine	17.4[U]	18.1[U]	17.1[U]	17.1[U]	16.7[U]
Carbadox	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Carbamazepine	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Cefotaxime	6.96[U]	7.23[U]	6.84[U]	6.45[U]	6.67[U]
Ciprofloxacin	6.96[U]	7.23[U]	6.84[U]	6.45[U]	6.67[U]
Clarithromycin	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Clinafloxacin	6.96[U]	10.2[U]	6.84[U]	6.45[U]	6.67[U]
Cloxacillin	3.48[UH]	17.9[UH]	3.77[UH]	3.22[U]	3.33[U]
Dehydronifedipine	0.696[U]	0.723[U]	0.684[U]	0.645[U]	0.667[U]
Diphenhydramine	0.696[U]	0.723[U]	0.684[U]	0.645[U]	0.667[U]
Diltiazem	0.348[U]	0.362[U]	0.342[U]	0.322[U]	0.333[U]
Digoxin	6.96[U]	7.23[U]	6.84[U]	6.45[U]	6.67[U]
Digoxigenin	6.96[U]	7.23[U]	6.84[U]	6.45[U]	6.67[U]
Enrofloxacin	3.48[U]	3.62[U]	3.42[U]	3.22[U]	3.33[U]
Erythromycin-H2O	2.67[U]	2.77[U]	2.62[U]	2.47[U]	2.56[U]
Flumequine	1.74[U]	**3.71**	**2.19**	1.61[U]	**2.96**
Fluoxetine	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Lincomycin	3.48[U]	3.62[U]	2.95[U]	3.22[U]	3.33[U]
Lomefloxacin	3.48[U]	3.62[U]	9.82[U]	3.22[U]	3.33[U]
Miconazole	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Norfloxacin	17.4[U]	24.3[U]	14.7[U]	21.6[U]	17.0[U]
Norgestimate	3.48[U]	3.62[U]	3.42[U]	3.22[U]	3.33[U]
Ofloxacin	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Ormetoprim	0.696[U]	0.723[U]	0.684[U]	0.645[U]	0.667[U]
Oxacillin	3.48[UH]	3.62[UH]	6.26[UH]	3.22[U]	3.33[U]
Oxolinic Acid	0.696[U]	**1.12**	**0.839**	0.645[U]	**1.03**
Penicillin G	3.48[UH]	**105[H]**	**783**	3.22[U]	5.97[U]
Penicillin V	3.48[U]	6.5[U]	173[U]	3.22[U]	3.33[U]
Roxithromycin	0.348[U]	0.362[U]	0.342[U]	0.322[U]	0.333[U]
Sarafloxacin	17.4[U]	18.1[U]	17.1[U]	16.1[U]	16.7[U]
Sulfachloropyridazine	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Sulfadiazine	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Sulfadimethoxine	0.348[U]	0.362[U]	0.342[U]	0.322[U]	0.333[U]
Sulfamerazine	0.77[U]	0756[U]	0.854[U]	0.737[U]	0.667[U]
Sulfamethazine	0.696[U]	0.723[U]	0.684[U]	0.645[U]	0.667[U]
Sulfamethizole	0.696[U]	0.723[U]	0.899[U]	0.645[U]	0.667[U]
Sulfamethoxazole	0.696[U]	0.723[U]	0.684[U]	0.645[U]	0.667[U]
Sulfanilamide	17.4[U]	18.1[U]	17.1[U]	16.1[U]	16.7[U]
Sulfathiazole	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Thiabendazole	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Trimethoprim	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.67[U]
Tylosin	6.96[U]	7.23[U]	6.84[U]	6.45[U]	6.67[U]
Virginiamycin M1	3.48[U]	3.62[U]	3.42[U]	3.22[U]	3.33[U]
1,7-Dimethylxanthine	69.6[U]	72.3[U]	68.4[U]	64.5[U]	64.5[U]

[U] Non-detect at reporting limit
[H] Concentration is estimated

Table A-8. PPCP concentrations reported for samples, equipment blank, DI blank, and Lab blank at the San Marcos groundwater sites (i.e., Hotel and Deep Hole springs) in Spring. Samples with detectable concentrations denoted in bold.

PPCP List Continued	Hotel Spring	Deep Hole	Equipment Blank	DI Blank	Lab Blank
Alprazolam	0.348[U]	0.362[U]	0.342[U]	0.322[U]	0.30[U]
Amitriptyline	0.348[U]	0.362[U]	0.342[U]	0.322[U]	0.30[U]
Amlodipine	1.17[U]	1.21[U]	1.15[U]	1.08[U]	1.01[U]
Benzoylecgonine	0.174[U]	0.181[U]	0.171[U]	0.161[U]	0.15[U]
Benztropine	0.812[U]	0.844[U]	0.797[U]	0.752[U]	0.70[U]
Betamethasone	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.50[U]
Cocaine	**0.821**	**0.196**	**0.28**	**0.257**	**0.547**
DEET	**4.13**	**3.65**	**18.8**	**0.89**	**0.628**
Desmethyldiltiazem	0.122[U]	0.127[U]	0.12[U]	0.113[U]	0.105[U]
Diazepam	0.582[U]	0.605[U]	0.572[U]	0.539[U]	0.502[U]
Fluocinonide	2.33[U]	2.42[U]	2.29[U]	2.16[U]	2.01[U]
Fluticasone propionate	2.33[U]	2.42[U]	2.29[U]	2.16[U]	2.01[U]
Hydrocortisone	6.96[U]	7.23[U]	6.84[U]	6.45[U]	6.0[U]
10-hydroxy-amitriptyline	0.174[U]	0.181[U]	0.171[U]	0.161[U]	0.15[U]
Meprobamate	1.74[U]	1.81[U]	1.71[U]	1.61[U]	1.50[U]
Methylprednisolone	4.64[U]	4.82[U]	4.56[U]	4.30[U]	4.0[U]
Metoprolol	0.582[U]	0.605[U]	0.572[U]	0.539[U]	0.502[U]
Norfluoxetine	0.582[U]	0.605[U]	0.572[U]	0.539[U]	0.502[U]
Norverapamil	0.174[U]	0.181[U]	0.171[U]	0.161[U]	0.15[U]
Paroxetine	1.17[U]	1.21[U]	1.15[U]	1.08[U]	1.01[U]
Prednisolone	4.64[U]	4.82[U]	4.56[U]	4.30[U]	4.0[U]
Prednisone	6.96[U]	7.23[U]	6.84[U]	6.45[U]	6.0[U]
Promethazine	0.348[U]	0.362[U]	0.342[U]	0.322[U]	0.30[U]
Propoxyphene	0.348[U]	0.362[U]	0.342[U]	0.322[U]	0.30[U]
Propranolol	0.348[U]	0.362[U]	0.342[U]	0.322[U]	0.30[U]
Sertraline	0.348[U]	0.362[U]	0.342[U]	0.322[U]	0.30[U]
Simvastatin	2.33[U]	2.42[U]	2.29[U]	2.16[U]	2.01[U]
Theophylline	6.96[U]	7.23[U]	6.84[U]	6.45[U]	6.0[U]
Trenbolone	2.33[U]	2.42[U]	2.29[U]	2.16[U]	2.01[U]
Trenbolone acetate	0.348[U]	0.362[U]	0.342[U]	0.322[U]	0.30[U]
Valsartan	4.64[U]	4.82[U]	4.56[U]	4.30[U]	4.0[U]
Verapamil	0.174[U]	0.181[U]	0.171[U]	0.161[U]	0.15[U]

[U] Non-detect at reporting limit

Table A-9. PPCP concentrations reported for samples, DI blank, and lab blank at the San Marcos groundwater sites (i.e., Hotel and Deep Hole springs) in Fall. Samples with detectable concentrations denoted in bold.

PPCP list	Hotel spring	Deep Hole	DI Blank	Lab Blank
Acetaminophen	2.98[U]	2.98[U]	3.13[U]	3.0[U]
Azithromycin	1.49[U]	1.49[U]	1.56[U]	1.50[U]
Caffeine	5.97[U]	5.96[U]	6.26[U]	6.0[U]
Carbadox	3.98[U]	3.97[U]	4.17[U]	4.0[U]
Carbamazepine	0.298[U]	0.298[U]	0.313[U]	0.30[U]
Cefotaxime	5.91[U]	5.90[U]	6.20[U]	5.94[U]
Ciprofloxacin	1.49[U]	1.49[U]	1.56[U]	1.50[U]
Clarithromycin	0.298[U]	0.298[U]	0.313[U]	0.30[U]
Clinafloxacin	1.99[U]	1.98[U]	2.08[U]	2.0[U]
Cloxacillin	2.98[UH]	2.98[UH]	3.13[UH]	3.0[UH]
Dehydronifedipine	0.298[U]	0.298[U]	0.313[U]	0.30[U]
Diphenhydramine	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Diltiazem	0.149[U]	0.149[U]	0.156[U]	6.0[U]
Digoxin	5.97[U]	5.96[U]	6.26[U]	6.0[U]
Digoxigenin	1.49[U]	1.49[U]	1.56[U]	1.50[U]
Enrofloxacin	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Erythromycin-H2O	1.49[U]	1.49[U]	1.56[U]	1.50[U]
Flumequine	0.298[U]	0.298[U]	0.313[U]	0.30[U]
Fluoxetine	0.149[U]	0.149[U]	0.156[U]	0.15[U]
Lincomycin	0.597[U]	0.596[U]	6.26[U]	6.26[U]
Lomefloxacin	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Miconazole	0.298[U]	0.298[U]	0.313[U]	0.30[U]
Norfloxacin	1.99[U]	1.98[U]	2.08[U]	2.0[U]
Norgestimate	1.49[U]	1.49[U]	1.56[U]	1.50[U]
Ofloxacin	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Ormetoprim	0.149[U]	0.149[U]	0.156[U]	0.15[U]
Oxacillin	1.49[UH]	1.49[UH]	1.56[U]	1.50[U]
Oxolinic Acid	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Penicillin G	2.98[UH]	2.98[UH]	3.13[U]	3.0[U]
Penicillin V	1.49[U]	1.49[U]	1.56[U]	1.50[U]
Roxithromycin	0.149[U]	0.149[U]	0.156[U]	0.15[U]
Sarafloxacin	2.98[U]	2.98[U]	3.13[U]	3.0[U]
Sulfachloropyridazine	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Sulfadiazine	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Sulfadimethoxine	0.298[U]	0.298[U]	0.313[U]	0.30[U]
Sulfamerazine	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Sulfamethazine	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Sulfamethizole	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Sulfamethoxazole	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Sulfanilamide	5.97[U]	5.96[U]	6.26[U]	6.0[U]
Sulfathiazole	1.49[U]	1.49[U]	1.56[U]	1.50[U]
Thiabendazole	0.298[U]	0.298[U]	0.313[U]	0.30[U]
Trimethoprim	0.298[U]	0.298[U]	0.313[U]	0.30[U]
Tylosin	0.597[U]	0.596[U]	0.626[U]	0.60[U]
Virginiamycin M1	0.597[U]	0.596[U]	0.626[U]	0.60[U]
1,7-Dimethylxanthine	5.97[U]	5.96[U]	6.26[U]	6.0[U]

[U] Non-detect at reporting limit
[H] Concentration is estimated

Table A-10. PPCP concentrations reported for samples, DI blank, and lab blank at the San Marcos groundwater sites (i.e., Hotel and Deep Hole springs) in Fall. Samples with detectable concentrations denoted in bold.

PPCP List Continued	Hotel Spring	Deep Hole	DI Blank	Lab Blank
Alprazolam	0.298^{U}	0.298^{U}	0.313^{U}	0.30^{U}
Amitriptyline	0.298^{U}	0.298^{U}	0.313^{U}	0.30^{U}
Amlodipine	1.0^{U}	0.999^{U}	1.05^{U}	1.01^{U}
Benzoylecgonine	0.149^{U}	0.149^{U}	0.156^{U}	0.15^{U}
Benztropine	0.696^{U}	0.695^{U}	0.73^{U}	0.70^{U}
Betamethasone	1.49^{U}	1.49^{U}	1.56^{U}	1.50^{U}
Cocaine	0.149^{U}	0.149^{U}	0.156^{U}	0.15^{U}
DEET	**2.37**	**8.16**	**2.08**	**1.77**
Desmethyldiltiazem	0.104^{U}	0.104^{U}	0.11^{U}	0.105^{U}
Diazepam	0.499^{U}	0.498^{U}	0.524^{U}	0.502^{U}
Fluocinonide	2.0^{U}	2.0^{U}	2.10^{U}	2.01^{U}
Fluticasone propionate	2.0^{U}	2.0^{U}	2.10^{U}	2.01^{U}
Hydrocortisone	5.97^{U}	5.96^{U}	6.26^{U}	6.00^{U}
10-hydroxy-amitriptyline	0.149^{U}	0.149^{U}	0.156^{U}	0.15^{U}
Meprobamate	1.49^{U}	1.49^{U}	1.56^{U}	1.50^{U}
Methylprednisolone	3.98^{U}	3.97^{U}	4.17^{U}	4.00^{U}
Metoprolol	0.499^{U}	0.498^{U}	0.524^{U}	0.502^{U}
Norfluoxetine	0.499^{U}	0.498^{U}	0.524^{U}	0.502^{U}
Norverapamil	0.149^{U}	0.149^{U}	0.156^{U}	0.15^{U}
Paroxetine	1.0^{U}	0.999^{U}	1.05^{U}	1.05^{U}
Prednisolone	3.98^{U}	3.97^{U}	4.17^{U}	4.00^{U}
Prednisone	5.97^{U}	5.96^{U}	6.26^{U}	6.00^{U}
Promethazine	0.298^{U}	0.298^{U}	0.313^{U}	0.30^{U}
Propoxyphene	0.298^{U}	0.298^{U}	0.313^{U}	0.30^{U}
Propranolol	0.298^{U}	0.298^{U}	0.313^{U}	0.30^{U}
Sertraline	0.298^{U}	0.298^{U}	0.313^{U}	0.30^{U}
Simvastatin	2.0^{U}	2.0^{U}	2.10^{U}	2.01^{U}
Theophylline	5.97^{U}	5.96^{U}	6.26^{U}	6.00^{U}
Trenbolone	2.0^{U}	2.0^{U}	2.10^{U}	2.01^{U}
Trenbolone acetate	0.298^{U}	0.298^{U}	0.313^{U}	0.30^{U}
Valsartan	3.98^{U}	3.97^{U}	4.17^{U}	4.00^{U}
Verapamil	0.149^{U}	0.149^{U}	0.156^{U}	0.15^{U}

^{U} Non-detect at reporting limit

Table A-11. PPCP concentrations reported for samples, equipment blank, DI blank, and lab blank at the Comal groundwater sites (i.e., Spring run 1, 3 and 7) in Spring. Samples with detectable concentrations denoted in bold.

PPCP list	Spring run 1	Spring run 3	Spring run 7	Equipment Blank	DI Blank	Lab Blank
Acetaminophen	17.1[U]	16.4[U]	16.2[U]	17.1[U]	16.1[U]	16.7[U]
Azithromycin	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Caffeine	17.1[U]	16.4[U]	16.2[U]	17.1[U]	17.1[U]	16.7[U]
Carbadox	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Carbamazepine	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Cefotaxime	6.85[U]	6.55[U]	6.5[U]	6.84[U]	6.45[U]	6.67[U]
Ciprofloxacin	6.85[U]	6.55[U]	6.5[U]	6.84[U]	6.45[U]	6.67[U]
Clarithromycin	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Clinafloxacin	6.85[U]	6.9[U]	6.5[U]	6.84[U]	6.45[U]	6.67[U]
Cloxacillin	3.43[UH]	3.27[UH]	3.25[UH]	3.77[UH]	3.22[U]	3.33[U]
Dehydronifedipine	0.685[U]	0.655[U]	0.65[U]	0.684[U]	0.645[U]	0.667[U]
Diphenhydramine	0.685[U]	0.655[U]	0.65[U]	0.684[U]	0.645[U]	0.667[U]
Diltiazem	0.343[U]	0.327[U]	0.372[U]	0.342[U]	0.322[U]	0.333[U]
Digoxin	6.85[U]	6.55[U]	6.5[U]	6.84[U]	6.45[U]	6.67[U]
Digoxigenin	6.85[U]	6.55[U]	6.5[U]	6.84[U]	6.45[U]	6.67[U]
Enrofloxacin	3.43[U]	3.27[U]	3.25[U]	3.42[U]	3.22[U]	3.33[U]
Erythromycin-H2O	2.63[U]	2.51[U]	2.49[U]	2.62[U]	2.47[U]	2.56[U]
Flumequine	1.71[U]	1.64[U]	1.62[U]	**2.19**	1.61[U]	**2.96**
Fluoxetine	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Lincomycin	3.43[U]	3.27[U]	3.25[U]	2.95[U]	3.22[U]	3.33[U]
Lomefloxacin	3.43[U]	3.27[U]	3.25[U]	9.82[U]	3.22[U]	3.33[U]
Miconazole	1.74[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Norfloxacin	17.4[U]	19.9[U]	16.5[U]	14.7[U]	21.6[U]	17.0[U]
Norgestimate	3.43[U]	3.27[U]	3.25[U]	3.42[U]	3.22[U]	3.33[U]
Ofloxacin	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Ormetoprim	0.696[U]	0.655[U]	0.65[U]	0.684[U]	0.645[U]	0.667[U]
Oxacillin	3.43[UH]	3.27[UH]	3.25[UH]	6.26[UH]	3.22[U]	3.33[U]
Oxolinic Acid	0.685[U]	**0.659**	0.65[U]	**0.839**	0.645[U]	**1.03**
Penicillin G	3.43[UH]	3.27[UH]	3.25[UH]	**783**	3.22[U]	5.97[U]
Penicillin V	3.43[U]	3.27[U]	3.25[U]	173[U]	3.22[U]	3.33[U]
Roxithromycin	0.343[U]	0.327[U]	0.325[U]	0.342[U]	0.322[U]	0.333[U]
Sarafloxacin	17.1[U]	16.4[U]	16.2[U]	17.1[U]	16.1[U]	16.7[U]
Sulfachloropyridazine	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Sulfadiazine	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Sulfadimethoxine	0.343[U]	0.327[U]	0.325[U]	0.342[U]	0.322[U]	0.333[U]
Sulfamerazine	0.707[U]	0.655[U]	0.682[U]	0.854[U]	0.737[U]	0.667[U]
Sulfamethazine	0.685[U]	0.655[U]	0.65[U]	0.684[U]	0.645[U]	0.667[U]
Sulfamethizole	0.685[U]	0.655[U]	0.65[U]	0.899[U]	0.645[U]	0.667[U]
Sulfamethoxazole	0.685[U]	**0.809**	**0.723**	0.684[U]	0.645[U]	0.667[U]
Sulfanilamide	17.1[U]	16.4[U]	16.2[U]	17.1[U]	16.1[U]	16.7[U]
Sulfathiazole	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Thiabendazole	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Trimethoprim	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.67[U]
Tylosin	6.85[U]	6.55[U]	6.5[U]	6.84[U]	6.45[U]	6.67[U]
Virginiamycin M1	3.43[U]	3.27[U]	3.25[U]	3.42[U]	3.22[U]	3.33[U]
1,7-Dimethylxanthine	68.5[U]	65.5[U]	65.0[U]	68.4[U]	64.5[U]	64.5[U]

[U] Non-detect at reporting limit

[H] Concentration is estimated

Table A-12. PPCP concentrations reported for samples, equipment blank, DI blank, and lab blank at the Comal groundwater sites (i.e., Spring run 1, 3 and 7) in Spring. Samples with detectable concentrations denoted in bold.

PPCP List Continued	Spring run 1	Spring run 3	Spring Run 7	Equipment Blank	DI Blank	Lab Blank
Alprazolam	0.343[U]	0.327[U]	0.325[U]	0.342[U]	0.322[U]	0.30[U]
Amitriptyline	0.343[U]	0.327[U]	0.327[U]	0.342[U]	0.322[U]	0.30[U]
Amlodipine	1.15[U]	1.10[U]	1.09[U]	1.15[U]	1.08[U]	1.01[U]
Benzoylecgonine	0.171[U]	0.164[U]	0.162[U]	0.171[U]	0.161[U]	0.15[U]
Benztropine	0.8[U]	0.764[U]	0.758[U]	0.797[U]	0.752[U]	0.70[U]
Betamethasone	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.50[U]
Cocaine	**0.336**	**0.264**	**0.349**	**0.28**	**0.257**	**0.547**
DEET	**1.07**	**1.15**	**0.992**	**18.8**	**0.89**	**0.628**
Desmethyldiltiazem	0.12[U]	0.115[U]	0.114[U]	0.12[U]	0.113[U]	0.105[U]
Diazepam	0.573[U]	0.548[U]	0.544[U]	0.572[U]	0.539[U]	0.502[U]
Fluocinonide	2.3[U]	2.19[U]	2.18[U]	2.29[U]	2.16[U]	2.01[U]
Fluticasone propionate	2.3[U]	2.19[U]	2.18[U]	2.29[U]	2.16[U]	2.01[U]
Hydrocortisone	6.85[U]	6.55[U]	6.50[U]	6.84[U]	6.45[U]	6.0[U]
10-hydroxy-amitriptyline	0.171[U]	0.164[U]	0.162[U]	0.171[U]	0.161[U]	0.15[U]
Meprobamate	1.71[U]	1.64[U]	1.62[U]	1.71[U]	1.61[U]	1.50[U]
Methylprednisolone	4.57[U]	4.36[U]	4.33[U]	4.56[U]	4.30[U]	4.0[U]
Metoprolol	0.573[U]	0.548[U]	0.544[U]	0.572[U]	0.539[U]	0.502[U]
Norfluoxetine	0.573[U]	0.548[U]	0.544[U]	0.572[U]	0.539[U]	0.502[U]
Norverapamil	0.171[U]	0.164[U]	0.162[U]	0.171[U]	0.161[U]	0.15[U]
Paroxetine	1.15[U]	1.10[U]	1.09[U]	1.15[U]	1.08[U]	1.01[U]
Prednisolone	4.57[U]	4.36[U]	4.33[U]	4.56[U]	4.30[U]	4.0[U]
Prednisone	6.85[U]	6.55[U]	6.50[U]	6.84[U]	6.45[U]	6.0[U]
Promethazine	0.343[U]	0.327[U]	0.325[U]	0.342[U]	0.322[U]	0.30[U]
Propoxyphene	0.343[U]	0.327[U]	0.325[U]	0.342[U]	0.322[U]	0.30[U]
Propranolol	0.343[U]	0.327[U]	0.325[U]	0.342[U]	0.322[U]	0.30[U]
Sertraline	0.343[U]	0.327[U]	0.325[U]	0.342[U]	0.322[U]	0.30[U]
Simvastatin	2.3[U]	2.19[U]	2.18[U]	2.29[U]	2.16[U]	2.01[U]
Theophylline	6.85[U]	6.55[U]	6.50[U]	6.84[U]	6.45[U]	6.0[U]
Trenbolone	2.3[U]	2.19[U]	2.18[U]	2.29[U]	2.16[U]	2.01[U]
Trenbolone acetate	0.343[U]	0.327[U]	0.327[U]	0.342[U]	0.322[U]	0.30[U]
Valsartan	4.57[U]	4.36[U]	4.33[U]	4.56[U]	4.30[U]	4.0[U]
Verapamil	0.171[U]	0.164[U]	0.162[U]	0.171[U]	0.161[U]	0.15[U]

[U] Non-detect at reporting limit

Table A-13. PPCP concentrations reported for samples, duplicate samples, DI blank, and lab blank at the Comal groundwater sites (i.e., Spring run 1, 3 and 7) in Fall. Samples with detectable concentrations denoted in bold.

PPCP list	Spring run 1	Spring run 3	Spring run 3 duplicate	Spring run 7	DI Blank	Lab Blank
Acetaminophen	**454**	3.33[U]	3.06[U]	2.99[U]	3.13[U]	3.0[U]
Azithromycin	1.45[U]	1.67[U]	1.53[U]	1.49[U]	1.56[U]	1.50[U]
Caffeine	**111**	6.66[U]	6.11[U]	5.97[U]	6.26[U]	6.0[U]
Carbadox	3.86[U]	4.44[U]	4.08[U]	3.98[U]	4.17[U]	4.0[U]
Carbamazepine	0.29[U]	0.333[U]	0.306[U]	0.299[U]	0.313[U]	0.30[U]
Cefotaxime	5.74[U]	6.66[U]	6.05[U]	5.91[U]	6.20[U]	5.94[U]
Ciprofloxacin	1.45[U]	1.67[U]	1.53[U]	**2.28**	1.56[U]	1.50[U]
Clarithromycin	0.29[U]	0.333[U]	0.306[U]	0.299[U]	0.313[U]	0.30[U]
Clinafloxacin	1.93[U]	2.22[U]	2.04[U]	1.99[U]	2.08[U]	2.0[U]
Cloxacillin	2.9[UH]	3.33[UH]	3.06[UH]	2.99[UH]	3.13[UH]	3.0[UH]
Dehydronifedipine	0.29[U]	0.333[U]	0.306[U]	0.299[U]	0.313[U]	0.30[U]
Diphenhydramine	**0.866**	0.666[U]	0.611[U]	0.597[U]	0.626[U]	0.60[U]
Diltiazem	**0.904**	0.167[U]	0.153[U]	0.149[U]	0.156[U]	6.0[U]
Digoxin	5.8[U]	6.66[U]	6.11[U]	5.97[U]	6.26[U]	6.0[U]
Digoxigenin	1.45[U]	1.67[U]	1.53[U]	1.49[U]	1.56[U]	1.50[U]
Enrofloxacin	0.58[U]	0.666[U]	0.611[U]	**0.598**	0.626[U]	0.60[U]
Erythromycin-H2O	1.45[U]	1.67[U]	1.53[U]	1.49[U]	1.56[U]	1.50[U]
Flumequine	0.29[U]	0.333[U]	0.306[U]	0.299[U]	0.313[U]	0.30[U]
Fluoxetine	0.145[U]	0.167[U]	0.153[U]	0.149[U]	0.156[U]	0.15[U]
Lincomycin	0.58[U]	0.666[U]	0.611[U]	0.597[U]	6.26[U]	6.26[U]
Lomefloxacin	0.58[U]	0.666[U]	0.611[U]	0.597[U]	0.626[U]	0.60[U]
Miconazole	0.29[U]	0.333[U]	0.306[U]	0.299[U]	0.313[U]	0.30[U]
Norfloxacin	1.98[U]	2.22[U]	2.04[U]	1.99[U]	2.08[U]	2.0[U]
Norgestimate	1.45[U]	1.67[U]	1.53[U]	1.49[U]	1.56[U]	1.50[U]
Ofloxacin	0.58[U]	0.666[U]	0.611[U]	**0.654**	0.626[U]	0.60[U]
Ormetoprim	0.145[U]	0.167[U]	0.153[U]	0.149[U]	0.156[U]	0.15[U]
Oxacillin	1.45[UH]	1.67[UH]	1.53[U]	1.49[UH]	1.56[U]	1.50[U]
Oxolinic Acid	0.58[U]	0.666[U]	0.611[U]	0.597[U]	0.626[U]	0.60[U]
Penicillin G	2.9[UH]	3.33[UH]	0.306[U]	2.99[UH]	3.13[U]	3.0[U]
Penicillin V	1.45[U]	1.67[U]	1.53[U]	1.49[U]	1.56[U]	1.50[U]
Roxithromycin	0.145[U]	0.167[U]	0.153[U]	0.149[U]	0.156[U]	0.15[U]
Sarafloxacin	2.9[U]	3.33[U]	3.06[U]	2.99[U]	3.13[U]	3.0[U]
Sulfachloropyridazine	0.58[U]	0.666[U]	0.611[U]	0.597[U]	0.626[U]	0.60[U]
Sulfadiazine	0.58[U]	0.666[U]	0.611[U]	0.597[U]	0.626[U]	0.60[U]
Sulfadimethoxine	0.29[U]	0.333[U]	0.306[U]	0.299[U]	0.313[U]	0.30[U]
Sulfamerazine	0.58[U]	0.666[U]	0.611[U]	0.597[U]	0.626[U]	0.60[U]
Sulfamethazine	0.58[U]	0.666[U]	0.611[U]	0.597[U]	0.626[U]	0.60[U]
Sulfamethizole	0.58[U]	1.67[U]	1.53[U]	0.597[U]	0.626[U]	0.60[U]
Sulfamethoxazole	0.58[U]	0.666[U]	0.611[U]	**0.673**	0.626[U]	0.60[U]
Sulfanilamide	5.8[U]	6.66[U]	6.11[U]	5.97[U]	6.26[U]	6.0[U]
Sulfathiazole	1.45[U]	1.67[U]	1.53[U]	1.49[U]	1.56[U]	1.50[U]
Thiabendazole	**0.367**	**0.469**	0.306[U]	**0.692**[C]	0.313[U]	0.30[U]
Trimethoprim	0.29[U]	0.333[U]	0.306[U]	0.299[U]	0.313[U]	0.30[U]
Tylosin	0.58[U]	0.666[U]	0.611[U]	0.597[U]	0.626[U]	0.60[U]
Virginiamycin M1	0.58[U]	0.666[U]	0.611[U]	0.597[U]	0.626[U]	0.60[U]
1,7-Dimethylxanthine	**33.2**	6.66[U]	6.11[U]	5.97[U]	6.26[U]	6.0[U]

[U] Non-detect at reporting limit

[H] Concentration is estimated

Table A-14. PPCP concentrations reported for samples, duplicate samples, DI blank, and lab blank at the Comal groundwater sites (i.e., Spring run 1, 3 and 7) in Fall. Samples with detectable concentrations denoted in bold.

PPCP List Continued	Spring run 1	Spring run 3	Spring run 3 duplicate	Spring Run 7	DI Blank	Lab Blank
Alprazolam	0.29^U	0.333^U	0.306^U	0.299^U	0.313^U	0.30^U
Amitriptyline	0.29^U	0.333^U	0.306^U	0.299^U	0.313^U	0.30^U
Amlodipine	0.972^U	1.12^U	1.02^U	1.0^U	1.05^U	1.01^U
Benzoylecgonine	**0.485**	0.167^U	0.153^U	0.149^U	0.156^U	0.15^U
Benztropine	0.676^U	0.777^U	0.713^U	0.697^U	0.73^U	0.70^U
Betamethasone	1.45^U	1.67^U	1.53^U	1.49^U	1.56^U	1.50^U
Cocaine	**0.207**	0.167^U	0.153^U	0.149^U	0.156^U	0.15^U
DEET	**2.35**	**2.51**	**2.08**	**2.25**	**2.08**	**1.77**
Desmethyldiltiazem	**0.196**	0.117^U	0.107^U	0.105^U	0.11^U	0.105^U
Diazepam	0.485^U	0.558^U	0.511^U	0.5^U	0.524^U	0.502^U
Fluocinonide	1.94^U	2.23^U	2.05^U	2.0^U	2.10^U	2.01^U
Fluticasone propionate	1.94^U	2.23^U	2.05^U	2.0^U	2.10^U	2.01^U
Hydrocortisone	5.8^U	6.66^U	6.11^U	5.97^U	6.26^U	6.00^U
10-hydroxy-amitriptyline	0.145^U	0.167^U	0.153^U	0.149^U	0.156^U	0.15^U
Meprobamate	1.45^U	1.67^U	1.53^U	1.49^U	1.56^U	1.50^U
Methylprednisolone	3.86^U	4.44^U	4.08^U	3.98^U	4.17^U	4.00^U
Metoprolol	0.485^U	0.558^U	0.511^U	0.5^U	0.524^U	0.502^U
Norfluoxetine	0.485^U	0.558^U	0.511^U	0.5^U	0.524^U	0.502^U
Norverapamil	0.145^U	0.167^U	0.153^U	0.149^U	0.156^U	0.15^U
Paroxetine	0.972^U	1.12^U	1.02^U	1.0^U	1.05^U	1.05^U
Prednisolone	3.86^U	4.44^U	4.08^U	3.98^U	4.17^U	4.00^U
Prednisone	5.80^U	6.66^U	6.11^U	5.97^U	6.26^U	6.00^U
Promethazine	0.29^U	0.333^U	0.306^U	0.299^U	0.313^U	0.30^U
Propoxyphene	0.29^U	0.333^U	0.306^U	0.299^U	0.313^U	0.30^U
Propranolol	0.29^U	0.333^U	0.306^U	0.299^U	0.313^U	0.30^U
Sertraline	0.29^U	0.333^U	0.306^U	0.299^U	0.313^U	0.30^U
Simvastatin	1.94^U	2.23^U	2.05^U	2.0^U	2.10^U	2.01^U
Theophylline	**65.6**	6.66^U	6.11^U	5.97^U	6.26^U	6.00^U
Trenbolone	1.94^U	2.23^U	2.05^U	2.0^U	2.10^U	2.01^U
Trenbolone acetate	0.29^U	0.333^U	0.306^U	0.299^U	0.313^U	0.30^U
Valsartan	3.86^U	4.44^U	4.08^U	3.98^U	4.17^U	4.00^U
Verapamil	0.145^U	0.167^U	0.153^U	0.149^U	0.156^U	0.15^U

^U Non-detect at reporting limit

Appendix F2 | **Comal Springs Biological Monitoring Report**

HABITAT CONSERVATION PLAN
BIOLOGICAL MONITORING PROGRAM
Comal Springs/River Aquatic Ecosystem

ANNUAL REPORT

December 2022

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EXECUTIVE SUMMARY

The Edwards Aquifer Habitat Conservation Plan (EAHCP) Biological Monitoring Program continued to track biota and habitat conditions of the Comal Springs/River ecosystem in 2022 through a series of routine and Critical Period monitoring activities outlined in this report. Monitoring in the Comal system consisted of routine surveys specific to HCP Covered Species: Fountain Darter (*Etheostoma fonticola*), Comal Springs Salamander (*Eurycea* sp.), and multiple Comal Springs invertebrates. Community-level monitoring data were also collected on aquatic vegetation, fish, and benthic macroinvertebrates. In addition, reduced river discharge triggered several Critical Period and species-specific low-flow sampling events. The last extensive drought in the Comal system occurred near the start of EAHCP implementation in 2013-2014. Nine years later, EAHCP activities have included extensive efforts to enhance, diversify, and maintain habitat for the Covered Species in the spring runs, Landa Lake, and the Old Channel Environmental Protection and Restoration Area (ERPA). Thus, the results from 2022 biological monitoring provide our first glimpse of real-time ecological responses of the aquatic community in the Comal Springs/River ecosystem under extreme drought conditions following extensive EAHCP activities.

In 2022, low precipitation and higher ambient temperatures in central Texas resulted in severe drought conditions by spring and transitioned to an exceptional drought classification by mid-summer. Total river discharge in the Comal System was below median historical conditions for most of the year and declined to levels not observed since 2014. Median and minimum mean daily discharge in 2022 (166 and 89 cfs, respectively) were higher than 2014 (135 and 65 cfs, respectively), but lower than other recent low-flow years in 2009, 2011, and 2013. Two visual habitat evaluations and subsequent update memorandums were completed this year as discharge decreased below 100 cfs. Low spring flow and subsequent low water levels during late summer contributed to degraded habitat conditions at the fringes (Upper Spring Run and New Channel) and loss of wetter area in the spring runs. In contrast, habitat quality was generally maintained in Landa Lake and the Old Channel ERPA. Despite the low-flow conditions experienced in 2022, water quality parameters measured during Critical Period sampling were typically within the range of historical observations.

Comal River monthly median discharge decreased throughout the year. Monthly median discharge aligned with long-term medians from January to March and descended to values near the long-term 10th percentile from April through September. Flows dropped below 150 cfs in June, triggering a full Critical Period sampling event. Discharge decreased further to 100 cfs in July, 90 cfs in August, and 85 cfs in September, initiating a second full Critical Period event and multiple species-specific triggers (i.e., Comal Springs Salamander, Comal Springs Riffle Beetle). River discharge fell below the long-term 10th percentile for all of October. As such, Critical Period sampling conditions continued into the fall with required biological monitoring being incorporated into the routine fall sampling event. Annual minimum daily discharge occurred in August (89 cfs).

Despite low-flow conditions, spatial trends in water temperature were generally consistent with historical data. Patterns in water temperature variability were characterized by three distinct groups. Higher and more variable water temperatures at Blieders Creek were unique compared to all other stations and directly related to this drainage receiving no upstream springflow contributions. Low variation in spring runs and Landa Lake (0.1–1.1 °C) represented more stable environments within the Comal system. In contrast, temperatures at riverine stations were more variable than spring environments, exhibiting a longitudinal gradient of increasing variability with distance from spring sources. Egg and/or larvae threshold exceedance occurred at all stations except at the two Landa Lake stations. Threshold exceedance for both life stages most frequently occurred at Blieders and within riverine stations.

Seasonal patterns in total aquatic vegetation coverage varied spatially. Coverages at Upper Spring Run were lower than long-term averages across seasons but were higher than the low-flow average. At Landa Lake, total coverage mirrored long-term averages despite low-flow conditions. In riverine reaches, total coverage was below seasonal averages at the Old Channel and higher at the two New Channel reaches. Higher vegetation coverages in the New Channel reaches were best explained by the prolonged absence of flood pulse events along Dry Comal Creek. At Upper Spring Run, coverages were most impacted by low-flow conditions throughout 2022 and mainly driven by decreased bryophyte and increased filamentous algae cover. In contrast, Landa Lake and Old Channel represent the most stable environments; therefore, were less impacted by low flows, though bryophyte coverage has declined at Landa Lake in recent years. Below average total coverages in the Old Channel study reach should not be interpreted an indicator of degraded conditions, since non-native *Hygrophila* historically dominated the reach prior to the substantial improvements in composition due to EAHCP restoration. In summary, reduced flows in 2022 impacted aquatic vegetation in the Upper Spring Run and demonstrated minimal disturbance among the other study reaches.

Fountain Darter densities among vegetation types demonstrated predictable patterns observed in previous years and continue to support the importance of ornate taxa, whereas patterns in size structure demonstrated that taxa used at a given life stage can vary based on local patch conditions. Seasonal patterns in population performance were consistent across the three sampling methods. Ubiquitously lower medians for each metric in summer suggested potential short-term negative effects from reduced flows, though whether this was a true short-term decline remains uncertain, due to confounding factors such as imperfect detection. Regardless, each metric returned to quantities similar to historical data by fall. However, drop-net data demonstrated that population responses under continued low-flow conditions in fall varied spatially. Densities decreased from spring to fall at Upper Spring Run and New Channel, whereas the Old Channel was generally stable. At Landa Lake, densities decreased from spring to summer, then increased in fall.

Results from drop-netting were reach specific. Current and historical trends suggest persistence of suitable habitat in Landa Lake and Old Channel facilitate darter resistance to low flows. Agreement between occurrence and density in 2022 also supports this and further suggests higher habitat suitability increases distributional continuity of darters, thus increasing carrying capacity. That being said, overall habitat suitability in Upper Spring Run aligned with Landa Lake and Old Channel, indicating that criteria for some taxa (e.g., filamentous algae) may not generalize well throughout the system. Additional detail is needed in defining habitat suitability criteria, as "filamentous algae" may represent multiple algae taxa with differential suitability. Lastly, substantially high recruitment in the fall best explains the increase in density at Landa Lake, while densities at Upper Spring Run and New Channel remained low. Inconsistent trends suggest that heightened recruitment may function as a population resilience mechanism during periods of low flow but is dependent on the environmental conditions within a given reach. Additional research is needed to understand how different demographic processes contribute to population dynamics.

Evidence of detectable temporal trends in fish communities varied among the selected metrics, as well as between and within study segments. Species richness and diversity were typically higher in riverine areas and lowest at Landa Lake. At Upper Spring Run, species richness and diversity were intermediate and aligned more with riverine segments. Five-year trends in species richness usually varied from event to event and displayed no detectable patterns. No apparent trends in diversity were documented at Upper Spring Run and New Channel. In contrast, diversity increased from 2018–2022 at Landa Lake, suggesting that community composition in these reaches have become more heterogenous in recent years. Temporal trends in richness of spring-associated fishes (hereafter 'spring fishes') were congruent with community-level observations and generally stable throughout the study area. Relative density of spring fishes showed no emergent patterns at Upper Spring Run, Landa Lake, and New Channel. At Landa Lake, relative density was consistently higher and varied substantially less than other segments. Relative density was variable at Upper Spring Run, whereas the New Channel showed similar stability to Landa Lake. At the Old Channel, relative density of spring fishes declined the past five years, but the mechanisms behind this are unclear.

Comal Springs Salamander catch rates were variable among sites in 2022, though decreases from spring to summer were a consistent trend. From summer to fall, catch rates increased at Spring Island Outfall and Spring Run 1, whereas Spring Run 3 trends were more stable and exhibited simar catch rates to events from 2018–2021. At Spring Island Run, catch rates were at normal levels when wetted habitats were present. Based on 2022 results and five-year trends, negative effects on Comal Salamander populations by low-flow conditions were acute for most sites, where substantially lower catch rates mostly occurred throughout the summer with reductions in wetted area. The magnitude of declines was lesser at Spring Run 3, which maintained greater springflow, and as seen following previous drought years, catch rates would be expected to increase upon the return of more average flow conditions.

Macroinvertebrate drift-net sampling of spring orifices showed that the density of *Stygobromus* sp. was slightly above to the long-term median in spring and below it in fall. Lower densities in fall were expected under low-flow conditions, though were surprisingly high at the Western Upwelling location. Lure sampling for Comal Springs Riffle Beetles (*Heterelmis comalensis*) showed that 2022 catch rates decreased from spring to fall at Spring Island and Spring Run 3, while counts at Western Shoreline increased from spring to summer, then decreased in fall. Seasonal trends, in summary, were either similar or lower than historical data and lures with higher counts were less frequent. Lower counts this year, combined with historical observations, suggests low flows in 2022 and reductions in wetted area may have resulted in reduced surface abundance. Benthic invertebrates can move from eucrenal habitats to the hyporheos zone to seek refuge during low-flow periods and decreased Comal Springs Riffle Beetle counts may alternatively be explained by most individuals being unavailable to sample (i.e., temporary emigration). A new EAHCP study has been initiated to better understand population dynamics for this species.

Overall, 2022 biological monitoring provided essential documentation into the current condition of the Covered Species and stability of their habitats in the Comal Springs/River following nine years of EAHCP implementation. It also provided another data point for real-time flow-ecology responses during extreme drought. Patterns in river discharge were intermediate compared to previous low-flow years and its impacts on ecological conditions of the system varied spatially, as well as among species and communities assessed. Specifically, Covered Species and aquatic vegetation appeared to be more impacted by reduced flows in the upper fringes of the system and spring run habitats compared to Landa Lake and downstream riverine habitats. This suggests greater resistance and resilience potential in Landa Lake and the Old Channel ERPA where high quality habitat conditions for the Fountain Darter have been established and are being maintained. The 2022 data set also highlights continued low-flow concerns for the Comal Springs invertebrates and Comal Springs Salamanders with decreases in wetted area in the spring runs, western shoreline, and spring island areas influencing available surface habitat for these organisms. Comal Springs Salamanders have shown the resilience to come back in large numbers following the last severe drought which impacted spring run habitats. However, the dynamics of subsurface and aquifer use by Comal invertebrates is still not fully understood. Subsequent monitoring efforts and targeted applied research investigations will provide opportunities to better understand the dynamics of this complex ecological system and how it responds to future hydrologic conditions.

INTRODUCTION

The Edwards Aquifer Habitat Conservation Plan (EAHCP) supports the issuance of an Incidental Take Permit that allows the "incidental take" of Covered Species (Table 1) from otherwise lawful activities in the Comal Springs system. Section 6.3.1 of the HCP established a continuation of biological monitoring in the Comal Springs/River. This biological monitoring program was first established in 2000 (formerly known as the Edwards Aquifer Authority [EAA] Variable Flow Study), and its original purpose was to evaluate the effects of variable flow on the biological resources of the Comal Springs/River, with an emphasis on threatened and endangered species. However, the utility of the EAHCP biological monitoring program has surpassed its initial purpose (EAHCP 2012). The biological data collected since the implementation of this monitoring program (BIO-WEST 2001–2022) now serves as the cornerstone for several underlying components which include the following: (1) long-term biological goals (LTBGs) and management objectives (Section 4.1); (2) determination of potential impacts to Covered Species, "incidental take" assessment, and Environmental Impact Statement alternatives (Section 4.2); and (3) establishment of core adaptive-management activities for triggered monitoring and adaptive-management response actions (Section 6.4.3). Additionally, biological monitoring program data, in conjunction with other available information, are essential to adaptive management as the EAHCP proceeds. Current and future data collection will help assess the effectiveness and efficiency of certain EAHCP mitigation and restoration activities conducted in the Comal Springs/River and calculate the EAHCP habitat baseline and net disturbance determination and annual "incidental take" estimate.

Table 1. Covered Species directly sampled for under the Edwards Aquifer Habitat Conservation Plan in the Comal spring and river ecosystems.

SCIENTIFIC NAME	COMMON NAME	ESA STATUS
Insects		
Heterelmis comalensis	Comal Springs Riffle Beetle	Endangered
Stygoparnus comalensis	Comal Springs Dryopid Beetle	Endangered
Crustaceans		
Stygobromus pecki	Peck's Cave Amphipod	Endangered
Amphibians		
Eurycea sp.	Comal Springs Salamander	Petitioned
Fish		
Etheostoma fonticola	Fountain Darter	Endangered

This report provides the methodology and results for biological monitoring activities conducted in 2022 within the Comal Spring/River ecosystem. In addition to routine monitoring, Critical Period and species-specific low-flow sampling were triggered. The results include summaries of current physiochemical conditions, as well as current conditions of floral and faunal communities, encompassing routine and low-flow sampling. For all aquatic organisms, historic observations (BIO-WEST 2001–2022a) are also used to provide context to current conditions.

METHODS

Study Location

The Comal Springs System is the largest spring complex in Texas. It encompasses an extensive headsprings system and the Comal River (New Braunfels, Comal County, Texas), and is fed by the Edwards Aquifer (Brune 2002). Dam construction and channelization during the late-1800s modified headspring habitats (Odgen et al. 1986; Crowe and Sharpe 1997) and drainage patterns of the river (Ottmers 1987). Impoundment of Comal Springs resulted in the formation of Landa Lake (Linam et al. 1993), which is fed by four spring runs of variable size (Ogden et al. 1986; Crowe and Sharpe 1997). From the headwaters, the river flows about 5 kilometers (km) before its confluence with the Guadalupe River. The majority of water that exits Landa Lake flows through the “New Channel”, an engineered diversion that was originally created to act as a cooling system for a power generation plant. Remaining flows are diverted to the original river channel, known as the “Old Channel,” that rejoins the New Channel about 2.5 km downstream (Ottmers 1987).

The watershed is dominated by urban landcover and is subjected to recreational use. Spring inputs from the Edwards Aquifer provide stable physiochemical conditions, and springflow conditions are dictated by aquifer recharge and human water use (Sung and Li 2010). In the 1950s, Comal Springs temporarily ceased flowing (Schneck and Whiteside 1976; Brune 2002). Despite this, the Comal Springs System maintains diverse assemblages of floral and faunal communities (Bowles and Arsuffi 1993; Crowe and Sharpe 1997) and includes multiple endemic aquatic organisms, such as Comal Springs Riffle Beetle (*Heterelmis comalensis*), Peck’s Cave Amphipod (*Stygobromus pecki*), Comal Springs Salamander (*Eurycea* sp.), and Fountain Darter (*Etheostoma fonticola*).

Sampling Strategy

Based on the long-term biological goals (LTBGs) and management objectives outlined in the EAHCP, study areas were established to conduct long-term monitoring and quantify population trends of the Covered Species (EAHCP 2012). The sampling locations selected are designed to cover the entire extent of Covered Species habitats, but they also allow for holistic ecological interpretation while maximizing resources (Figures 1–3).

Comprehensive sampling within the established study area varies temporally and spatially among Covered Species. The current sampling strategy includes five spatial resolutions:

1. System-wide sampling
    a. Aquatic vegetation mapping: 5-year intervals (winter)
2. Select longitudinal locations
    a. Water temperature monitoring: year-round at permanent monitoring stations
    b. Discharge measurements: 2 events/year (spring, fall)
3. Reach sampling
    a. Aquatic vegetation mapping: 2 events/year (spring, fall)
    b. Fountain Darter drop-net sampling: 2 events/year (spring, fall)
    c. Fountain Darter random-station dip-net surveys: 3 events/year (spring, summer, fall)

4. Springs Sampling
    a. Endangered Comal invertebrate sampling: 2 events/year (spring, fall)
    b. Comal Salamander surveys: 2 events/year (spring, fall)
    c. Fountain Darter visual surveys: 2 events/year (spring, fall)
5. River section/segment
    a. Fountain Darter timed dip-net surveys: 3 events/year (spring, summer, fall)
    b. Fish community sampling: 2 events/year (spring, fall)
    c. Macroinvertebrate community sampling: 2 events/year (spring, fall)

In addition to annual comprehensive sampling outlined above, low-flow sampling may also be conducted, but is dependent on EAHCP flow triggers, which include Critical Period Low-Flow Sampling and species-specific sampling (EAHCP 2012). In 2022, river discharge was less than 150 cubic feet per second (cfs) in June and 100 cfs in August, which resulted in Critical Period Low-flow full sampling events. Flow conditions in the fall remained in Critical Period but required biological monitoring was integrated into the routine full, Fall sampling event. In addition, species-specific triggers were met from July to October for Comal Springs Salamander and Comal Springs Riffle Beetle (Appendix A). Critical Period water grab sampling and visual habitat assessment results are presented in Appendix B.

The remaining methods sections provide brief descriptions of the procedures utilized for comprehensive sampling efforts, which includes specifics on all Critical Period and species-specific sampling efforts. A more-detailed description of the gear types used, methodologies employed, and specific GPS coordinates can be found in the Standard Operating Procedures Manual for the EAHCP biological monitoring program for the Comal Springs/River ecosystem (EAA 2017).

Comal River Discharge and Springflow

River hydrology in 2022 was assessed using US Geological Survey (USGS) stream gage data from January 1 to October 31. Mean daily discharge expressed in cubic feet per second (cfs) was acquired from USGS gage #08169000, which represents cumulative river discharge that encompasses springflow and local runoff contributions. It should be noted that some of these data are provisional and are subject to revision at a later date (USGS 2022). The annual distribution of mean daily discharge was compared for the past 5-years using boxplots. The distribution of 2022 mean daily discharge was summarized by month using boxplots. Monthly discharge levels were compared with long-term (1928–present) 10th, 50th (i.e., median), and 90th percentiles.

Discharge was also measured in spring and fall at five cross-section stations (Upper Spring Run, Spring Run 1, Spring Run 2, Spring Run 3, Old Channel) using a flowmeter and adjustable wading rod. Additional discharge measurements were conducted during Critical Period and species-specific events triggered in June (n = 2), August (n = 2), September (n = 2), and October (n = 2). Some cross-section discharges were omitted from one event in August and September due to measurement error. Additionally, discharge was measured at four M9 stations (Spring Island Upper Far, Spring Island Lower Near, Spring Island Lower Far, Landa Lake Cable) by EAA personnel using a SonTek RiverSurveyor Acoustic Doppler Profiler (Figure 3).

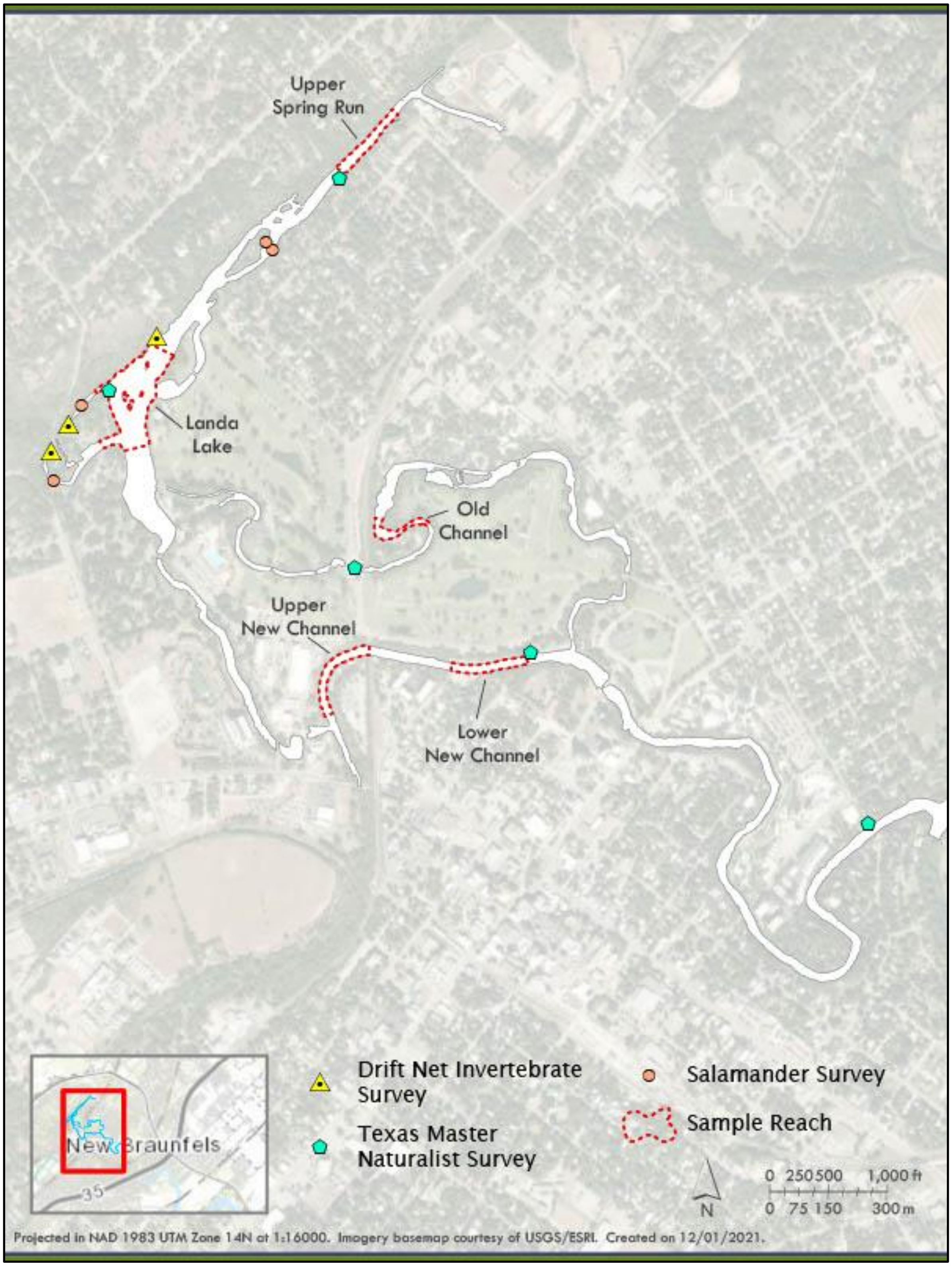

Figure 1. Locations of drift-net invertebrate, Comal Springs Salamander, Texas Master Naturalist, and biomonitoring (includes aquatic vegetation mapping, drop-net sampling, presence/absence dip-net sampling, and macroinvertebrate community sampling) sample areas within the Comal Spring/River study area.

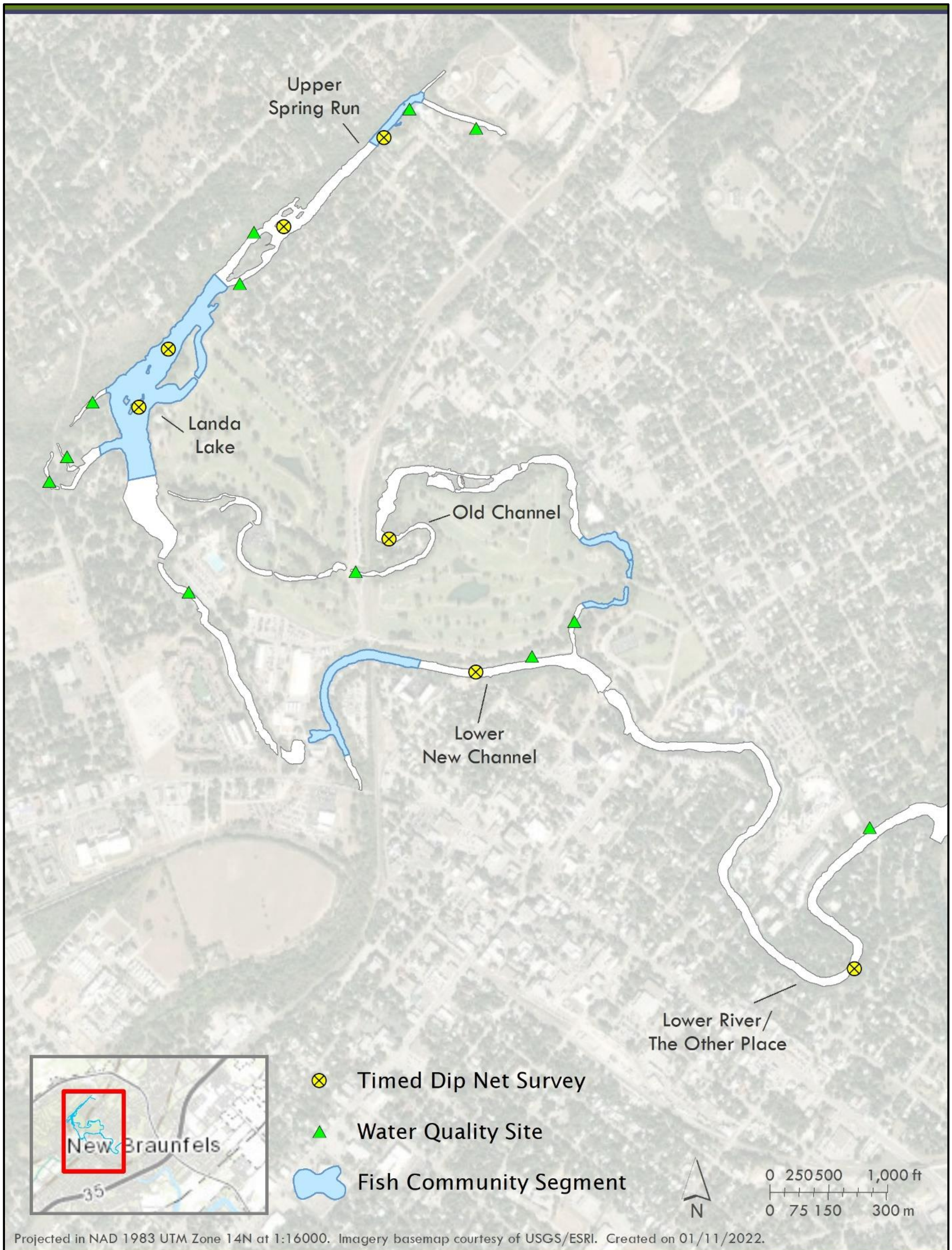

Figure 2. **Locations of fish community, water quality, and Fountain Darter timed dip-net surveys within the Comal Springs/River study area.**

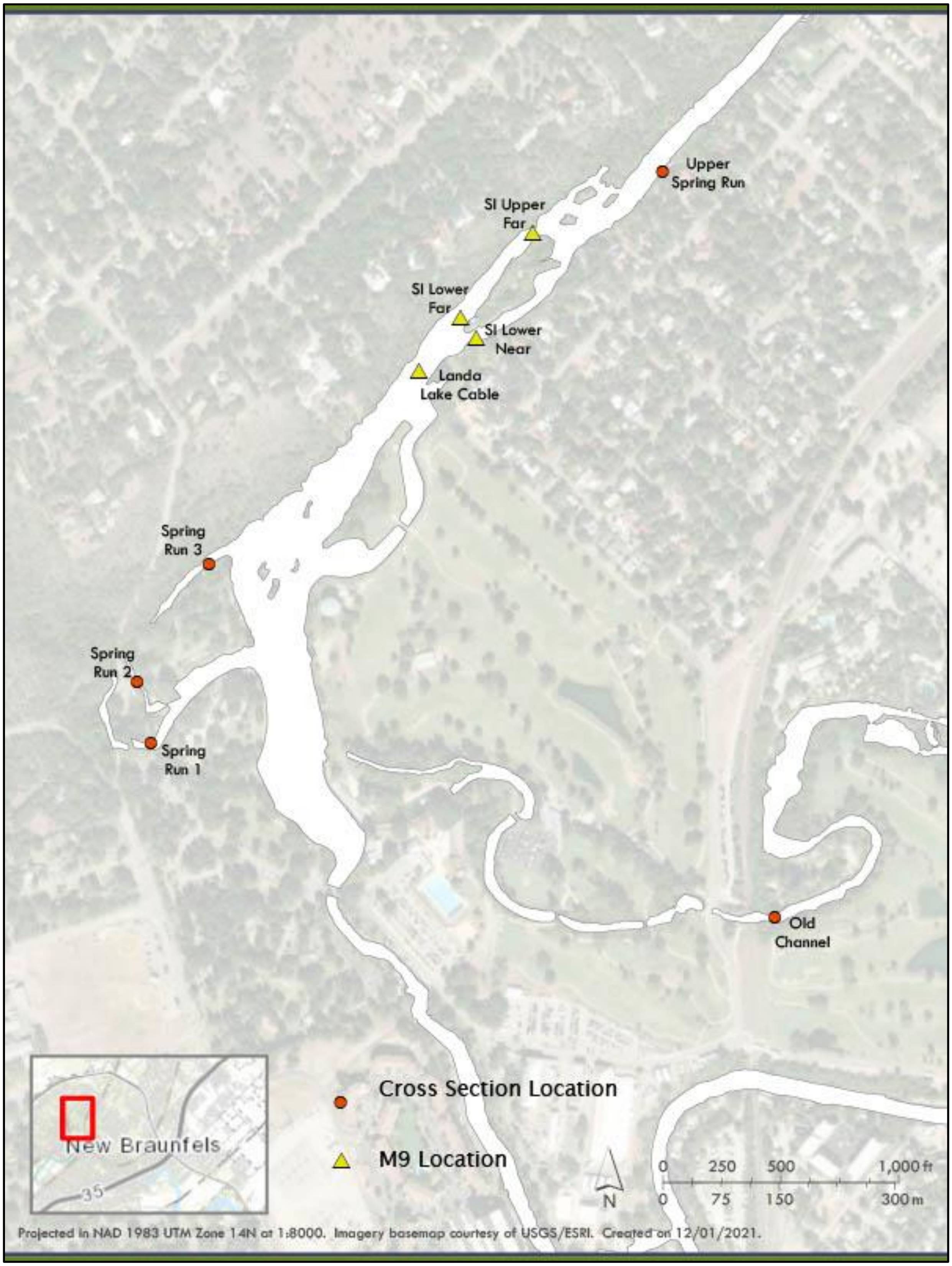

Figure 3. Cross-section and M9 discharge collection locations in the Comal Springs/River study area.

To quantify the contribution of each station to total system discharge, percent total discharge ([discharge(station *x*)/cumulative river discharge]*100) was calculated. Cumulative river discharge was based on the mean daily discharge value on the day of each measurement. Discharge and percent total discharge were summarized for spring and fall measurements, which were compared to 5-year and long-term (cross-section stations: 2003–present; M9 stations: 2014–present) averages ±95% confidence intervals using bar graphs. Results for cross-section stations are presented in the main body of the report and results for M9 stations can be found in Appendix E.

Water Temperature

Spatiotemporal trends in water temperature were assessed using temperature data loggers (HOBO Tidbit v2 Temp Loggers) at the 13 permanent monitoring stations established in 2000. Data loggers recorded water temperature every 10 minutes and were downloaded at regular intervals. Prior to analysis, data processing was conducted to locate potential data logger errors per station by comparing time-series for the current year with previous years. Timeframes displaying temperatures that deviated substantially from historical data and didn't exhibit ecologically rational trends (e.g., discontinuities, ascending drift) were considered unreliable and omitted from the dataset. For analysis, the distribution of water temperatures for the current year was assessed among stations based on 4-hour intervals and summarized using boxplots. Water temperatures were also compared with maximum optimal temperature requirements for Fountain Darter larval (≥25 °C) and egg (≥26 °C) production (McDonald et al. 2007). Further, 25 °C is also the designated threshold within the HCP Fountain Darter LTBGs study reaches (Upper Spring Run [Heidelberg], Landa Lake, New Channel, Old Channel) (EAHCP 2012). In the case of stations that surpassed either water temperature threshold during the year, the general timeframes in which those exceedances occurred are discussed in the text.

Texas Master Naturalist Monitoring

Volunteers with the Texas Master Naturalist program continued their monitoring efforts in 2022 at select locations along the Comal system. Volunteers collected water quality and recreation data at the following five sites: (1) Houston Street site within the Upper Spring Run Reach, (2) Gazebo site within the Landa Lake Reach, (3) Elizabeth Avenue site upstream of the Old Channel Reach, (4) New Channel site within the New Channel Reach, and (5) the downstream-most Union Avenue site (Figure 1). Volunteer monitoring was performed on a weekly basis, with surveys conducted primarily on Friday afternoons between 1200 and 1500 hours. At each site, an Oakton Waterproof EcoTester pH 2 was used to measure pH, and a LaMotte Carbon Dioxide Test Kit was used to measure carbon dioxide (CO_2) concentrations in the water column. In addition to water-quality measurements, recreational-use data were collected at each site by counting the number of tubers, kayakers, anglers, etc., within the survey site at the time of sampling. Volunteers also took photographs at each site during each sampling event, and occasionally made additional notes on recreational use or the condition of the river. Results from this monitoring effort can be found in Appendix D.

Aquatic Vegetation

Mapping

The team used a sit-in kayak to complete aquatic vegetation mapping in each sample reach during the spring, two summer Critical Period, and fall monitoring events (Figure 1). A Trimble GPS unit and external Tempest antenna set on the bow of the kayak was used to collect high-accuracy (10–60 centimeter [cm]) geospatial data. A data dictionary with pre-determined attributes was loaded into the GPS unit for data collection in the field. Discrete patch dimensions and the type and density of vegetation were recorded from the kayak. In some instances, an accompanying free diver was used to provide additional detail and to verify surface observations. The discreteness of an individual vegetation patch was determined by the dominant species located within the patch compared to surrounding vegetation. Once a patch of vegetation was visually delineated, the kayak was maneuvered around the perimeter of the vegetation patch to collect geospatial data with the GPS unit, thus creating a vegetation polygon. Attributes assigned to each polygon included species type and percent cover of each of the four most-dominant species. The type of substrate (silt, sand, gravel, cobble, organic) was identified if substrate was a dominant feature within the patch. Rooted aquatic vegetation, floating aquatic vegetation, bryophytes, and algae were mapped as separate features. Only aquatic vegetation patches 1 meter (m) in diameter or larger were mapped as polygons.

Data Processing and Analysis

During data processing, Microsoft pathfinder was used to correct spatial data and create shapefiles. Spatial data were projected using the Projected Coordinate System NAD 1983 Zone 14N. Post processing was conducted to clean polygon intersections, check for and correct errors, and calculate cover for individual discrete polygons as well as totals for all encountered aquatic plant species.

Vegetation types are described in the Results and Discussion section by genus. Vegetation community composition among taxa and grouped by native vs. invasive taxa are compared for the last five years using stacked bar graphs. Total surface area of aquatic vegetation, measured in square meters (m^2), is presented for each season using bar graphs and is compared with long-term averages (2001–present) from spring, fall, high-flow events, and low-flow events. High-flow and low-flow averages were calculated from Critical Period Events. These events are based on predetermined river discharge triggers (Appendix A), which result in additional mapping events to assess flow-related impacts to the vegetation community.

Fountain Darter

Drop-Net Sampling

Drop-net sampling was utilized to quantify Fountain Darter densities and evaluate habitat utilization during the spring, two summer Critical Period, and fall monitoring events (Figure 1). Sample sites were selected using a random-stratified design. In each study reach, two sample sites per vegetation strata were randomly selected based on dominant aquatic vegetation (including open areas) mapped prior to sampling (see Aquatic Vegetation Mapping for details). At each sample site, all organisms were first trapped using a 2 m^2 drop-net. Organisms were then collected by sweeping a 1 m^2 dip-net along the river bottom within the drop-net. If no fish were collected after the first 10 dip-net sweeps, the site was considered complete, and if fish were collected, an additional 5 sweeps were conducted. If Fountain Darters were collected on sweep 15, additional sweeps were conducted until no Fountain Darters were collected.

Most fishes collected were identified to species and enumerated. Two morphologically similar species, Western Mosquitofish (*Gambusia affinis*) and Largespring Gambusia (*Gambusia geiseri*), which are known to hybridize, were classified by genus (*Gambusia* sp.). Larval and juvenile fishes too small to confidently identify to species in the field were also classified by genus. All Fountain Darters and the first 25 individuals of other fish taxa were measured (total length expressed in millimeters [mm]).

Physiochemical habitat data were collected at each drop-net location. Water depth in feet (ft) and velocity in feet per second (ft/s) were collected at the upstream end of drop-net samples using a flowmeter and adjustable wading rod. Water-velocity measurements were collected at 15 cm above the river bottom to characterize flows that directly influence Fountain Darters. Mean-column velocity was measured at 60% of water depth at depths of less than three feet. At depths of three feet or greater, water velocities were measured at 20% and 80% of depth and averaged to estimate mean column velocity. Water quality was measured within each drop-net using a multiprobe, which included water temperature (degrees Celsius [°C]), pH, dissolved oxygen (milligrams per liter [mg/L], percent saturation), and specific conductance (microsiemens per centimeter [µs/cm]). Mid-column water quality was measured at water depths of less than three feet, whereas bottom and surface values were measured and averaged at depths of three feet or greater. Lastly, vegetation composition (%) was visually estimated and dominate substrate type was recorded within each drop-net sample.

Dip-Net Sampling

Dip-net sampling was used to provide additional metrics for assessing Fountain Darter population trends and included qualitative timed surveys and random-station presence/absence surveys. All sampling was conducted using a 40x40-cm (1.6-mm-mesh) dip net, and surveys for both methods were conducted in spring, summer, and fall. Summer sampling included two Critical Period events, one of which being integrated into routine summer monitoring.

Timed dip-net sampling was conducted to examine patterns in Fountain Darter abundance and size structure along a more extensive longitudinal gradient compared to drop-net sampling. Surveys were conducted within established monitoring sites for a fixed amount of search effort (Upper Spring Run: 0.5 hour, Spring Island: 0.5 hour, Landa Lake: 1 hour, Old Channel: 1.0 hour, New Channel: 1.0 hour, Lower River: 1.0 hour) (Figure 2). In each study reach, a single surveyor used a dip net to collect Fountain Darters in a downstream to upstream fashion. Collection efforts mainly focused on suitable Fountain Darter habitat, specifically in areas with dense aquatic vegetation. Non-wadeable habitats (>1.4 m) were not sampled. All Fountain Darters collected were enumerated, measured (mm), and returned to the river at point of collection.

Random-station presence/absence surveys were implemented to assess Fountain Darter occurrence. During each monitoring event, sampling stations were randomly selected within the vegetated area of each sample reach (Upper Spring Run: 5, Landa Lake: 20, Old Channel: 20, New Channel: 5) (Figure 1). At each random station, presence/absence was recorded during four independent dips. To avoid recapture, collected Fountain Darters were returned to the river in areas adjacent to the random station being sampled. Habitat variables recorded at each station included dominant aquatic vegetation, and presence/absence of bryophytes and algae.

Visual Surveys

Visual surveys with the aid of SCUBA gear were conducted at Landa Lake in areas too deep for implementing the Fountain Darter sampling methods described above (Figure 1). Sampling occurred during the spring, two summer Critical Period, and fall monitoring events. To standardize data relative to any potential diel patterns in behavior, observations were conducted in early afternoon during each sampling event. A specially designed grid (7.8 m^2) was used to quantify the number of Fountain Darters using these deeper habitats. During each survey, all Fountain Darters within the grid were counted and the percentage of bryophyte coverage within the grid was recorded. Results of visual surveys are presented in Appendix E.

Data Analysis

Key demographic parameters used to evaluate Fountain Darter observations included population performance, size structure, and recruitment. Population performance was assessed using drop-net, timed dip-net, and random dip-net data. Counts of darters per drop-net sample were standardized as density (darters/m^2). Timed dip-net total darter counts per study reach were standardized as catch-per-unit-effort (CPUE; darters/person-hour [p-h]) for each sampling event. Random dip-net occurrence per station was based on whether or not a Fountain Darter was observed during any of the four dips and percent occurrence was calculated per sampling event at each site as: (sum[darter presence]/sum[random stations])*100. Fountain Darter density, CPUE, and percent occurrence were compared among seasons using boxplots. In addition, most seasonal observations were compared to observations from the past five years and long-term observations (2001–present). Lastly, temporal trends in Fountain Darter density were assessed per sampling event for each study reach for the past five years using boxplots and compared to their respective long-term (2001–present) medians and quartiles (25th and 75th percentile).

Size structure and recruitment were assessed among seasons. Fall and spring were assessed by combining drop-net and timed dip-net data and summer was assessed only using timed dip-net data. Boxplots coupled with violin plots were used to display the distribution of darter lengths per sampling event during each season for the past five years. Boxplots show basic length-distribution statistics (i.e., median, quartiles, range) and violin plots visually display the full distribution of lengths relative to each sampling event using kernel probability density estimation (Hintze and Nelson 1998). Recruitment was quantified as the percent of darters ≤20 mm during each sampling event. Based on a linear model built by Brandt et al. (1993) that looked at age-length relationships of laboratory-reared Fountain Darters, individuals of this size are likely less than 3 months old and not sexually mature (Brandt et al. 1993; Schenck and Whiteside 1977). Percent recruitment ±95% confidence intervals (i.e., beta distribution quantiles; McDonald 2014) were shown for the past five years by season and compared to their respective long-term averages.

Habitat use was assessed based on population performance and size structure among vegetation strata using drop-net and random station dip-net observations. Fountain Darter density by vegetation taxa was compared based on current, five-year, and long-term (2001–present) observations using boxplots. Proportion of occurrence was also calculated among vegetation types sampled during random-station dip-netting for the current year. Lastly, boxplots coupled with violin plots were used to display the distribution of darter lengths by vegetation taxa using drop-net data to examine habitat use among size classes for the current year.

Habitat suitability was quantified to examine reach-level changes in habitat quality for Fountain Darters through time. First, Habitat Suitability Criteria (HSC) ranging from 0 (unsuitable habitat) to 1 (most suitable habitat) were built based on occurrence data for all vegetation types (including open habitat) that have been sampled using logistic regression (Manly et al. 1993). Resulting HSC were then multiplied by the areal coverage of each vegetation strata mapped during a biomonitoring event, and results were summed across vegetation strata to calculate a weighted usable area for each reach. To make data comparable between reaches of different sizes, the total weighted usable area of each reach was then divided by the total area of the reach, resulting in an Overall Habitat Suitability Index (OHSI) for each reach during each sampling event. Following this method, temporal trends of Fountain Darter OHSI ±95% CI were calculated per sampling event for each study reach (Upper Spring Run, Landa Lake, Old Channel, Upper New Channel, Lower New Channel) for the past five years. Long-term (2003–present) OHSI and 95% CI averages were also calculated to provide historical context to recent OHSI observations. Specific details on the analytical framework used for developing OHSI and evaluating its efficacy as a Fountain Darter habitat index, including methods to build HSC, can be found in Appendix H.

Fish Community

Mesohabitat, Microhabitat, and Seine Sampling

Fish community sampling was conducted in the spring, two summer Critical Period events, and fall to quantify fish assemblage composition/structure and to assess Fountain Darter population performance in river segments and habitats (e.g., deeper areas) not sampled during drop-net and timed dip-net surveys. The following four monitoring segments were sampled: Upper Spring Run, Landa Lake, Old Channel, and New Channel (Figure 2). Deeper habitats were sampled using visual transect surveys, and shallow habitats were sampled via seining.

A total of three mesohabitat transects were sampled at each segment during visual surveys. At each transect, four divers swam from bank-to-bank at approximately mid-column depth, enumerating all fishes observed and identifying them to species. After each mesohabitat transect was completed, microhabitat sampling was also conducted along four, 5-meter-long PVC pipe segments (micro-transect pipes) placed on the stream bottom, spaced evenly along the original transect. Divers started at the downstream end and swam up the pipe searching through the vegetation, if present, and substrate within approximately 1 m of the pipe. All fishes observed were identified to species and enumerated. For both surveys, any individuals that could not be identified to species were classified by genus. At each micro-transect pipe, total area surveyed (m^2), aquatic vegetation composition (%), and substrate composition (%) were recorded. Water depth (ft) and velocity (ft/s) data were collected in the middle of each micro-transect pipe using a portable flowmeter and adjustable wading rod. Water-velocity measurements were taken 15 cm from the bottom, mid-column, and at the surface. Standard water-quality parameters were also recorded once at each mesohabitat transect using a handheld water-quality sonde.

In shallow habitats, at least three seining transects were sampled within each monitoring segment (except for Landa Lake). At each of these, multiple seine hauls were pulled until the entire wadeable area had been covered. After each seine haul, fish were identified, measured (mm), and enumerated. Total area surveyed (m^2) was visually estimated for each seining transect. Habitat data from each seine haul location included substrate and vegetation composition (%); water depth (ft); and mid-column velocity (ft/s).

Data Analysis

To evaluate fish community results, all analyses were conducted using fishes identified to species; fishes identified to genus or family were excluded. Total counts of species from independent samples were first quantified as density (fish/m^2) to standardize abundance among the three gear types used.

Based on microhabitat sampling, temporal trends in Fountain Darter density were assessed per sampling event for each study reach for the past five years using boxplots and compared to their respective long-term (2014–present) medians and quartiles. Overall species richness and diversity using the Shannon's diversity index (Spellerberg and Fedor 2003) for each study segment was assessed for the past five years and plotted with bar graphs. Richness and relative density (%; [sum(species *x* density)/sum(all species density)]*100) of spring-associated fishes (Table 2) were also quantified and presented in the same manner as species richness and diversity.

Table 2. Spring-associated fishes within the Comal Springs System based on Craig et al. (2016).

SCIENTIFIC NAME	COMMON NAME
Dionda nigrotaeniata	Guadalupe Roundnose Minnow
Notropis amabilis	Texas Shiner
Astyanax mexicanus	Mexican Tetra
Gambusia geiseri	Largespring Gambusia
Etheostoma fonticola	Fountain Darter
Etheostoma lepidum	Greenthroat Darter
Percina apristis	Guadalupe Darter
Percina carbonaria	Texas Logperch

Comal Springs Salamander Surveys

In spring and fall, biologists performed timed visual surveys for Comal Springs Salamanders within the four following established sampling areas: Spring Run 1, Spring Run 3, Spring Island Spring Run, and Spring Island East Outfall (Figure 1). Nine additional sampling events occurred during Critical Period and species-specific events triggered in June (n = 1), July (n = 1), August (n = 3), September (n = 2), and October (n = 2). Timed surveys involved sampling from downstream to upstream within the extent of the sampling area. Biologists inspected under rocks within the top 5 cm of the substrate surface and within aquatic vegetation to quantify salamanders while moving upstream toward the main spring orifice. A dive mask and snorkel were utilized to view organisms, as depth permitted. Locations of all Comal Springs Salamander observations were recorded using pin flags. Following survey completion, and water depth (ft) and presence/absence of vegetation were noted to potentially serve as a baseline assessment of habitat parameters should the salamander population change significantly in subsequent sampling years. To account for any potential diel patterns in behavior, all surveys were initiated in the morning and completed by early afternoon.

Survey effort was previously fixed during routine sampling. Within Spring Run 1, a one-hour survey was conducted from the Landa Park Drive Bridge upstream to just below the head spring orifice. Spring Run 3 was surveyed for one hour from the pedestrian bridge closest to Landa Lake upstream to the second pedestrian bridge. Surveys in the Spring Island area were divided into the following two sections: (1) one 30-minute survey of Spring Island Run and (2) one 30-minute survey of the east outfall upwelling area on the east side of Spring Island near Edgewater Drive. Based on this, effort across all sites represents a total of 6 person-hours (p-h) under the established monitoring methodology. However, reduced habitat availability associated with low-flow conditions experienced in 2022 required modification in search times. Specifically, total survey effort at each site was adjusted relative to the percent of wetted habitats available for salamanders at a given sampling event. For example, if wetted habitats were reduced by 50% at Spring Run 1, a 50% reduction in survey time was implemented (i.e., 30 minutes).

Data Analysis

Comal Springs Salamander counts and CPUE (salamanders/p-h) were used to assess seasonal and five-year trends, respectively. Data from all sampling events in 2022 were used for analysis despite varied search effort at each site. Since adjustments in search time were scalable, varied effort offset differences in total survey area, providing statistically valid comparisons in catch rates. Salamander counts were presented for each season using bar graphs and are compared with long-term (2001–present) spring, fall, high-flow event, and low-flow event averages. High-flow and low-flow event averages were calculated from Critical Period Events. These events are based on predetermined river discharge triggers (Appendix A), which result in additional survey events to assess flow-related impacts to the Comal Springs Salamander population. Temporal trends in salamander density were also assessed per sampling event for each sampling area for the past five years using bar graphs.

Macroinvertebrates

Drift-net Sampling and Data Analysis

Macroinvertebrate samples were collected via drift net at three sites in the Comal system. During each comprehensive sampling event, drift nets were placed over the major spring openings of Comal Spring Runs 1 and 3 and a moderate-sized spring upwelling (Spring 7) along the western shoreline of Landa Lake (Figure 1). Drift nets were anchored into the substrate directly over each spring opening, with the net faced perpendicular to the direction of flow. Net openings were circular with a 0.45-m diameter, and the mesh size was 100 micrometers (μm). The tail of the drift net was connected to a detachable, 0.28-m-long cylindrical bucket (200 μm mesh), which was removed at 6-hour intervals during sampling, after which cup contents were sorted and invertebrates removed in the field. The remaining bulk samples were preserved in ethanol and sorted later in the laboratory, where minute organisms that had been overlooked in the field were removed. All Comal Springs Riffle Beetles, Peck's Cave Amphipods, and Comal Springs Dryopid Beetles captured via drift net were returned to their spring of origin, with the exception of voucher organisms (fewer than 20 living specimens of each species identifiable in the field).

All non-endangered invertebrates were preserved in 70% ethanol. Additionally, water-quality measurements (temperature, pH, conductivity, dissolved oxygen, and current velocity) were taken at each drift-net site using a water-quality meter and handheld flow meter.

The total numbers of endangered species at each site are presented in the results and a summary of total numbers for all taxa can be found in Appendix E. Temporal trends in *Stygobromus pecki* per cubic meter were assessed per sampling event for each sampling area over the past five years using boxplots and compared to their respective long-term (2003–present) medians and quartiles (25th and 75th percentile).

Comal Springs Riffle Beetle Sampling and Data Analysis

Comal Springs Riffle Beetles were collected from three areas in the Comal River system during two routine sampling events in spring and fall. Five additional sampling events occurred during Critical Period and species-specific events triggered in June (n = 1), July (n = 1), August (n = 1), and September (n = 2). Sampling followed the methods of the Cotton Lure standard operating procedure developed for the HCP (EAA 2017). This methodology consists of placing lures of 15x15 cm pieces of 60% cotton/40% polyester cloth into spring openings/upwellings in the Comal system, where they remain in situ for approximately 30 days. During this time, they become inoculated with local organic and inorganic matter, biofilms, and invertebrates, including Comal Springs Riffle Beetle. These lures were placed in sets of 10 in the following three areas: (1) Spring Run 3, (2) along the western shoreline of Landa Lake ("Western Shoreline"), and (3) near Spring Island. Due to declines in wetted habitats in the summer, alternate sampling methods were implemented during three low-flow sampling events conducted from August to September to limit disturbance from over sampling. For these low-flow events, sets of 3 lures were placed in the most suitable habitat available at each site and remained in situ for about 15 days. Lures lost, disturbed, or buried by sedimentation were not included in subsequent analyses. Numbered tags placed on the banks of Spring Run 3 and Western Shoreline were utilized, when possible, to identify lure locations.

All Comal Springs Riffle Beetles collected with cotton lures were identified, counted, and returned to their spring of origin during each sampling effort. A dissecting scope with a maximum magnification of 90x was used to correctly identify riffle beetles in the field. The sampling crew also recorded counts of *Microcylloepus pusillus*, Comal Springs Dryopid Beetle, and Peck's Cave Amphipod collected on lures. These and any other spring invertebrates collected on the lures were also placed back into their spring of origin. Crews utilized a mask and snorkel to place and remove lures in areas with deeper water depths.

Adult Comal Springs Riffle Beetle relative abundance (beetles/lure) were compared among seasons for each area using boxplots. In addition, seasonal observations were compared to five-year and long-term observations (2004–present). Temporal trends in relative abundance were also assessed per sampling event for each area for the past five years using boxplots and compared to their respective long-term (2004–present) medians and quartiles (25th and 75th percentile). Data collected during the three low-flow sampling events with alternate methods were omitted from all analyses. Due to lower replicates and set times, these data were not statistically comparable with the other events, and were instead summarized for each event separately, based on total adult Comal Springs riffle beetle counts per site.

Rapid Bioassessment Sampling and Data Analysis

Rapid bioassessment protocols (RBPs) are tools for evaluating biotic integrity and overall habitat health based on the community of organisms present (Barbour et al. 1999). Macroinvertebrates are the most frequently used biological units for RBPs because they are ubiquitous, diverse, and there is an acceptable working knowledge of their taxonomy and life histories (Poff et al. 2006, Merritt et al. 2008).

BIO-WEST performed sampling and processing of freshwater benthic macroinvertebrates, following Texas RBP standards (TCEQ 2014). Macroinvertebrates were sampled with a D-frame kick net (500 µm mesh) by disturbing riffle or run habitat (consisting primarily of cobble-gravel substrate) for five minutes while moving in a zig-zag fashion upstream. Invertebrates were then haphazardly distributed in a tray and subsamples were taken by scooping out haphazard portions of material and placing them into a separate sorting tray.

All macroinvertebrates were picked from the tray before another subsample was taken. This process was continued until a minimum of 140 individuals were picked to represent a sample. If the entire sample did not contain 140 individuals, the process was repeated again until this minimum count was reached. Macroinvertebrates were collected in this fashion from Upper Spring Run, Landa Lake, Old Channel, New Channel, and the Lower River reaches (Figure 1). Picked samples were preserved in 70% isopropyl, returned to the laboratory, and identified to established taxonomic levels (TCEQ 2014), usually genus. Members of the family Chironomidae (non-biting midges) and class Oligochaeta (worms) were retained at those taxonomic levels. The 12 ecological metrics of the Texas RBP benthic index of biotic integrity (B-IBI) were calculated for each sample. Each metric represents a functional aspect of the macroinvertebrate community related to ecosystem health, and sample values are scored from 1 to 4 based on benchmarks set by reference streams for the state of Texas. The aggregate of all 12 metric scores for a sample represent the B-IBI score for the reach that sample was taken from. The B-IBI point-scores for each sample are compared to benchmark ranges and are described as having aquatic-life-uses of "Exceptional", "High", "Intermediate", or "Limited". In this way, point-scores were calculated and the aquatic-life-use for each sample reach was evaluated. Temporal trends in B-IBI scores were assessed per sampling event for each reach during the past five years using bar graphs.

RESULTS and DISCUSSION

In 2022, low precipitation and higher ambient temperatures in central Texas resulted in severe drought conditions by spring and transitioned to an exceptional drought classification by mid-summer. As described in the next section, total river discharge in the Comal System was below median historical conditions for most of the year and have not approached these levels since 2014. Median and minimum mean daily discharge were higher in 2022 (166 and 89 cfs, respectively) than 2014 (135 and 65 cfs, respectively), and were both lower than other low-flow years in 2009, 2011, and 2013 (195–255 and 111–159 cfs, respectively). Despite the low-flow conditions experienced in 2022, the majority of water quality parameters measured during Critical Period sampling were within the range of historical observations (Appendix B, Table B1 and B2; Crowe and Sharp 1997). Nitrate concentrations were higher than historical data (0.77–1.76 mg/L; Crowe and Sharp 1997) at some stations in both spring (i.e., Spring Runs, Landa Lake) and riverine (i.e., lower Old Channel and New Channel) habitats (1.89–2.15 mg/L). However, nitrate at these stations were still well below toxic concentrations (Boyd 2015). See Appendix B for a complete summary of water quality conditions during Critical Period low-flow sampling.

Comal River discharge decreased throughout the year, reaching 100 cfs at the end of July and 90 cfs by mid-August, which triggered two full system visual habitat evaluations and memorandum updates. Habitat quality documented for the Covered Species varied spatially during the evaluations at these two flow levels. At 100 cfs in July, Fountain Darter habitat quality (i.e., aquatic vegetation) remained stable, with minimal decreases in total aquatic vegetation coverage across reaches, except at Upper Spring Run. Habitat for Comal Springs Salamander (i.e., Spring Runs) and invertebrates (i.e., Spring Runs, Landa Lake's western shoreline, and Spring Island) were noticeably reduced as water levels decreased. By mid-August, lower than average discharge coupled with summer time conditions resulted in elevated water temperatures in Blieders Creek and locations further downstream from spring flow orifices, though conditions slightly improved from July to August. Habitat quality for Fountain Darters was maintained in Landa Lake and the Old Channel, while conditions in the Upper Spring Run were considered degraded. Habitat quality for Comal Springs Salamander and macroinvertebrates remained similar for the majority of the summer, but increased recharge and resulting increases in springflow slightly improved surface habitat conditions in spring environments from mid-August through the remainder of the year.

In summary, total river discharge in the Comal System in 2022 was the lowest since 2014. Based on past conditions observed in 2014, it remains important to keep tracking the system-wide Fountain Darter and surface-dwelling invertebrate habitat conditions as these lower-than average discharge levels continue to persist. The remaining sections in the Results and Discussion describes current trends in river discharge, water temperature, Covered Species populations, and select floral and faunal communities through the Comal system during this low-flow year.

River Discharge and Springflow

Over the last five years, annual median mean daily discharge in the Comal River increased from 2018 (296 cfs) to 2019 (358 cfs) and then decreased from 2019 to 2022 (166 cfs), representing the lowest median flow conditions during this time period. Maximum discharge was lowest in 2020 (394 cfs) and 2022 (220 cfs). In addition, maximum discharge was highest in 2021 (1,850 cfs), the only year in this time period with mean daily discharge exceeding 1,000 cfs, representing a 99th percentile discharge event. Minimum discharge was lowest in 2018 (161 cfs) and 2022 (89 cfs). Greater variation in discharge (i.e., interquartile range) occurred in 2018 (93 cfs) and 2022 (152 cfs), compared to more stable flow conditions in 2020 (55 cfs) and 2021 (27 cfs) (Figure 4A).

Monthly patterns in river discharge showed monthly median mean discharge was below long-term monthly medians the entire year. Monthly median discharge was comparable from January (274 cfs) to March (268 cfs), and was slightly below long-term medians. Following March, median discharge descended to magnitudes akin to long-term 10th percentile from April (224 cfs) to September (120 cfs). Median discharge then further decreased in October (91 cfs) and mean daily discharge was below the long-term 10th percentile the entire month. Lastly, variation in discharge was greatest from May (22 cfs) to August (20 cfs) and was much lower in January (3 cfs) compared to any other month in 2022 (≥13 cfs) (Figure 5B).

Routine spring sampling occurred in May, when daily discharge ranged from 163–215 cfs and were more similar to long-term 10th percentile values (183 cfs). Discharge during summer sampling in June ranged from 124–168 cfs, which also were similar to the long-term 10th percentile (145 cfs). Flows descending below 200 cfs in June triggered Critical Period sampling, which in addition to usual routine summer sampling, included discharge measurements, fixed station photography, water quality grab sampling, aquatic vegetation mapping, Fountain Darter drop-netting and visual surveys, salamander surveys, fish community sampling, and CSRB surveys. Discharge decreased further to 100 cfs in July, requiring full-system habitat assessments. In August, discharge declined to 90 cfs, triggering a second Critical Period sampling event and species-specific sampling for Comal Springs Salamander and CSRB. Discharge reaching 85 cfs in September triggered a third Critical Period sampling event. Based on this, species-specific sampling was conducted in September for Comal Springs Salamander and CSRB and other Critical Period sampling activities were included in routine fall sampling. As mentioned previously, mean daily discharge during fall sampling in October was below the long-term 10th percentile (166 cfs), ranging from 91–134 cfs (Figure 5B).

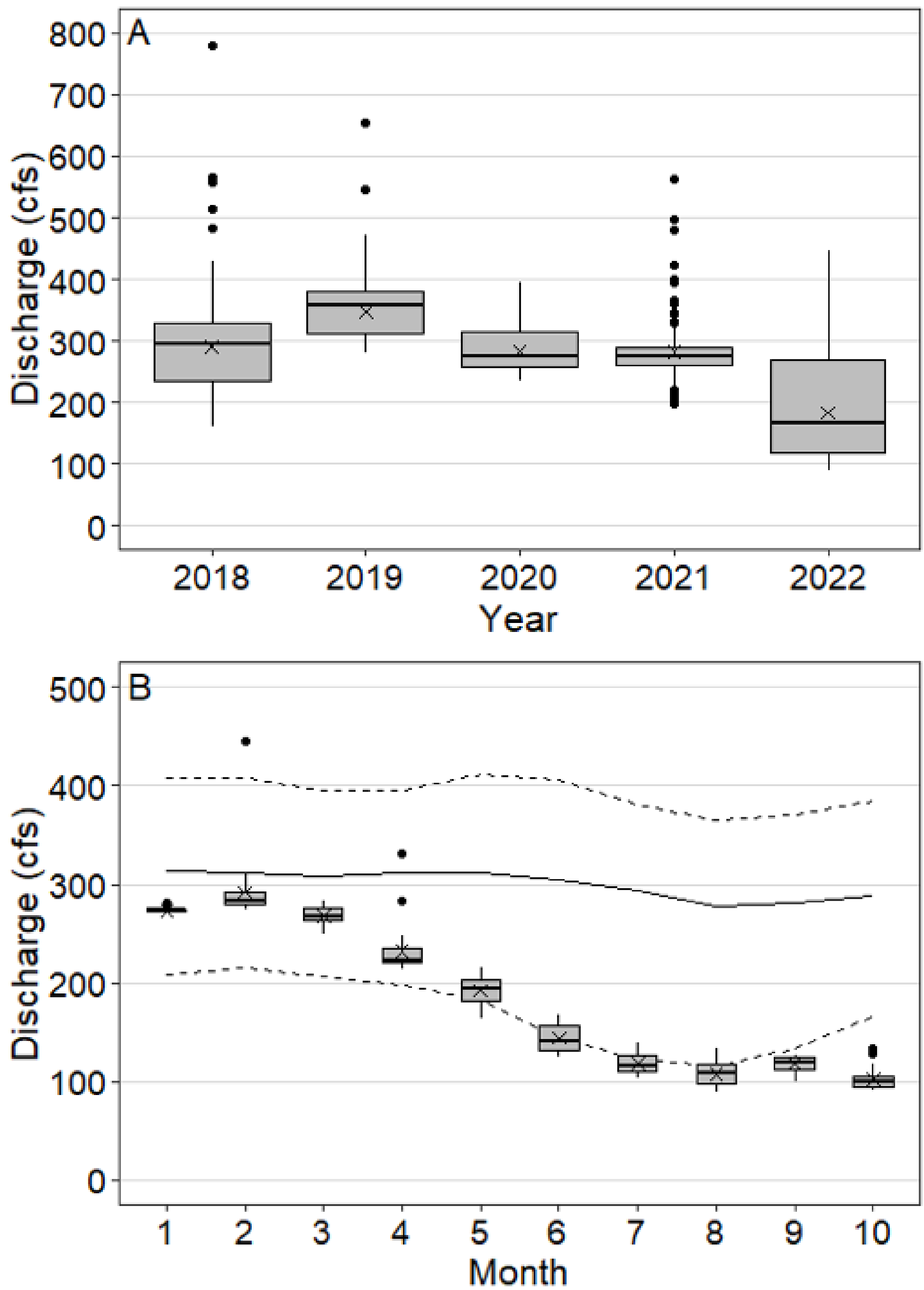

Figure 4. **Boxplots displaying Comal River mean daily discharge annually from 2018-2022 (A) and among months (January–October) in 2022 (B). Each month is compared to the 10th percentile (lower dashed line), median (solid line), and 90th percentile (upper dashed line) of their long-term (1956–2021) daily means. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles. One outlier for year 2022 in panel A is not shown (1,850 cfs).**

Cross-section discharges were generally low in spring 2022 and decreased from spring to fall across all stations at variable magnitudes. Stations where discharge was below lower confidence interval boundaries included Upper Spring Run (fall), Spring Run 1 (spring, summer, fall), Spring Run 2 (fall), and Spring Run 3 (fall). Percent total discharge showed similar trends in 2022 and compared to historical data at all stations except Spring Run 3 and Old Channel. At Spring Run 3, percent total discharge was similar to historical trends in fall, despite a decline in discharge. Percent total discharge at the Old Channel was the only station that increased in 2022 and was higher than historical trends in spring and summer. Flow in the Old Channel Reach is regulated by culverts at Landa Lake Dam and stays relatively consistent despite changes to total flow in the system. When total flow in the system starts to decline drastically, as in Spring 2022, it makes up a larger percentage of the total (Figure 5). When total flow increases, the percent contribution by flow in the Old Channel Reach declines (Figure 5).

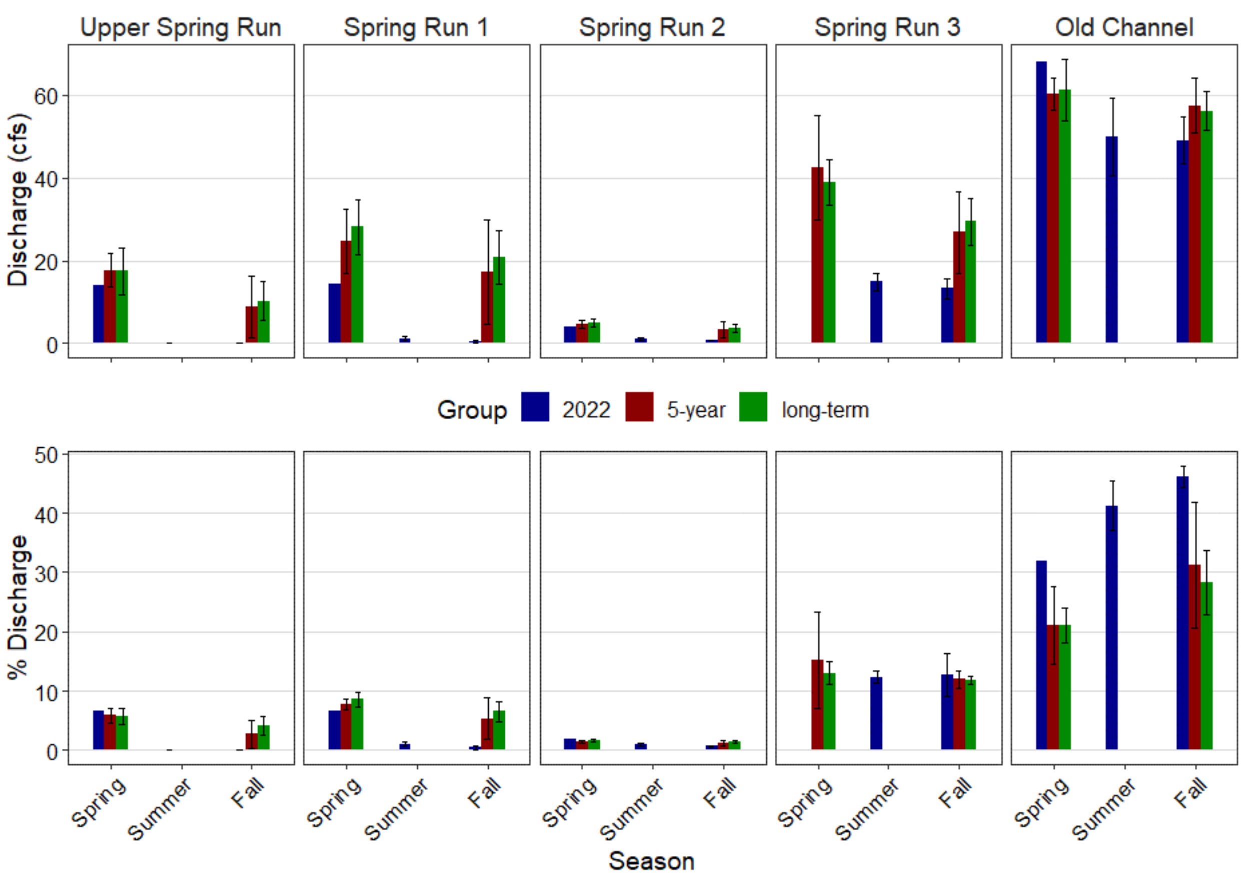

Figure 5. **Current (blue bars), five-year (2018–2022; red bars), and long-term (2003–2022; green bars) discharge and percent total discharge based on spring and fall cross-section measurements in the Comal Springs/River. Five-year and long-term values are represented as means and error bars denote 95% confidence intervals.**

Water Temperature

Median water temperature was similar among stations, varying about 2 °C and ranging from 22.8 °C at Blieders to 24.4 °C at Old Channel. Patterns in water temperature variability were characterized by three distinct groups. High variation in water temperature (i.e., interquartile range) at Blieders (5.9 °C) was unique compared to all other stations and directly related to this drainage receiving no springflow contributions. Low variation in spring runs and Landa Lake (0.1–1.1 °C) represented more stable environments within the Comal system. In contrast, riverine stations were more variable than spring environments, exhibiting a longitudinal gradient, where variation increased from Old Channel (1.5 °C) and New Channel Upstream (1.3 °C) to New Channel Downstream (2.9 °C) and Other Place (2.8 °C). Greater variation generally denoted increased frequency of higher water temperatures of about 24–27 °C (Figure 6). Longitudinal trends in 2022 match expectations based on previous years and are typical within spring-associated ecosystems, where water temperatures increase in magnitude and variation further downstream from spring inputs (Groeger et al. 1997, Kollaus and Bonner 2012).

Egg and/or larvae threshold exceedance occurred at all stations except Landa Lake and Spring Runs 1-3. Total number of days water temperatures exceeded the Fountain Darter larval production threshold ranged from 23 to 106 days. Larval exceedance was recorded at 1 4-hr measurements per day in September and October at Booneville Near, as well as 1–3 4-hr measurements from April–October at New Channel Upstream (105 days) and Downstream (102 days) and June–October at Heidelberg (27 days) and Old Channel (106 days). Lastly, larval exceedance occurred at maximums of 4 and 5 4-hr measurements per day from April–October at Blieders (31 days) and March–October at Other Place (106 days), respectively.

Exceedance in the Fountain Darter egg production threshold was recorded at 1–2 4-hr measurements per day at Heidelberg (June and October [4 days]), Booneville Far (June–August [22 days]), Old Channel (June–September [75 days]), New Channel Upstream (June–August [44 days]). Egg production exceedance occurred up to 3 4-hr measurements per day at New Channel Downstream (June–September [71 days]) and Other Place (June–September [72 days]). Lastly, temperatures above the egg production threshold occurred at 1–6 measurements per day at Blieders (April–September [77 days]), with 4–6 exceedance measurements occurring most frequently from April (16 days) to September (26 days). Stations where larval and egg production thresholds were exceeded occurred throughout all of 2022. Threshold exceedance for both life stages varied spatially and were more frequent at Blieders and in riverine areas downstream compared to spring run environments and Landa Lake. (Figure 6).

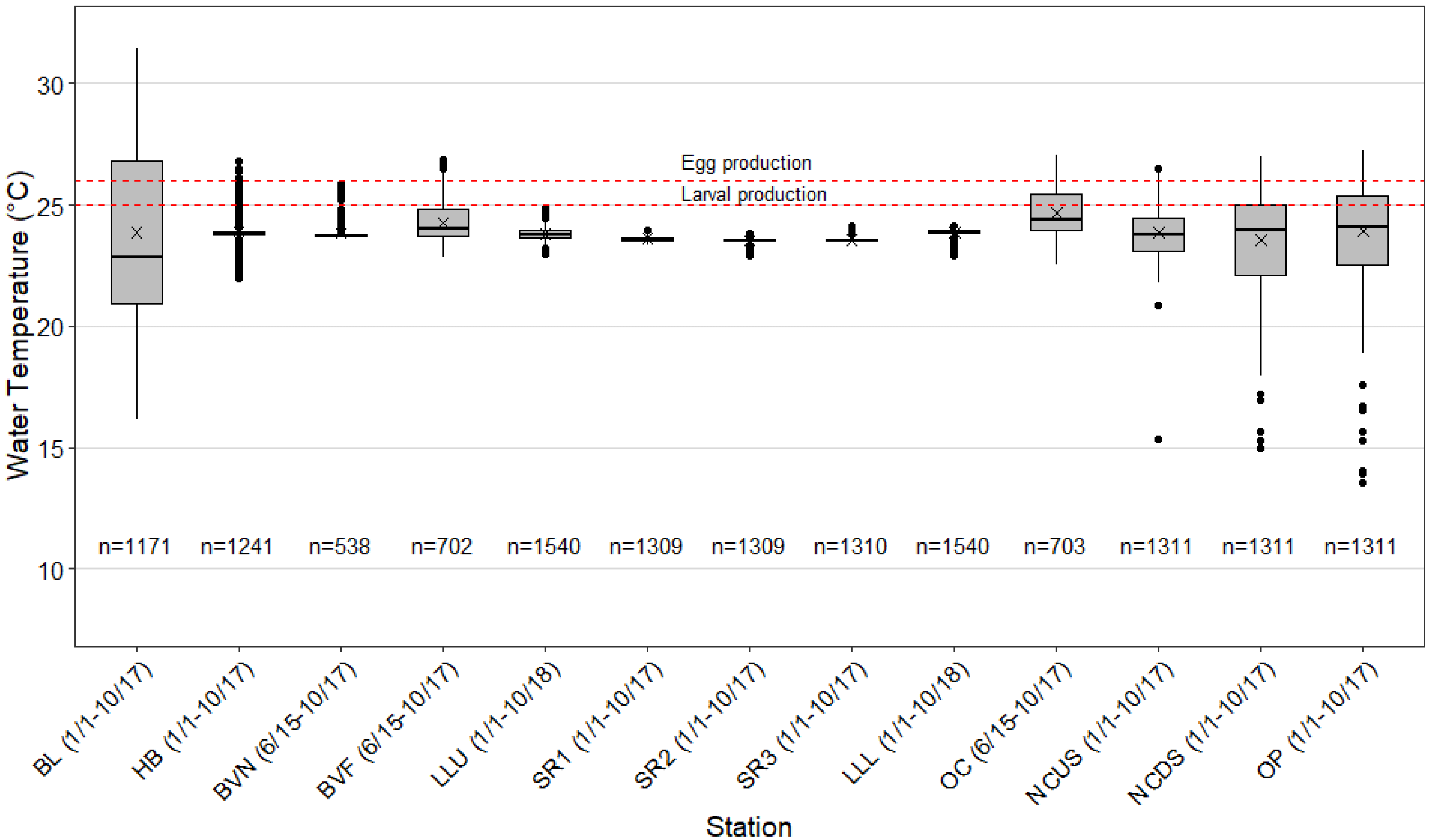

Figure 6. **Boxplots displaying 2022 water temperatures at logger stations (data collection timeframe [Month/Day]). Data are based on measurements collected at 4-hour increments. Stations include Blieders Creek (BL), Heidelberg (HB), Boonville Near (BVN), Boonville Far (BVF), Landa Lake Upper (LLU), Spring Run 1 (SR1), Spring Run 2 (SR2), Spring Run 3 (SR3), Landa Lake Lower (LLL), New Channel Upstream (NCUS), New Channel Downstream (NCDS), and Other Place (OP). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles. The "n" values along the x-axis represent the number of individual temperature measurements in each category. The red dashed lines indicate maximum optimal temperatures for Fountain Darter larval (≥25 °C) and egg (≥26 °C) production (McDonald et al. 2007).**

Aquatic Vegetation

Upper Spring Run Reach

In 2022, this reach was impacted heavily by low springflow conditions due to the ongoing drought. As a result, both spring and fall vegetation cover was below their respective long-term averages, yet still remained higher than the low-flow average. Across all four mapping events aquatic vegetation coverage remained similar (1,757–1,908 m^2) (Figure 7). *Sagittaria* continues to be the most dominant plant taxa throughout the reach regardless of flow conditions. For the first time in several years *Cabomba* established in a few locations along the reach, likely a result of higher sediment deposition and lack of scour due to consistent lower flows. Benthic and epiphytic algae was prominent in spring, June, and August, but reduced considerably by fall. Bryophyte growth was mostly absent in the reach across all mapping events. Reduced bryophyte coverage is not a direct result of 2022 low flows, but is a trend observed since 2019, despite more typical flow conditions in previous years (Figure 8).

Landa Lake Reach

Aquatic vegetation cover in Landa Lake typically exhibits less annual variability and less impact from flow disturbance events compared to other study reaches. Results in 2022 were no exception, with both spring and fall total seasonal cover mirroring their respective seasonal averages (Figure 7). Landa Lake was dominated by *Vallisneria* and *Sagittaria*. *Vallisneria* usually accounts for greater than 50% of the total coverage and both species tend to remain consistent in coverage across seasons (BIO-WEST 2001-2022). However, *Vallisneria* did retreat slightly in some areas of Landa Lake owing to reduced flow conditions. Large denuded areas appeared below the Landa Lake islands. Bryophytes were not abundant in Landa Lake during any mapping event but continue to follow a decreasing trend in recent years (Figure 8). Epiphytic and benthic algae were present in Landa Lake but not abundant. *Ludwigia* and *Cabomba* coverages have benefited from planting efforts in the past 5 years and *Ludwigia* had the greatest positive response from restoration plantings in 2022. That being said, expansion of these species continues to be overshadowed by the expansive cover of *Vallisneria* and *Sagittaria* in the reach. The annual Comal River Restoration Report provides more information regarding the restoration of native vegetation in the Landa Lake Reach (BIO-WEST 2022b).

Old Channel Reach

Total rooted vegetation in the Old Channel reach was reduced compared to the previous year. Spring vegetation cover of rooted vegetation was below the long-term average. Vegetation coverage during June and August mapping events showed a decreasing trend in rooted vegetation coverage (Figure 7). That being said, bryophyte coverage increased in 2022, though was not represented in total areal coverage calculations, which exclusively quantifies rooted vegetation (Figure 8). Fall sampling showed a slight increase in total rooted vegetation cover, but still remained below the long-term average (Figure 7). Coverages below long-term averages were due to *Hygrophila* historically dominating the reach prior to restoration; therefore, lower coverages should not be interpreted as an indicator of degraded conditions. Bryophytes were a dominant vegetation type during spring (500 m^2) and fall (800 m^2) and were dense along the bare stream bed as well as in rooted vegetation. Rooted vegetation was still common in the reach. Declines in *Ludwigia* drove the reduction in cover in spring, June, and August mappings, which was likely a result of biomass loss due to reduced flows. *Cabomba* expanded in coverage slightly over most mapping events and both species expanded slightly in coverage by fall (Figure 8).

Upper New Channel Reach

In 2022, both spring and fall mapping showed higher than average vegetation coverage (Figure 7). Aquatic vegetation has benefited from the prolonged absence of flood events and flood pulses along Dry Comal Creek. Although recreation activity was frequent in the reach it did not seems to hamper the expansion of rooted vegetation such as *Hygrophila*. *Cabomba* increased slightly from spring to fall. Although bryophyte remained abundant in the reach over most of the year, this vegetation type was greatly reduced by fall and almost entirely replaced by filamentous algae, which was noted as unusually abundant in the reach during fall 2022 (Figure 8).

Lower New Channel Reach

The spring and fall coverages for 2022 were both greater than their respective long-term averages, with a decreasing trend from spring to fall (Figure 7). This reach was highly recreated over the summer leading to lower coverage, especially for *Hygrophila* (Figures 7 and 8). The two dominant species in this reach, *Cabomba* and *Hygrophila*, lose biomass easily as a result of high flows and recreation, but can recover quickly once river conditions stabilize. This was observed this year as spring, June, and August mapping all trended consecutively lower, with a subsequent gain in vegetation coverage for fall.

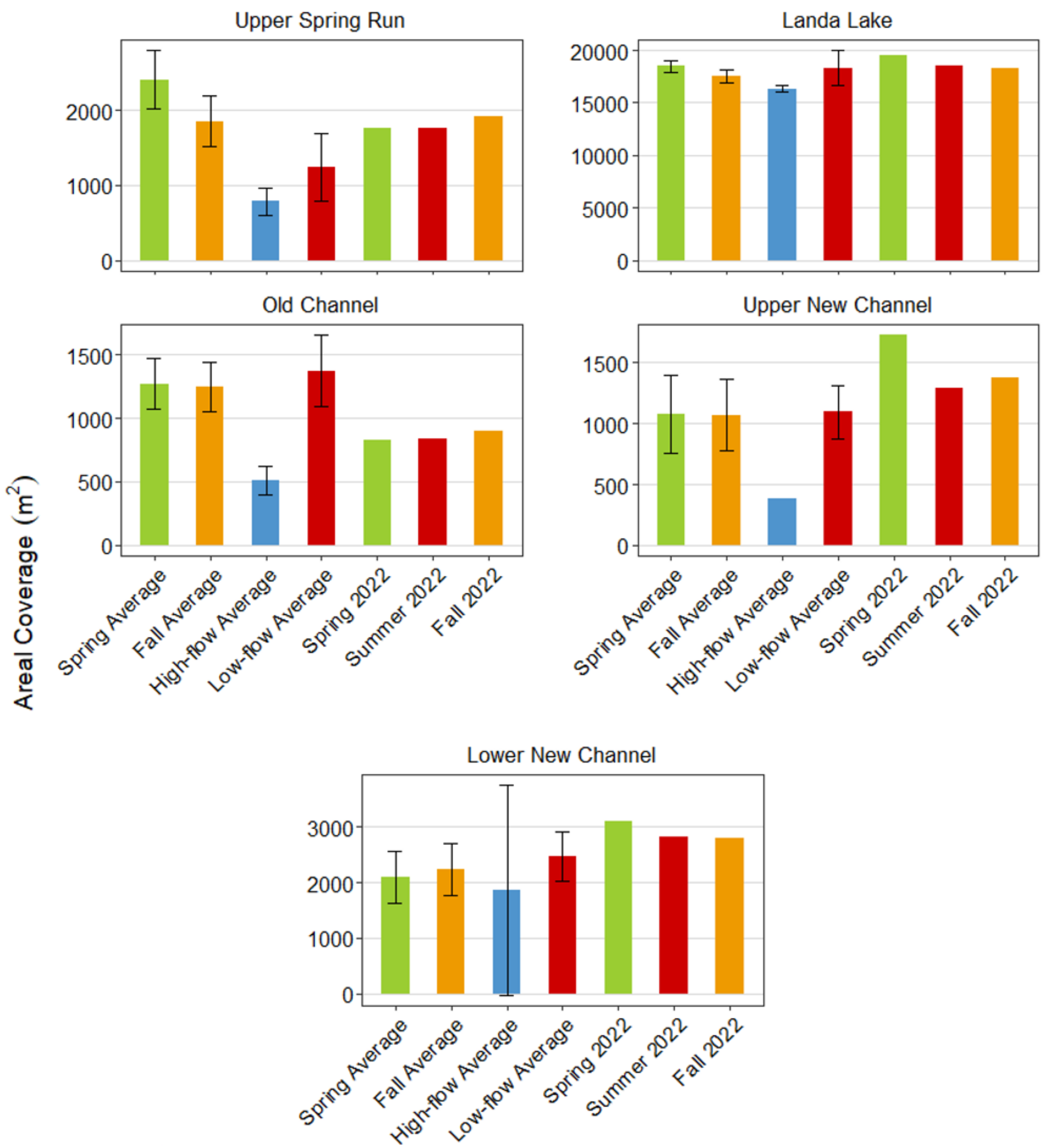

Figure 7. **Areal coverage (m²) of aquatic vegetation among study reaches in the Comal Springs/River. Long-term (2001–2022) study averages are provided with error bars representing 95% confidence intervals. Summer 2022 is based on the average areal coverage of June and August mapping events.**

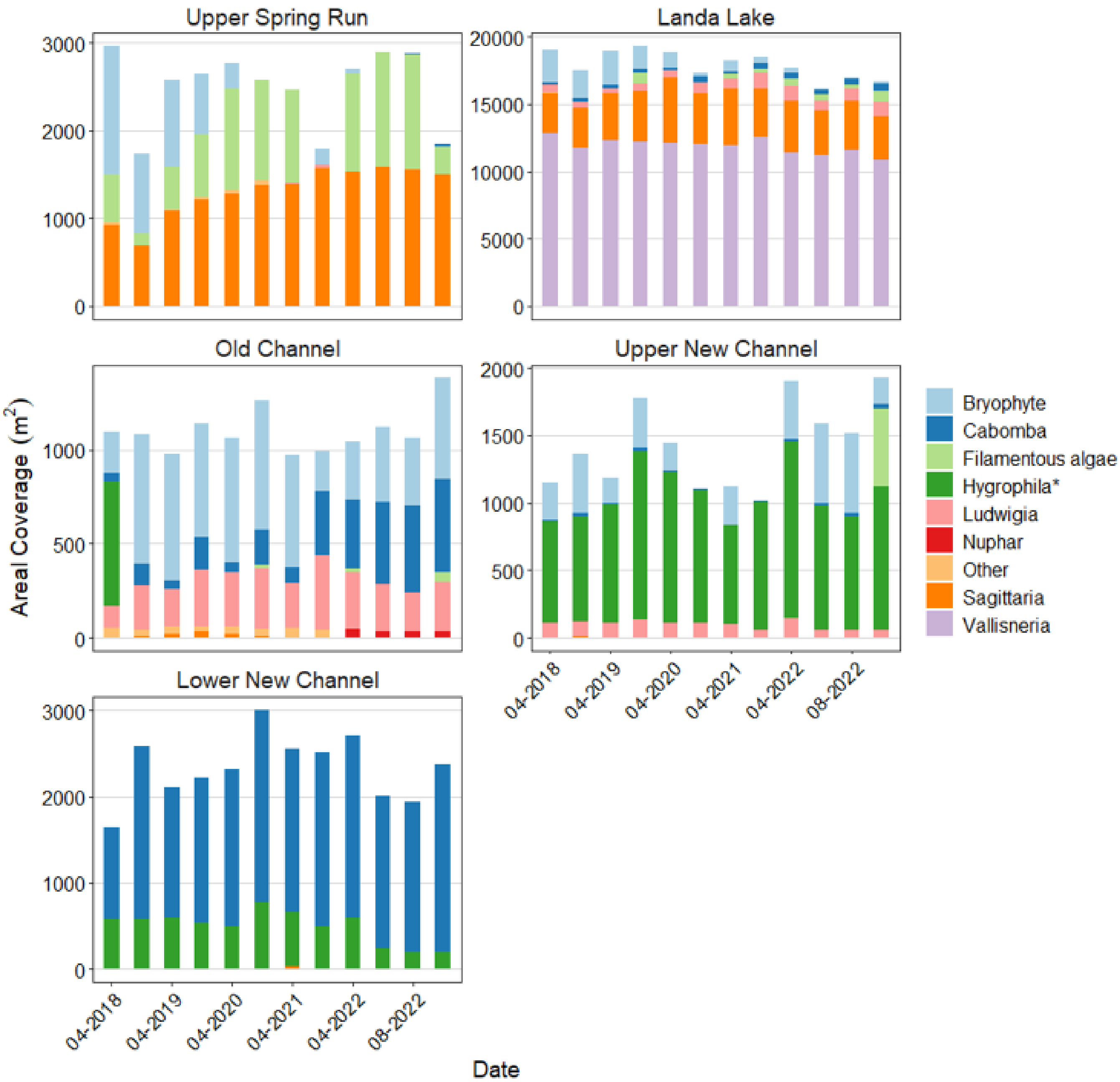

Figure 8. **Aquatic vegetation coverage (m^2) among taxa from 2018–2022 in the Comal Springs/River. (*) in the legend denotes non-native taxa. All taxa represent rooted vegetation except bryophyte and filamentous algae.**

Fountain Darter

A total of 2,365 Fountain Darters were observed at 138 drop-net samples in 2022. Drop-net densities ranged from 0.00–85.00 darters/m^2. Community summaries and raw drop-net data are included in appendices E and G, respectively. Habitat conditions observed during drop-netting can be found in Table 3. Timed dip-netting resulted in a total of 1,450 Fountain Darters during 20 person-hours (p-h) of effort. Site CPUE ranged from 10–222 darters/p-h. Fountain Darters were present at 151 out of 200 random-stations and reach-level percent occurrence among monitoring events ranged from 0–100%. A summary of occurrences per reach and vegetation taxa can be found in Table 4. Visual surveys in Landa Lake resulted in 112 darters observed and densities ranged from 2.18–5.00 darters/m^2 (bryophyte coverage = 10–75%) (Appendix D, Figure D10).

Table 3. Habitat conditions observed during 2022 drop-net sampling in the Comal Springs/River. Physical habitat parameters include counts of dominant vegetation (median % composition) and dominant substrate type sampled. Depth-velocity and water quality parameters include medians (min-max) of each variable among all drop-net samples.

HABITAT PARAMETERS	USR	LL	OC	NC
Vegetation				
Bryophyte[1]	4 (70%)	8 (68%)	8 (100%)	0
Cabomba[1]	0	8 (100%)	8 (100%)	8 (100%)
Filamentous algae[1]	8 (95%)	0	0	0
Hygrophila[1]	0	0	0	8 (100%)
Ludwigia[1]	0	8 (95%)	8 (100%)	8 (100%)
Open	8 (90%)	8 (98%)	8 (100%)	8 (100%)
Sagittaria[2]	8 (100%)	8 (100%)	0	0
Vallisneria[2]	0	8 (100%)	0	0
Substrate				
Cobble	4	1	4	0
Gravel	15	11	6	6
Sand	0	7	2	5
Silt	9	29	20	19
Depth-velocity				
Water depth (ft)	2.6 (1.5–4.0)	2.6 (0.7–3.8)	2.4 (0.7–4.0)	2.0 (0.8–3.7)
Mean column velocity (ft/s)	0.0 (0.0–0.0)	0.0 (0.0–0.6)	0.1 (0.0–0.5)	0.1 (0.0–0.7)
15-cm column velocity (ft/s)	0.0 (0.0–0.0)	0.0 (0.0–0.2)	0.0 (0.0–0.3)	0.0 (0.0–0.5)
Water quality				
Water temperature (°C)	23.8 (23.0–24.9)	24.3 (20.9–26.3)	23.9 (22.1–24.9)	23.9 (21.1–25.0)
DO (mg/L)	5.9 (5.0–9.5)	8.0 (5.4–12.4)	8.5 (6.4–9.8)	8.8 (7.8–10.1)
DO % saturation	70.0 (59.8–113.9)	96.5 (62.6–149.9)	101.5 (76.7–116.3)	103.9 (93.1–120.8)
pH	7.4 (7.2–7.8)	7.4 (7.2–7.8)	7.6 (7.4–8.0)	7.8 (7.1–8.1)
Specific conductance (µs/cm)	584 (581–591)	583 (577–591)	582 (580–585)	584 (581–591)

[1]Denotes ornate vegetation taxa with complex leaf structure
[2]Denotes long broad or ribbon-like, austere-leaved vegetation taxa

Table 4. Summary of vegetation types sampled among reaches during 2022 random-station surveys in the Comal Springs/River and the percent occurrence of Fountain Darters in each vegetation type and reach. Raw numbers represent the sum of detections per reach-vegetation type combination.

VEGETATION TYPE	USR	LL	OC	NC	Total	Occurrence (%)
Bryophyte[1]	1	7	39	0	47	100.00
Cabomba[1]	0	10	3	11	24	68.57
Filamentous algae[1]	4	0	0	0	4	57.14
Ludwigia[1]	0	11	32	0	43	86.00
Sagittaria[2]	1	13	0	0	14	48.28
Vallisneria[2]	0	19	0	0	19	59.38
Total	6	60	74	11	151	75.50
Occurrence (%)	30.00	75.00	92.50	55.00	-	-

[1]Denotes ornate vegetation taxa with complex filamentous or leaf structure
[2]Denotes long broad or ribbon-like, austere-leaved vegetation taxa

Population Demography

Seasonal population trends

Median Fountain Darter density in 2022 was higher in the spring (6.25 darters/m^2) than summer (1.25 darters/m^2) and fall (1.00 darters/m^2). Variation in density (i.e., interquartile range) was also greater in spring (15.38 darters/m^2) compared to other seasons (8.63–9.38 darters/m^2). Compared to historical data, spring and fall densities mostly aligned with 5-year and long-term trends whereas summer densities were lower than long-term trends (Figure 9A). Mean density was higher than the median across seasons and temporal extents, demonstrating positively skewed distributions (i.e., clustered darters). Current median CPUE and occurrence trends paralleled density, displaying higher values in spring (103 darters/p-h and 95%, respectively) compared to summer (42 darters/p-h and 55%, respectively), and fall (60 darters/p-h and 68%, respectively) (Figure 9B and 9C). Median CPUE was slightly higher than historical data in spring, lower in summer, and similar in fall. Despite differences in catch rates observed in spring and summer 2022, upper and lower quartiles generally aligned with historical data, indicating variation was similar (Figure 9B). Lastly, occurrence in 2022 compared to 5-year trends showed prevalence was higher in spring, lower in summer, and similar in fall (Figure 9C).

In summary, seasonal patterns in population performance were consistent across each sampling method. In spring and fall, current trends in central tendency and variation didn’t deviate substantially from past observations. In contrast, summer trends were below historical medians for each population metric and could indicate short-term negative effects from reduced flows. Average recruitment rates in spring and summer do not appear to provide an explanation for lower population performance in summer and instead could be related to habitat trends. For example, summer densities at Landa Lake were low in *Cabomba* (3.50–12.50 darters/m^2), which exhibited higher water temperatures (max = 26.3 °C) than usual. These patches of *Cabomba* at Landa Lake are directly connected to the slough arm that is often warmer than other parts of the lake, suggesting the quality of suitable vegetation during low flows depends on environmental conditions at a given patch location (Angermeier et al. 2002). That being said, fall metrics returned to normal levels, indicating some reaches were resilient to reduced flows due to intrinsic and/or extrinsic mechanisms (see subsequent sections for further discussion). Despite evidence to suggest potential short-term effects from reduced flows in summer, upper and lower quartiles for CPUE and occurrence were similar to historical trends, while the upper quartile for density was below long-term observations. This alternately suggests CPUE and occurrence were not meaningfully different than historical data and that lower densities may instead be result of imperfect detection (Davis et al. 2011; Kéry and Royle 2021).

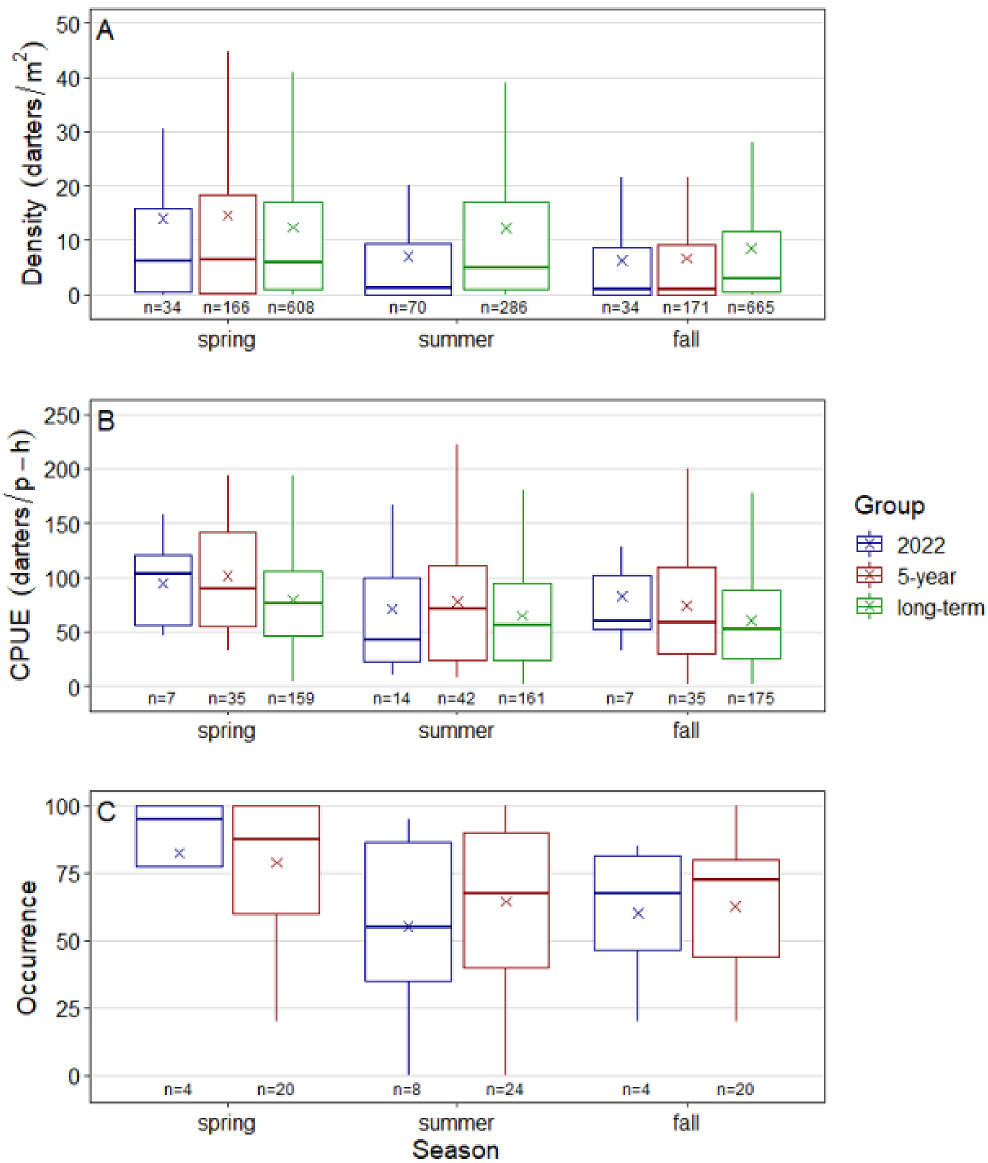

Figure 9. **Boxplots comparing Fountain Darter density from drop-net sampling (A), catch-per-unit-effort (CPUE) from timed dip-netting (B), and proportional occurrence from random station dip-netting (C) among seasons in the Comal Springs/River. Temporal groups include 2022, 5-year (2018–2022), and long-term (2001–2022) observations. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axes represent the number of samples per category.**

Drop-net sampling density trends

Fountain Darter density trends varied among and within reaches in 2022. Median density at Upper Spring Run was greater than the long-term median (1.50 darters/m^2) in the spring (3.75 darters/m^2) and then decreased in subsequent events (0.00–0.25 darters/m^2). Upper Spring Run densities in spring 2022 were also the highest observed since 2018. At Landa Lake, median density was temporally concordant in 2022 (5.25–8.00 darters/m^2) and all events were below the long-term median (11.00 darters/m^2). That being said, high density samples (>30 darters/m^2) were observed, though not in August (maximum = 10.50 darters/m^2). Median density at the Old Channel was above the long-term median (3.50 darters/m^2) in spring (10.00 darters/m^2) and the August low-flow event (8.25 darters/m^2), while the June low-flow event (4.25 darters/m^2) was comparable to the long-term. Median density declined further in fall (2.50 darters/m^2), though higher density samples were still observed (16.50–19.50 darters/m^2). At Upper New Channel, median density was highest in spring (4.50 darters/m^2) and above the long-term (2.00 darters/m^2), decreasing below the long-term median the remainder of the year (0.50–0.75 darters/m^2) (Figure 10).

Drop-net samples with high Fountain Darter densities generally resulted in greater medians and upper quartiles that varied in frequency among reaches the past five years. As such, directional trajectories in density varied spatially and depended on the boxplot descriptive statistic being assessed. Patterns in median density were generally apparent on a seasonal basis, with spring events exhibiting higher median density. Five-year trends were generally stable at Old Channel and Landa Lake. In contrast, directional trends in upper quartile quantities were more apparent and negative at Upper Spring Run and New Channel. The majority of upper quartile values at Upper Spring Run were below the long-term median from 2020 to present, suggesting a potential downward trend in density in this reach. Landa Lake also displayed a decline in upper quartiles, though at a lower magnitude. This slight decline in upper quartiles indicates densities were lower than expected in higher quality habitats, which may be directly related to decreasing bryophyte coverages in recent years. That being said, densities at Landa Lake remained compatible with long-term trends. These suggested causal mechanisms, however, should be interpreted with some uncertainty, due to confounders like detectability (Davis et al. 2011; Kéry and Royle 2021).

In summary, drop-netting showed spatial discordance in trends and may be best explained by distinct environmental conditions relative to reach position within the Comal Springs/River. Due to differences in environmental conditions such as vegetation coverage and water temperature outlined above, sub-population response to environmental change would be expected to differ among them (Fagan 2002; Campbell Grant et al. 2007). For example, loss of highly suitable habitat (e.g., bryophyte) was more substantial in the upper section of Comal Springs (i.e., Upper Spring Run) than Landa Lake, while the Old Channel remained stable in this regard. This combined with current and historical trends suggests persistence of suitable habitat in Landa Lake and Old Channel facilitate darter resistance at low flows (Dunn and Angermeier 2018). Further, higher fall recruitment resulted in increased fall densities at Landa Lake, but not Upper Spring Run and New Channel. This also indicates resilience to low flows through enhanced reproductive output, though trends vary spatially as a result of environmental characteristics and perhaps density dependence (i.e., Allee effect) (Holomuzki et al. 2010; Matthews et al. 2011; Katz and Freeman 2015). Under this scenario, recovery would be expected to occur in Upper Spring Run reach once suitable habitat conditions resume, as shown by historical data.

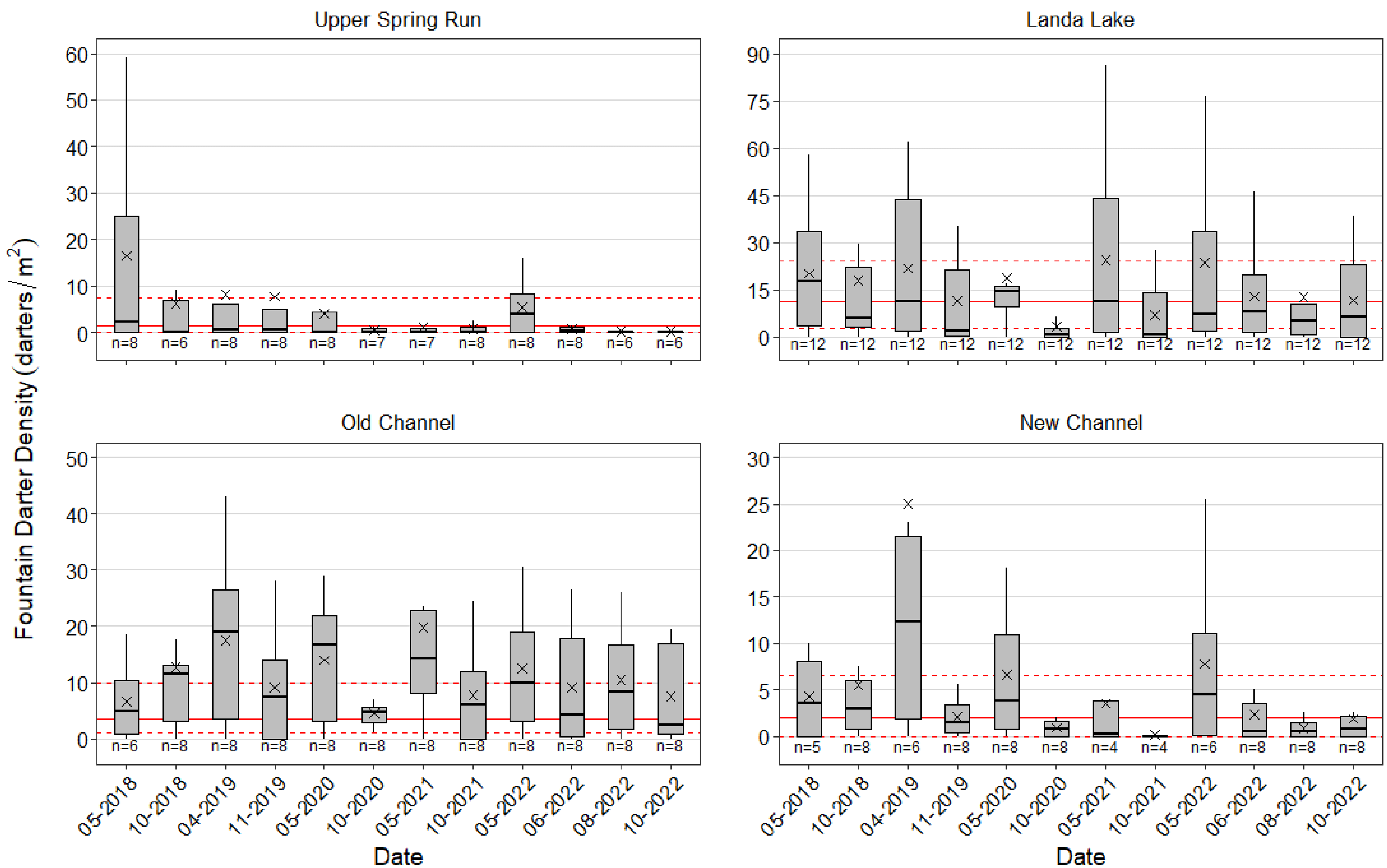

Figure 10. **Boxplots displaying temporal trends in Fountain Darter density (darters/m²) among study reaches from 2018–2022 during drop-net sampling in the Comal Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axes represent the number of drop-net samples in each category. Solid and dashed red lines denote long-term (2001–2022) medians and interquartile ranges, respectively.**

Size structure and recruitment trends

Five-year trends in Fountain Darter size structure and recruitment were consistent among seasons, though discrepancies were observed during certain events. In general, smaller darters were more frequent in spring during the peak reproductive period, as seen by lower median lengths (19–22 mm) and increased recruitment (45.31–60.44%). Violin plots further demonstrate smaller darters were more common in spring, though their proportions differed across years, characterized with normal or negatively skewed distributions. Patterns in size structure observed in 2022 were similar to long-term trends in the spring. Recruitment was noticeable higher in 2019 (59.18%) and 2020 (60.44%) and the lack of confidence interval overlap with long-term trends supports these were meaningful increases. Median lengths were generally similar in summer and fall, with all violin plots displaying positive skewness towards larger darters. As such, recruitment rates were lower during these seasons, generally about 25% or less. Exceptions to this trend included summer 2021 (35.53%) and fall 2022 (45.19%) (Figure 11).

Recruitment in the fall was well above average, denoting the highest relative abundance of young-of-year in recent years and resembling spring recruitment rates. Enhanced fall recruitment was potentially due to low and stable flows throughout 2022. Moreover, higher rates of recruitment were also documented during past periods of similar hydrologic conditions in the Comal system (Appendix E, Figure E13 and E14), supporting that stable and/or low flows can increase recruitment (Freeman et al. 2001; Poff and Zimmerman 2010; Craven et al. 2010; Katz and Freeman 2015). A previous study that assessed population dynamics of the Turquoise Darter (*Etheostoma inscriptum*) also observed greater young-of-year abundances during years of low/stable flows, suggesting recruitment can be a population response to low-flows (Katz and Freeman 2015), and a similar pattern was observed in the San Marcos River this year. This suggests that increased recruitment can augment Fountain Darter persistence during low-flow periods, though further research is needed to better understand the phenology of this species and to examine this pattern under additional discharges and durations (McCargo and Peterson 2010; Katz and Freeman 2015).

Habitat Use and Suitability

Density trends among vegetation taxa

Median densities in 2022 were highest in bryophyte (16.75 darters/m^2) and *Cabomba* (12.25 darters/m^2) and mostly aligned with historical trends. Maximum densities in 2022 occurred in bryophyte (76.50–85.50 darters/m^2) and some samples were also high in *Cabomba* (25.50–38.50 darters/m^2) (Figure 12). Moreover, high variation in density (i.e., interquartile range) for bryophyte (21.50 darters/m^2) and *Cabomba* (24.25 darters/m^2) demonstrate that while they often harbor greater densities of darters, high variability is a natural phenomenon within a given vegetation taxa. Median density was moderate for *Hygrophila* (5.75 darters/m^2) and *Ludwigia* (4.00 darters/m^2). *Hygrophila* densities were slightly higher in 2022 than historical trends, while *Ludwigia* was more similar (Figure 12). Maximum densities in *Ludwigia* (26.00–46.50 darters/m^2) were denoted as outliers, indicating it can support high densities in certain conditions. Greater densities within these ornate taxa aligned with expectations by historical data and past research on Fountain Darter habitat associations (Schenck and Whiteside 1976; Linam et al. 1993; Alexander and Phillips 2012; Edwards and Bonner 2022).

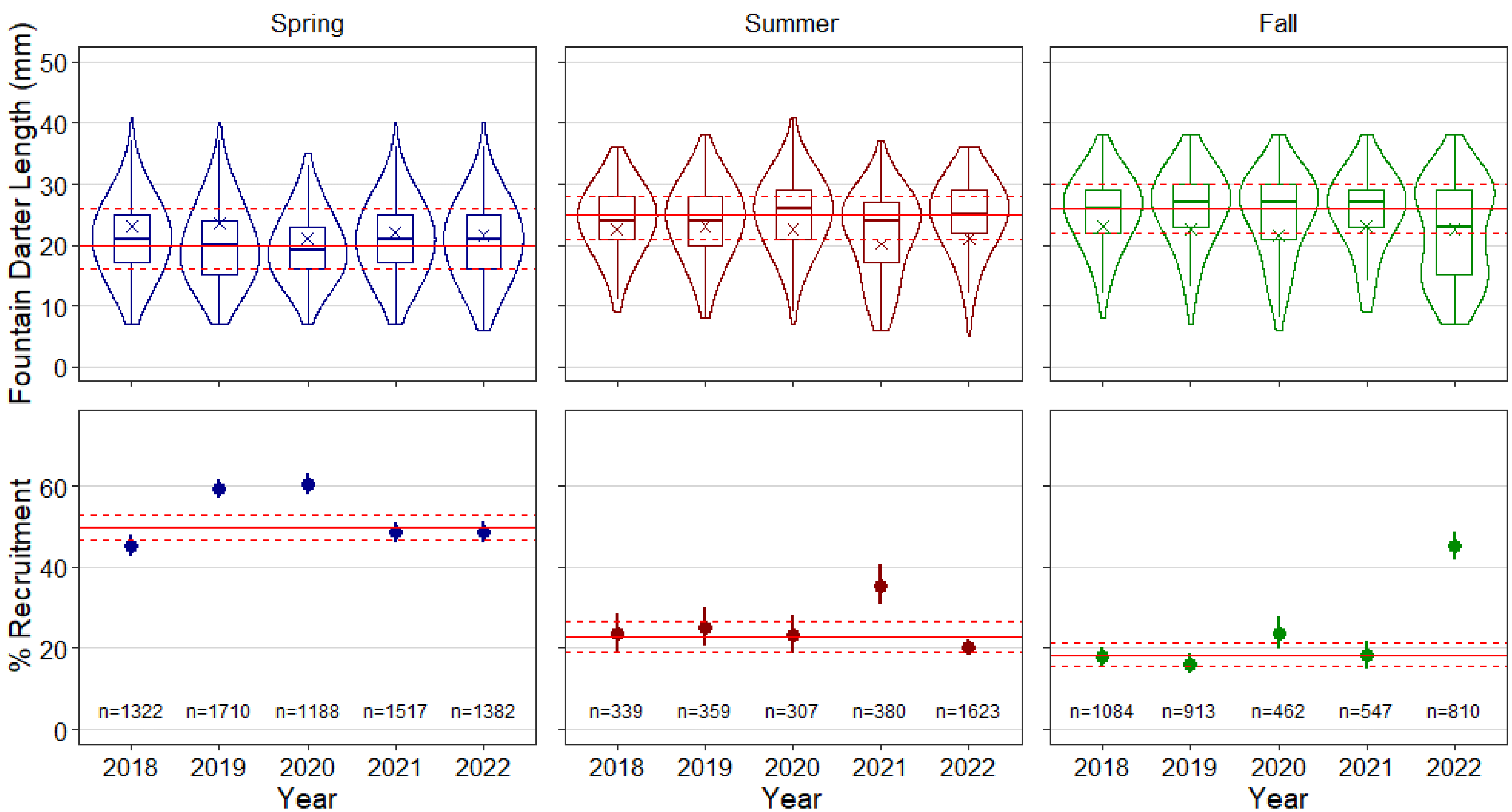

Figure 11. **Seasonal trends of Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the Comal River from 2018–2022. Spring and fall trends are based on drop-net and timed dip-net data in aggregate, whereas summer trends are based on timed dip-net data only. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability density; polygons outlining boxplots). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axis of the top row represent the number of Fountain Darter length measurements in each distribution. Recruitment is the percent relative abundance (± 95% CI) of darters ≤20 mm. Long-term (2001–2022) trends in size structure are represented by median (solid red line) and interquartile range (dashed red lines). Recruitment is compared to the long-term mean percentage (solid red line) and 95% CI (dashed red lines).**

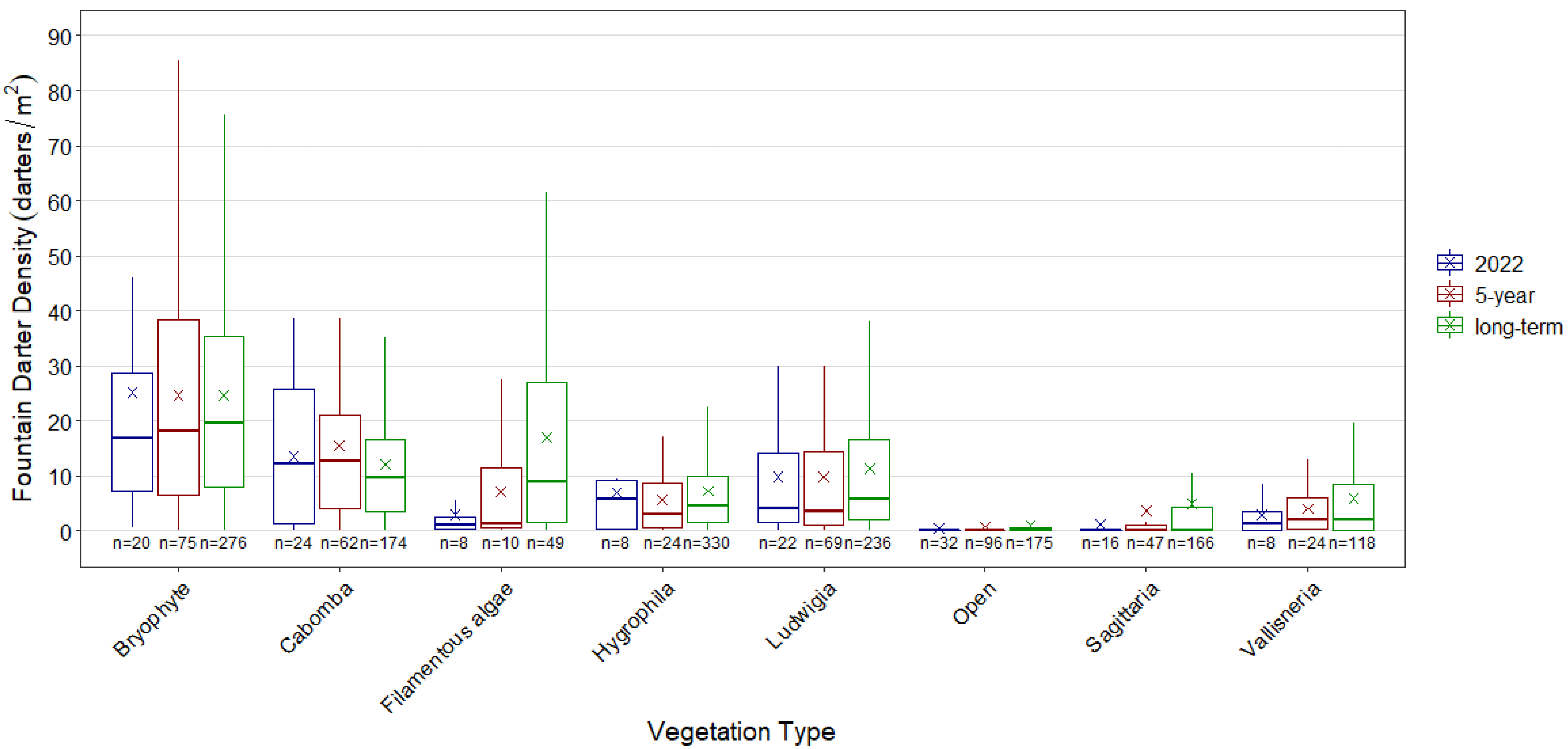

Figure 12. **Boxplots displaying 2022, 5-year (2018–2022), and long-term (2001–2022) drop-net Fountain Darter density (darters/m^2) among vegetation types in the Comal Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axes represent drop-net sample sizes per group.**

The remaining habitats had lower median densities (0.00–1.00 darters/m^2) this year. Open habitats mirrored historical data, while filamentous algae, *Sagittaria*, and *Vallisneria* were lower than expected (Figure 12). Decreased densities may be best explained by the localities where these taxa were sampled. For example, all filamentous algae samples occurred at Upper Spring Run, which exhibited low population densities in 2022, suggesting that decreased densities could be a result of factors related to density-dependence, where habitat associations are weaker at low population size, despite preference being strong (Angermeier et al. 2022).

Alternately, spatial variation in environmental conditions is a known determinant on the suitability of specific habitats, which would characterize filamentous algae as unsuitable during low flows (Fagan 2002; Falke et al. 2011). This may also explain why past studies show conflicting results on the use of filamentous algae by Fountain Darters (Linam et al. 1993; Alexander and Phillips 2012; Edwards and Bonner 2022). However, these differences may be better explained by taxa specific patterns that are overlooked because algae are usually identified at a coarse taxonomic level. In addition, decreased densities of *Sagittaria* and *Vallisneria* in Landa Lake may be because samples were often located along the eastern shoreline further from springflow inputs, resulting in higher water temperatures (25.00–25.60 °C). Lastly, densities ≥10.00 darters/m^2 were uncommon for most taxa, but did occur when bryophytes were present within other vegetation taxa, suggesting usage can increase for moderately suitable (e.g., *Ludwigia*) or less-suitable (e.g., *Sagittaria*, *Vallisneria*) taxa when bryophytes enhance the complexity of a habitat's physical structure.

Size structure among vegetation taxa

Distribution summary statistics and violin plots showed that Fountain Darter size structure varied among vegetation taxa sampled in 2022. Median lengths were most frequently 23 or 24 mm, with minimum and maximum medians observed in bryophyte (21 mm) and filamentous algae (26 mm). Size structure distributions were positively skewed for all taxa except bryophyte. The uniform distributional shape exhibited by bryophyte suggests it's an important habitat across all life stages. That being said, relative proportions of smaller darters (i.e., ≤20 mm) were noticeably higher in *Cabomba*, *Ludwigia*, and *Vallisneria*, indicating these taxa can also be important habitat for juveniles (Figure 13). Lastly, results for multiple taxa differed compared to the previous year. *Hygrophila* and *Ludwigia* length distributions had inverse shapes compared to 2021, while the relative proportion of juveniles in 2022 increased for *Vallisneria* and decreased for filamentous algae (Figure 13; BIO-WEST 2022a).

Inconsistent length distributions between 2021 and 2022 indicates habitat use by recent recruits can vary annually (BIO-WEST 2022a). Differences among years may be explained by several factors described in the previous section. For example, low proportions of juveniles in filamentous algae were attributed to decreased recruitment in Upper Spring Run where most/all filamentous algae was sampled. *Vallisneria* drop-net samples with greater juvenile abundance had bryophytes present within. Bryophytes were also commonly observed within *Ludwigia*, which harbored both juveniles and adults. This suggests greater physical complexity augmented by bryophytes can increase habitat for juveniles and the overall carrying capacity for darters.

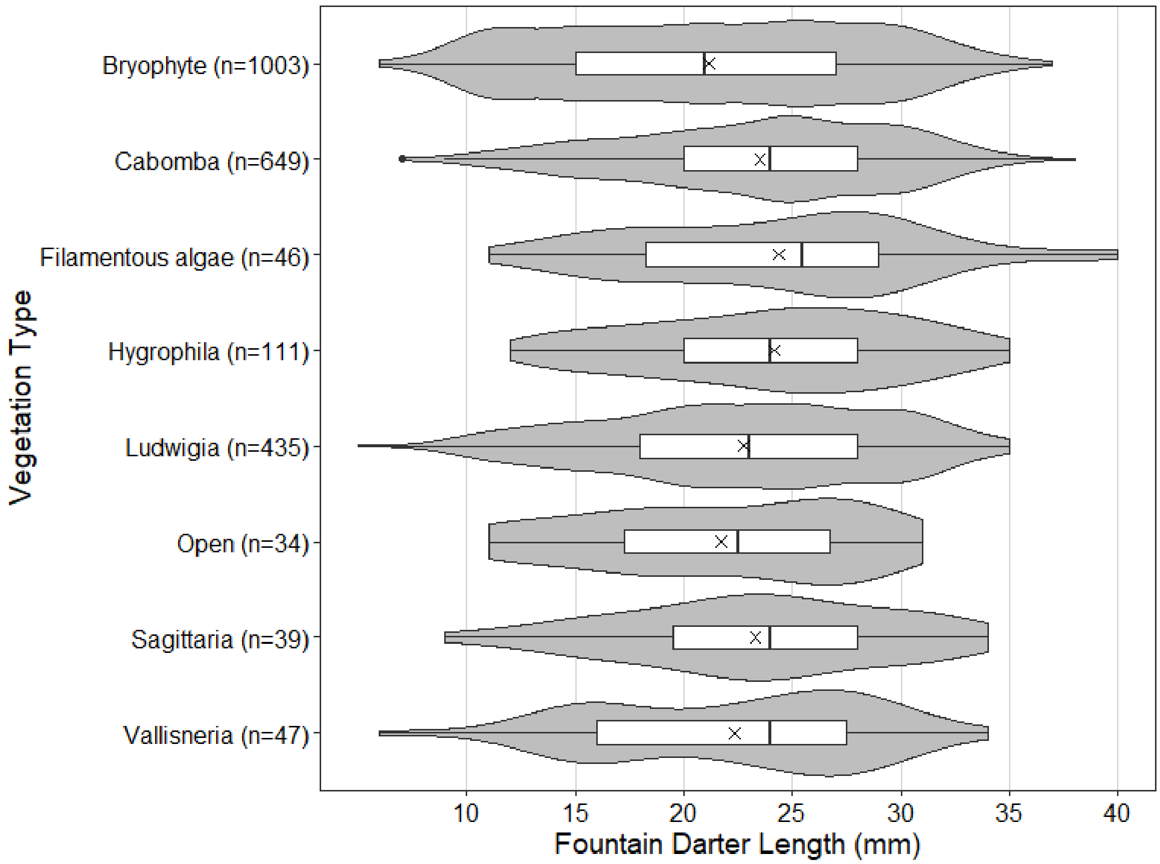

Figure 13. Boxplots and violin plots (grey polygons) displaying Fountain Darter lengths among dominant vegetation types during 2022 drop-net sampling in the Comal Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles. The "n" values represent the number of Fountain Darter length measurements per vegetation type.

Habitat suitability

Temporal trends in Fountain Darter habitat suitability at Upper Spring Run showed OHSI decreased from 2018–2021 (0.63–0.42), then increased by summer 2022 (0.54), and decreased again in fall (0.43). Changes in OHSI can be mostly attributed to changes in bryophyte and filamentous algae composition. At Landa Lake, OHSI was stable from 2018–2021 (0.57–0.62) and slightly declined in 2022 (0.54–0.56). Suitability in 2022 aligned with the lower long-term confidence interval, though confidence interval overlap with the mean suggests this decline was not substantial. Patterns in habitat suitability were cyclical at the Old Channel (0.49–0.59), with all OHSI within the limits of long-term trends for all events. At the Upper New Channel, OHSI was stable and typically below the long-term mean from 2018–2021 (0.39–0.44), then increased to quantities more similar to historical conditions in 2022 (0.46–0.49). The Lower New Channel showed no noticeable patterns in OHSI and was either similar or above the long-term mean (0.51) (Figure 14).

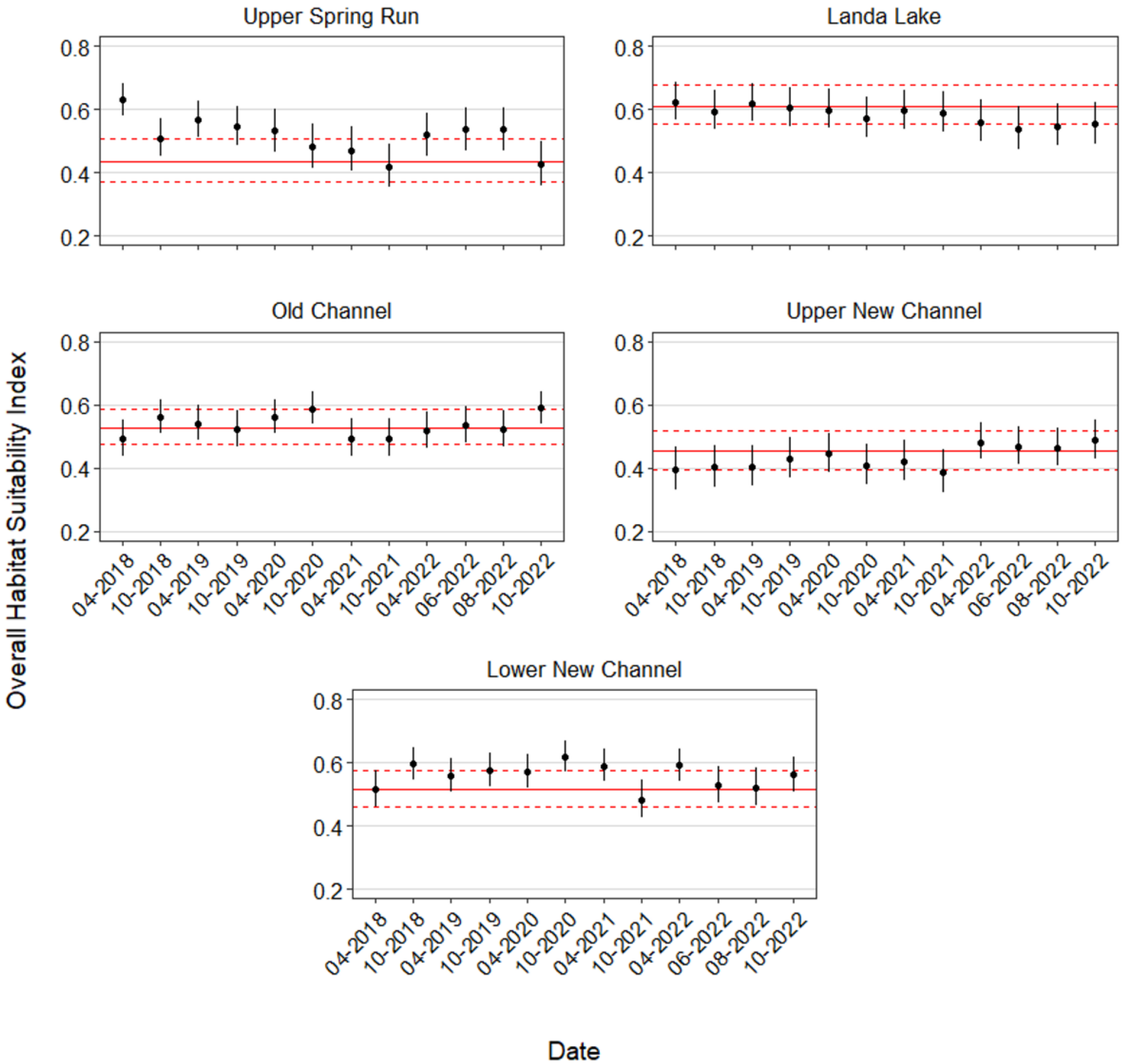

Figure 14. **Overall Habitat Suitability Index (OHSI) (±95% CI) from 2018–2022 among study reaches in the Comal Springs/River. Solid and dashed red lines denote means of long-term (2003–2022) OHSI and 95% CI, respectively.**

Fountain Darter habitat suitability in 2022 varied across reaches. Regardless of the directionality, trends in OHSI consistently corresponded to changes in coverages of bryophyte, filamentous algae, and open habitats (i.e., changes in total vegetation coverage). Habitat suitability at Upper Spring Run was high, despite decreases in bryophytes and directly due to increased filamentous algae. Lower OHSI at Landa Lake was attributed to decreased bryophyte and increased open habitats, while the inverse resulted in increased OHSI at the Old Channel. At the Upper New Channel, OHSI was high the entire year due to increased bryophyte and filamentous algae. The utility of OHSI for providing potential explanations on Fountain Darter population trends are apparent when put into context with random dip-net results. Sites for random dip-netting are selected via simple random sampling, which provides unbiased estimates of prevalence at the reach-level. As such, higher Fountain Darter prevalence at Landa Lake (75%) and the Old Channel (92%) can be attributed to greater availability of more suitable habitat (e.g., bryophyte, *Cabomba*, *Ludwigia*) (Table 4). The strong relationship between OHSI and occurrence supports that the continuity of Fountain Darter distributions at the reach-level depend on the composition and configuration of vegetation assemblages (Table G1 and Figure G3). Additionally, occurrence data corresponded with density in 2022, suggesting that higher habitat suitability increases spatial continuity and can result in increased population density, which is apparent when comparing Landa Lake and Old Channel versus Upper Spring Run and New Channel (Angermeier et al. 2002).

Agreement between occurrence and density is not always consistent, such as in Upper Spring Run, where low prevalence and high densities are periodically observed in tandem. Similar patterns were observed in the San Marcos River this year, demonstrating spatial structured distributions and restricted patches of suitable habitat does not appear to negatively affect population performance (Davis and Cooke 2010; Davis et al. 2011). Alternatively, incongruence between OHSI and density in Upper Spring Run may suggest that habitat suitability criteria for some vegetation taxa need refinement. At Upper Spring Run, population performance was ubiquitously low among sampling methods, despite expansion of filamentous algae driving larger increases in OHSI. Development of more refined habitat suitability criteria that account for spatiotemporal variation in taxa suitability within filamentous algae could enhance the realization of OHSI and benefit future assessments. Filamentous algae may include multiple distinct algae species with varying suitability to darters, which may be complicating habitat suitability criteria.

Fish Community

A total of 13,881 fishes represented by 9 families and 25 unique species were observed in the Comal Springs System during 2022 sampling. Complete summaries of segment-level community composition can be found in Appendix E. Fish assemblage structure (percent relative density) was more even in riverine areas compared to spring environments. Assemblages were consistently dominated by Guadalupe Roundnose Minnow (*Dionda nigrotaeniata*; 11.1–63.2%) across segments and *Gambusia* sp. at Upper Spring Run (19.1%) and Old Channel (17.4%). Texas Shiner (*Notropis amabilis*) was abundant in riverine areas and was more dominant at the New Channel (21.7%) than Old Channel (13.6%). Fountain Darter ranked 4th in abundance at Upper Spring Run (8.9%), Landa Lake (5.5%), and New Channel (9.7%), and ranked 5th at the Old Channel (9.3%) (Appendix E, Table E2).

Evidence of detectable temporal trends in fish communities varied among the selected metrics and between and within study segments. Species richness and diversity were typically higher in riverine areas and lowest at Landa Lake. At Upper Spring Run, species richness and diversity were intermediate and more similar to riverine segments. Five-year trends in species richness usually varied from event to event and displayed no detectable patterns. Larger fluctuations in species richness (i.e., 5–7 species) did occur, but were uncommon and didn't result in any meaningful directional changes. No apparent trends in diversity were observed at Upper Spring Run and New Channel. In contrast, diversity generally increased from 2018–2022 at Landa Lake (0.74–1.00) and Old Channel (1.33–2.11), though did vary for some prior and subsequent events

(Figure 15), suggesting that community composition in these reaches have become more heterogenous in recent years (Figure 15).

Temporal trends in richness of spring-associated fishes (hereafter ‘spring fishes’) were congruent with community-level observations and generally stable throughout the study area. Spring fishes richness ranged from 3–6 species across all segments and from event to event usually didn’t change by more than one species. Relative density of spring fishes showed no emergent patterns at Upper Spring Run, Landa Lake, and New Channel. At Landa Lake, relative density was consistently higher and varied substantially less than other segments. Variation in relative density was a typical pattern at Upper Spring Run, whereas the New Channel showed similar stability to Landa Lake. Two events at Upper Spring Run and New Channel had noticeable lower relative densities during the second summer 2022 event in August (37.73%) and fall 2021 (46.09%), receptively, though returned to normal levels at successive sampling events. At the Old Channel, relative density of spring fishes declined over the past five years. Relative density first decreased from spring 2018 (90.06%) to fall 2020 (54.62%). This was followed by a large subsequent increase in spring 2021, (80.59%) then it decreased again to fall 2022 (65.00%) (Figure 16).

Temporal trends in Fountain Darter density from 2018–2022 were based on microhabitat sampling data. In 2022, median density at Upper Spring Run was mostly similar to the long-term, while variability (i.e., interquartile range) decreased throughout the year due to declines in upper quartile quantities. Temporal trends in density at Upper Spring Run were generally stable and showed a somewhat consistent cyclical pattern, being higher in spring and lower in fall. Median density in the current year was below the long-term median during all but one event at Landa Lake and Old Channel. At these reaches, densities have been trending downward the past five years, with higher densities in 2018 and 2019 compared to 2020–2022. At the New Channel, densities were substantially higher than historical data in spring 2022 and descended below the long-term median by fall. Prior to 2022, densities were generally stable through time and varied seasonally (Figure 17).

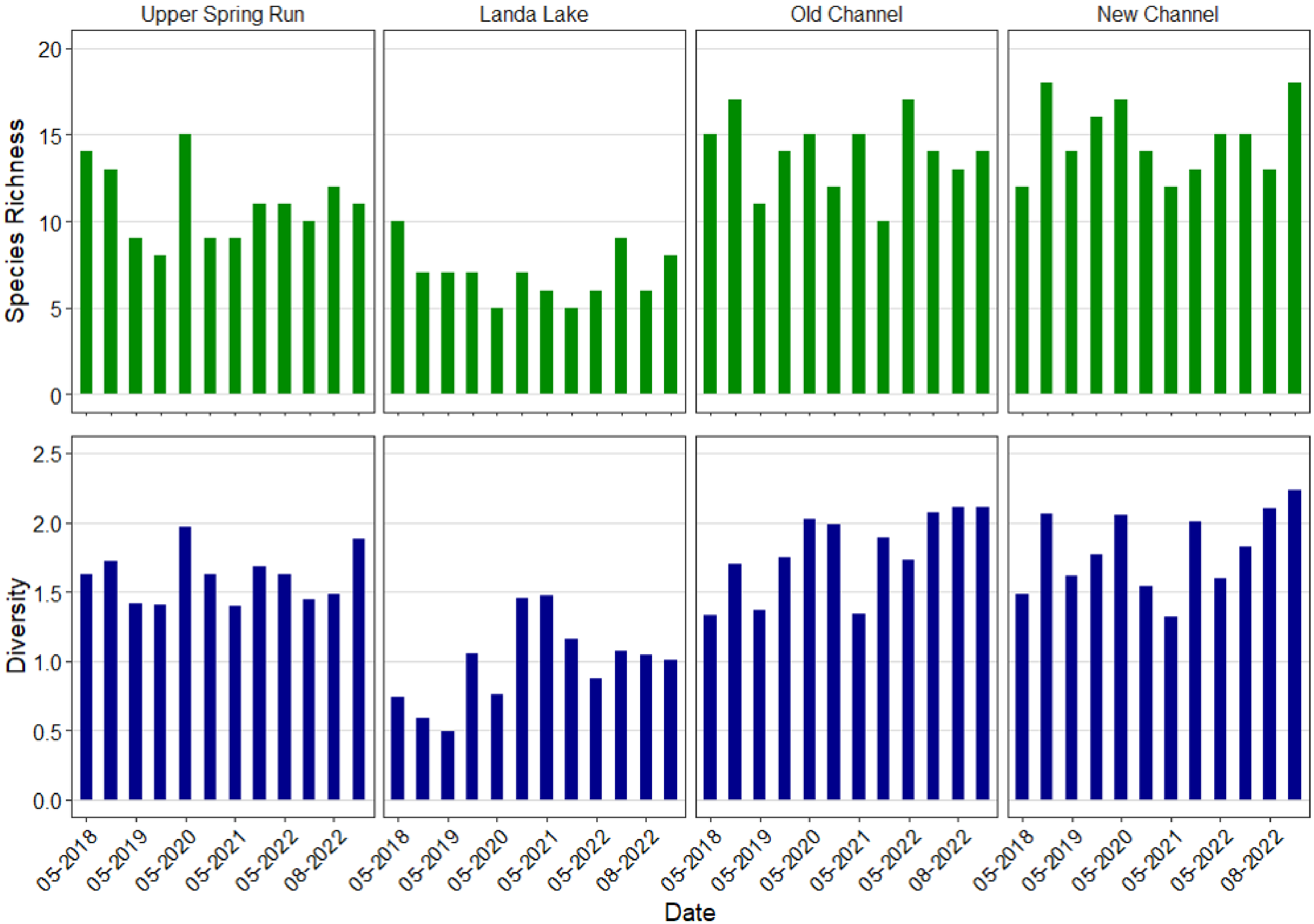

Figure 15. **Bar graphs displaying species richness (top row) and diversity (bottom row) from 2018–2022 based on all three fish community sampling methods in the Comal Springs/River.**

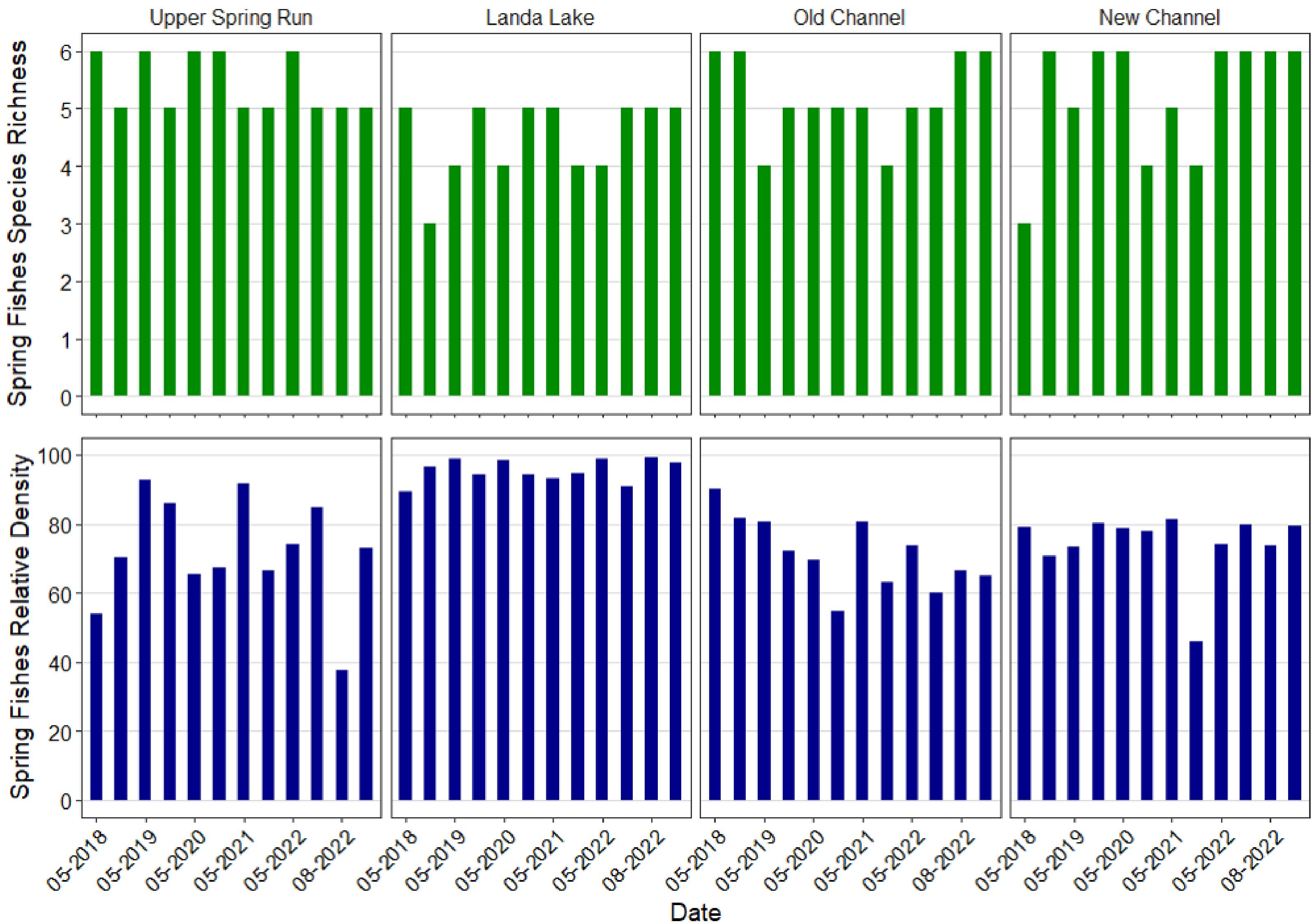

Figure 16. **Bar graphs displaying spring fish richness (top row) and relative density (RD; %) (bottom row) from 2018–2022 based on all three fish community sampling methods in the upper Comal Springs/River.**

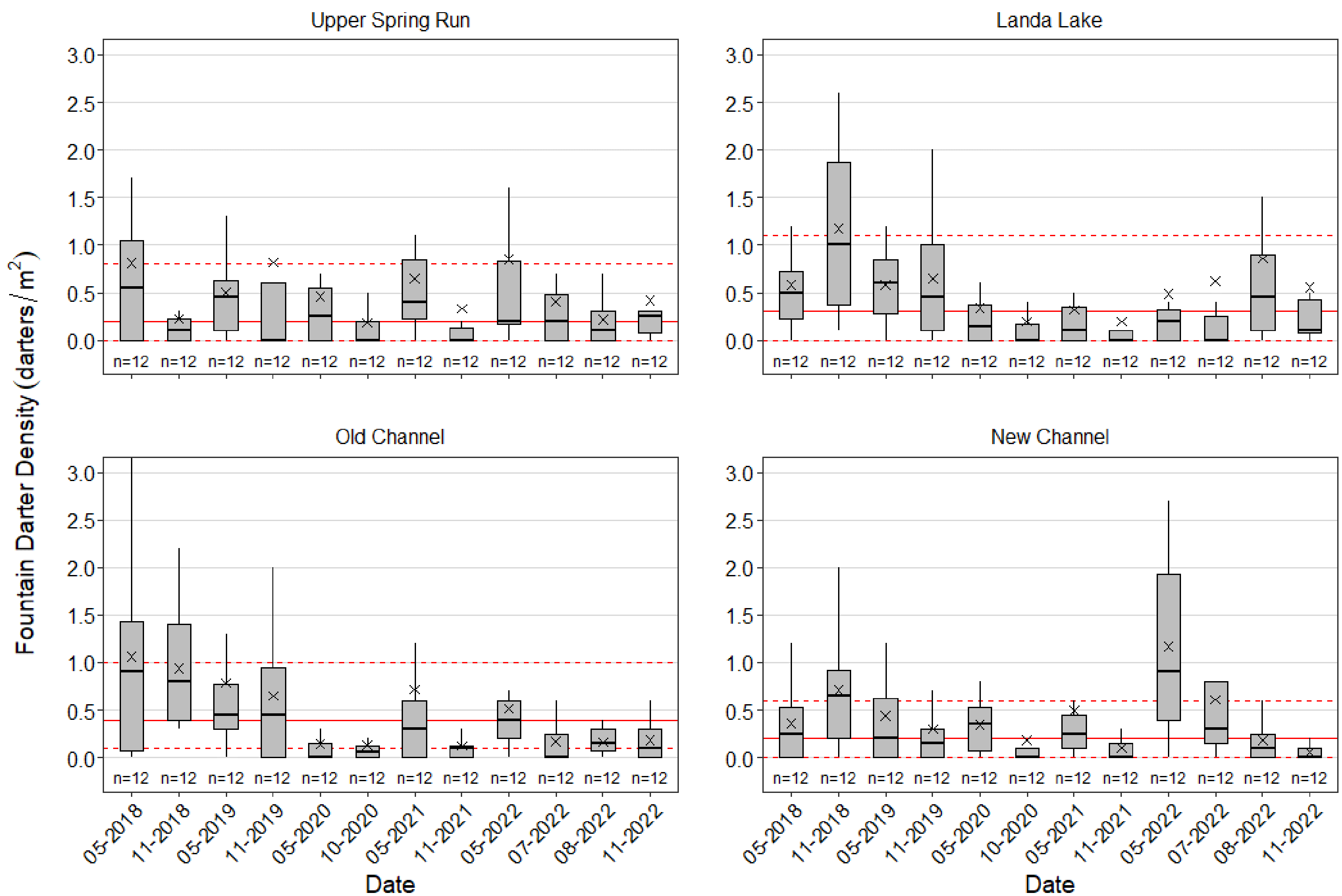

Figure 17. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) among study reaches from 2018–2022 during fish community microhabitat sampling in the Comal Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axes represent the number of microhabitat samples per category. Solid and dashed red lines denote long-term (2014–2022) medians and interquartile ranges, respectively.**

Comal Springs Salamander

A total of 1,326 Comal Springs Salamanders were observed during 11 survey efforts in 2022. At Spring Island Run, salamander counts in 2022 were lower than the long-term averages in spring and fall, where summer was higher than the low-flow average. Lack of confidence interval overlap in spring and fall also suggests counts were meaningfully lower. Comal Springs Salamander counts at Spring Island Outfall and Spring Run 1 were higher than long-term trends in spring and summer, while fall was more similar. At Spring Run 3, counts were above long-term means across all seasons (Figure 18).

Five-year trends at Spring Island Run and Spring Run 3 did not display any distinct patterns in CPUE, varying about 1 and 10 salamanders/p-h, respectively. At Spring Run Outfall, CPUE generally showed a decrease from 2018 to June 2022, though high catch rates were observed during this period. Following this decrease, CPUE continued to trend upward to Fall 2022. Trends in CPUE were cyclical at Spring Run 1, which showed an increase from 2018 to May 2022, which was followed by a sharp decrease the subsequent event. After this sharp drop, CPUE steadily increased up to fall 2022 (Figure 19). Subsequent monitoring will help determine if returns to typical catch rates by fall are maintained following this low-flow year.

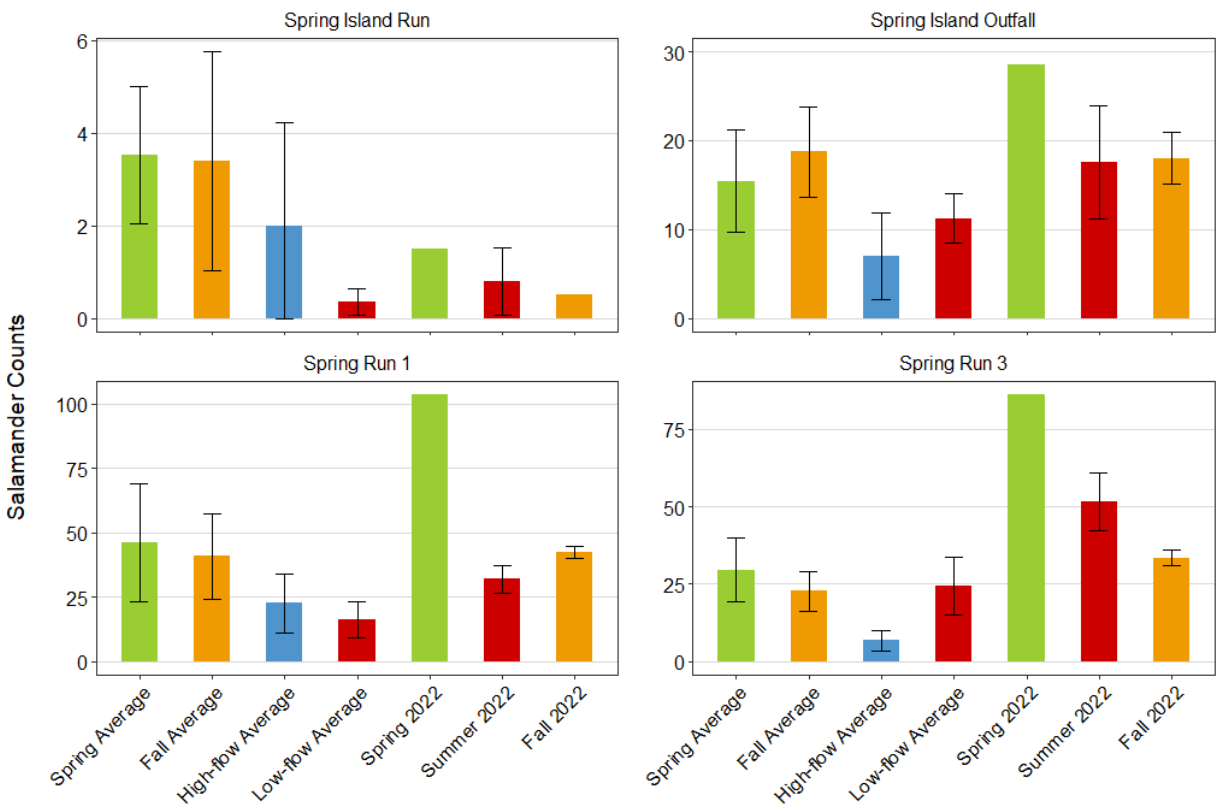

Figure 18. Comal Springs Salamander counts among Comal Springs survey sites in 2022, with the long-term (2001–2022) average for each sampling event. Error bars for long-term averages represent 95% confidence intervals.

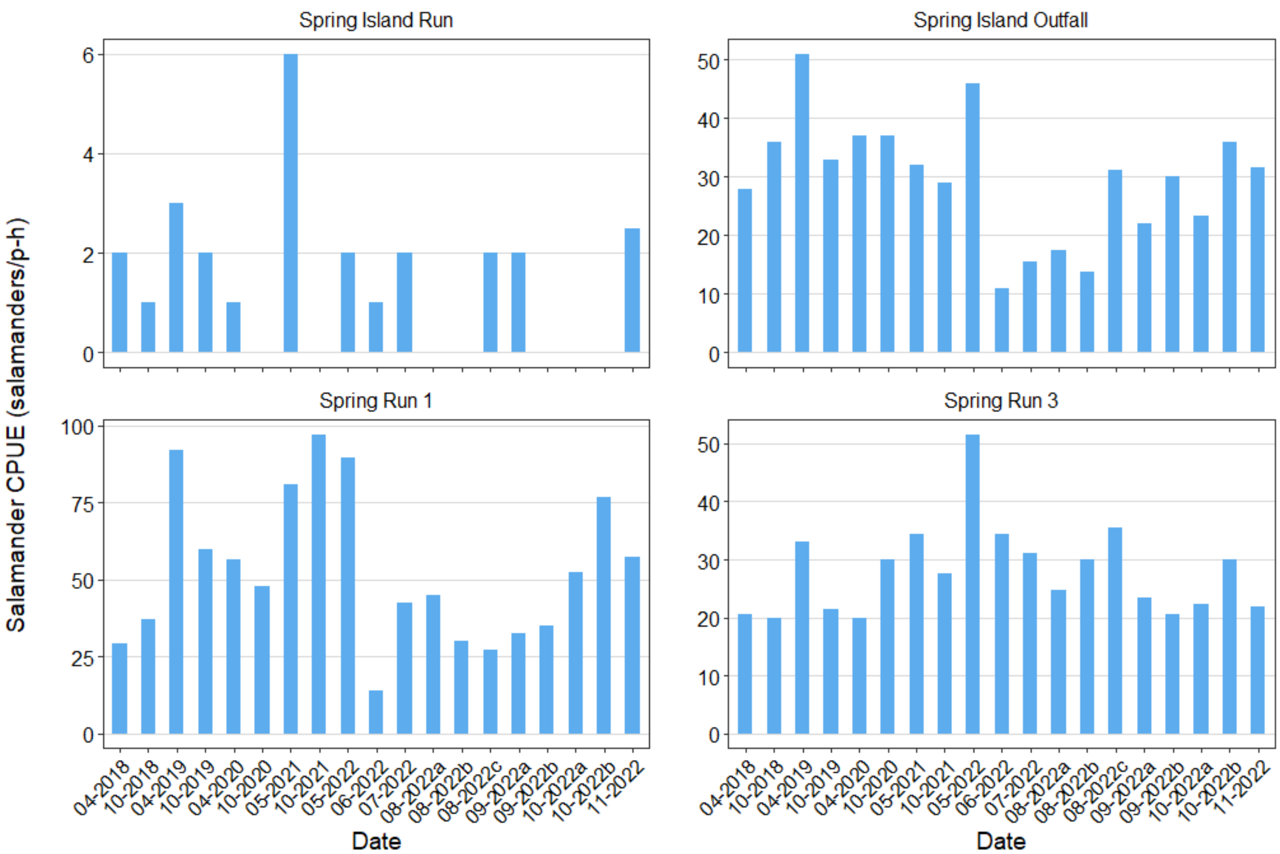

Figure 19. **Comal Springs Salamander catch-per-unit-effort (CPUE; salamanders/person-hr) among sites from 2018–2022 in the Comal Springs. No bar within dates at Spring Island Run denotes zero salamanders observed.**

Macroinvertebrates

Drift-Net Sampling

A total of 1,024 macroinvertebrates represented by 12 families and 20 taxa were collected during 144 drift-net hours. The sum of individuals collected were lower at Spring Run 1 (n = 221) than Spring Run 3 (n = 497) and Western Upwelling (n = 306), which can likely be attributed reduced springflows in 2022. For example, the drift-net at Spring Run 1 was set at an alternate location than usual during fall sampling due to the headwaters being dry (Figure 20). Across all sampling efforts, dominate taxa included *Stygobromus* sp. (45.21%), *Comalcandona tressleri* (18.07%), and *Lirceolus* sp. (14.26%). The remaining taxa each represented less than 5% of the total catch. A total of 29 *Stygobromus pecki* were collected in 2022 and no *Heterelmis comalensis* were observed (Table 5). Full drift-net results are presented in Appendix E. Over the past 5 years, the median counts of *Stygobromus* sp. per cubic meter of water filtered most often aligned with or exceeded the long-term median (0.02 *Stygobromus*/m^3). Median counts were lower than the long-term in fall 2022 (0.01 *Stygobromus*/m^3); however, higher values were observed at the Western Upwelling (0.10 *Stygobromus*/m^3) (Figure 21).

Figure 20. Photo displaying the habitat conditions and alternate drift-net location at Spring Run 1 during fall sampling. This drift-net was moved from its usual location due to the headwaters being dry.

Table 5. **Total numbers of endangered species collected at each site during drift-net sampling in May and October 2022Full drift-net results are presented in Appendix E.**

TAXA	SITE (TOTAL DRIFT-NET HOURS) RUN 1 (48)	RUN 3 (48)	UPWELLING (48)
Crustaceans			
Amphipoda			
Crangonyctidae			
Stygobromus pecki	8	9	12
Insects			
Coleoptera			
Elmidae			
Heterelmis comalensis	0	0	0

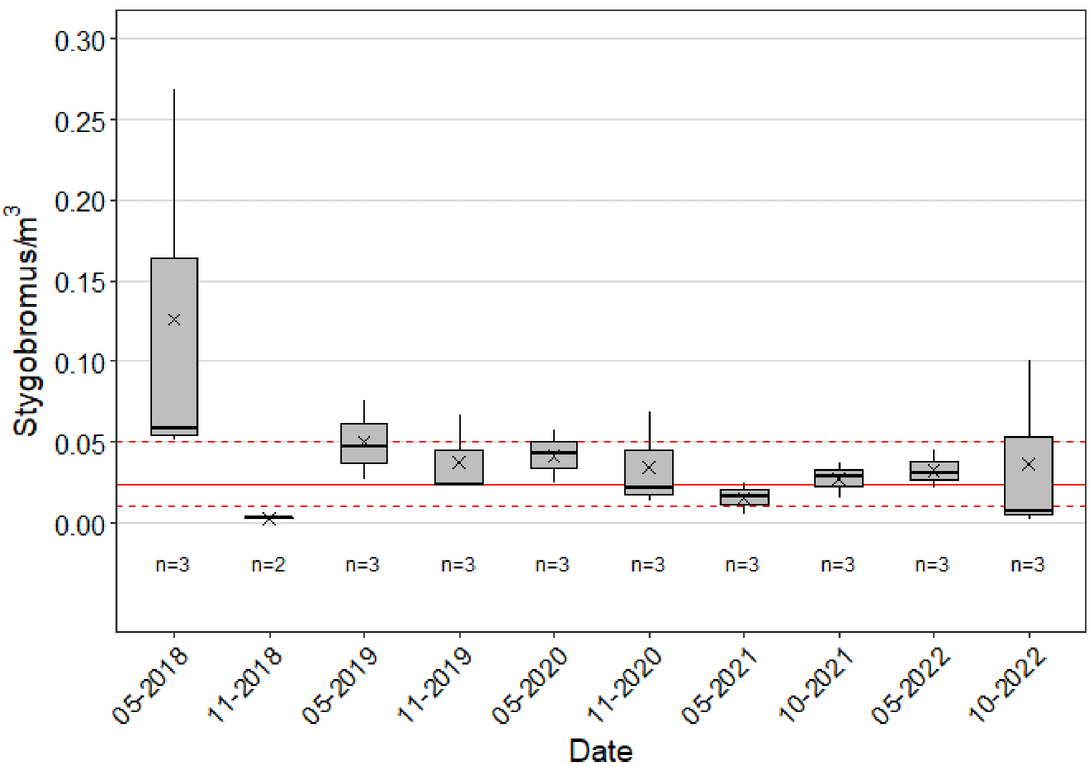

Figure 21. **Boxplots displaying *Stygobromus* sp. counts per cubic meter of water (*Stygobromus*/m^3) at Western Upwelling, Spring Run 1, and Spring Run 3 from 2018–2022. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. Solid and dashed red lines denote long-term (2003–2022) medians and interquartile ranges, respectively.**

Comal Springs Riffle Beetle

A total of 351 adult Comal Springs Riffle Beetle (CSRB) were collected at 116 lures during sampling efforts in 2022 and counts ranged from 0–66 beetles/lure. Summaries of the three CSRB low-flow sampling events not included in seasonal and temporal analyses are presented in Table 6. These data were not used due to lower sample replicates (n = 3) and set times (n = two weeks) per event.

Median counts at Spring Island in spring 2022 (3.50 beetles/lure) was similar to historical data (2.00–2.50 individuals/lure). Spring 2022 medians at Spring Run 3 (2.00 beetles/lure) and Western Shoreline (0.00 beetles/lure) aligned with 5-year trends (2.00 and 0.00 beetles/lure, respectively), which were both lower than long-term data (5.00 and 4.00 beetles/lure, respectively). Across all sites, median counts in summer (0.00–3.00 beetles/lure) were below long-term trends (2.00–5.00 beetles/lure) (Figure 21). During the three summer efforts not included for analysis, adult CSRB were detected at two events at each site and total counts per site varied substantially across events (Table 6). Fall median counts at Spring Island were similar in 2022 (1.00 beetles/lure) compared to historical trends (2.00 beetles/lure). At Spring Run 3, fall median counts aligned with 5-year trends in 2022 (0.00 beetles/lure), which were lower than the long-term (4.00 beetles/lure), while Western Shoreline in 2022 (0.00 beetles/lure) was lower than both groups (1.00 and 4.00 beetles/lure) (Figure 21). In summary, counts in 2022 decreased from spring to fall at Spring Island and Spring Run 3, while counts at Western Shoreline increased from spring to summer, then decreased in fall. Seasonal trends in summary were either similar or lower than historical data and lures with higher counts were less frequent (Figure 21 and 22). Counts ranging from 11–36 beetles/lure were observed in 2022, but were rare and represented as outliers not shown in Figure 21 and 22.

Temporal trajectories in counts the past five years varied depending on the quantity being assessed. Median counts fluctuated across all sites and no strong directional changes were apparent. Compared to long-term trends, median counts were mostly similar to the long-term median. In contrast, median counts were more frequently below long-term trends at Spring Run 3 and Western Shoreline, although medians were similar or above for several events at these sites. Trends in upper quartile quantities displayed greater magnitudes of directional change. Upper quartiles at Spring Island and Spring Run 3 generally increased from spring 2018 to spring 2021, then decreased through fall 2022. A similar temporal trend occurred at Western Shoreline, although the maximum upper quartile was observed in summer 2022 (Figure 22).

Table 6. Summary of the three Comal Springs Riffle Beetle (CSRB) low-flow sampling events not included in seasonal and temporal analyses. These data were not used due to lower sample replicates (n = 3) and set times (n = two weeks) per event. Values presented for each event are the sum of adult CSRB counts per site.

Site	August 29	September 12	September 26	Total
Spring Island	0	17	9	**26**
Spring Run 3	1	5	0	**6**
Western Shoreline	22	0	2	**24**
Total	**23**	**22**	**11**	**56**

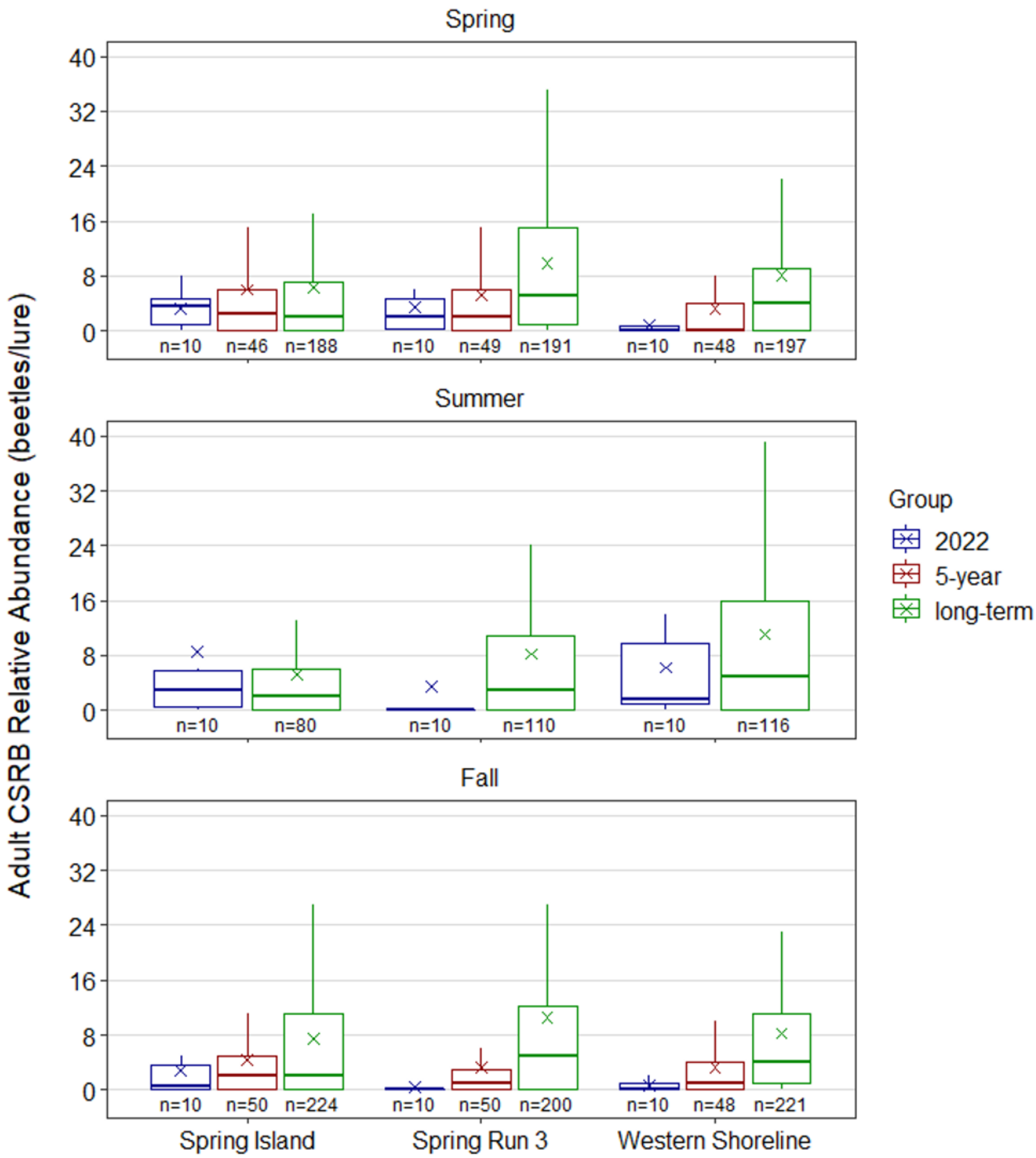

Figure 22. **Boxplots displaying 2022, 5-year (2018–2022), and long-term (2004–2022) trends in Adult Comal Springs Riffle Beetle abundance per retrieved lure by season across sites in the Comal Springs. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axes represent the number of lures included in each category.**

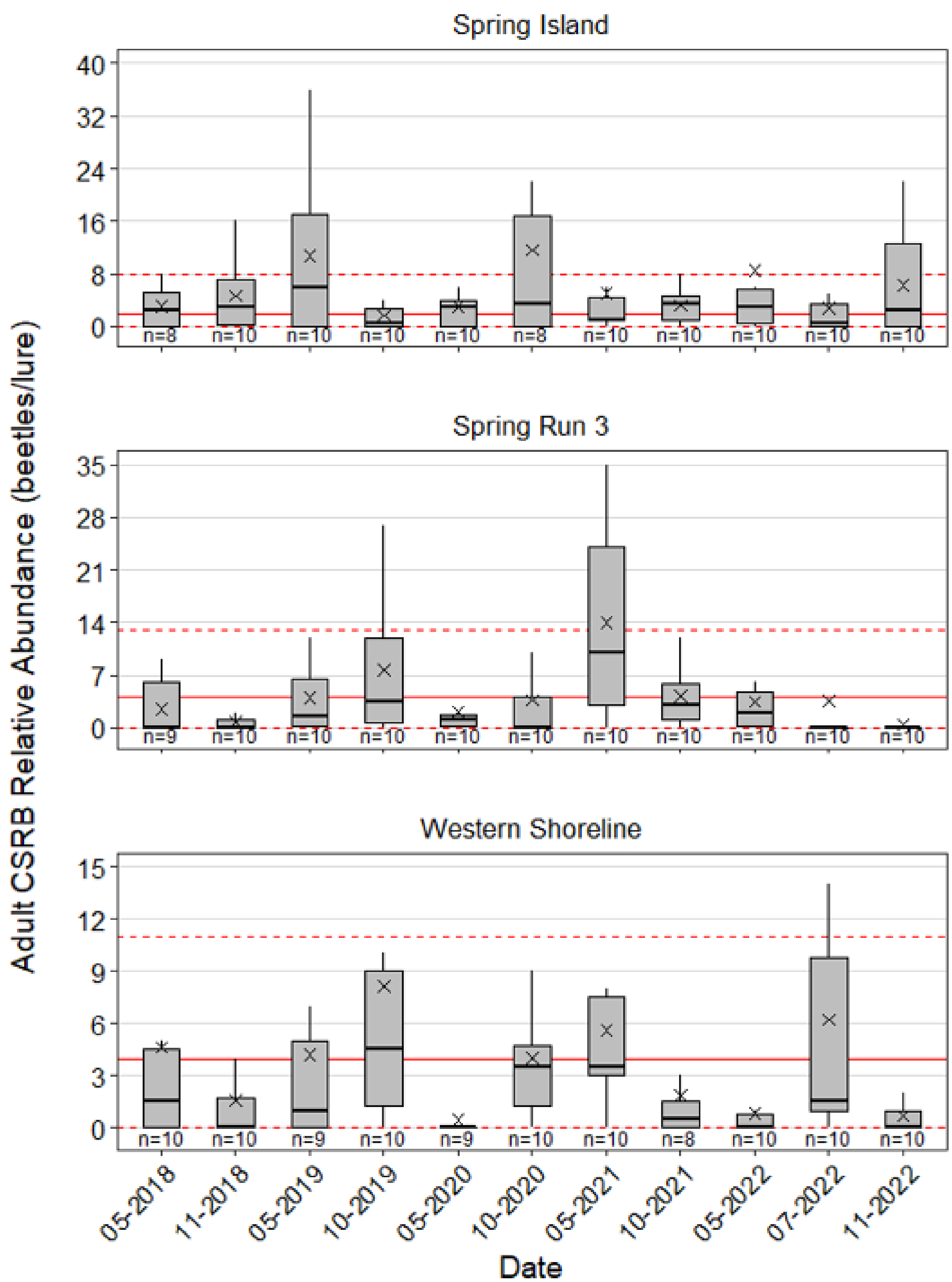

Figure 23. **Boxplots displaying temporal trends in adult CSRB abundance per retrieved lure among study reaches from 2018–2022 during lure sampling in Comal Springs. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axes represent the number of lures in each category. Solid and dashed red lines denote long-term (2004–2022) medians and interquartile ranges, respectively.**

In summary, median counts in 2022 were mostly below long-term medians at Spring Run 3 and Western Shoreline, while medians were more similar at Spring Island. Higher beetles/lure were less common in 2022 compared to events from 2018–2021, with exception of Western Shoreline in summer (Figure 22). This decline in counts may be due to the low-flow conditions experienced in 2022. During previous low-flow sampling events (summer 2009, 2011, 2013, and 2014), CSRB counts were similar to 2022 trends at Spring Island (Appendix E, Figure E22). In contrast, historical low-flow counts were higher at Spring Run 3 and Western Shoreline than data collected in 2022 and were more similar to long-term trends (Appendix E, Figure E23 and E24). This suggests low-flows in 2022 may have resulted in decreased CSRB surface abundances. That being said, it is unclear whether the declines observed are true trends or confounded by imperfect detection. Benthic invertebrates can move from eucrenal habitats to the hyporheos zone to seek refuge during low-flow periods (Williams and Hynes 1974; Dole-Olivier et al. 1997). Based on this, decreased CSRB counts may alternatively be explained by most individuals being unavailable to sample, due to temporary emigration (Kéry and Royle 2021). A new study has been initiated to estimate spatiotemporal trends of CSRB sub-populations and to quantify functional relationships between relative abundance and various environmental features (e.g., flow, water quality, physical habitat) (BIO-WEST 2022c).

Benthic Macroinvertebrate Rapid Bioassessment

Benthic macroinvertebrate rapid bioassessment data was collected during both the spring and fall sampling events in 2022 (raw data presented in Appendix F). A total of 789 and 968 individual macroinvertebrates, representing 55 and 53 unique taxa were sampled in spring and fall, respectively. Altogether, 82 unique taxa were represented among all samples from 2022. All samples in 2022 consisted of kick samples with suitable cobble-gravel habitat with no snag sampling supplements. Values for each metric are reported, while metric scores for calculating the B-IBI can be found in Table 6. Habitats sampled this year included cobble/gravel and root wads across sites. In addition, organic material was also sampled at each site, either in the form of debris jams or root wads. No supplement snag samples were taken.

Table 7. Metric value scoring ranges for calculating the Texas RBP B-IBI (TCEQ 2014).

METRIC	SCORING CRITERIA			
	4	3	2	1
Taxa richness	>21	15–21	8–14	<8
EPT taxa abundance	>9	7–9	4–6	<4
Biotic index (HBI)	<3.77	3.77–4.52	4.56–5.27	>5.27
% Chironomidae	0.79–4.10	4.11–9.48	9.49–16.19	<0.79 or >16.19
% Dominant taxon	<22.15	22.15–31.01	31.02–39.88	>39.88
% Dominant FFG	<36.50	36.50–45.30	45.31–54.12	>54.12
% Predators	4.73–15.20	15.21–25.67	25.68–36.14	<4.73 or >36.14
Ratio of intolerant: tolerant taxa	>4.79	3.21–4.79	1.63–3.20	<1.63
% of total Trichoptera as Hydropsychidae	<25.50	25.51–50.50	50.51–75.50	>75.50 or no Trichoptera
# of non–insect taxa	>5	4–5	2–3	<2
% Collector–gatherers	8.00–19.23	19.24–30.46	30.47–41.68	<8.00 or >41.68
% of total number as Elmidae	0.88–10.04	10.05–20.08	20.09–30.12	<0.88 or >30.12

Aquatic-life-use in 2022 generally aligned with years prior and indicates stable trends, though several exceptions were apparent. Upper Spring Run and Old Channel were described as "Intermediate" and "High" for both seasons, respectively. Aquatic life use at Landa Lake was ranked as "Limited" in the spring and "High" in the fall, while Other Place showed the inverse in 2022. Moreover, the "High" rank at Landa Lake and "Intermediate" at Other Place did not align with other scores the past five years. Lastly, the New Channel was described as "Exceptional" in spring and "High" in fall (Figure 24).

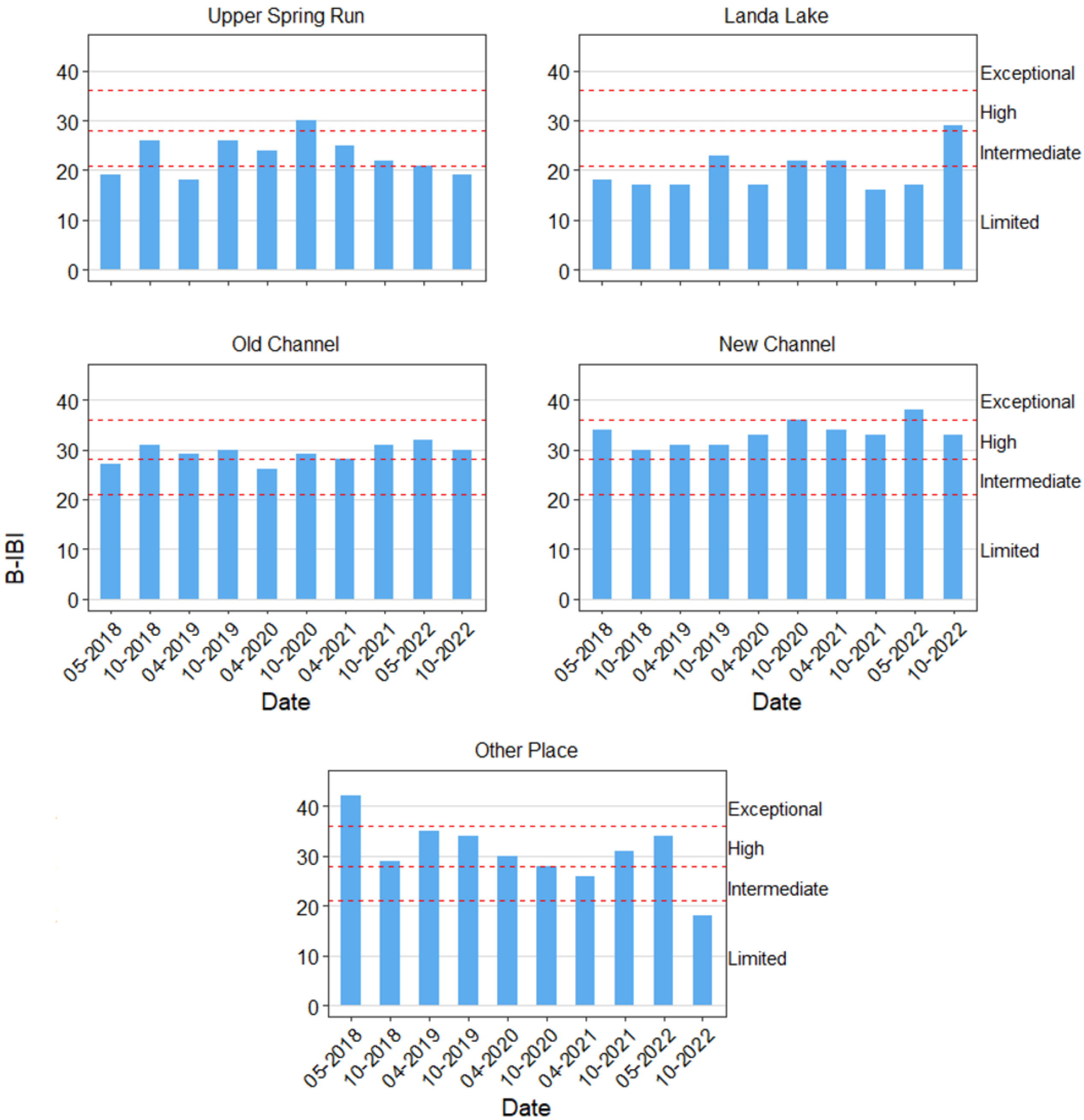

Figure 24. **Benthic macroinvertebrate Index of Biotic Integrity (B-IBI) scores and aquatic-life-use point-score ranges from 2018–2022 in the Comal Springs/River. "Exceptional" indicates highest quality habitats.**

In summary, lower scores that were typically observed at Upper Spring Run and Landa Lake compared to riverine sites were likely due to differences in mesohabitats available for sampling. Specifically, these communities are naturally different compared to the "least-disturbed reference streams", which contain swifter riffle habitats. As such, higher scores would be expected at riverine sites due to a higher likelihood of supporting more fluvial specialist, resulting in greater taxa diversity overall. It should also be noted that most reference streams do not exhibit the stenothermal conditions present within the Comal Springs/River and this may result in differing community composition. Based on this, the level of score is less important in this spring-associated system than the consistency or trends in results per reach over time. Additional monitoring will be needed to see if the inverse trends in fall 2022 continue at Landa Lake and Other Place, as well as to generate a robust reference dataset for the development of scoring criteria specific to this unique ecosystem, providing a more accurate realization of ecological health.

CONCLUSION

In 2022, low precipitation and higher ambient temperatures in central Texas resulted in severe drought conditions by spring and transitioned to an exceptional drought classification by mid-summer. Comal River monthly median discharge decreased throughout the year. The last extensive drought event in the Comal system was experienced during 2013 and 2014. That event was more severe with respect to the decline in springflow as well as the amount of ecological impact experienced. However, 2022 low-flow conditions did cause notable impacts and ecological responses. Egg and/or larvae threshold exceedance occurred at all stations except at the two Landa Lake deeper water stations. Threshold exceedance for both life stages most frequently occurred at Blieders Creek and within downstream riverine stations. Seasonal patterns in total aquatic vegetation coverage varied spatially. At Upper Spring Run, aquatic vegetation coverages were most impacted by low-flow conditions throughout 2022 and mainly driven by decreased bryophyte cover. In contrast, Landa Lake and Old Channel represent the most stable environments, and were therefore less impacted by low flows, though bryophyte coverage has declined at Landa Lake in recent years. Moreover, below average coverages at Old Channel should not be interpreted as an indicator of degraded conditions, since *Hygrophila* historically dominated the reach prior to the substantial changes in composition due to restoration. In summary, reduced flows in 2022 substantially impacted aquatic vegetation in the Upper Spring Run but impacts were minimal among the other study reaches.

Seasonal patterns in Fountain Darter population performance were consistent across the three sampling methods. As such, ubiquitously lower medians for each metric in summer suggested potential short-term negative effects from reduced flows, though whether this was a true short-term decline remains uncertain, due to confounding factors such as imperfect detection. Regardless, each metric returned to quantities aligned with historical data by fall. Drop-net data demonstrated that population responses under continued low-flow conditions in fall varied spatially. Densities decreased from spring to fall at Upper Spring Run and New Channel, whereas the Old Channel was generally stable. At Landa Lake, densities decreased from spring to summer, then increased in fall. Spatial patterns in low-flow response may be best explained by distinct environmental conditions in each reach. This suggests persistence of suitable habitat in Landa Lake and Old Channel facilitate darter resistance to low flows. Further, high recruitment in the fall best explains the increase in fall density at Landa Lake, while densities at Upper

Spring Run and New Channel remained low. Inconsistent trends among reaches suggest that heightened recruitment may function as a population resilience mechanism during periods of low flow but is dependent on the environmental conditions within a given reach.

Evidence of detectable temporal trends in fish communities varied among the selected metrics, as well as between and within study segments. Species richness and diversity were typically higher in riverine areas and lowest at Landa Lake. At the Old Channel, relative density of spring fishes declined the past five years. Comal Springs Salamander catch rates were variable among sites in 2022, though decreases from spring to summer were a consistent trend. Based on 2022 results and five-year trends, negative effects on Comal Springs Salamander populations by low-flow conditions were acute for most sites, where substantially lower catch rates mostly occurred throughout the summer. Reduced magnitude of decline was observed at Spring Run 3, which receives greater springflow inputs. As seen following previous droughts, catch rates would be expected to increase upon the return of more average flow conditions.

Macroinvertebrate drift-net sampling of spring orifices showed that the density of *Stygobromus* sp. was slightly above to the long-term median in spring and below it in fall. Lure sampling for CSRB showed that 2022 catch rates decreased from spring to fall at Spring Island and Spring Run 3, while counts at Western Shoreline increased from spring to summer, then decreased in fall. Seasonal trends, in summary, were either similar or lower than historical data and lures with higher counts were less frequent. Lower counts this year, combined with historical observations, suggests low flows in 2022 may have resulted in a population decline. However, it is unclear whether the declines observed are true trends or confounded by imperfect detection and subsurface habitat utilization.

In summary, 2022 biological monitoring provided valuable documentation of the current condition of the Covered Species and habitat stability in the Comal Springs/River following nine years of EAHCP implementation. Covered Species and aquatic vegetation appeared to be more impacted by reduced flows in the upper fringes of the system and spring run habitats compared to Landa Lake and downstream riverine habitats. This suggests greater resilience potential in Landa Lake and the Old Channel ERPA where high quality habitat conditions for the Fountain Darter have been established and are being maintained via the EAHCP. The 2022 data set also highlights the continued concern for the Comal invertebrates with decreases in wetted area in the spring runs, western shoreline, and spring island areas. Comal Springs Salamanders have shown the resilience to come back in large numbers following the last severe drought, but the dynamics of the Comal invertebrates subsurface and aquifer use is still not fully understood. Subsequent monitoring efforts and targeted applied research investigations will provide opportunities to better understand the dynamics of this complex ecological system and how it responds to future hydrologic conditions.

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APPENDIX A: CRITICAL PERIOD MONITORING SCHEDULES

COMAL RIVER/SPRINGS
Critical Period Low-Flow Sampling – Schedule and Parameters

FLOW TRIGGER (+ or - 10 cfs)	**PARAMETERS**
200 cfs	Full Sampling Event
150 cfs	Full Sampling Event
120 - 80 cfs	Riffle Beetles and spring discharge – Every 10 cfs decline (maximum weekly)
100 cfs	Full Sampling Event
100 - 50 cfs	Habitat Evaluations - Every 10 cfs decline (maximum weekly)
50 cfs	Full Sampling Event
50 - 0 cfs	Habitat Evaluations - Every 10 cfs decline (maximum weekly)
10 - 0 cfs	Full Sampling Event
RECOVERY	
25 - 100 cfs	Full Sampling Event (dependent on flow stabilization)
100 - 200 cfs	Full Sampling Event (dependent on flow stabilization)

PARAMETER DESCRIPTION

Fall Sampling Event	Aquatic Vegetation Mapping Fountain Darter Sampling Drop Net, Dip net (Presence/Absence), and Visual Parasite evaluations Fish Community Sampling Salamander Sampling - Visual Riffle Beetle – Cotton lure sampling Fish Sampling - Exotics/Predation (100 cfs and below) Water Quality - Suite I and Suite II
Riffle Beetle Monitoring	Spring discharge and wetted perimeter measurements
Habitat Evaluations	Photographs

COMAL RIVER/SPRINGS
Species-Specific Triggered Sampling

FLOW RATE (+ or - 5 cfs)	SPECIES	FREQUENCY	PARAMETERS
≤150 or ≥80 cfs	Fountain Darter	Every other month	Aquatic vegetation mapping to include Upper Spring Run reach, Landa Lake, Old Channel reach, and New Channel reach
≤150 or ≥80 cfs	Fountain Darter	Every other month	Conduct Dip net sampling/visual parasite evaluations at five (5) sites in the Upper Spring Reach; twenty (20) sites in Landa Lake; twenty (20) sites in the Old Channel reach and; at five (5) sites in the New Channel reach.
≤60 cfs	Fountain Darter	Weekly	Conduct Dip net sampling/visual parasite evaluations at five (5) sites in the Upper Spring Reach; twenty (20) sites in Landa Lake; twenty (20) sites in the Old Channel reach and; at five (5) sites in the New Channel reach.
≤60 cfs	Fountain Darter	Monthly	Aquatic vegetation mapping at Upper Spring Run reach, Landa Lake, Old Channel reach, and New Channel reach
≤120 cfs	Comal Springs Riffle Beetle	Every 2 weeks	Monitoring via cotton lures at Spring Run 3, western shore of Landa Lake, and Spring Island upwelling
≤120 cfs or ≥80 cfs	Comal Springs Salamander	Every other week	Salamander snorkel surveys will be conducted at three sites (Spring Runs 1 and 3 and the Spring Island area)
≤80 cfs	Comal Springs Salamander	Weekly	Salamander snorkel surveys will be conducted at three sites (Spring Runs 1 and 3 and the Spring Island area)

APPENDIX B: LOW-FLOW CRITICAL PERIOD WATER QUALITY SAMPING AND HABITAT EVALUATION

Water Quality Sampling Results

Table B1. **Water quality sampling at select stations during Low-flow Critical Period Monitoring in June 2022. Measurements were taken at the middle of the water-column.**

Site	Date	Time	Temp (°C)	spCond (µs/cm)	pH	D.O. (mg/L)	Depth (ft)	Velocity (ft/s)	Weather Conditions
Blieder's Creek	2022-06-27	12:01	25.1	580.7	7.3	6.9	2.6	0.0	partly cloudy, 98 F, 34% RH
Heidelberg Main Channel	2022-06-27	12:26	26.1	582.6	7.5	12.9	1.4	0.0	partly cloudy, 98 F, 35% RH
Island Park Near Channel	2022-06-27	12:40	23.5	582.6	7.2	5.5	1.3	0.0	mostly cloudy, 99 F, 36% RH
Island Park Far Channel	2022-06-27	12:52	25.3	582.0	7.4	9.7	1.3	0.1	mostly cloudy, 99 F, 36% RH
Landa Lake	2022-06-27	13:36	25.0	583.7	7.4	7.8	1.8	0.6	partly cloudy, 99 F, 34% RH
Spring Run 3	2022-06-27	13:55	23.6	588.1	7.3	5.6	0.8	1.3	partly cloudy, 99 F, 34% RH
Spring Run 2	2022-06-27	14:04	23.6	594.8	7.4	6.6	0.6	0.0	partly cloudy, 99 F, 34% RH
Spring Run 1 Upstream	2022-06-27	14:11	23.6	612.3	7.3	6.7	0.7	0.0	partly cloudy, 99 F, 34% RH
Spring Run 1	2022-06-27	14:15	25.1	583.7	7.5	7.9	0.5	0.7	partly cloudy, 99 F, 34% RH
SR1-SR2 Confluence	2022-06-27	14:22	26.0	591.4	7.5	8.0	0.6	0.0	mostly cloudy, 99 F, 34% RH
Old Channel Upstream	2022-06-27	13:03	25.5	581.9	7.7	9.0	1.8	0.4	mostly cloudy, 99 F, 36% RH
Old Channel Downstream	2022-06-27	14:44	25.5	579.7	8.0	9.1	1.0	0.5	overcast and windy, 100 F, 54% RH
New Channel Upstream	2022-06-27	13:25	25.3	582.5	7.5	10.6	2.6	0.3	partly cloudy, 99 F, 36% RH
New Channel Downstream	2022-06-27	15:14	25.4	577.9	7.9	8.9	5.0	0.5	overcast and calm, 100 F, 66% RH, some raindrops

Table B2. **Lab results from water quality grab samples collected at select stations during Low-flow Critical Period Monitoring on June 27, 2022. The unit for each parameter is milligrams per liter (mg/L). ND for each parameters denotes that it was not detectable.**

Site	Nitrate as N	Total N	Ammonium	Soluble Reactive P	Total P	Alkalinity	Total Suspended Solids
Blieder's Creek	1.34	1.50	0.40	ND	ND	237	ND
Heidelberg Main Channel	1.42	3.00	ND	ND	ND	245	ND
Island Park Near Channel	1.75	1.88	ND	ND	ND	251	ND
Island Park Far Channel	1.62	1.73	ND	ND	ND	249	ND
Landa Lake	2.01	1.83	ND	ND	0.18	242	ND
Spring Run 3	2.15	1.95	ND	ND	ND	243	ND
Spring Run 2	2.14	1.96	ND	ND	ND	247	15.00
Spring Run 1	2.05	1.89	ND	ND	ND	247	ND
Old Channel Upstream	1.55	1.50	ND	ND	ND	244	5.70
Old Channel Downstream	1.97	1.68	ND	ND	ND	247	ND
New Channel Upstream	1.93	1.93	ND	ND	ND	238	ND
New Channel Downstream	1.89	2.00	ND	ND	ND	249	8.90

Habitat Evaluation

BIO-WEST

MEMORANDUM

TO:	Chad Furl, Jamie Childers
FROM:	Ed Oborny (BIO-WEST)
DATE:	**August 5, 2022**
SUBJECT:	EA HCP Critical Period Habitat Evaluation – 100 cfs – Comal System

100 cfs Habitat Evaluation

COMAL SYSTEM:

The Spring 2022 Comprehensive Biological Monitoring effort for the Comal System was completed in May 2022. As total system discharge continued to decline, the 150 cfs full Critical Period monitoring trip was triggered and completed in late June. As of this memorandum, all activities associated with Comal Critical Period Biological Monitoring (**Task 2**) < 150 cfs event have been completed:

- Aquatic vegetation mapping of the four (Upper Spring Run, Landa Lake, Old Channel, and upper New Channel) study reaches.
- Comal Salamander surveys (Spring Run 1, Spring Run 3, and Spring Island).
- Thermister downloads and zebra mussel lure assessment.
- Fixed-station photography.
- Fountain Darter presence/absence and timed dip netting.
- Fountain Darter drop netting in the four study reaches.
- Fountain Darter visual surveys in Landa Lake.
- Fish Community sampling via SCUBA and seine.
- Comal Springs Riffle Beetle cotton lure sampling (Spring Run 3, Western Shoreline, and Spring Island).
- Suite I and II water quality sampling.

The 100 cfs Habitat Evaluation was completed on July 27th. Habitat evaluations for the Comal System are triggered at 100 cfs and required for every 10 cfs decline (not to exceed weekly) putting the next scheduled evaluation at 90 cfs. Preliminary observations and photo documentation associated with the full system Critical Period event completed in June and the 100 cfs Habitat Evaluation conducted on July 27th are presented below. As of this memorandum, the total system discharge in the Comal Springs system ≈ 100 cfs (see Figure to the right).

EDWARDS AQUIFER AUTHORITY — AQUIFER CONDITIONS

Area Index	Today	Yesterday	Ten Day
Bexar (J-17)	630.4	630.6	631.6
Uvalde (J-27)	843.3	843.4	843.8
Comal Springs	100	101	105
San Marcos	94	96	98

Provisional Daily water readings as of 9:00 AM
Last Updated on August 5 2022

Key ecological information regarding study reaches and full-system sampling are included herein relative to the Spring 2022 routine and June Critical Period sampling for comparison. Water temperature is a key component system-wide as it supports spring-related aquatic assemblages.

Recent 7-day trends in water temperature (°C) for July Critical Period sampling were assessed using temperature data loggers (HOBO Tidbit v2 Temp Loggers) at 13 permanent monitoring stations in the Comal Springs/River. A location map is purposely not included in this memorandum to avoid tampering with sensitive and expensive equipment. July water temperature data are currently not available at stations in Landa Lake; therefore, assessments are based on the most up-to-date data available (i.e., May) and Critical Period analyses will be conducted for these stations in the near future. Data for each monitoring station are based on 10-minute intervals and dates for recent trends extended from the last day that each data logger was downloaded to 7 days prior. All 7-day trends were examined from 7/23 – 7/29, except for Blieders (6/30 – 7/6), Landa Lake Upper (5/6 – 5/12), and Landa Lake Lower (5/6 – 5/12). Recent 7-day trends were compared to long-term water temperature data measured at 4-hour intervals in July (May for Landa Lake stations) from 2001 – 2021 or to the greatest temporal extent available. For analysis, 7-day trends were compared to long-term trends using boxplots to visualize differences in central tendency (i.e., median) and variation (e.g., range, interquartile range).

Results are provided in Table 1 and graphically depicted in Figures 1, 2, and 3. Overall, it is clear we are in a lower flow, summer time condition and water temperatures are elevated to the point of Fountain Darter impacts in the stagnant Blieders Creek area. Locations further downstream from the spring flow orifices (Figure 3) are at or approaching the 26°C interest point and will be important to monitor as drought and summer-time continues to coincide.

Table 1. Summary of boxplot descriptive statistics comparing recent 7-day and long-term trends in water temperature (°C) at 10 monitoring stations in the Comal Springs/River.

Station	Period	Min	Lower Box	Median	Upper Box	Max	Interquartile Range	Range
Blieders	7-day	27.63	28.92	29.37	29.97	31.10	1.06	3.48
Blieders	Long-term	23.09	24.90	25.68	26.92	29.94	2.02	6.85
Heidelberg	7-day	23.74	23.83	23.98	24.39	25.16	0.56	1.43
Heidelberg	Long-term	23.41	23.81	23.92	24.09	24.51	0.28	1.10
Booneville Near	7-day	23.67	23.67	23.69	23.76	23.91	0.10	0.24
Booneville Near	Long-term	23.47	23.52	23.59	23.64	23.82	0.12	0.35
Booneville Far	7-day	23.57	23.74	24.05	24.99	26.74	1.26	3.18
Booneville Far	Long-term	22.63	23.68	23.92	24.39	25.44	0.71	2.81
Landa Lake Upper	7-day	23.52	23.79	23.88	24.03	24.22	0.24	0.70
Landa Lake Upper	Long-term	23.30	23.63	23.76	23.85	24.18	0.22	0.88
Spring Run 1	7-day	23.67	23.69	23.71	23.74	23.79	0.05	0.12
Spring Run 1	Long-term	23.42	23.52	23.57	23.59	23.71	0.07	0.28
Spring Run 2	7-day	23.52	23.57	23.59	23.62	23.69	0.05	0.17
Spring Run 2	Long-term	23.26	23.33	23.44	23.61	23.89	0.28	0.63
Spring Run 3	7-day	23.50	23.50	23.50	23.50	23.50	0.00	0.00
Spring Run 3	Long-term	23.16	23.32	23.47	23.52	23.69	0.20	0.53
Landa Lake Lower	7-day	23.81	23.88	23.91	23.93	24.00	0.05	0.19
Landa Lake Lower	Long-term	23.57	23.79	23.86	23.93	24.15	0.15	0.58
Old Channel	7-day	23.74	24.07	24.56	25.74	26.92	1.66	3.18
Old Channel	Long-term	22.64	23.84	24.19	25.06	26.50	1.22	3.86
New Channel Upstream	7-day	23.64	23.95	24.56	25.57	26.43	1.62	2.79
New Channel Upstream	Long-term	23.14	23.67	23.92	24.53	25.81	0.87	2.67
New Channel Downstream	7-day	24.00	24.46	25.23	26.23	26.82	1.77	2.82
New Channel Downstream	Long-term	23.08	24.07	24.69	25.67	28.05	1.60	4.97
The Other Place	7-day	24.56	25.19	25.89	26.39	26.99	1.20	2.43
The Other Place	Long-term	23.03	23.92	24.46	25.23	26.67	1.32	3.64

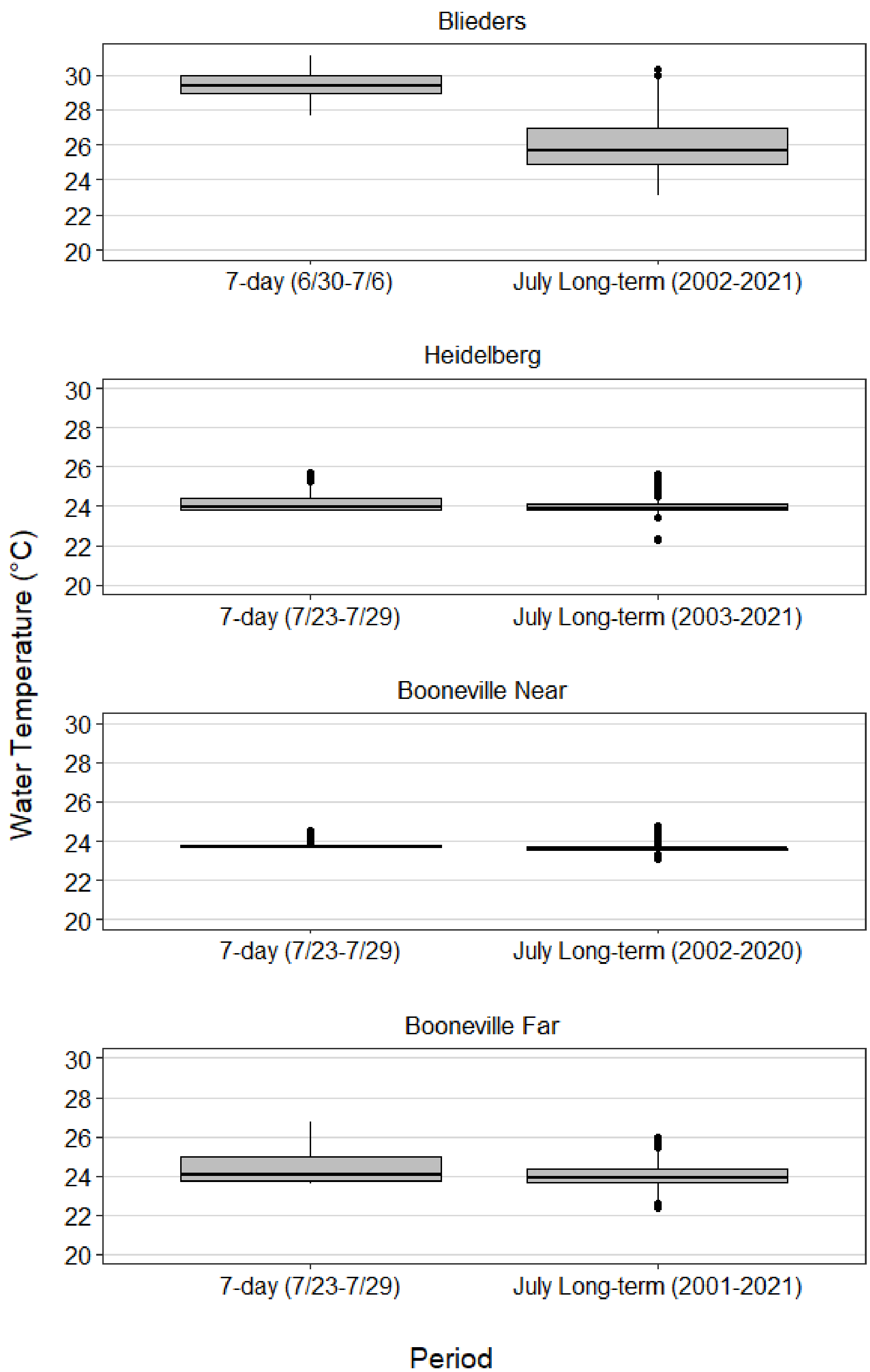

Figure 1. **Boxplots comparing recent 7-day and long-term water temperature trends at four monitoring stations from Blieders to Booneville Far. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

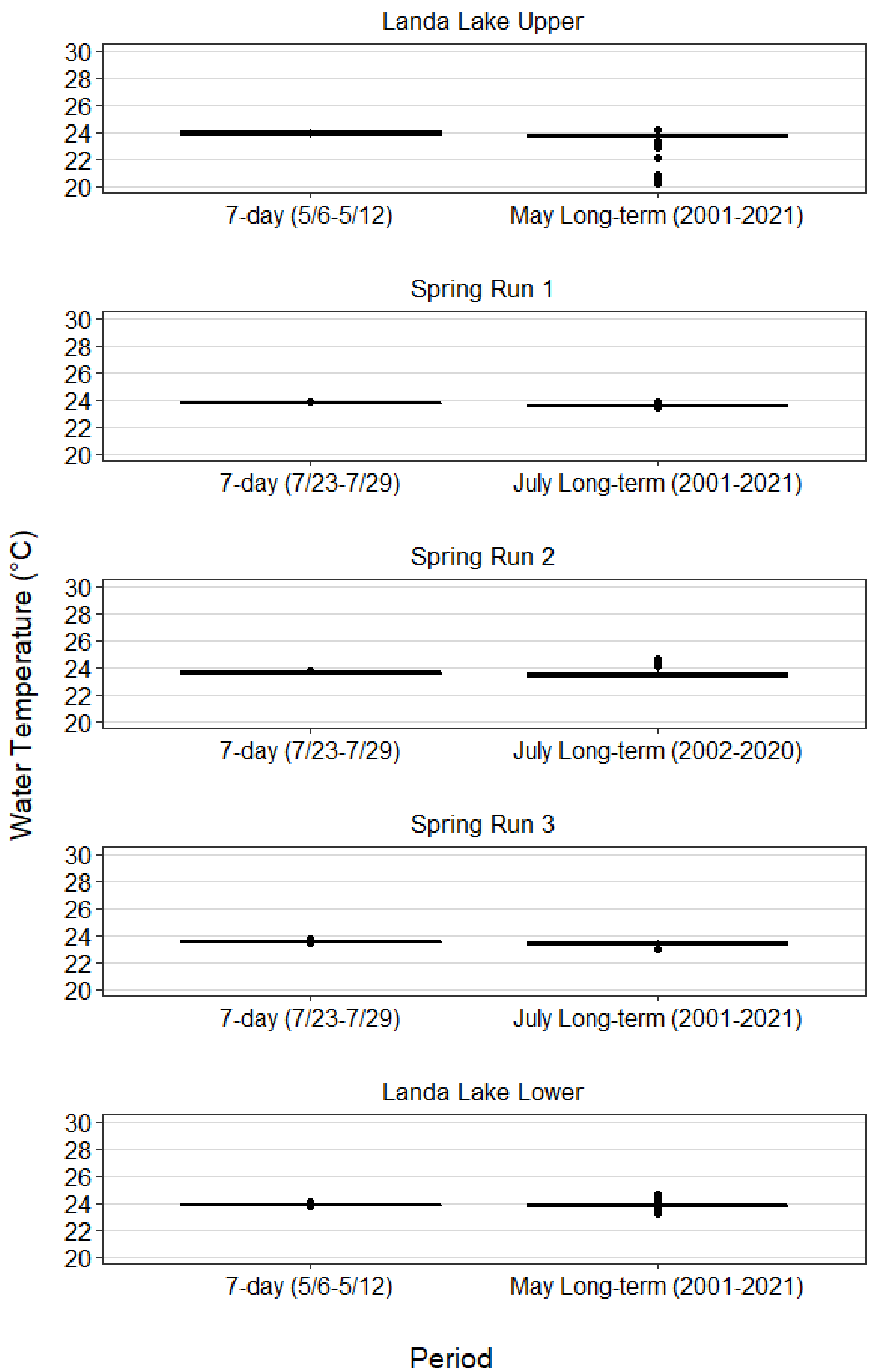

Figure 2. **Boxplots comparing recent 7-day and long-term water temperature trends at five monitoring stations from Landa Lake Upper to Landa Lake Lower. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

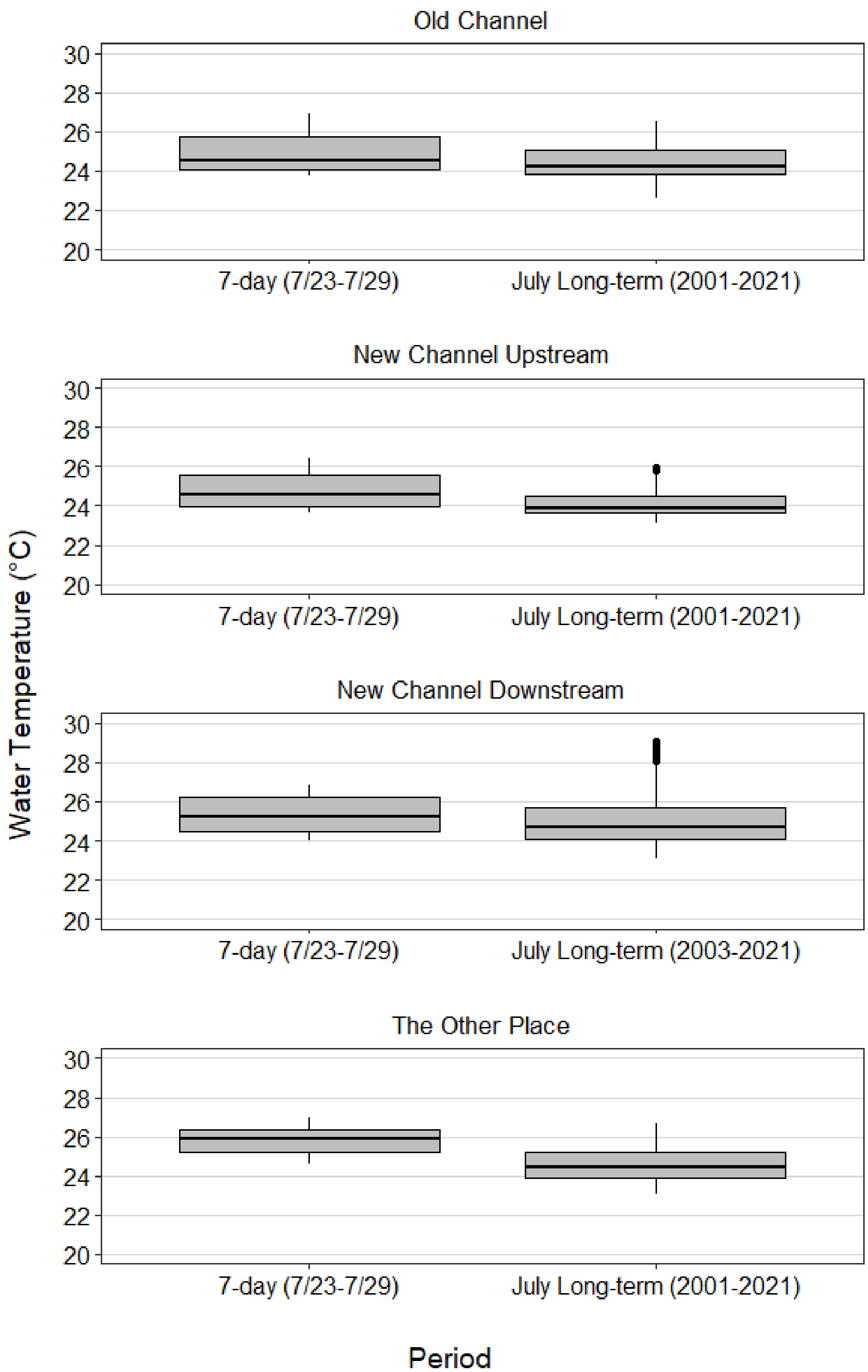

Figure 3. **Boxplots comparing recent 7-day and long-term water temperature trends at four monitoring stations from the Old Channel to the Other Place. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

Aquatic vegetation and Fountain Darter dip netting are key monitoring components as they comprise the equation / criteria for Fountain Darter refugia salvage activities described in Section 6.4.3 (**Comal Springs and River Ecosystem Adaptive Management Activities**) in the EAHCP. Those trigger conditions for the Fountain Darter in the Comal system are as follows:

- *Less than 50 percent mean aquatic vegetation (Landa Lake and Old Channel) AND less than 20 percent darter presence system-wide,*

OR

- *Less than 25 percent mean aquatic vegetation (Landa Lake and Old Channel) AND less than 30 percent darter presence system-wide.*

At present, neither of the above scenarios are close to being triggered. From April through June 2022, the five Comal Study reaches have varied in response to aquatic vegetation coverage. The Upper Spring Run reach remained steady, the Landa Lake reach exhibited a slight decline (<5%), the Old Channel increased in native aquatic vegetation, and the New Channel reaches experienced a > 20% decline in vegetation coverage in the upper reach, which is shallow, and a > 5% decline in the deeper lower reach. Fountain Darter dip netting results remain high with 90% of the sites having darters present in Spring 2022, and 80% of sites in late June. These numbers highlight the quality of Fountain Darter habitat conditions that are persisting in the Comal system this summer.

In contrast, Comal Spring Riffle Beetle and Comal Springs Salamander habitat throughout each species range is noticeably being reduced as water levels decline. This is most evident in the Upper Spring Run, Spring Runs 1 and 2, and to a lesser degree Spring Run 3, the Western Shoreline, and Spring Island. However, as of July 29th, abundant numbers of Comal Springs salamanders and riffle beetles are being supported in the system. It will be imperative to track both water temperature increases and wetted area reductions in the Comal System as this drought continues. The following pictorial habitat evaluation highlights the current Covered Species habitat conditions throughout the Comal System starting at the upper springs / Blieders Creek confluence and working downstream.

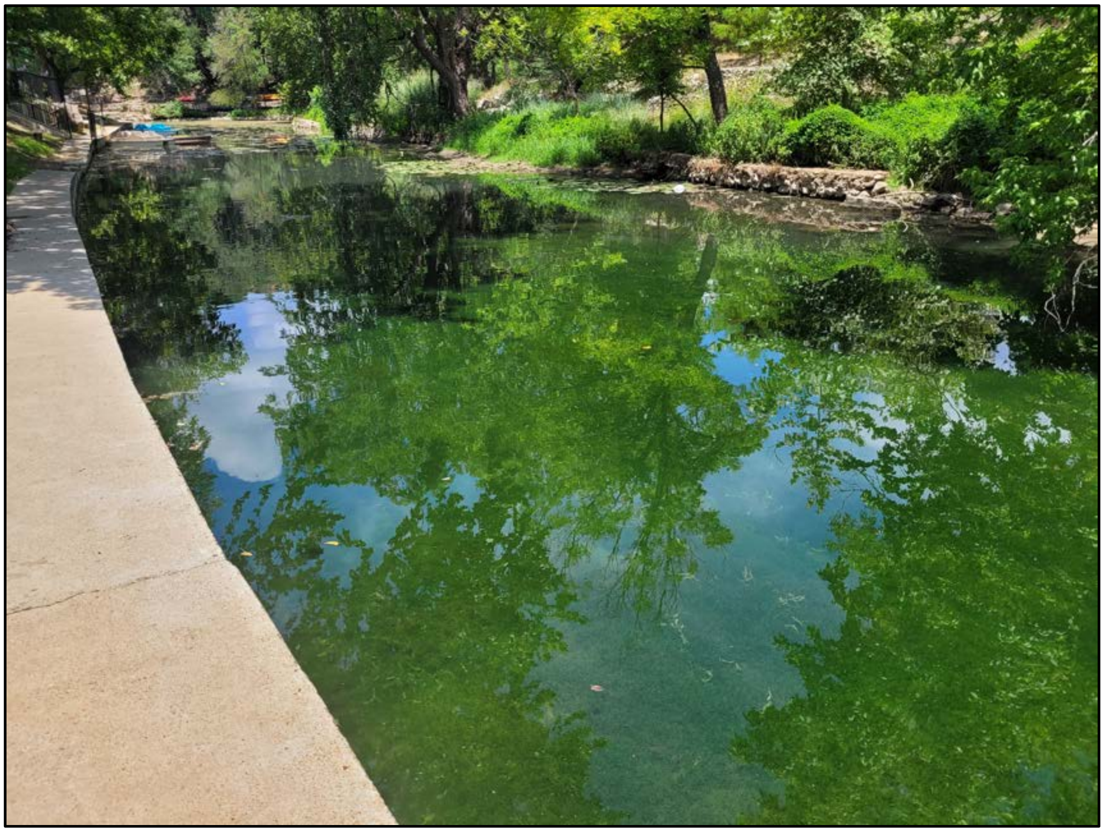

Figure 4: Blieders Creek looking downstream on July 27, 2022 (No visible flow with abundant green algae).

Figure 5: Upper Spring Run reach and Blieders Creek confluence on July 27, 2022 (105 cfs).

Figure 6: Upper Spring Run reach Fountain Darter habitat on July 27, 2022 (105 cfs).

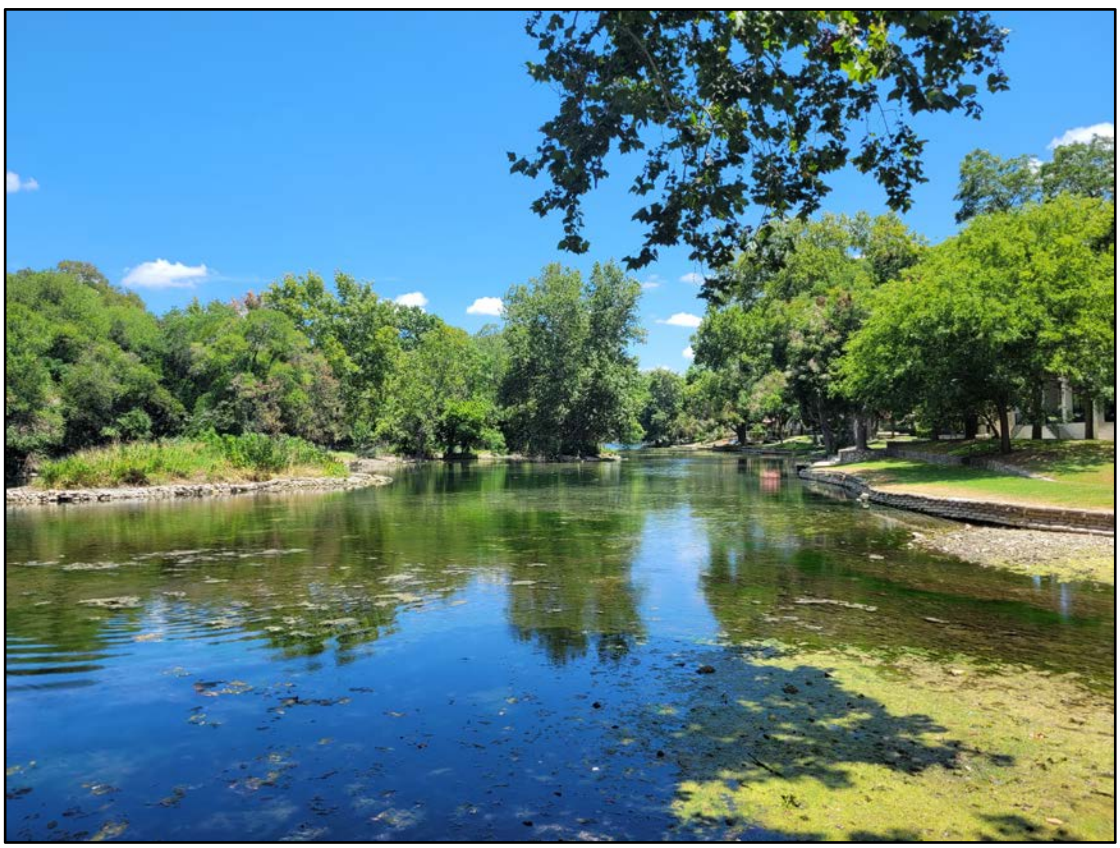

Figure 7: Spring Island Covered Species habitat looking upstream on July 27, 2022 (105 cfs).

Figure 8: Spring Island Spring Run Covered Species habitat on July 27, 2022 (105 cfs).

Figure 9: Landa Lake Floating Vegetation Matts (Left – 135 cfs on June 23) (Right 105 cfs on July 27).

Figure 10: Landa Lake Floating Vegetation Matts looking upstream from Fishing Pier on July 27, 2022.

Figure 11: Spring Run 1 Headwaters on July 27, 2022 (105 cfs).

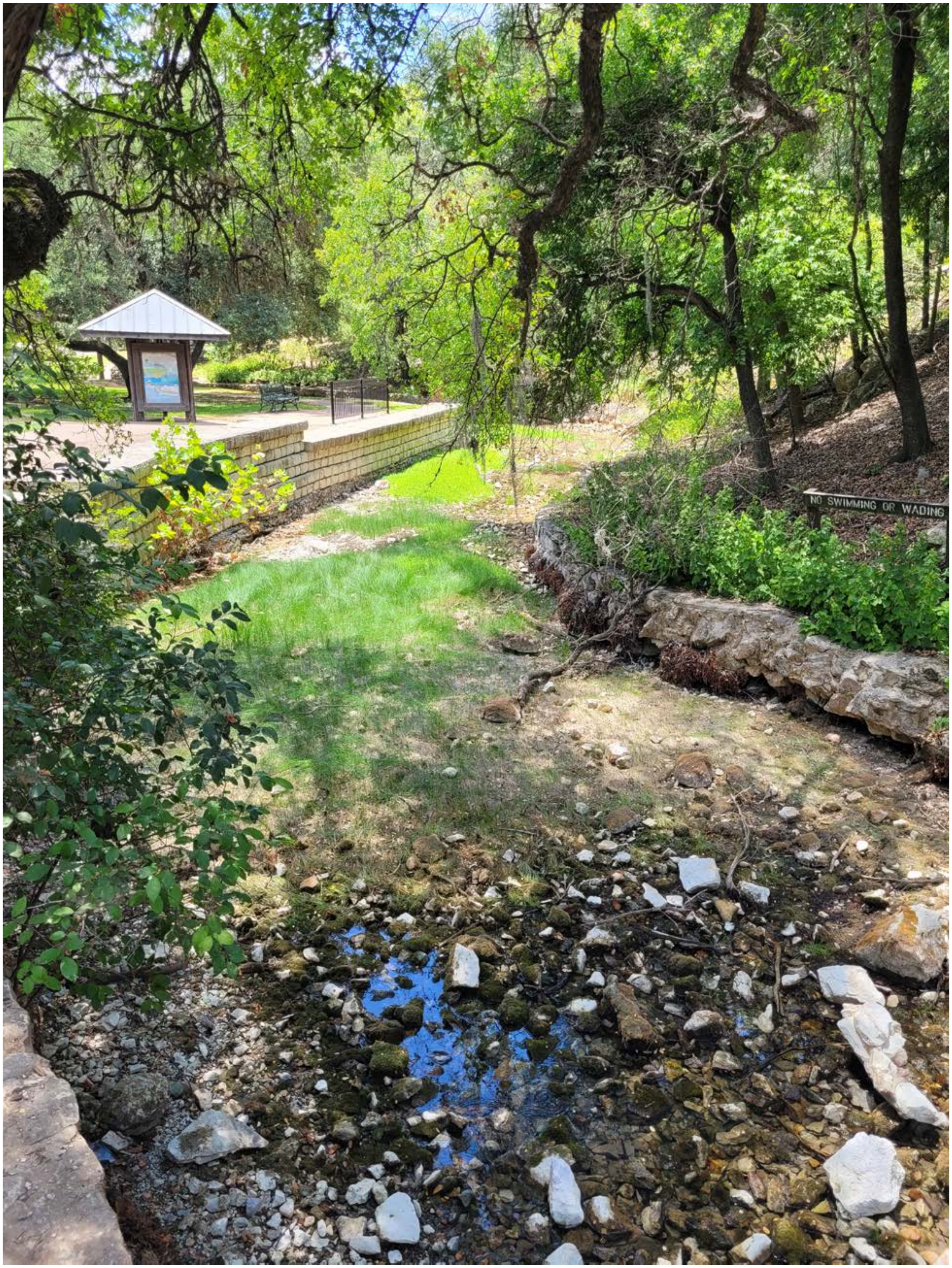

Figure 12: Spring Run 1 looking downstream from headwaters on July 27, 2022 (105 cfs).

Figure 13: Spring Run 2 kiddie pool looking downstream from bridge on July 27, 2022 (105 cfs).

Figure 14: Spring Run 1 and 2 confluence with Landa Lake on July 27, 2022 (105 cfs).

Figure 15: Spring Run 3 headwaters on July 27, 2022 (105 cfs).

Figure 16: Spring Run 3 looking downstream from headwaters on July 27, 2022 (105 cfs).

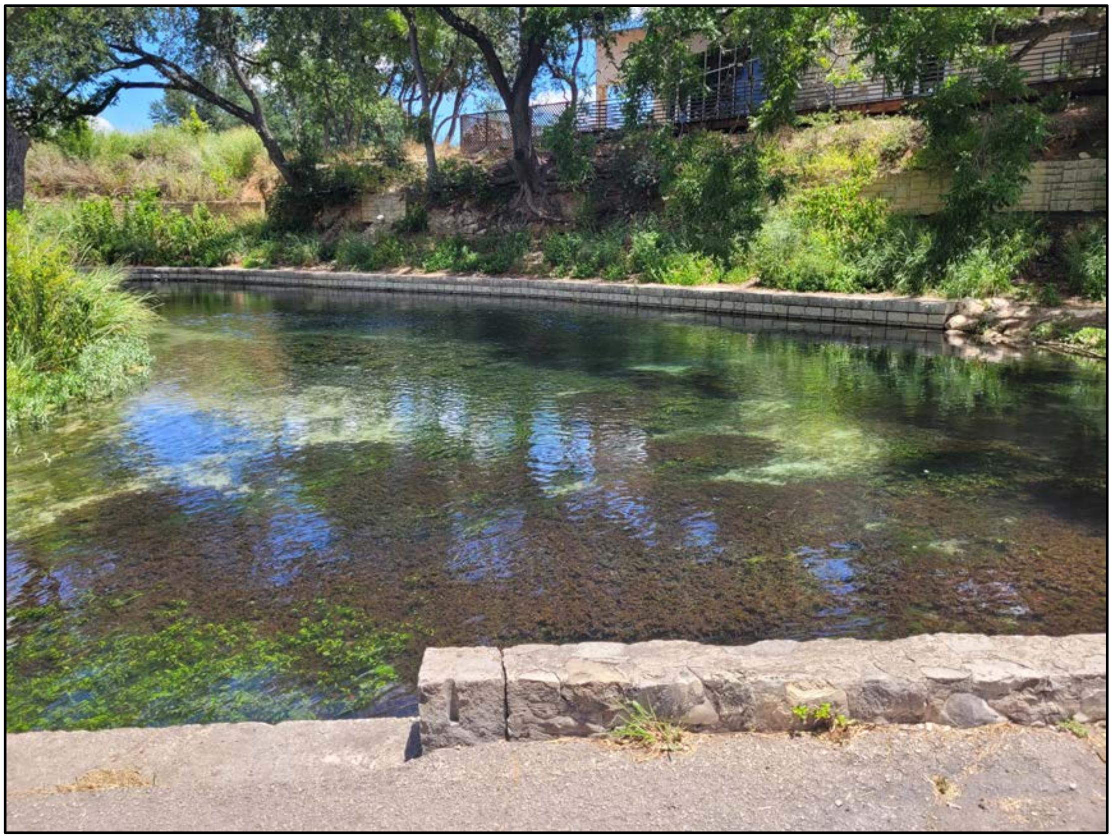

Figure 17: Old Channel ERPA looking upstream from Golf Course Bridge on July 27, 2022 (105 cfs).

Figure 18: Old Channel Study Area on July 27, 2022 (105 cfs).

In summary, total system discharge in the Comal System has not approached these levels since 2014. As witnessed in 2014, should this downward trend continue, these lower discharges will create worsening surface habitat conditions each week for the Comal Springs invertebrates. The good news is that Comal invertebrates are abundant at this time and the system continues to support quality Fountain Darter habitat throughout most of its range. In fact, the Old Channel ERPA through the Old Channel Study Reach has not seen as high-quality of native habitat conditions since the inception of the biological monitoring program over 20 years ago. Whether the fringes of the system (Blieders Creek and Upper Spring Run) are approaching a tipping point or will continue to hold fast is the exact reason the EAHCP Critical Period biological monitoring program is in place. It is vital to keep tracking the surface-dwelling invertebrates as surface habitat continues to decline at Comal Springs. Finally, it is likely that the <100 cfs full Critical Period Sampling effort for Comal Springs will be initiated in August.

As always, if you have any questions, please don’t hesitate to reach out.

Ed

MEMORANDUM

TO:	Chad Furl, Jamie Childers
FROM:	Ed Oborny (BIO-WEST)
DATE:	**August 23, 2022**
SUBJECT:	EA HCP Critical Period Habitat Evaluation – 90+ cfs – Comal System

COMAL SYSTEM: 90 cfs Habitat Evaluation

The 100 cfs Habitat Evaluation was completed on July 27th. Declining spring flow conditions and a USGS gage adjustment on August 11th triggered a full (< 100 cfs) Critical Period sampling event, subsequently initiated on August 15th. As part of that USGS adjustment, a 90 cfs habitat evaluation was triggered and conducted on August 19th. As of this memorandum, the total system discharge in the Comal Springs system is approximately 122 cfs (Figure 1).

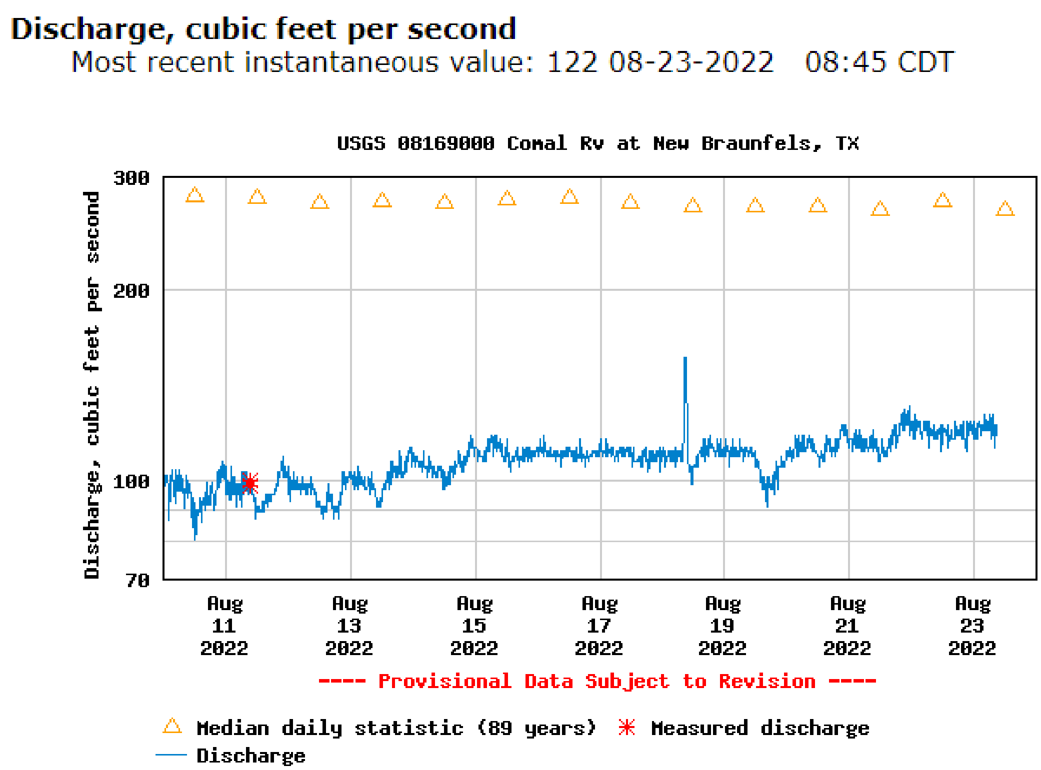

Figure 1. Total Comal River discharge over the past two weeks (USGS 08169000 Comal River at New Braunfels, Texas.

Water temperature is a key component system-wide as it supports spring-related aquatic assemblages. Recent 7-day trends in water temperature (°C) for August Critical Period sampling were assessed using temperature data loggers (HOBO Tidbit v2 Temp Loggers) at 13 permanent monitoring stations in the Comal Springs/River. Data for each monitoring station are based on 10-minute intervals and dates for recent trends extended from the last day that each data logger was downloaded to 7 days prior. All 7-day trends were examined from 8/10 – 8/16, except for Landa Lake Upper (8/13 – 8/19), and Landa Lake Lower (8/13 – 8/19). Recent 7-day trends were compared to long-term water temperature data measured at 4-hour intervals in August 2001 – 2021 or to the greatest temporal extent available. For analysis, 7-day trends were compared to long-term trends using boxplots to visualize differences in central tendency (i.e., median) and variation (e.g., interquartile range). Boxplots from July Critical Period sampling were also included for comparison, which includes updated results for Landa Lake Upper and Landa Lake Lower. Results are provided in Table 1 and graphically depicted in Figures 2, 3, and 4. Overall, it remains evident that lower than average discharge coupled with summer time conditions create elevated water temperatures in Blieders Creek (Figure 2) and locations further downstream from the spring flow orifices (Figure 4). However, conditions improved slightly in August over July as shown in Figures 2-4.

Table 1. Summary of boxplot descriptive statistics comparing recent 7-day and long-term trends in water temperature (°C) at 13 monitoring stations in the Comal Springs/River for the month of August.

Station	Period	Lower Whisker	Lower Box	Median	Upper Box	Upper Whisker	Interquartile Range
Blieders	7-day	26.16	27.28	28.12	28.89	31.08	1.61
Blieders	Long-term	22.86	24.82	25.72	27.21	30.21	2.39
Heidelberg	7-day	23.81	23.95	24.17	24.63	25.60	0.68
Heidelberg	Long-term	23.27	23.81	23.93	24.17	24.71	0.36
Booneville Near	7-day	23.67	23.67	23.69	23.81	24.00	0.14
Booneville Near	Long-term	23.34	23.52	23.56	23.64	23.82	0.12
Booneville Far	7-day	23.52	23.71	24.00	24.83	26.26	1.12
Booneville Far	Long-term	22.71	23.65	23.91	24.40	25.53	0.76
Landa Lake Upper	7-day	23.69	23.81	23.91	24.03	24.20	0.22
Landa Lake Upper	Long-term	23.41	23.69	23.82	23.88	24.17	0.19
Spring Run 1	7-day	23.69	23.74	23.76	23.81	23.91	0.07
Spring Run 1	Long-term	23.42	23.50	23.56	23.63	23.83	0.13
Spring Run 2	7-day	23.55	23.57	23.57	23.59	23.62	0.02
Spring Run 2	Long-term	22.98	23.33	23.50	23.62	24.05	0.29
Spring Run 3	7-day	23.47	23.50	23.50	23.52	23.55	0.02
Spring Run 3	Long-term	23.16	23.33	23.49	23.52	23.78	0.19
Landa Lake Lower	7-day	23.71	23.81	23.91	23.95	24.10	0.15
Landa Lake Lower	Long-term	23.57	23.78	23.86	23.93	24.15	0.15
Old Channel	7-day	23.67	24.00	24.44	25.36	27.14	1.35
Old Channel	Long-term	22.97	23.87	24.24	25.07	26.84	1.20
New Channel Upstream	7-day	23.69	23.98	24.46	25.21	26.70	1.23
New Channel Upstream	Long-term	22.99	23.67	23.97	24.59	25.97	0.92
New Channel Downstream	7-day	23.86	24.36	25.02	25.70	27.01	1.33
New Channel Downstream	Long-term	22.99	24.11	24.75	25.68	28.02	1.57
The Other Place	7-day	24.39	25.02	25.53	25.91	27.26	0.90
The Other Place	Long-term	23.03	23.97	24.62	25.39	27.47	1.42

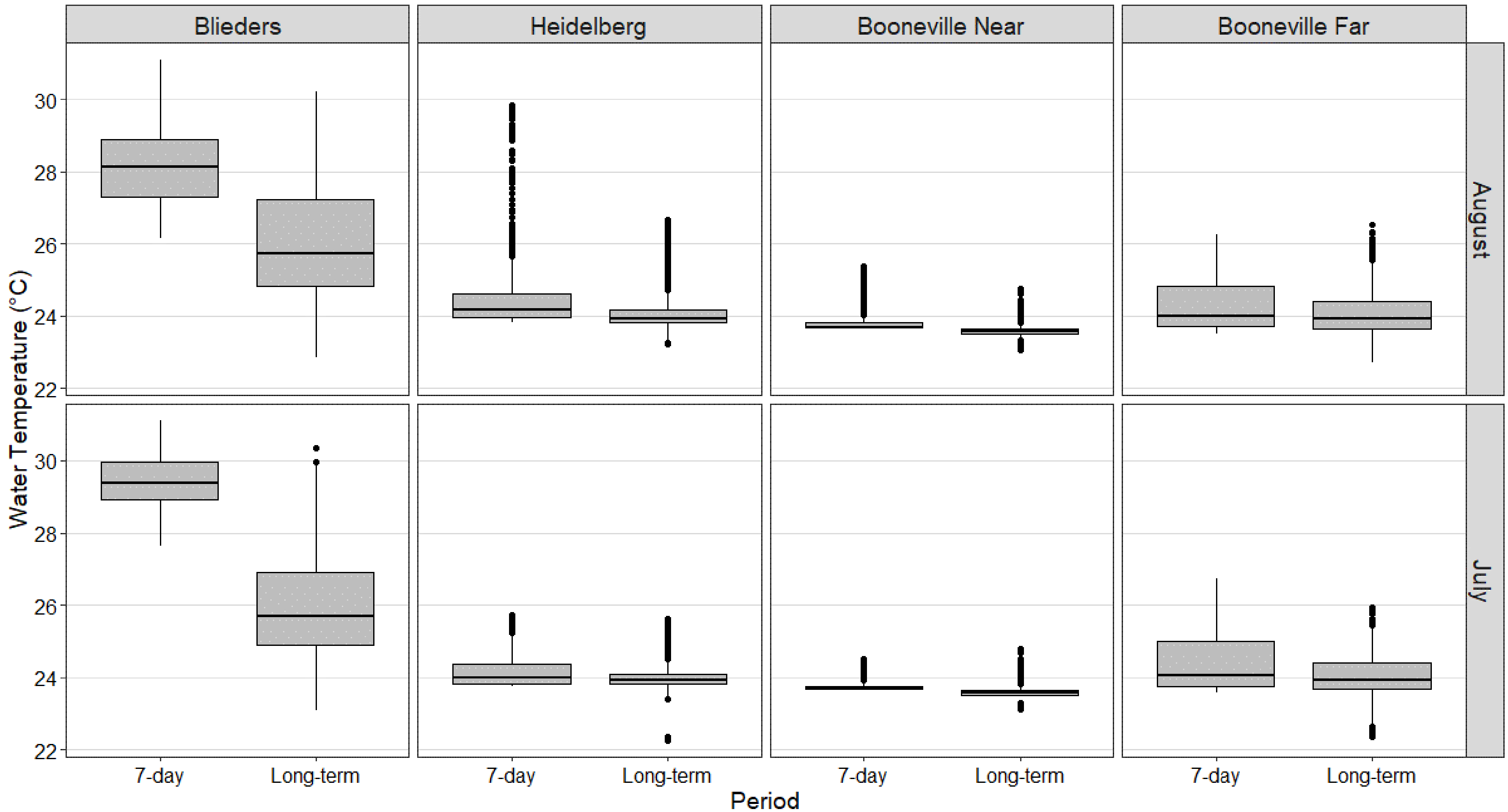

Figure 2. **Boxplots comparing recent 7-day and long-term water temperature trends at four monitoring stations from Blieders to Booneville Far for the month of August (top). July results are also included for comparison (bottom). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

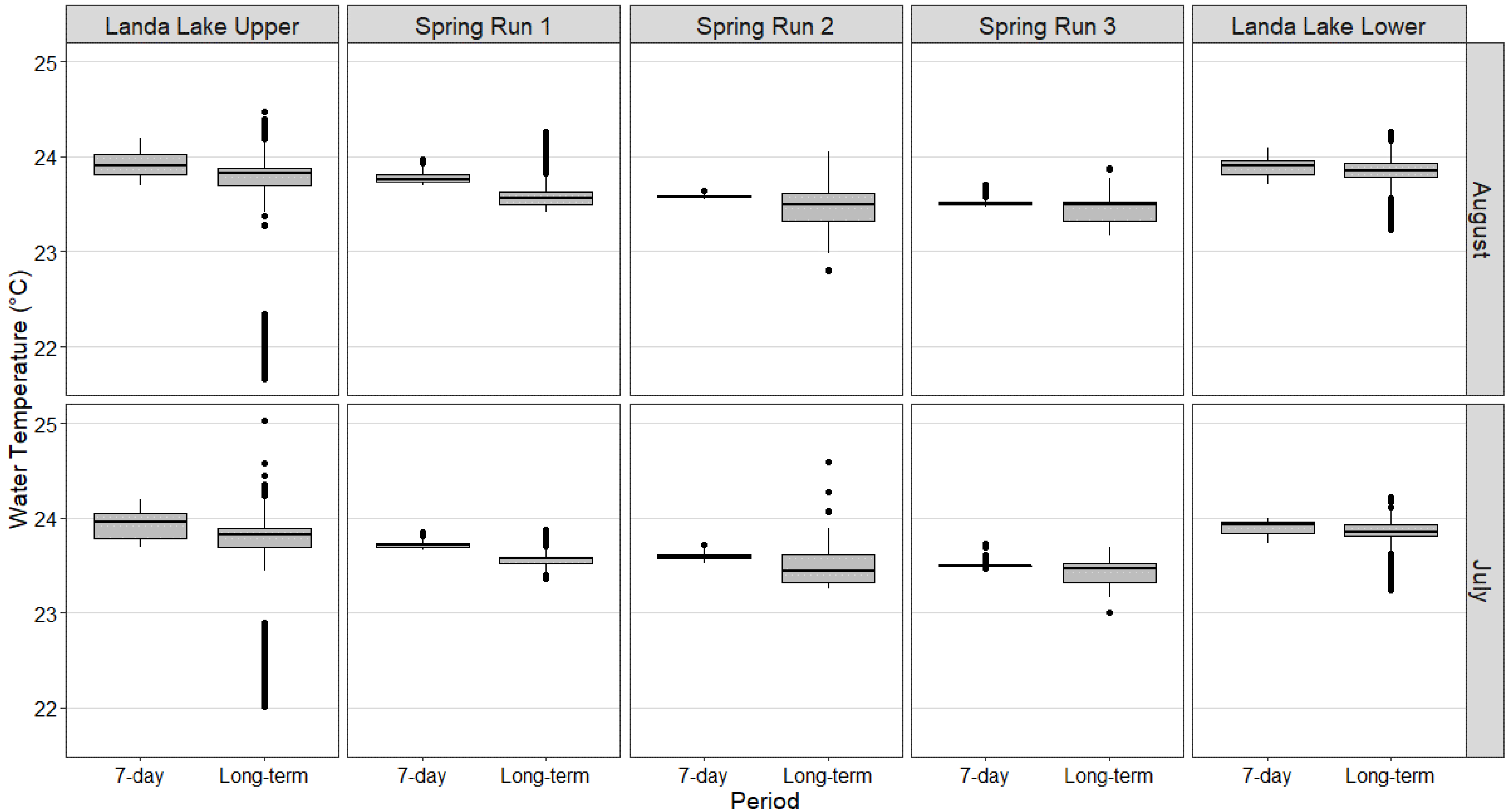

Figure 3. **Boxplots comparing recent 7-day and long-term water temperature trends at five monitoring stations from Landa Lake Upper to Landa Lake Lower for the month of August (top). July results are also included for comparison (bottom). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

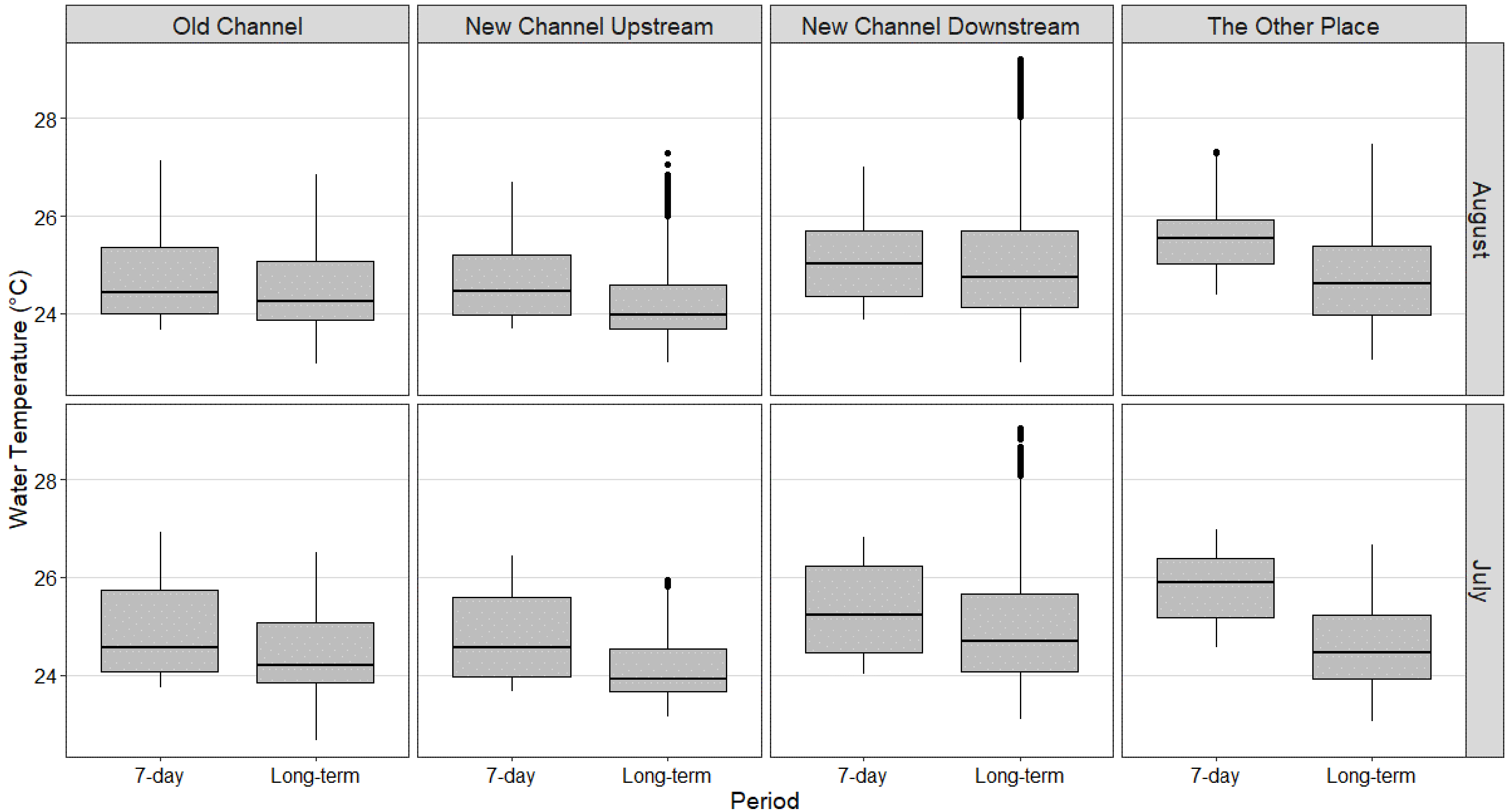

Figure 4. **Boxplots comparing recent 7-day and long-term water temperature trends at four monitoring stations from Old Channel to The Other Place for the month of August (top). July results are also included for comparison (bottom). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

Aquatic vegetation and Fountain Darter dip netting are key monitoring components as they comprise the criteria for Fountain Darter refugia salvage activities described in the EAHCP. From June to August 2022, aquatic vegetation coverage in the Upper Spring Run reach declined slightly (<5%), the Landa Lake reach exhibited a slight increase (<5%), and the Old Channel and New Channel reaches held steady. Fountain Darter dip netting results had 66% of the sites with darters present on August 18, 2022 compared to 80% of sites in late June.

Comal Spring Riffle Beetle and Comal Springs Salamander habitat throughout each species range continues to be reduced compared to average conditions. However, water levels for early August remained mostly steady since the July 27th habitat evaluation and have improved over the past few weeks. The following pictorial habitat evaluation highlights the Covered species habitat conditions observed on August 19th throughout the Comal System starting at the upper springs / Blieders Creek confluence and working downstream.

Figure 5: Blieders Creek (Left) looking downstream on August 19, 2022 (No visible flow with abundant green algae); Upper Spring Run Reach and Blieders Creek confluence (right) on August 19, 2022.

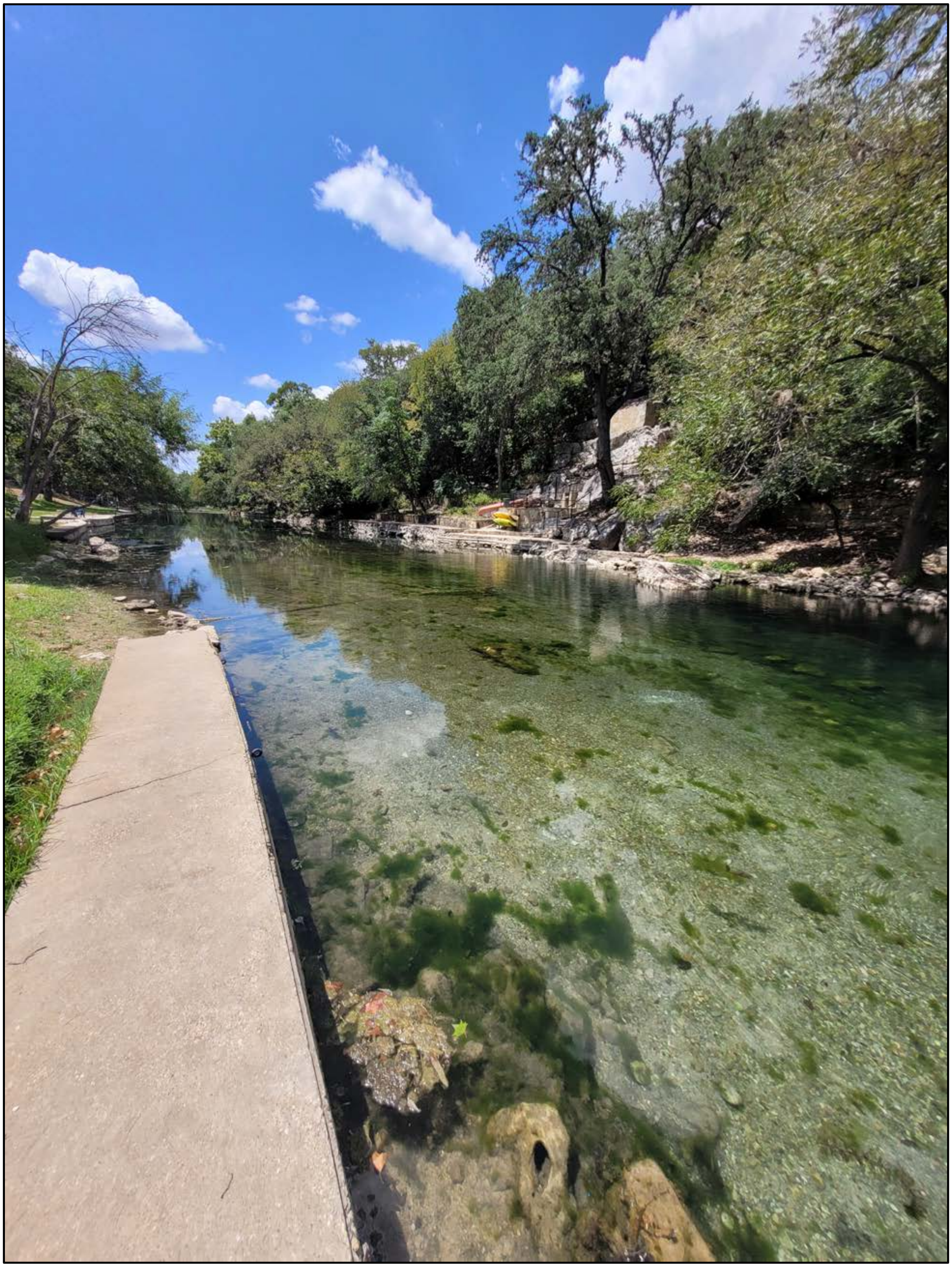

Figure 6: Upper Spring Run Reach Fountain Darter habitat looking downstream on August 19, 2022.

Figure 7: Spring Island Covered Species habitat looking upstream in near channel on August 19, 2022.

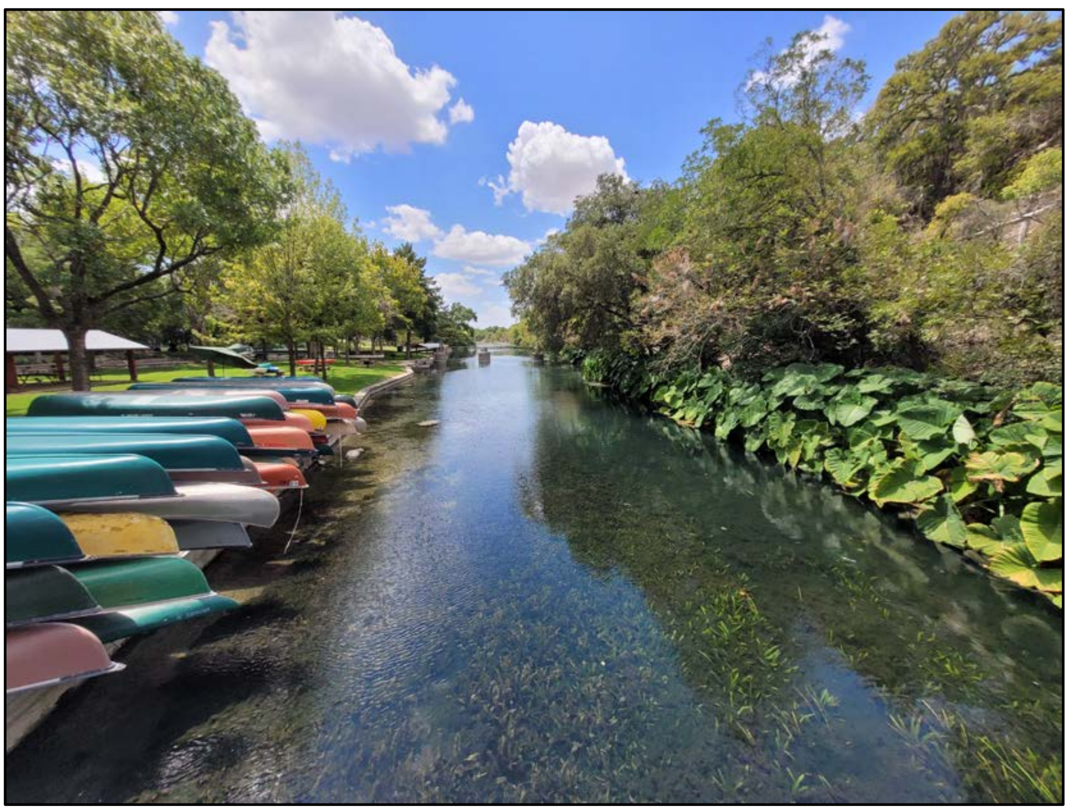

Figure 8: Spring Island Covered Species habitat looking downstream in far channel on August 19, 2022.

Figure 9: Spring Island Spring Run Covered Species habitat on August 19, 2022.

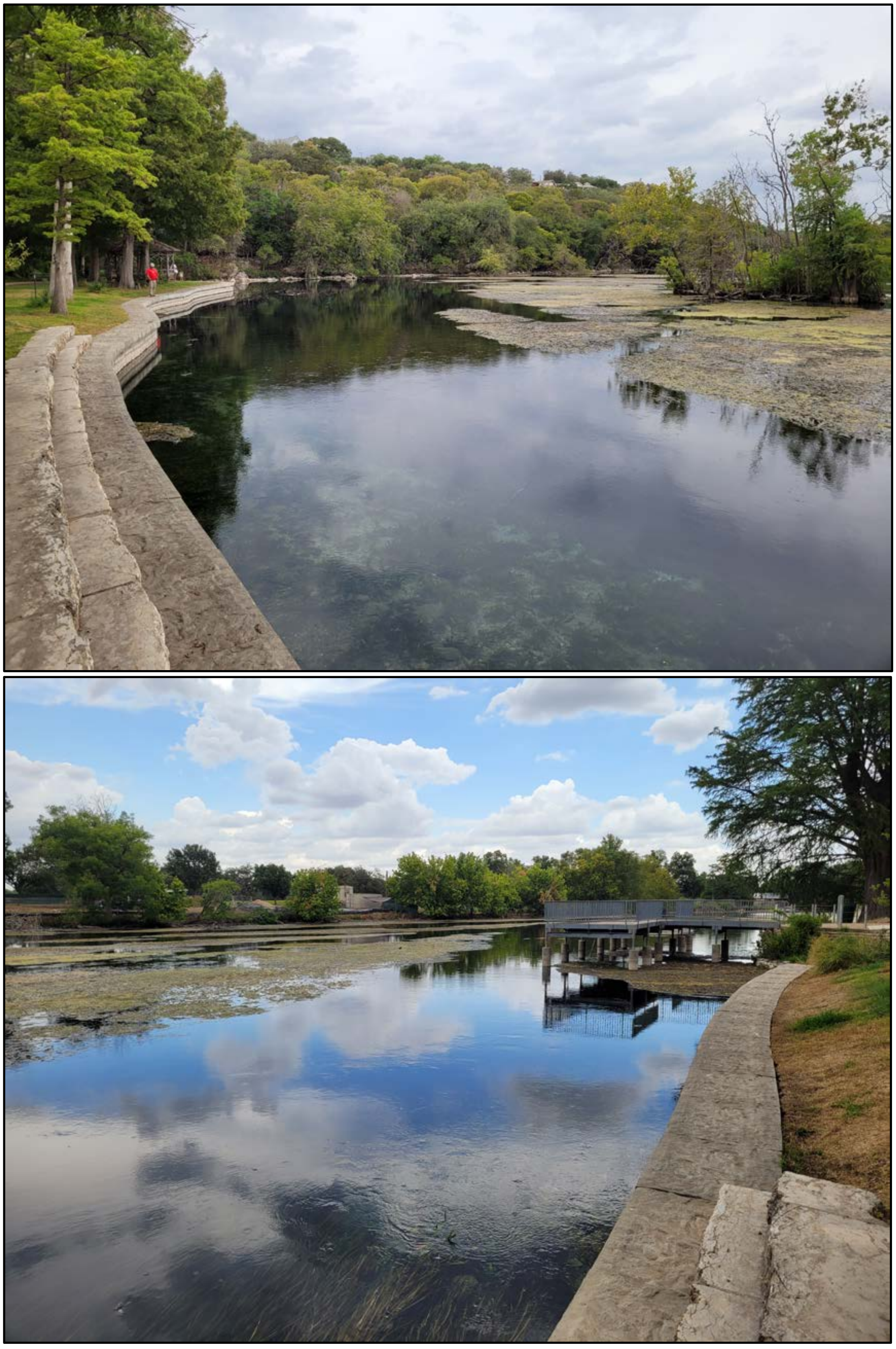

Figure 10: Landa Lake Floating Vegetation Matts looking upstream (top) and downstream (bottom) near the Fishing Pier on August 19, 2022.

Figure 11: Spring Run 1 Headwaters looking downstream on August 19, 2022.

Figure 12: Spring Run 3 headwaters on August 19, 2022.

Figure 13: Spring Run 3 looking downstream from headwaters on August 19, 2022.

Figure 14: Spring Run 1 and 2 confluence looking upstream from pedestrian bridge on August 19, 2022.

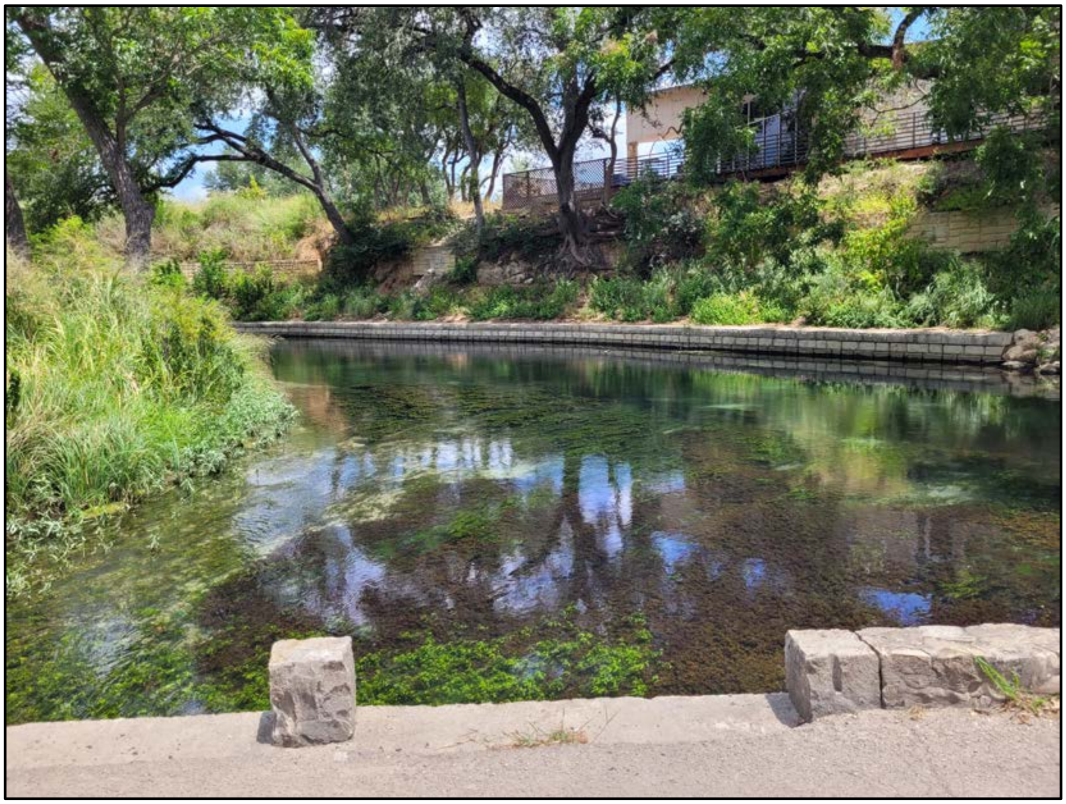

Figure 15: Old Channel ERPA looking upstream from Golf Course Bridge on August 19, 2022.

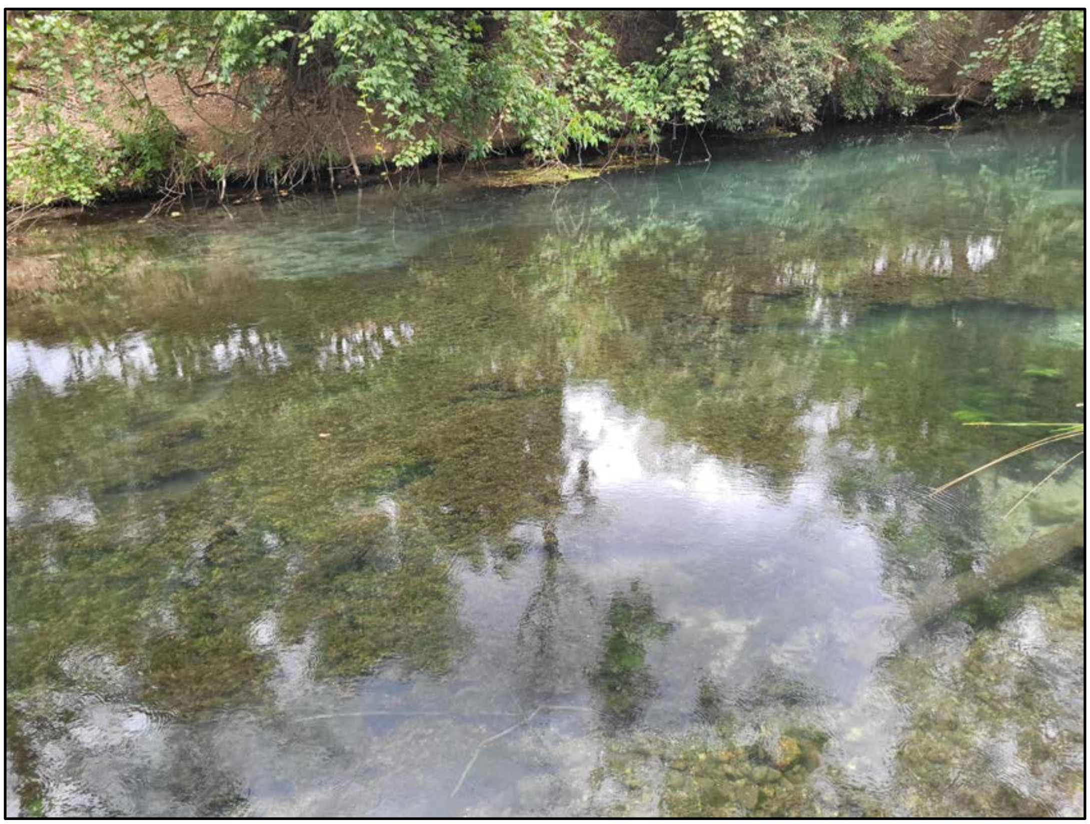

Figure 16: Fountain Darter Habitat in Old Channel Study Area on August 19, 2022.

Figure 17: New Channel looking downstream toward confluence with Old Channel on August 19, 2022.

In summary, total system discharge in the Comal System declined to below 90 cfs on August 11th. Recent precipitation and recharge have allowed the springs to rebound to approximately 122 cfs at the time of this memorandum (Figure 1). Since the July 27th evaluation, habitat conditions for the Comal invertebrates are slightly improving but remain less than favorable in several locations. Water temperature conditions were slightly improved in August and high-quality Fountain Darter habitat continues to be maintained in Landa Lake and the Old Channel from the ERPA through the Long-Term Biological Goal study site. Fountain Darter physical habitat conditions in the Upper Spring Run Reach continued to deteriorate as evident in Figure 6. It remains important to keep tracking the system-wide Fountain Darter and the surface-dwelling invertebrate's habitat conditions as these lower-than-average discharge conditions persist.

If you have any questions, please don't hesitate to reach out.

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APPENDIX C: AQUATIC VEGETATION MAPS

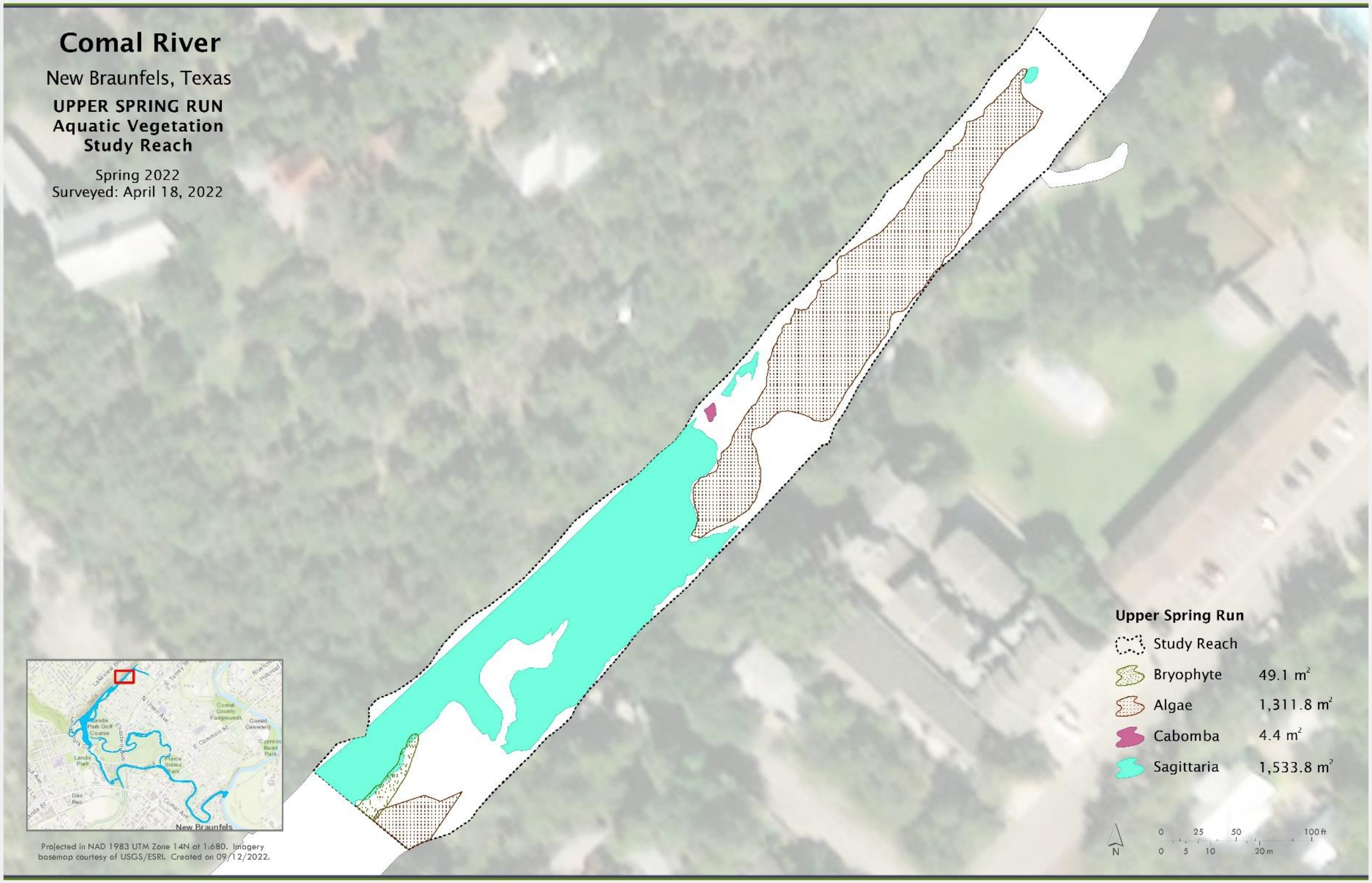

Figure C1. Map of aquatic vegetation coverage at Upper Spring Run Study Reach in spring 2022.

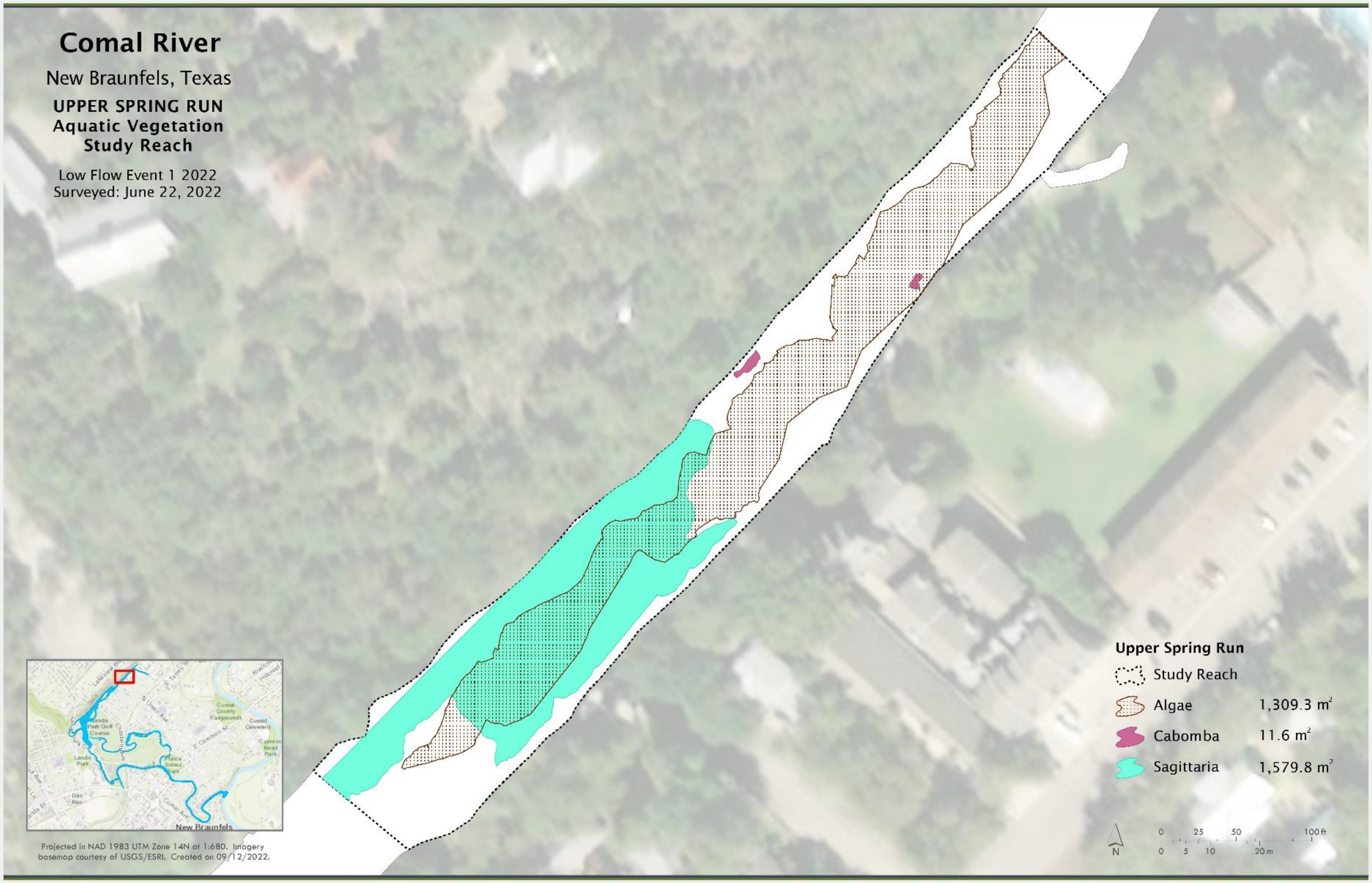

Figure C2. Map of aquatic vegetation coverage at Upper Spring Run Study Reach in summer 2022 during the first Critical Period low-flow sampling event (June).

Figure C3. **Map of aquatic vegetation coverage at Upper Spring Run Study Reach in summer 2022 during the second Critical Period low-flow sampling event (August).**

Figure C4. **Map of aquatic vegetation coverage at Upper Spring Run Study Reach in fall 2022.**

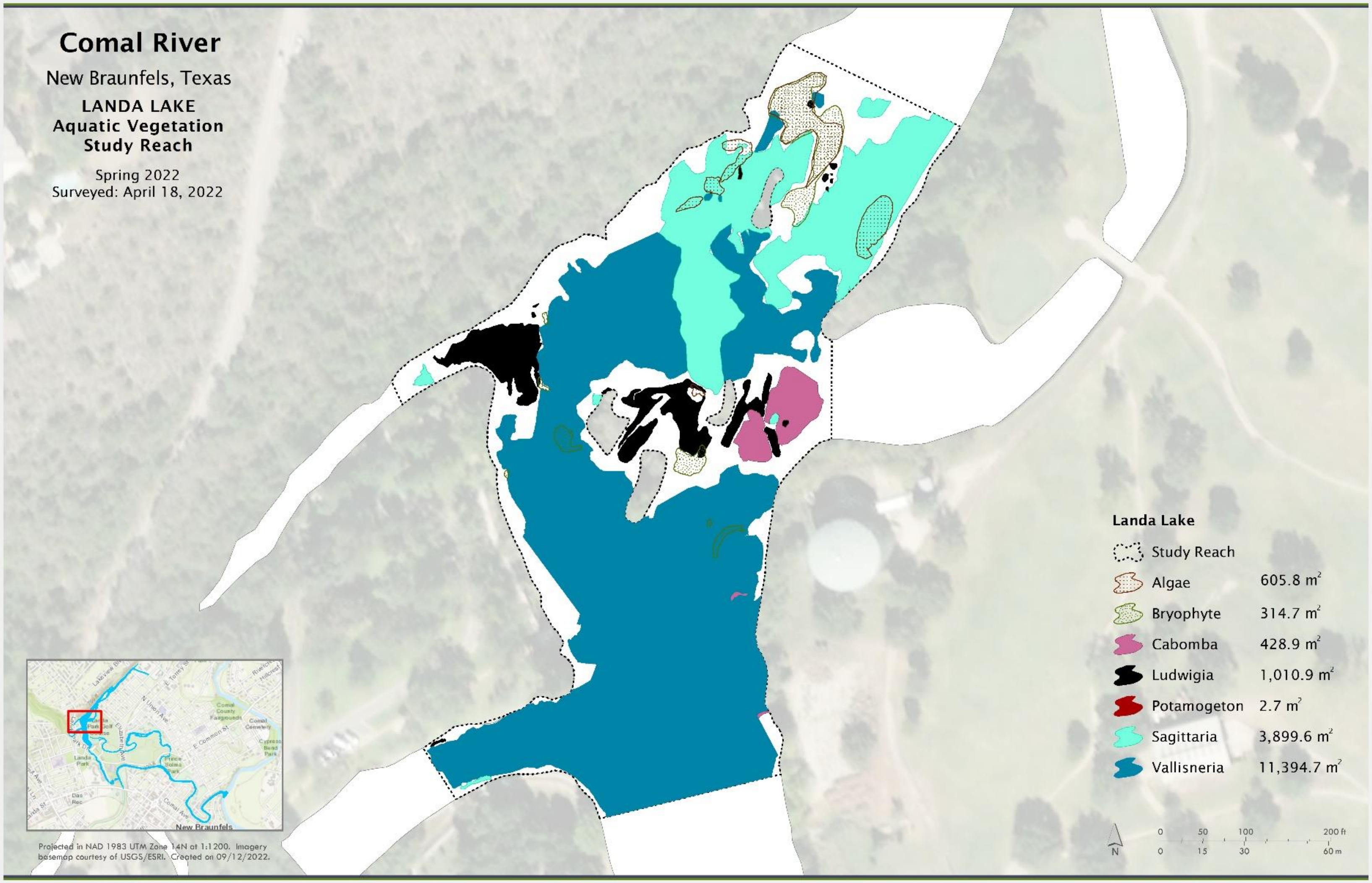

Figure C5. Map of aquatic vegetation coverage at Landa Lake Study Reach in spring 2022.

Figure C6. **Map of aquatic vegetation coverage at Landa Lake Study Reach in summer 2022 during the first Critical Period low-flow sampling event (June).**

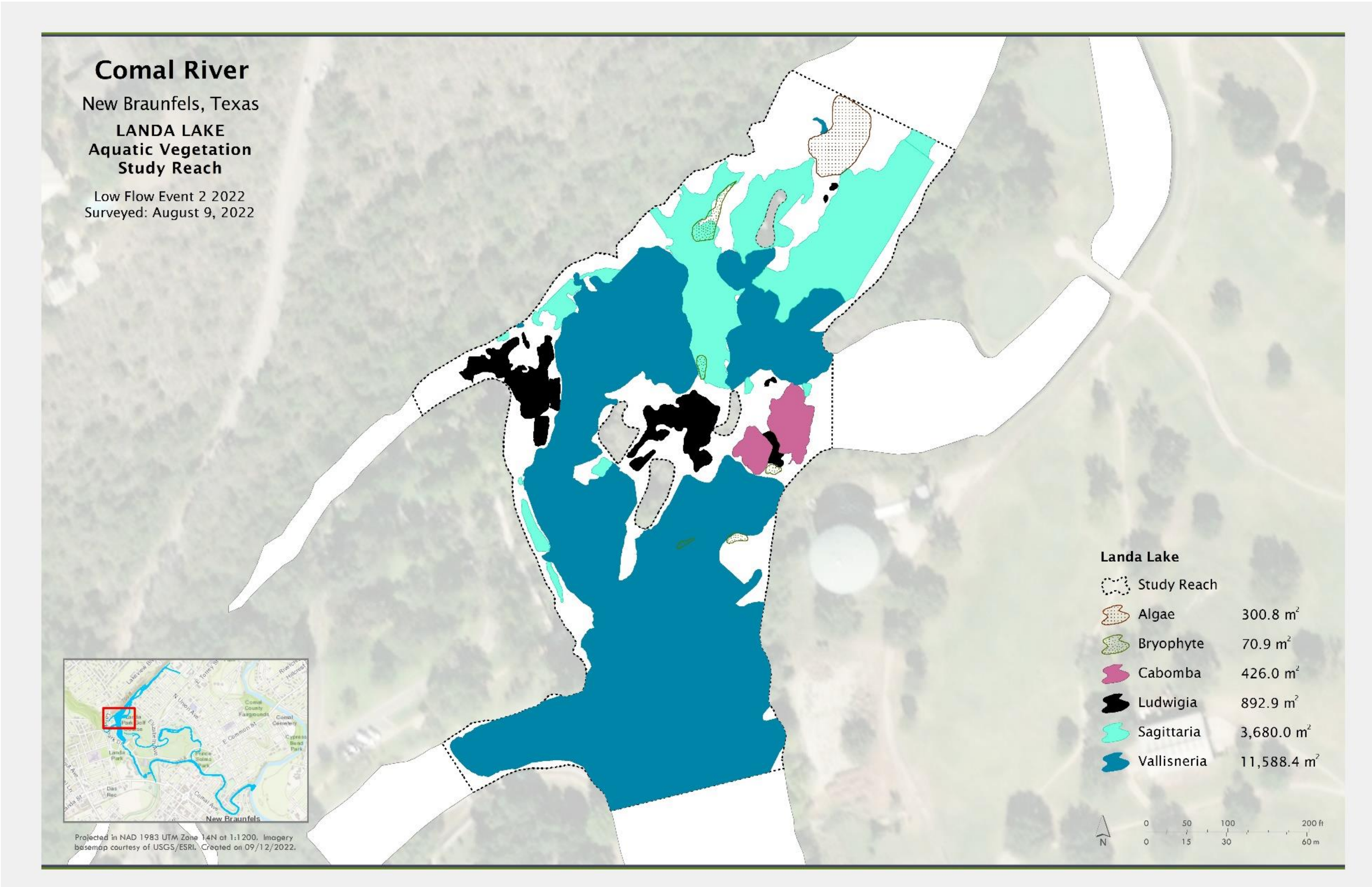

Figure C7. **Map of aquatic vegetation coverage at Landa Lake Study Reach in summer 2022 during the second Critical Period low-flow sampling event (August).**

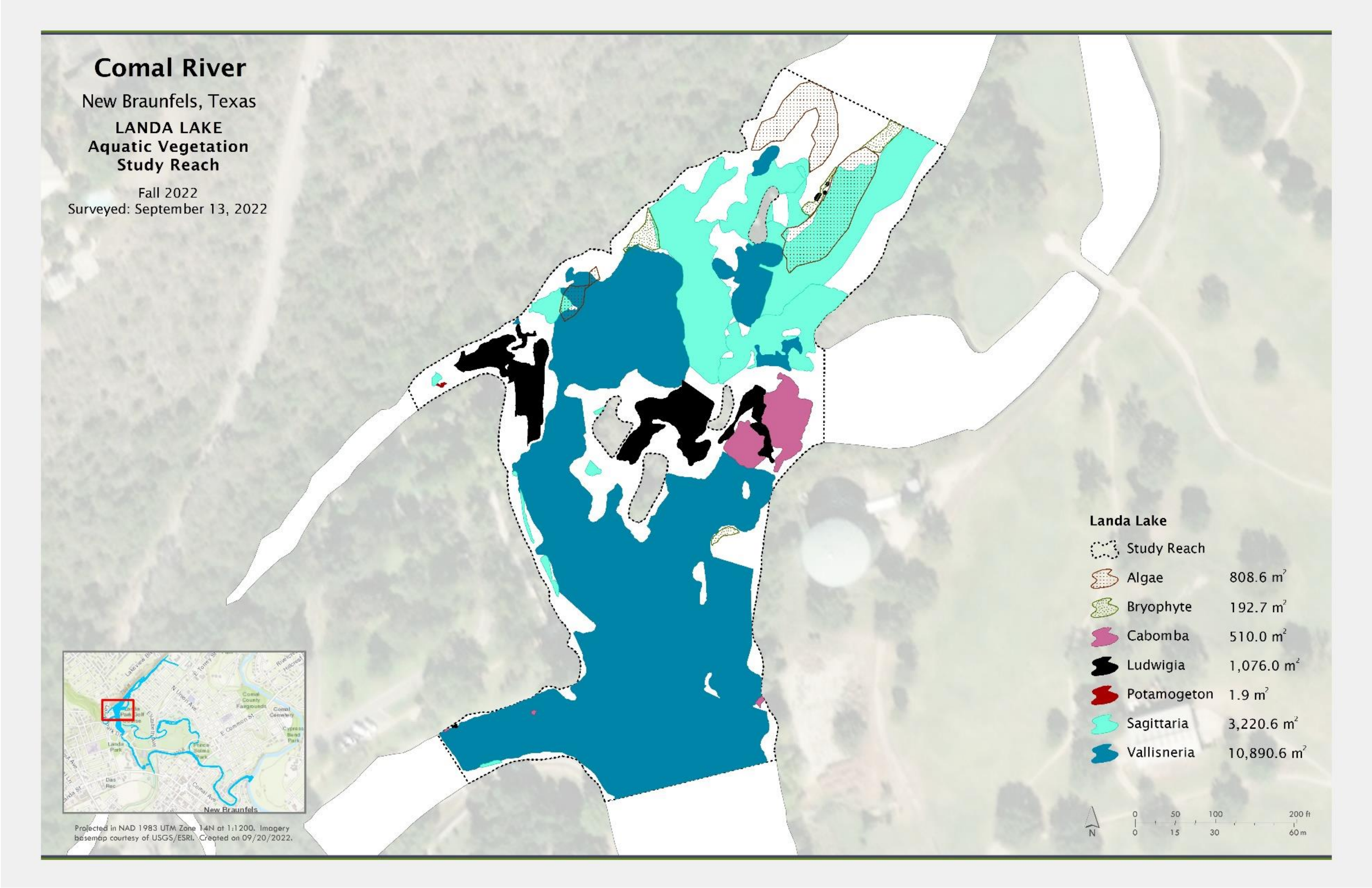

Figure C8. Map of aquatic vegetation coverage at Landa Lake Study Reach in fall 2022.

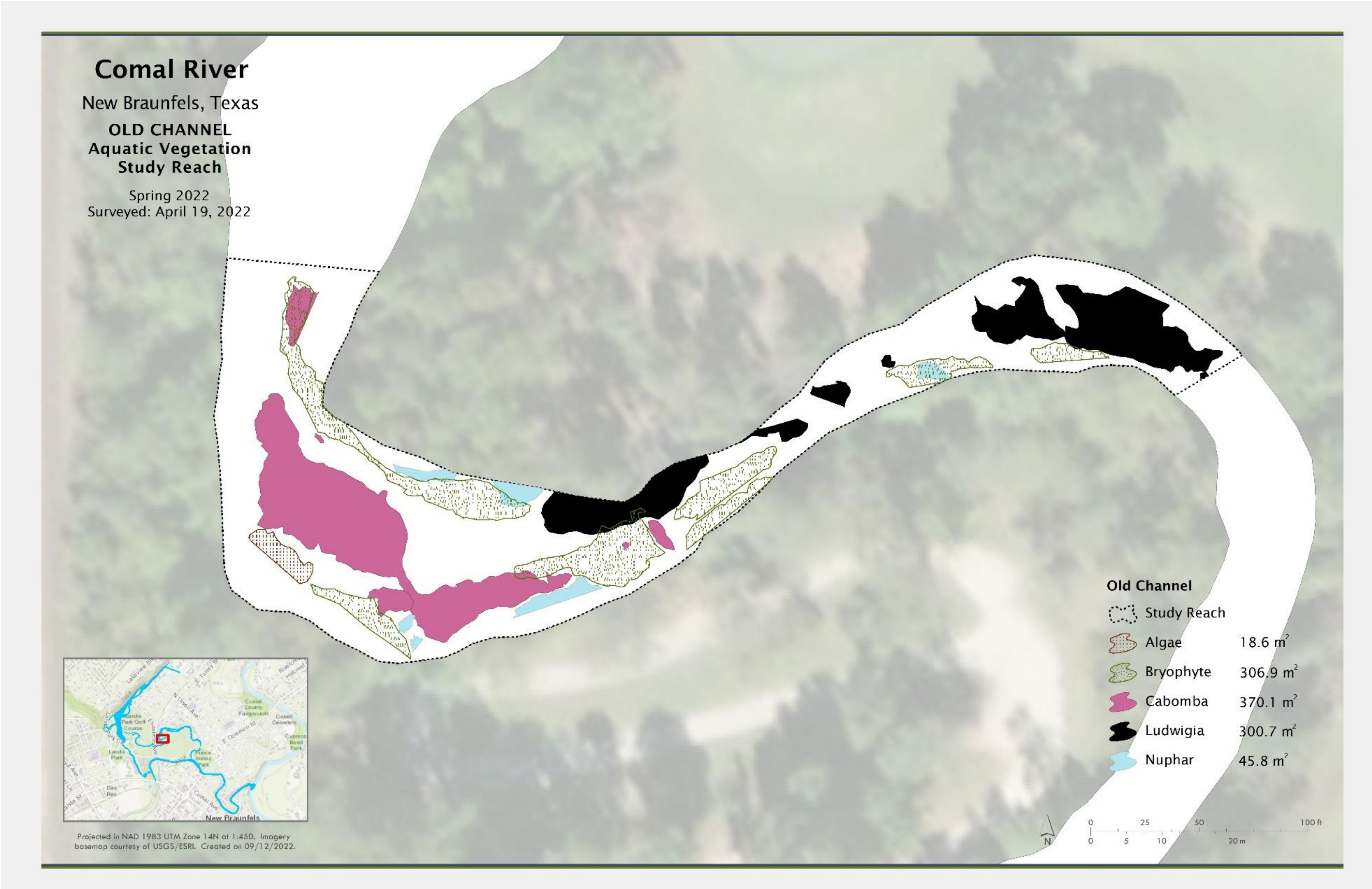

Figure C9. **Map of aquatic vegetation coverage at Old Channel Study Reach in spring 2022.**

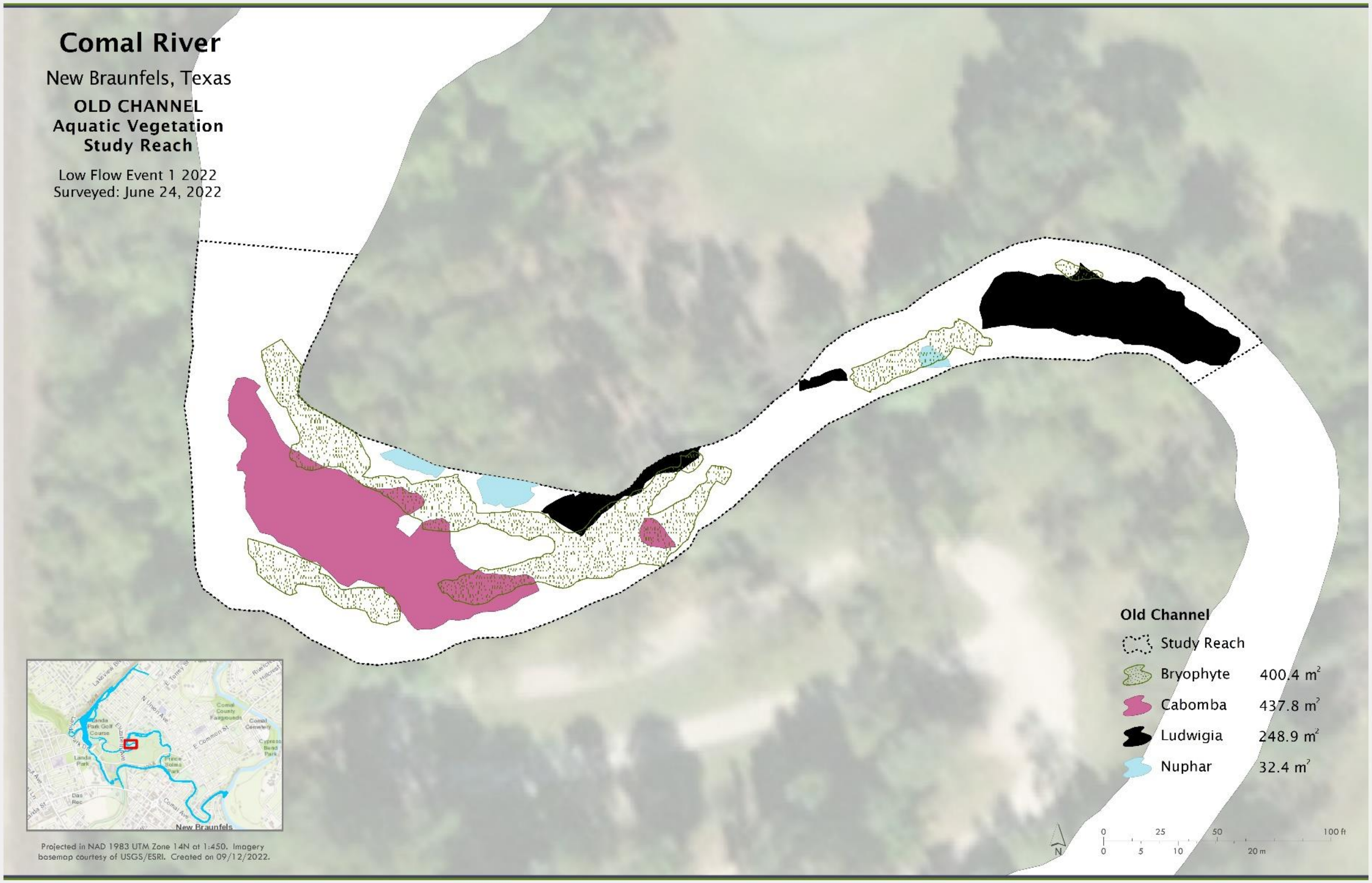

Figure C10. Map of aquatic vegetation coverage at Older Channel Reach in summer 2022 during the first Critical Period low-flow sampling event (June).

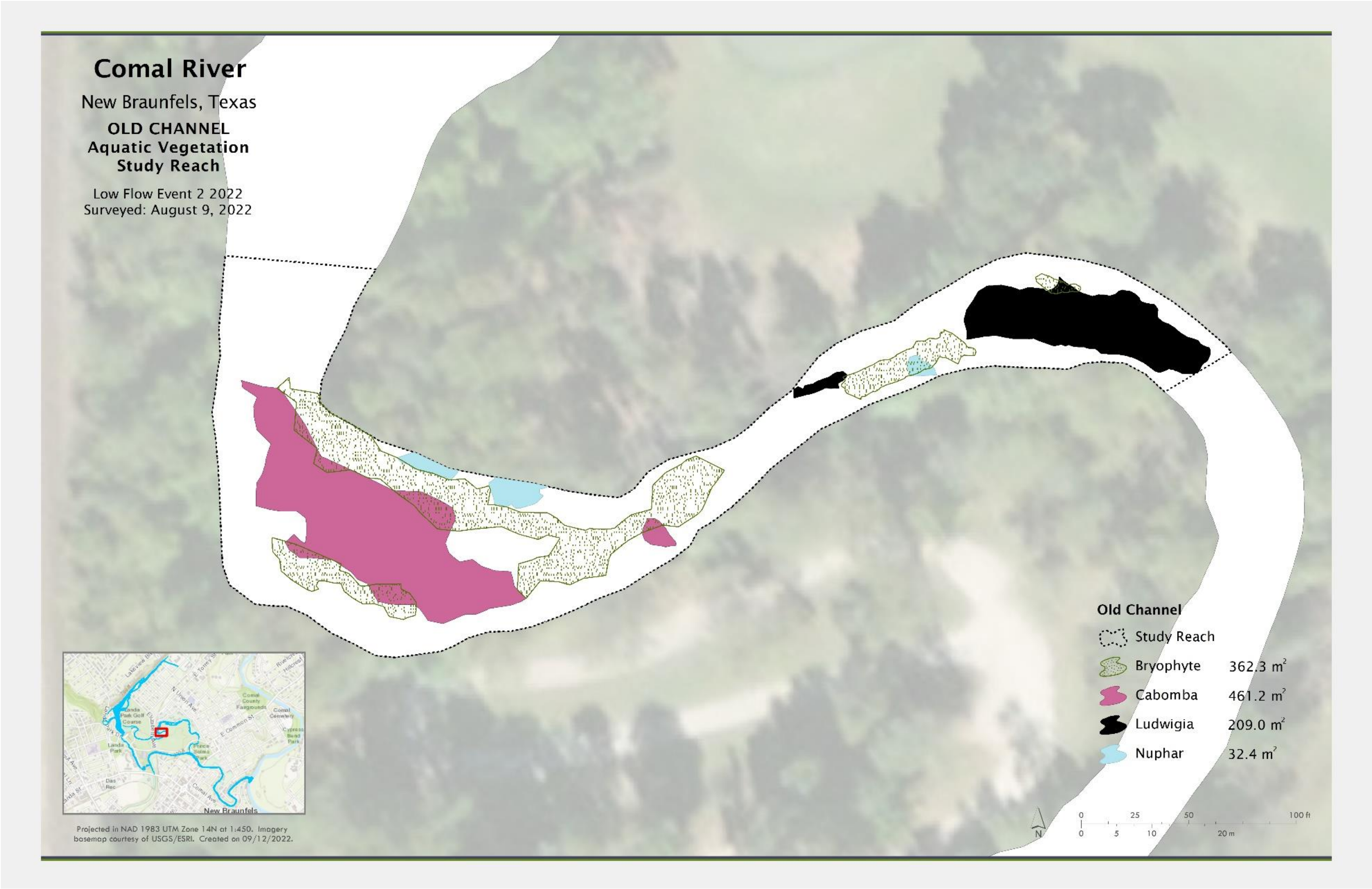

Figure C11. Map of aquatic vegetation coverage at Old Channel Study Reach in summer 2022 during the second Critical Period low-flow sampling event (August).

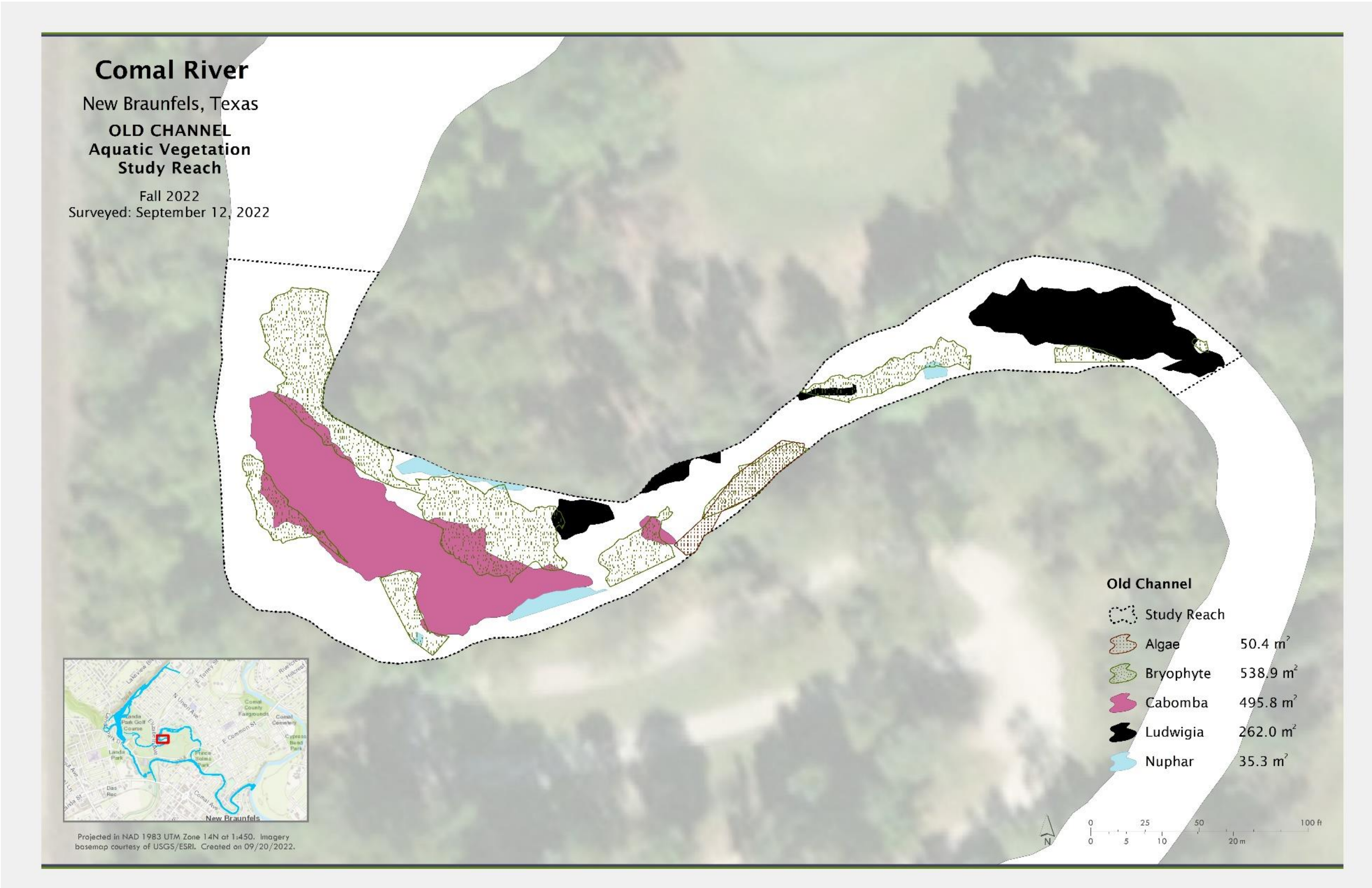

Figure C12. Map of aquatic vegetation coverage at Old Channel Study Reach in fall 2022.

Figure C13. Map of aquatic vegetation coverage at Upper New Channel Study Reach in spring 2022.

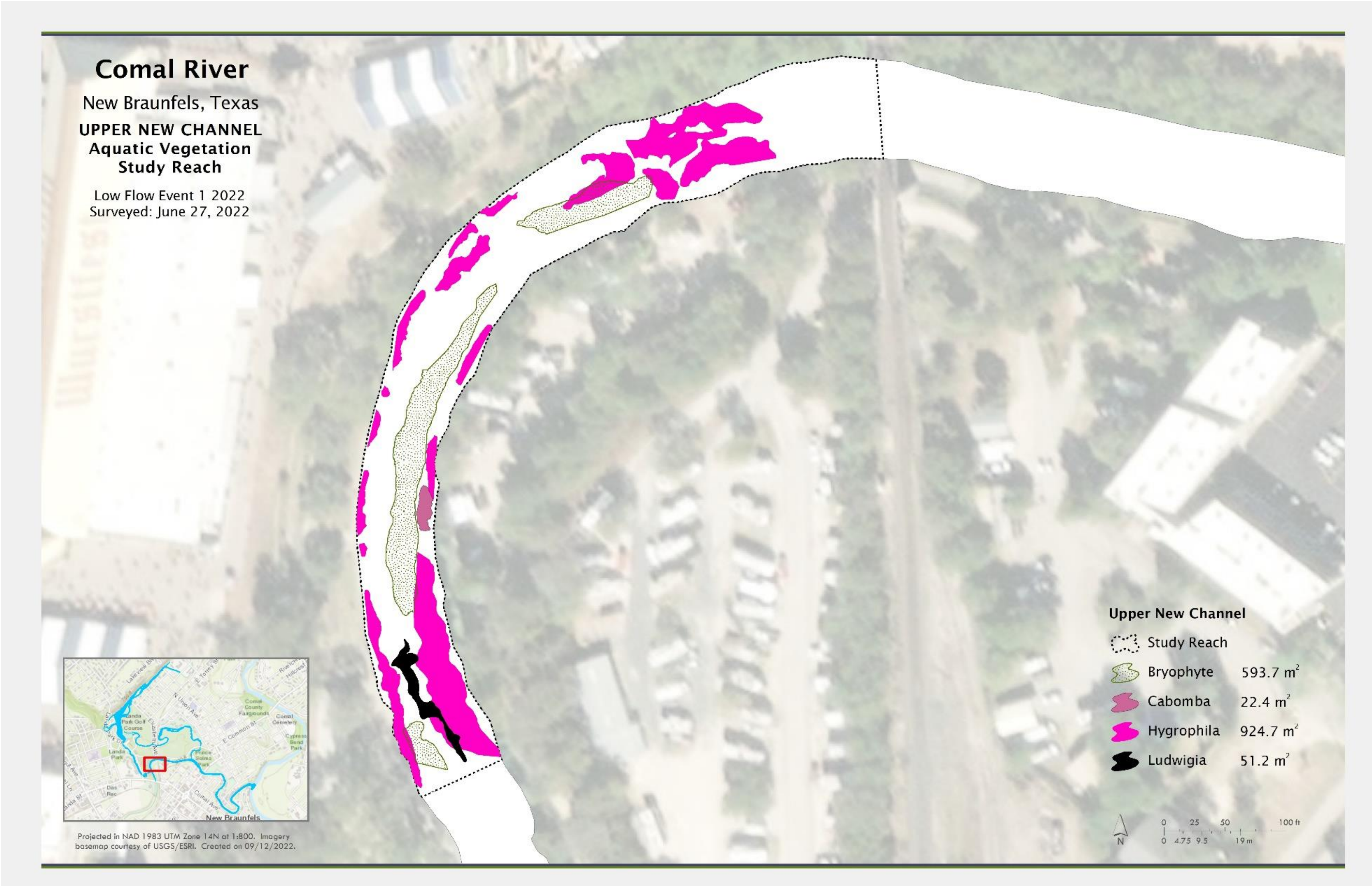

Figure C14. Map of aquatic vegetation coverage at Upper New Channel in summer 2022 during the first Critical Period low-flow sampling event (June).

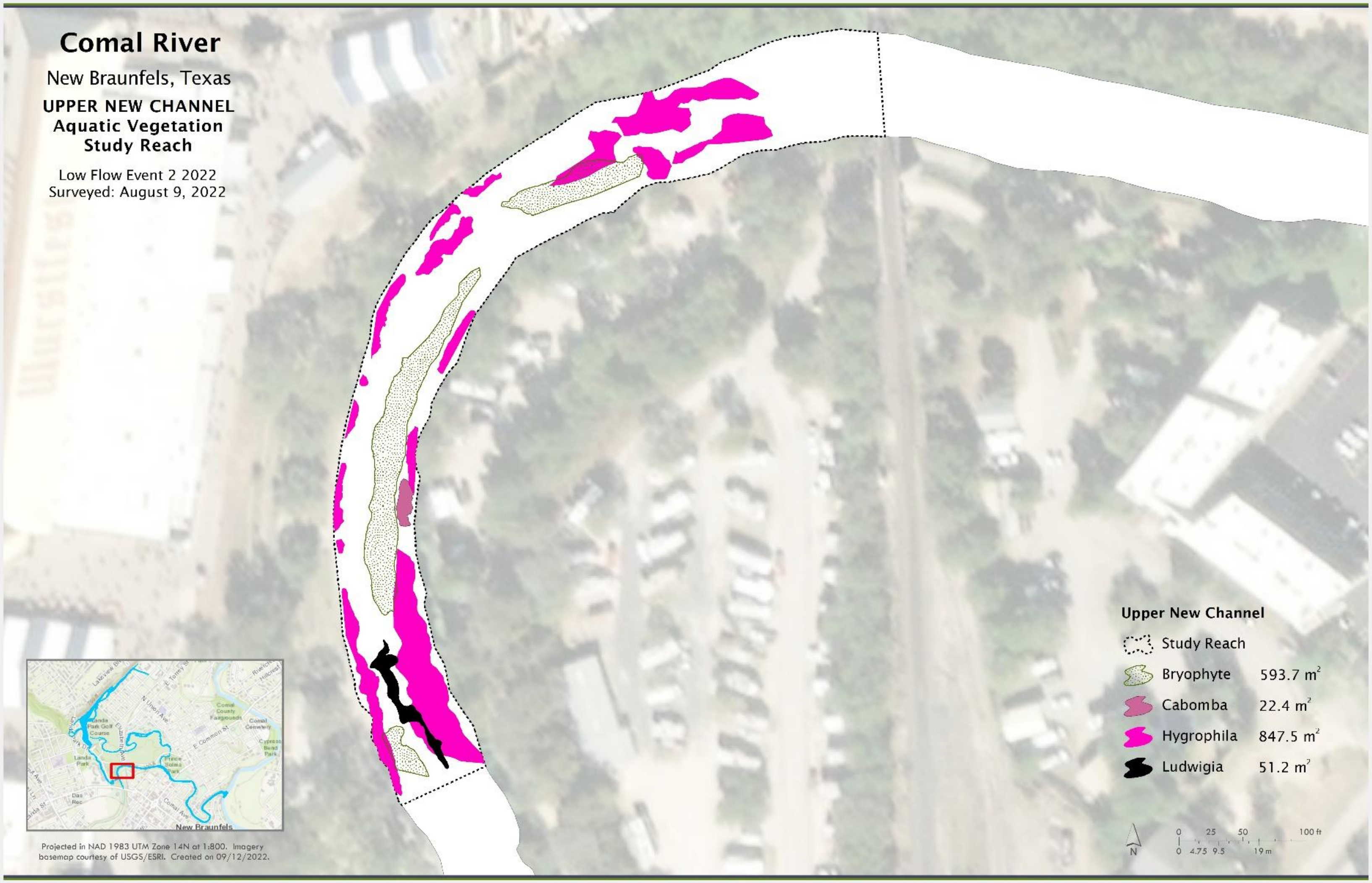

Figure C15. Map of aquatic vegetation coverage at Upper New Channel Study Reach in summer 2022 during the second Critical Period low-flow sampling event (August).

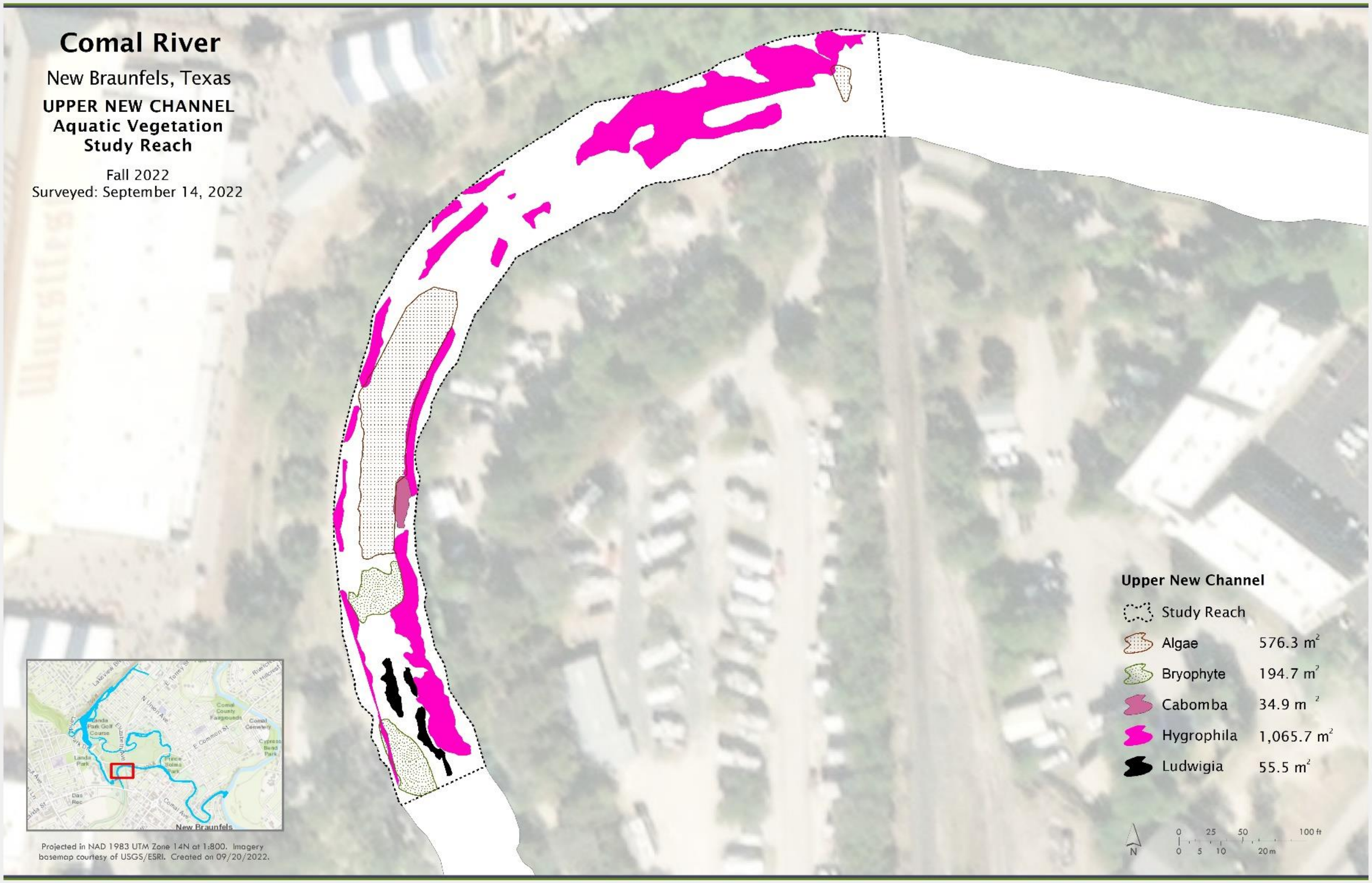

Figure C16. Map of aquatic vegetation coverage at Upper New Channel Study Reach in fall 2022.

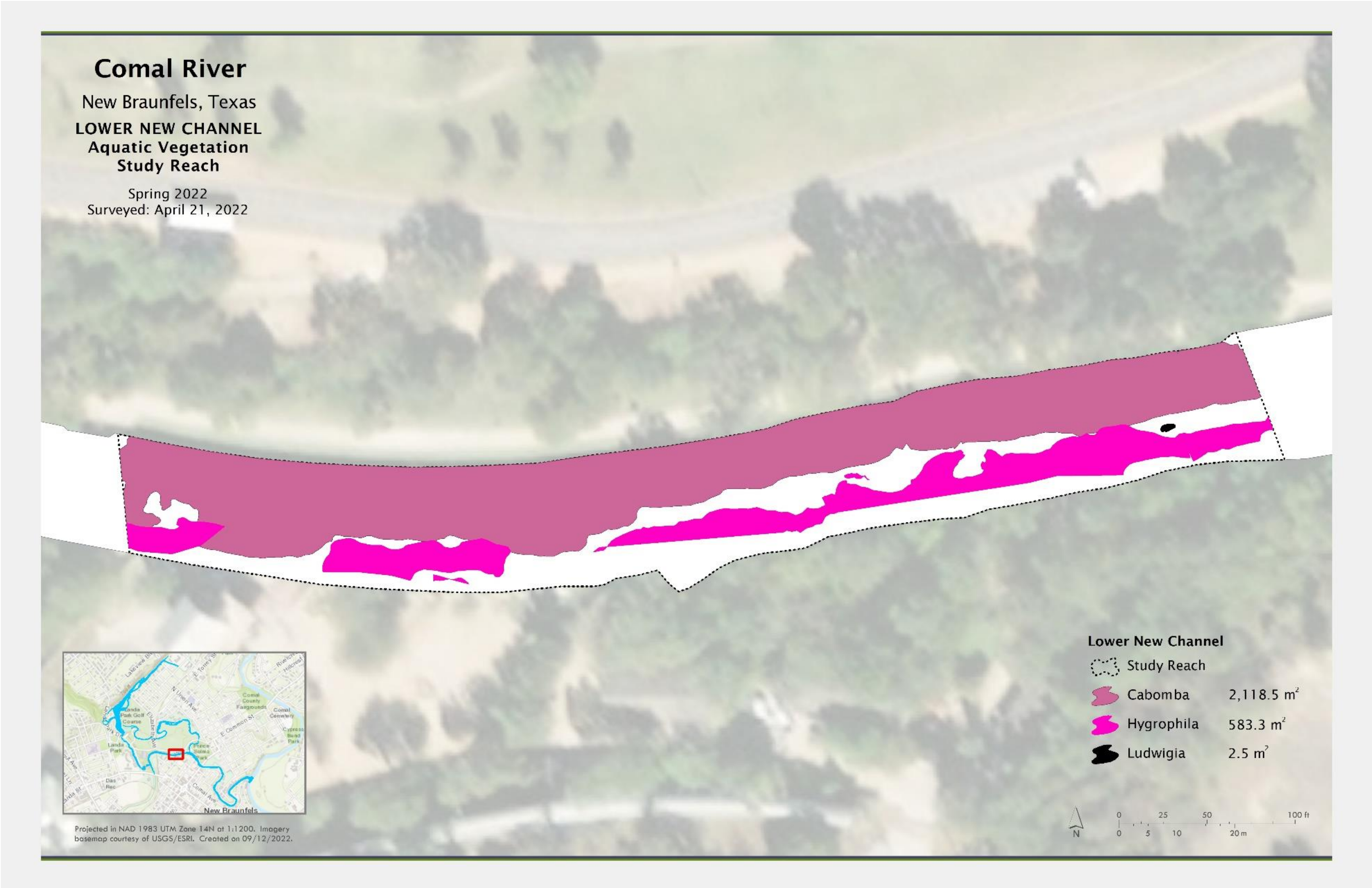

Figure C17. Map of aquatic vegetation coverage at Lower New Channel Study Reach in spring 2022.

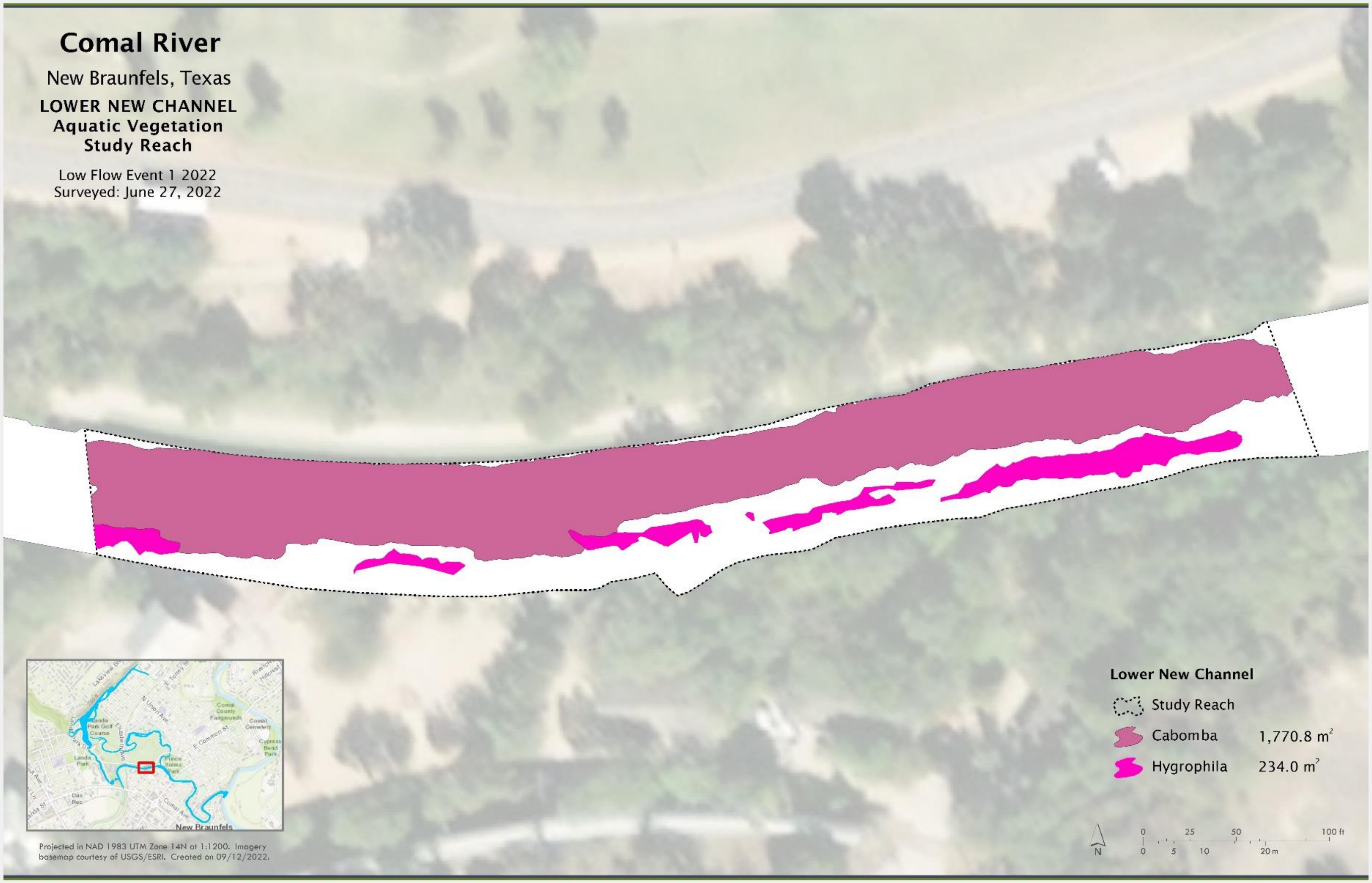

Figure C18. Map of aquatic vegetation coverage at Lower New Channel in summer 2022 during the first Critical Period low-flow sampling event (June).

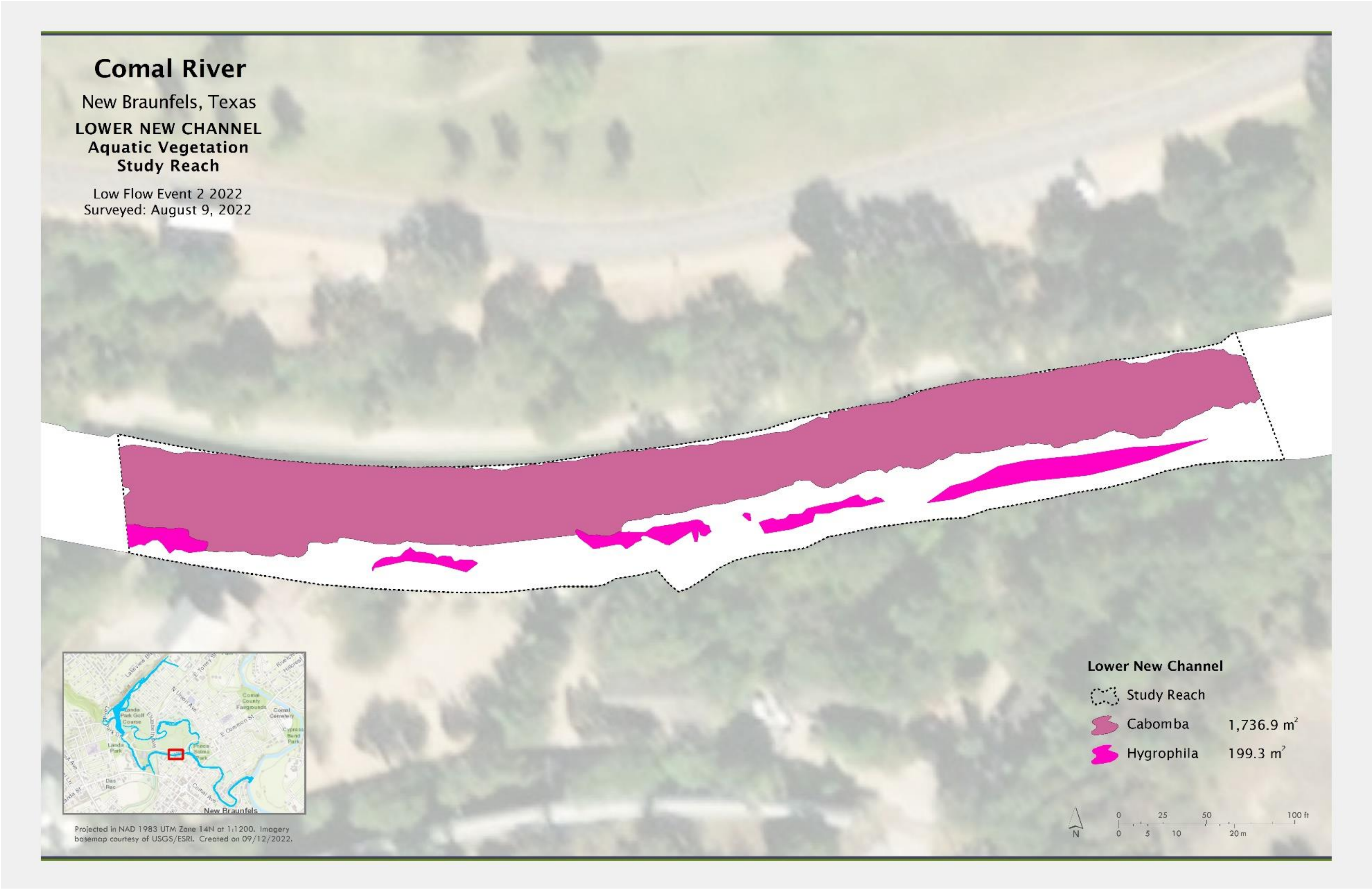

Figure C19. Map of aquatic vegetation coverage at Lower New Channel Study Reach in summer 2022 during the second Critical Period low-flow sampling event (August).

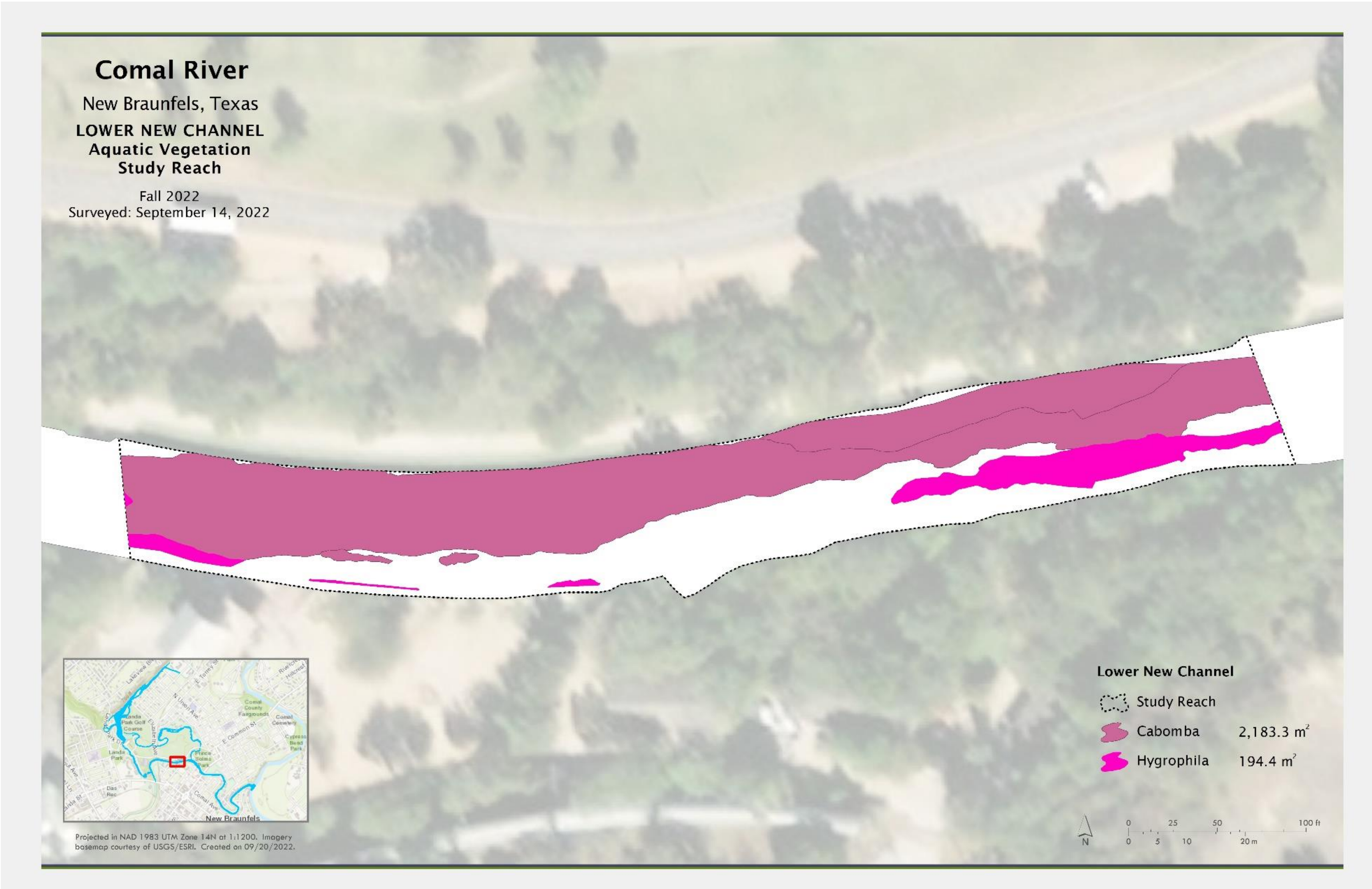

Figure C20. Map of aquatic vegetation coverage at Lower New Channel Study Reach in fall 2022.

APPENDIX D: TEXAS MASTER NATURALIST MONITORING RESULTS

Site locations are shown in Figure 2 of the report and listed from upstream (Houston Street) to downstream (Union Avenue). Water quality data collected by Master Naturalist volunteers in 2022 were similar to years past, observing CO_2 concentrations highest at sites near springs, such as the Houston Street (Upper Spring Run Reach) and Gazebo (Landa Lake/Spring Run 3) sample sites (Figure D1). Also continuing with past trends, pH measurements increased with increased distance from the springs (Figure D2). The inverse relationship between CO_2 and pH is directly related to greater concentrations of carbonic acid in spring waters, so as CO_2 concentrations decline going downstream, pH rises in the system. Within sites, year-to-year variation was relatively limited in both pH and CO_2 concentrations. In 2022, CO_2 was slightly lower and pH was slightly higher compared to the previous four years (Figures D1 and D2).

To compare recreational use at the various sites, weekly counts of recreation users collected by the Texas Master Naturalist volunteers were converted to monthly averages and plotted over a long-term survey period (Figures D3–D7). In 2022, the New Channel continued as the most recreated area in the system. Recreation was second highest at Union Avenue, which received similar pressure to the New Channel in 2022. As in previous years, recreational use at Elizabeth Street (Old Channel) was low because this site is not located within a city park or advertised for recreational use (Figures D3–D7).

The New Channel site has received the most recreation pressure throughout the Texas Master Naturalist monitoring (2006–2022). The peak of recreational use is usually during the summer months of June through September (Figure D6). During the warmer months, the New Channel site becomes a popular destination for tubers and others seeking relief from the heat in the cooler spring-fed water. Following lockdowns associated with the COVID-19 pandemic in 2020, activity at the New Channel site returned to levels similar to historical trends in 2021 and 2022. Much like the New Channel site, recreation pressure at the Union Avenue site can also be substantial during summer because this is a take-out site for many tubers floating the river (Figure D7) and like the New Channel, experienced increased traffic in 2021 and 2022 compared to 2020. However, unlike the New Channel site, this location does not offer long-term attraction such as picnic tables, resulting in fewer alternative or additional recreational activities.

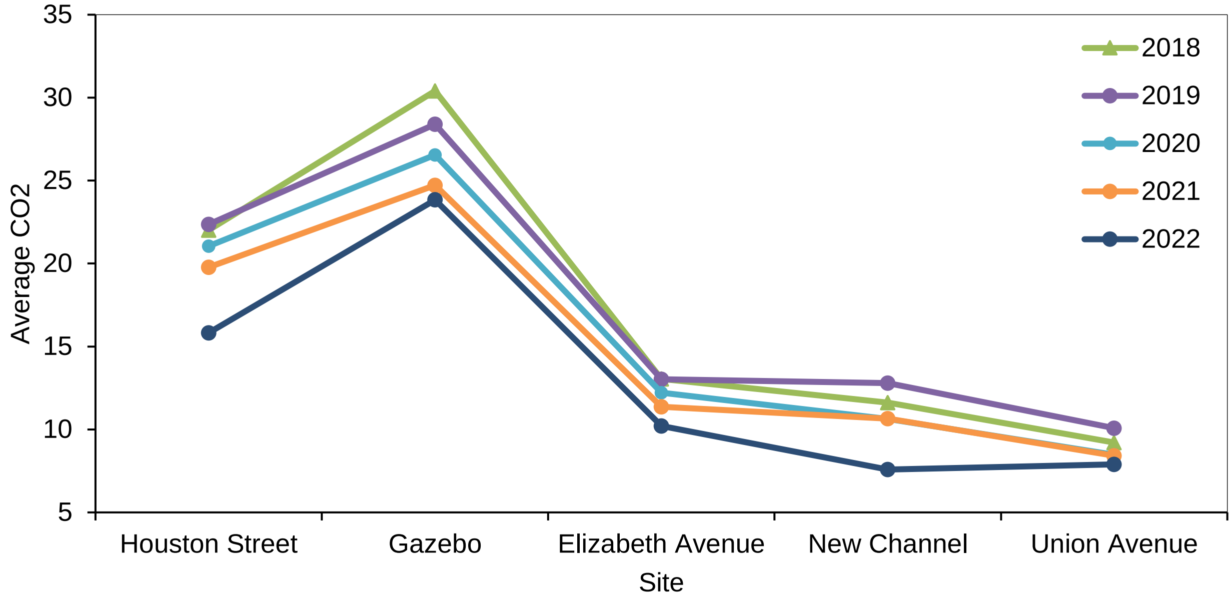

Figure D1. **Annual average dissolved carbon dioxide (CO_2) concentrations at five sites on the Comal River system (2018–202).**

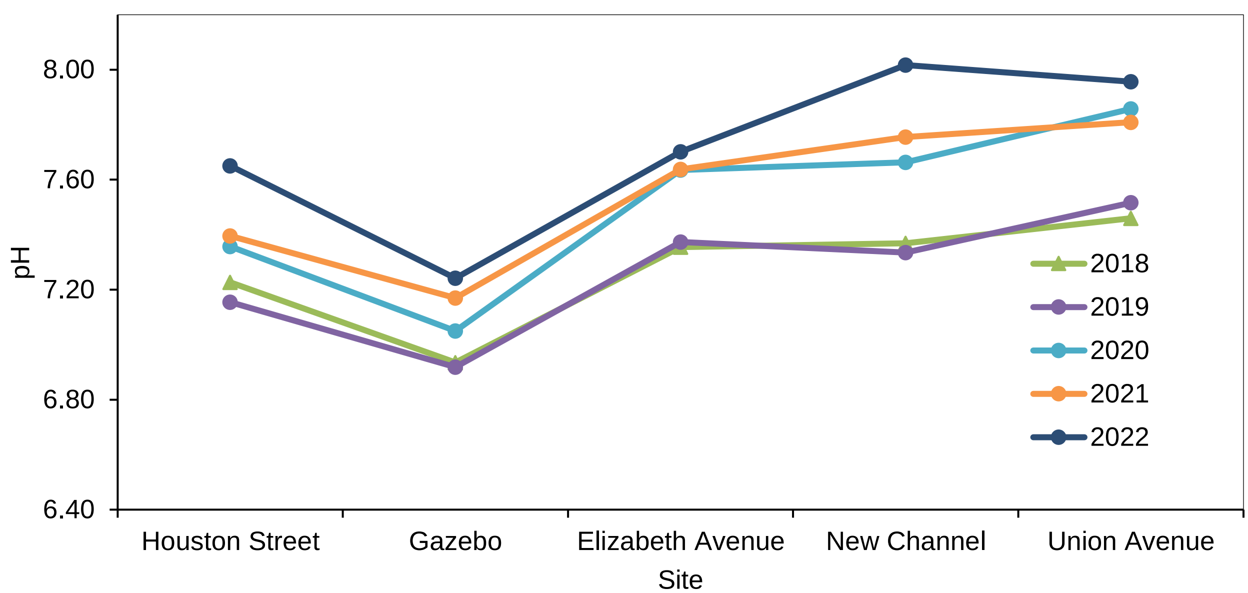

Figure D2. **Annual average pH values at five sites on the Comal River system (2018–2022).**

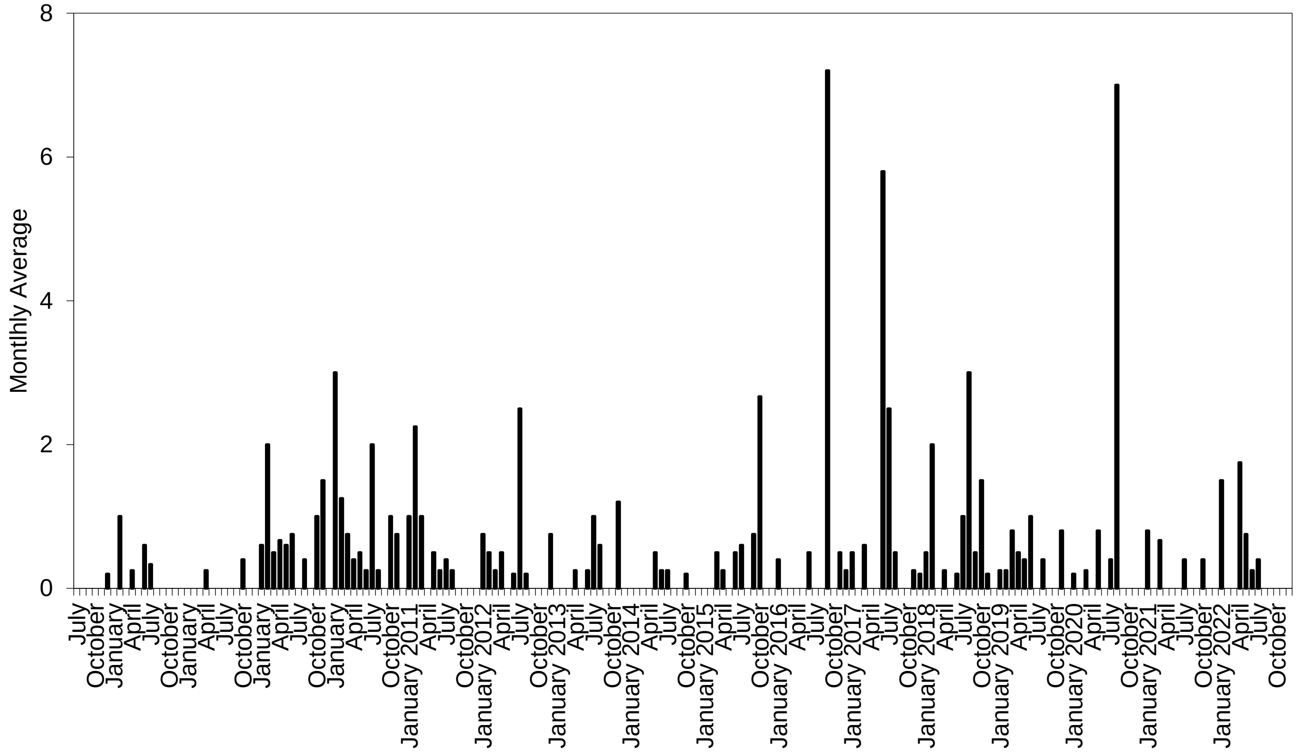

Figure D3. **Average daily recreational user counts at the Elizabeth Avenue site (2006–2022).**

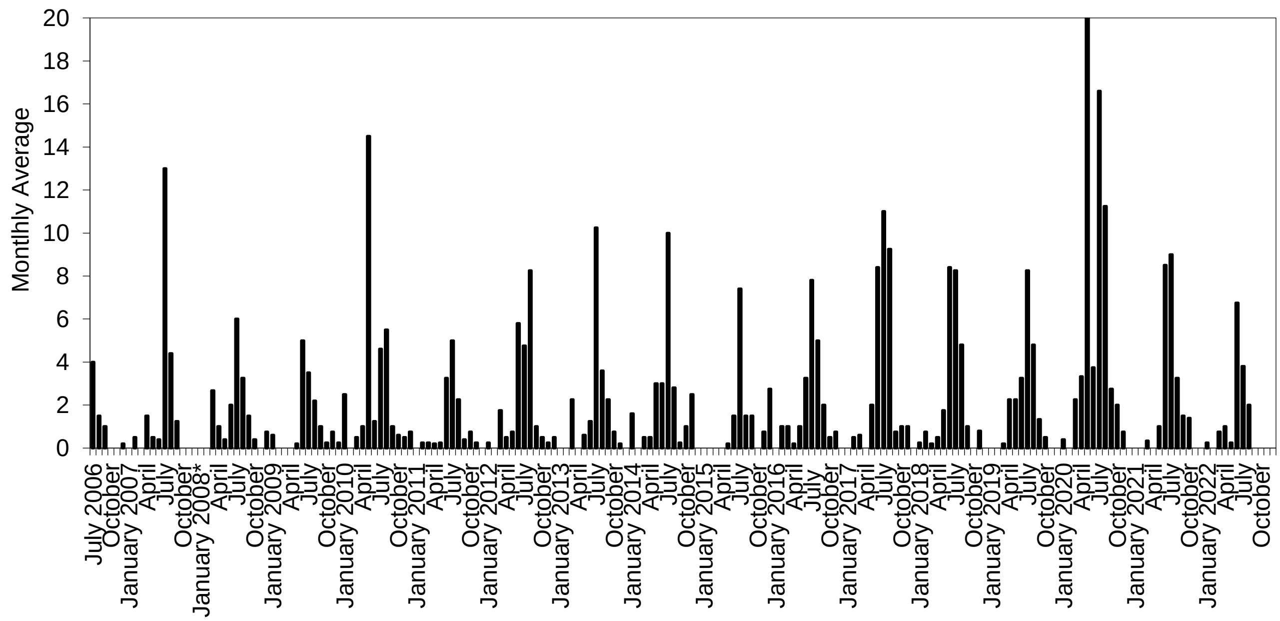

Figure D4. **Average daily recreational user counts at the Upper Spring Run site (2006–2022).**

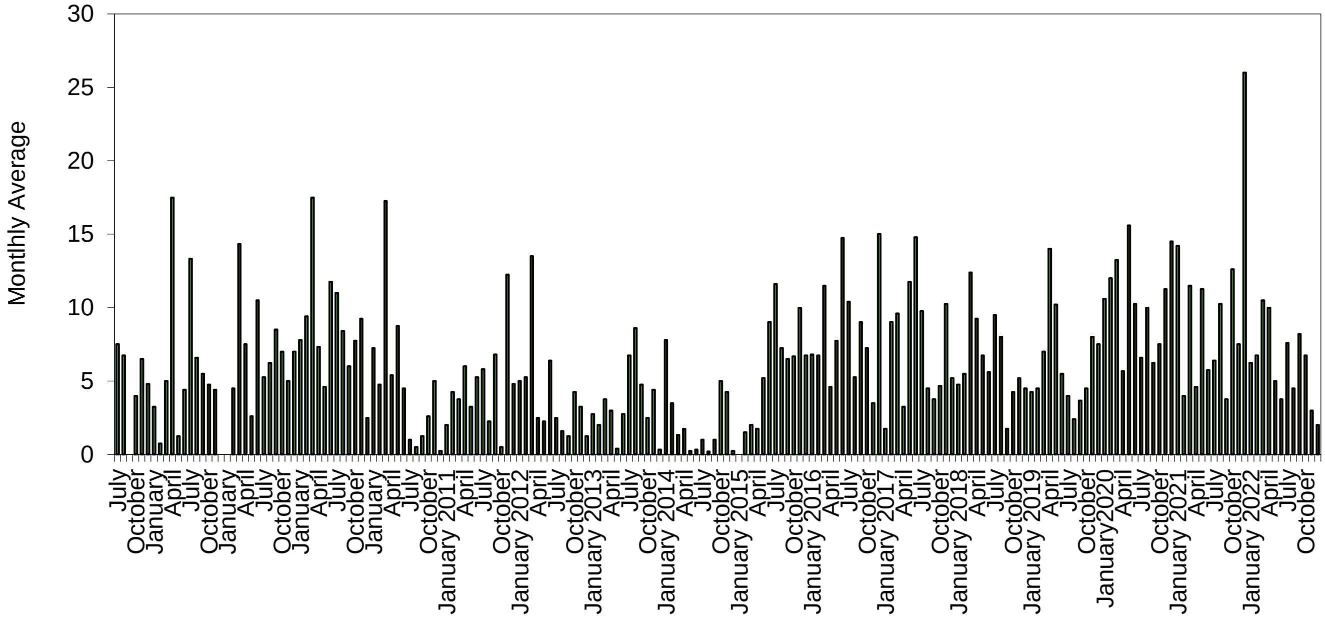

Figure D5. **Average daily user counts at the Landa Lake Park Gazebo site (2006–2022).**

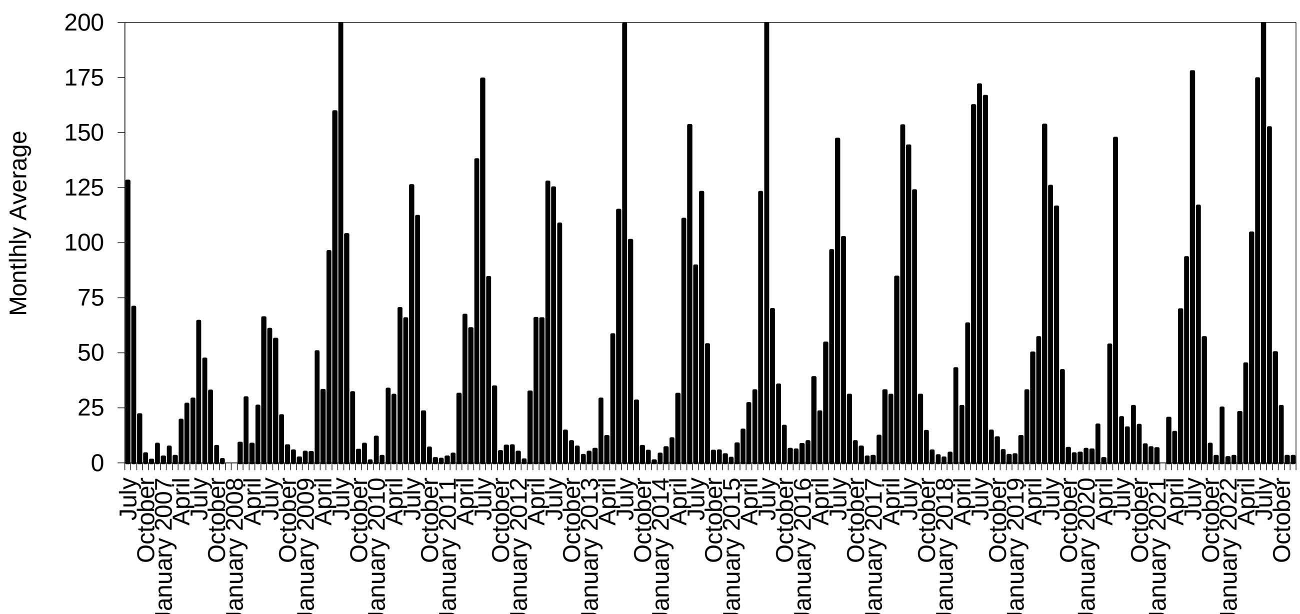

Figure D6. **Average daily user counts at the New Channel site (2006-2022).**

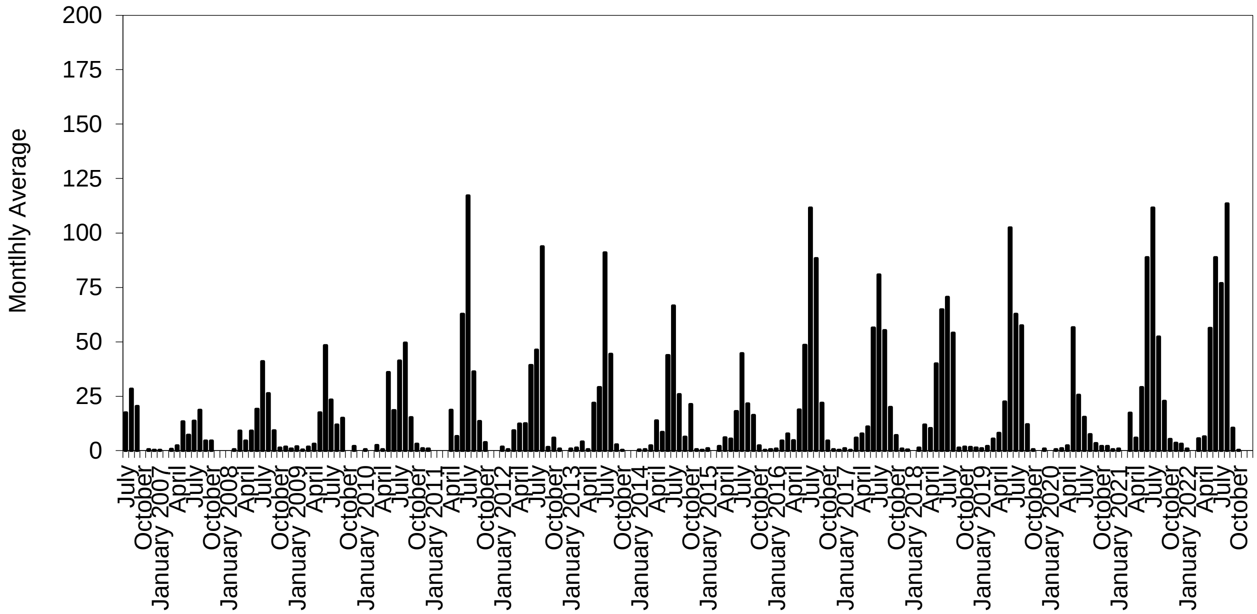

Figure D7. Average daily recreational user counts at the Union Avenue site (2006–2022).

APPENDIX E: TABLES AND FIGURES

TABLES

Fish Assemblage Results:
Drop-Net and Fish Community Sampling

Table E1. Overall number (#) and percent relative abundance (%) of fishes collected from the three long-term biological goals study reaches during drop-net sampling in 2022.

TAXA	UPPER SPRING RUN		LANDA LAKE		OLD CHANNEL		NEW CHANNEL	
	#	%	#	%	#	%	#	%
Cyprinidae								
Dionda nigrotaeniata	237	53.99	16	0.91	23	2.79	13	1.93
Notropis amabilis	0	0.00	0	0.00	1	0.12	0	0.00
Characidae								
*Astyanax mexicanus**	18	4.10	29	1.66	25	3.03	3	0.45
Ictaluridae								
Ameiurus natalis	1	0.23	15	0.86	0	0.00	4	0.60
Loricariidae								
*Hypostomus plecostomus**	0	0.00	0	0.00	1	0.12	0	0.00
Poeciliidae								
Gambusia sp.	4	0.91	54	3.09	13	1.58	78	11.61
Centrarchidae								
*Ambloplites rupestris**	0	0.00	0	0.00	0	0.00	2	0.30
Lepomis cyanellus	0	0.00	0	0.00	0	0.00	22	3.27
Lepomis gulosus	0	0.00	0	0.00	0	0.00	3	0.45
Lepomis miniatus	36	8.20	78	4.46	55	6.67	180	26.79
Lepomis sp.	11	2.51	76	4.35	34	4.13	84	12.50
Micropterus salmoides	11	2.51	24	1.37	2	0.24	29	4.32
Percidae								
Etheostoma fonticola	102	23.23	1457	83.30	633	76.82	173	25.74
Etheostoma lepidum	10	2.28	0	0.00	0	0.00	13	1.93
Cichlidae								
*Herichthys cyanoguttatus**	9	2.05	0	0.00	37	4.49	65	9.67
*Oreochromis aureus**	0	0.00	0	0.00	0	0.00	3	0.45
Total	**439**		**1749**		**824**		**672**	

Asterisks (*) denotes introduced species

Table E2. Overall number (#) and percent relative abundance (%) of fishes collected during fish community sampling in 2022.

TAXA	UPPER SPRING RUN		LANDA LAKE		OLD CHANNEL		NEW CHANNEL	
	#	%	#	%	#	%	#	%
Cyprinidae								
Cyprinella venusta	0	0.00	0	0.00	5	0.27	1	0.03
Dionda nigrotaeniata	1128	32.73	3481	63.19	310	16.91	342	11.06
Notropis amabilis	105	3.05	241	4.37	272	14.84	672	21.73
Notropis volucellus	0	0.00	0	0.00	87	4.75	65	2.10
Catastomidae								
Moxostoma congestum	0	0.00	1	0.02	0	0.00	0	0.00
Characidae								
*Astyanax mexicanus**	230	6.67	511	9.28	250	13.64	475	15.36
Ictaluridae								
Ameiurus natalis	1	0.03	0	0.00	1	0.05	7	0.23
Ictaluris punctatus	0	0.00	0	0.00	2	0.11	0	0.00
Loricariidae								
Loricariidae sp.	0	0.00	1	0.02	8	0.44	7	0.23
Fundulidae								
Fundulus notatus	0	0.00	0	0.00	1	0.05	0	0.00
Poeciliidae								
Gambusia affinis	64	1.86	0	0.00	38	2.07	70	2.26
Gambusia geiseri	31	0.90	0	0.00	39	2.13	129	4.17
Gambusia sp.	657	19.07	566	10.27	319	17.40	154	4.98
*Poecilia latipinna**	0	0.00	20	0.36	1	0.05	0	0.00
Centrarchidae								
*Ambloplites rupestris**	0	0.00	0	0.00	3	0.16	3	0.10
*Lepomis auritus**	62	1.80	3	0.05	78	4.26	191	6.18
Lepomis cyanellus	0	0.00	0	0.00	1	0.05	1	0.03
Lepomis gulosus	0	0.00	0	0.00	1	0.05	2	0.06
Lepomis macrochirus	11	0.32	0	0.00	2	0.11	25	0.81
Lepomis megalotis	21	0.61	0	0.00	9	0.49	45	1.45
Lepomis miniatus	14	0.41	1	0.02	10	0.55	49	1.58
Lepomis sp.	50	1.45	19	0.34	35	1.91	196	6.34
Micropterus punctatus	0	0.00	0	0.00	0	0.00	1	0.03
Micropterus salmoides	561	16.28	278	5.05	58	3.16	239	7.73
Micropterus sp.	1	0.03	0	0.00	0	0.00	0	0.00
Percidae								
Etheostoma fonticola	306	8.88	304	5.52	170	9.27	300	9.70
Etheostoma lepidum	112	3.25	62	1.13	25	1.36	71	2.30
Etheostoma sp.	67	1.94	20	0.36	11	0.60	22	0.71
Etheostoma spectabile	0	0.00	1	0.02	0	0.00	0	0.00

<u>**Cichlidae**</u>								
*Herichthys cyanoguttatus**	25	0.73	0	0.00	97	5.29	26	0.84
Total	**3446**		**5509**		**1833**		**3093**	

Asterisks (*) denotes introduced species

Table E3. Total numbers of stygobitic and endangered species collected at each site (24 hours per event) during spring and fall 2022. Federally endangered species are designated with (E). A = adults; L = larvae.

TAXA	RUN 1	RUN 3	UPWELLING	TOTAL
Crustaceans				
Amphipoda				
Crangonyctidae				
Stygobromus pecki (E)	8	9	12	29
Stygobromus russelli				0
Stygobromus bifurcatus				0
Stygobromus flagellatus				0
Stygobromus spp.	93	108	262	463
All *Stygobromus*	101	117	274	492
Hadziidae				
Mexiweckelia hardeni	5	20		25
Sebidae				
Seborgia relicta	5	4	5	14
Bogidiellidae				
Artesia subterranea	2			2
Parabogidiella americana				0
Ingolfiellidae				
Ingolfiella n. sp		1		1
Isopoda				
Asellidae				
Lirceolus spp.	35	101	10	146
Cirolanidae				
Cirolanides texensis			1	1
Cirolanides wassenichae				0
Microceberidae				
Texicerberus sp.				0
Ostracoda				
Candonidae				

Comalcandona tressleri	52	131	2	185
Comalcandona gibsoni	1	10		11
Rugosuscandona scharfi		2		2
Ufocandona hannaleeae				0
Thermosbaenacea				
Monodellidae				
Tethysbaena texana				0
Bathynellacea				
Parabathynellidae				
Texanobathynella bowmani				0
Bathynellidae				
Hobbsinella edwardensis				0
Turbellaria				
Kenkiidae				
Sphalloplana mohri				0
Mollusca				
Gastropda				
Cochliopidae				
Phreatodrobia nugax				0
Phreatodrobia micra	1	1		2
Phreatodrobia plana		35	10	45
Phreatodrobia rotunda		3		3
Phreatodrobia spica	1	42		43
Undescribed genus	1	23	1	25
Annelids				
Lumbriculata				
Lumbriculidae				
Eremidrilus sp.?	1	4	3	8
Haplotaxis sp.?	15			15
Arachnids				
Hydrachnoidea				

Hydryphantidae				
Almuerzothyas comalensis	1			1
<u>Insects</u>				
Coleoptera				
Dytiscidae				
Comaldessus stygius		3(A)		3
Haideoporus texanus				0
Dryopidae				
Stygoparnus comalensis (E)				0
Elmidae				
Heterelmis comalensis (E)				0

FIGURES

Springflow: M9 Measurements

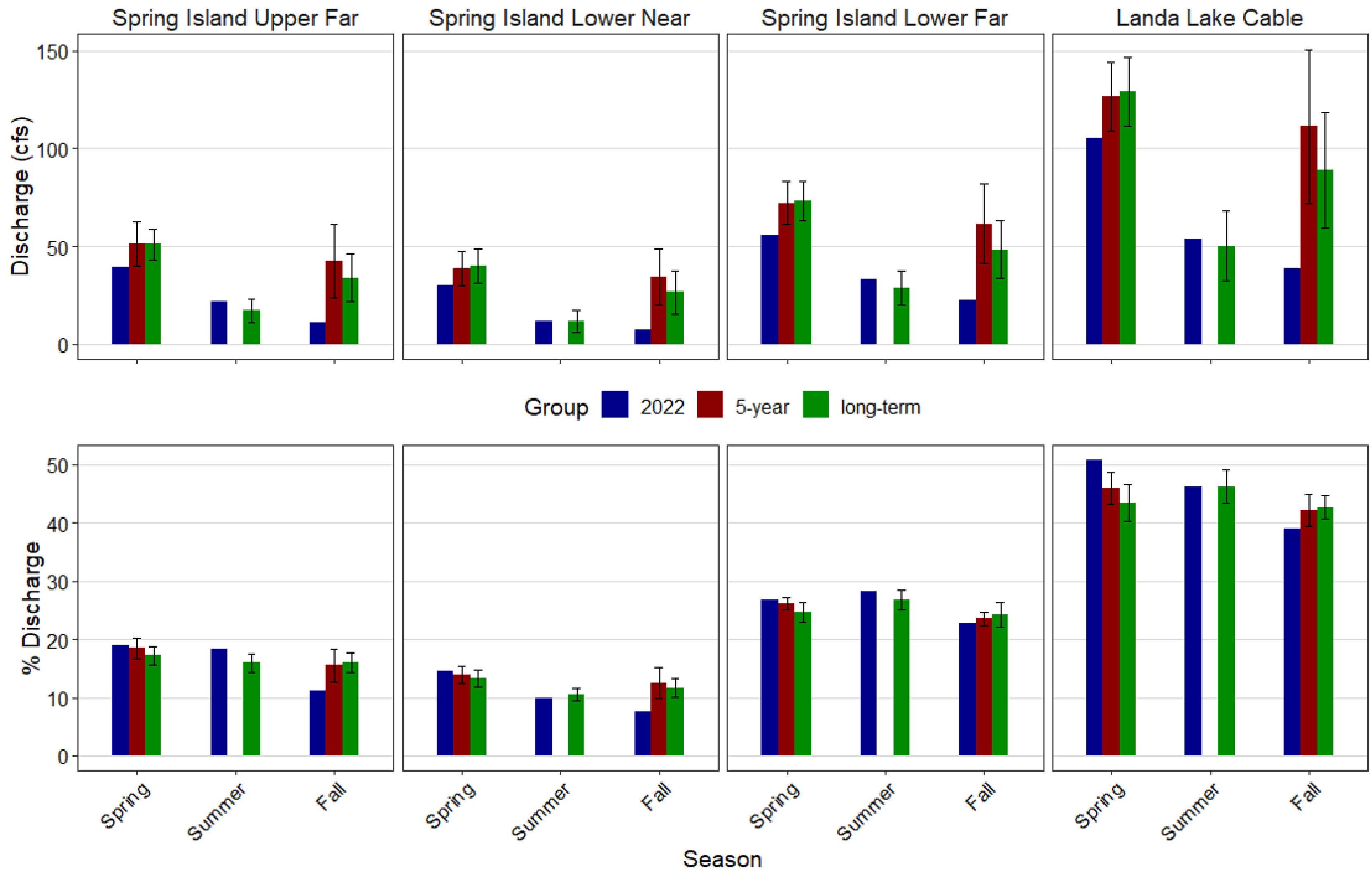

Figure E1. **Current (blue bars), five-year (2018–2022; red bars), and long-term (2014–2022; green bars) discharge and percent total discharge based on spring and fall M9 measurements in the Comal Springs/River. Five-year and long-term values are represented as means and error bars denote 95% confidence intervals.**

Aquatic Vegetation

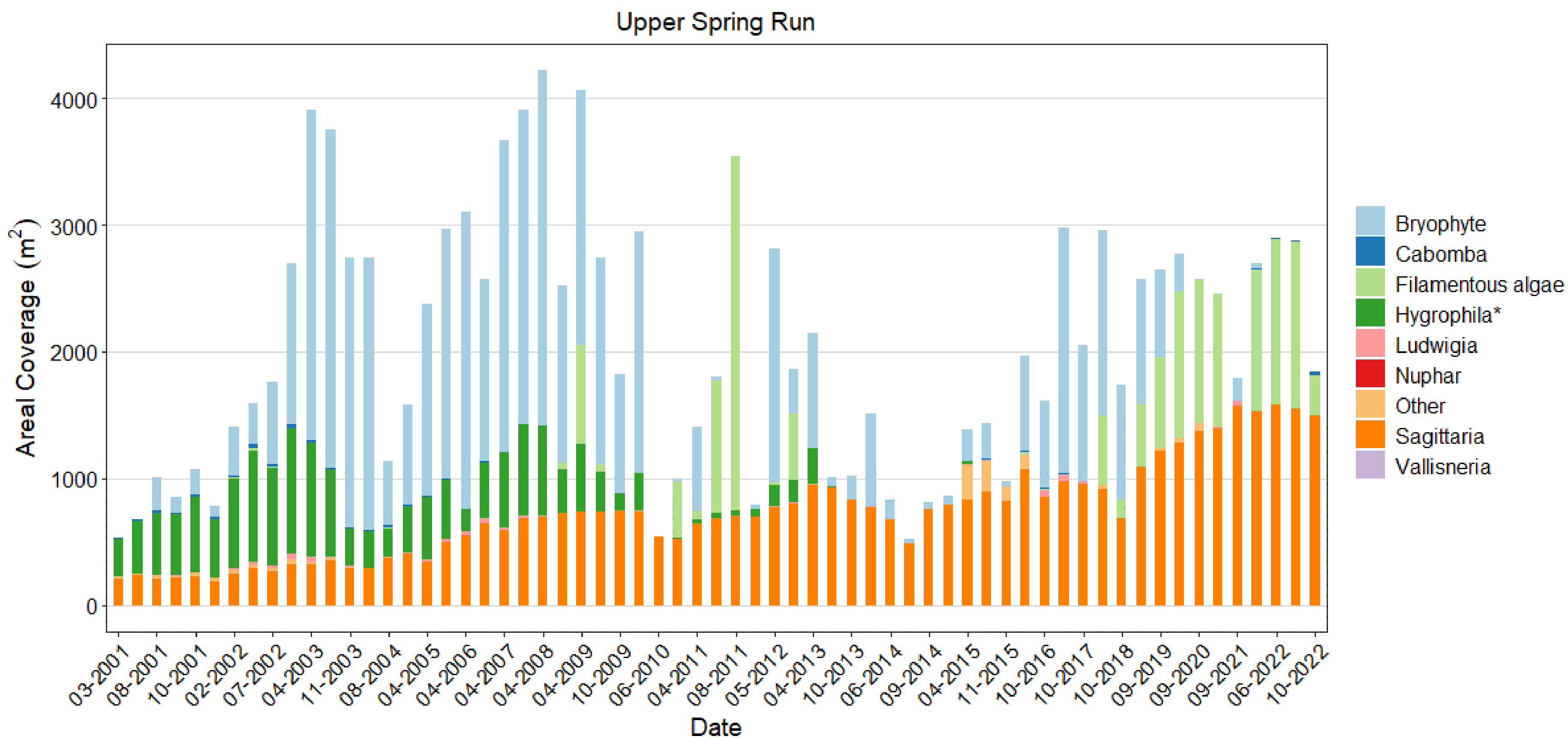

Figure E2. **Aquatic vegetation composition (m²) among select taxa from 2001–2022 at the Upper Spring Run.**

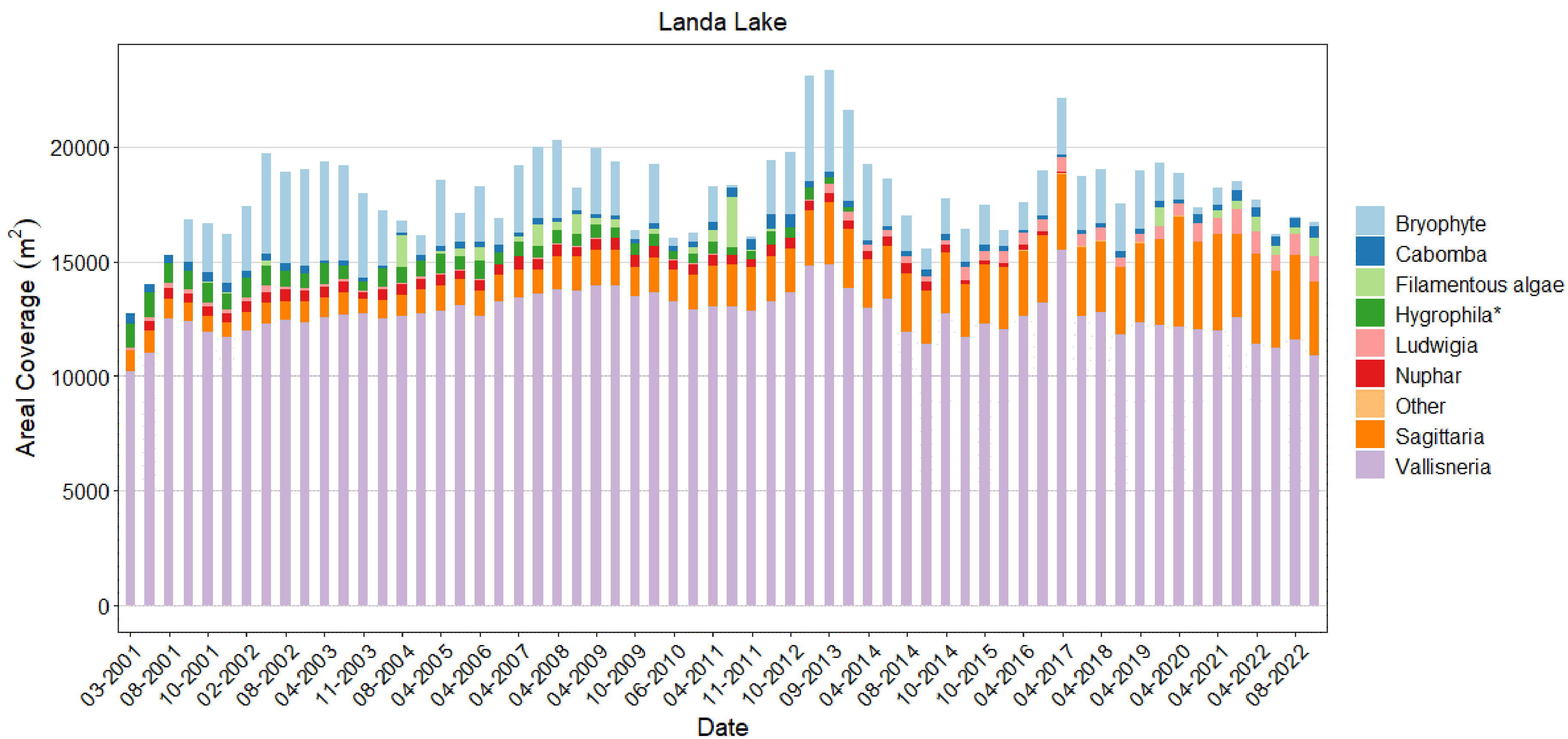

Figure E3. Aquatic vegetation composition (m²) among select taxa from 2001–2022 at Landa Lake

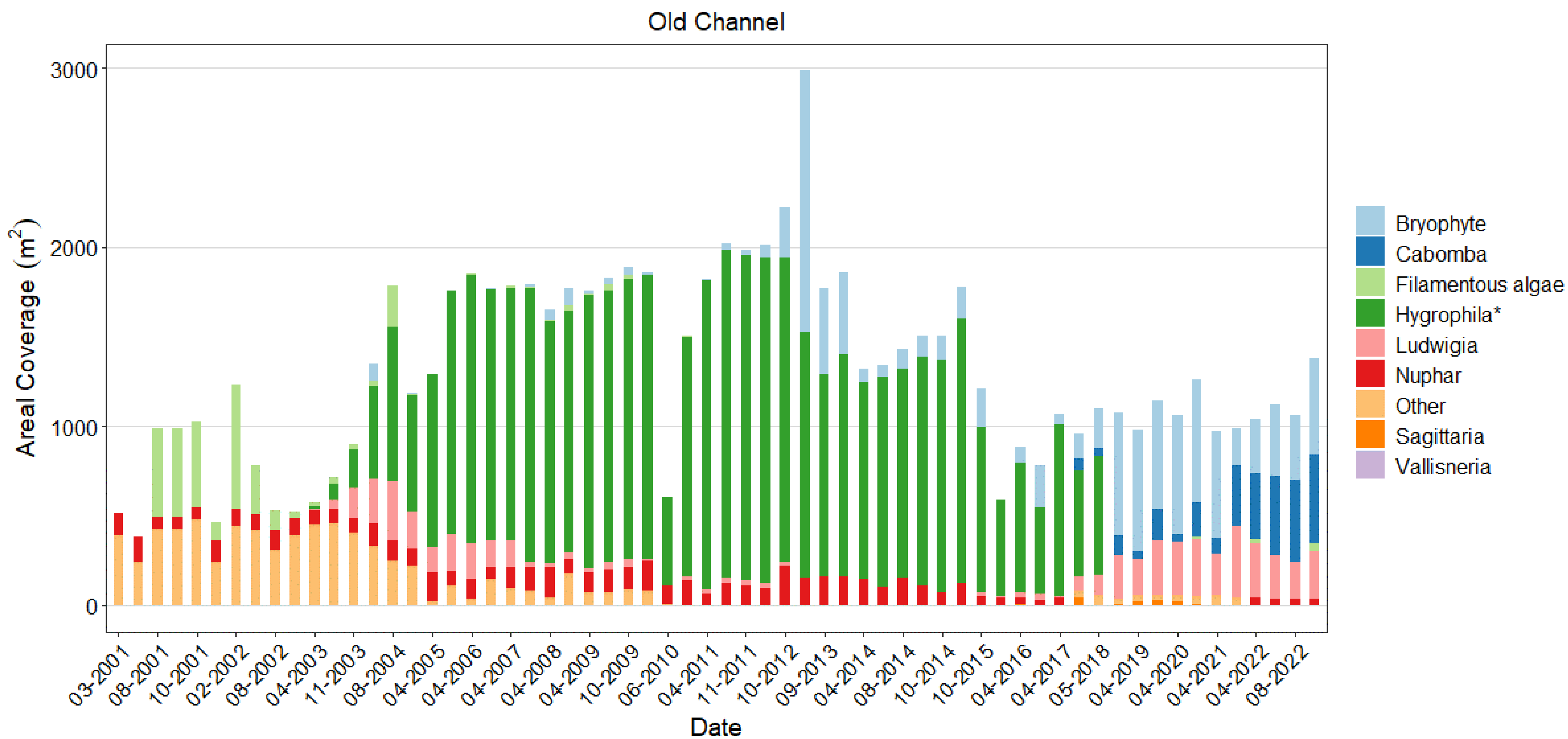

Figure E4. **Aquatic vegetation composition (m^2) among select taxa from 2001–2022 at the Old Channel.**

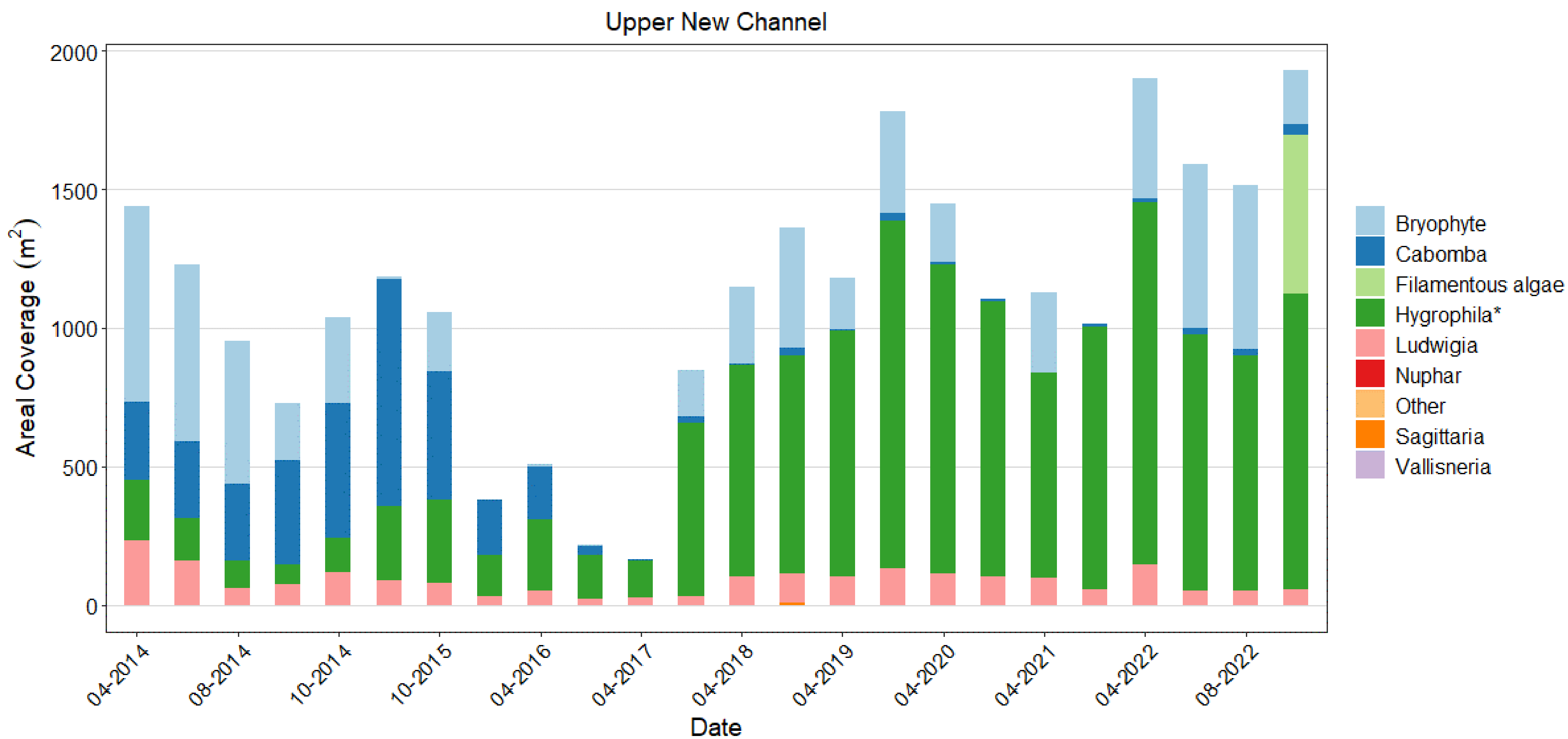

Figure E5. **Aquatic vegetation composition (m^2) among select taxa from 2014–2022 at the Upper New Channel.**

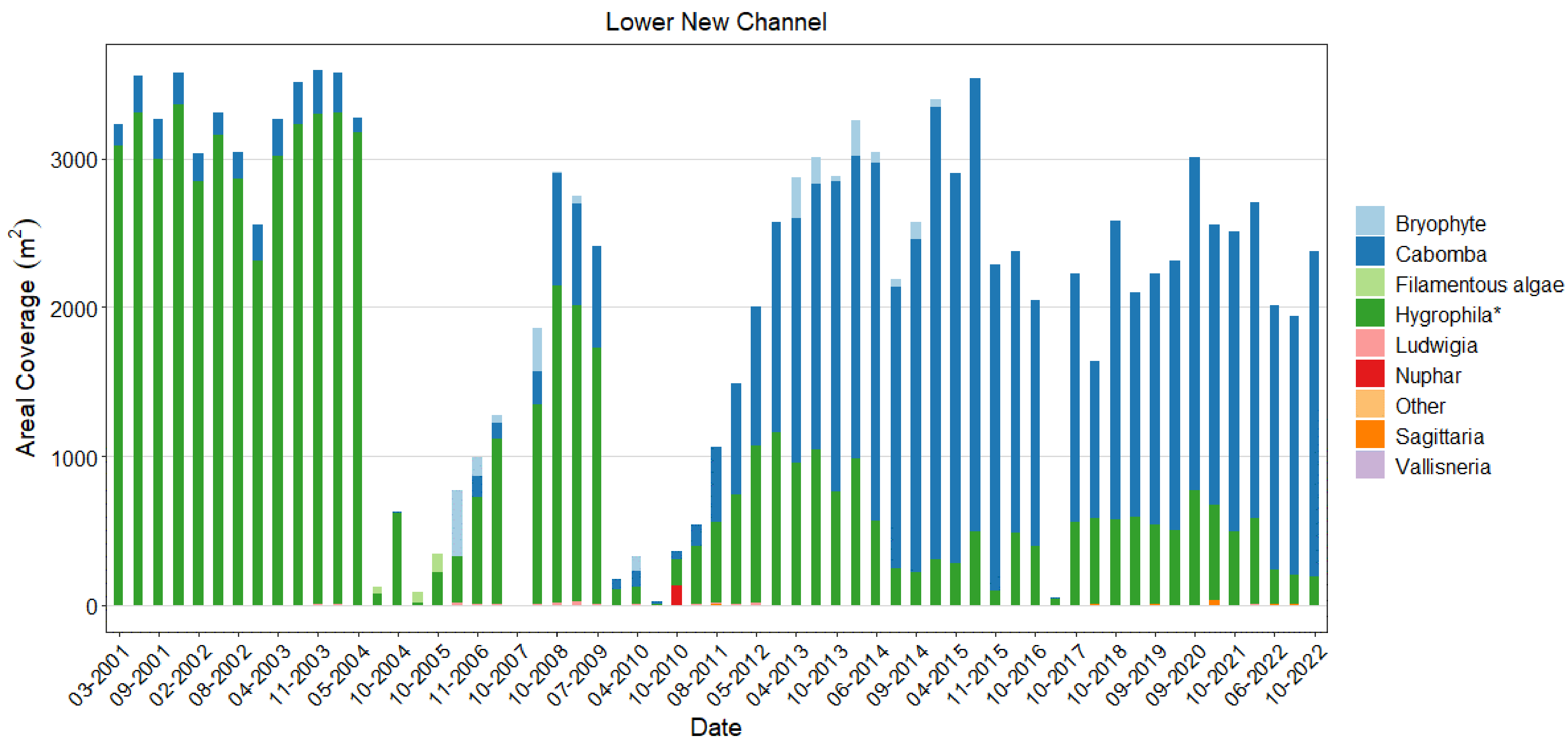

Figure E6. Aquatic vegetation composition (m²) among select taxa from 2001–2022 at the Lower New Channel. (*) in the legend denotes non-native taxa.

Fountain Darter

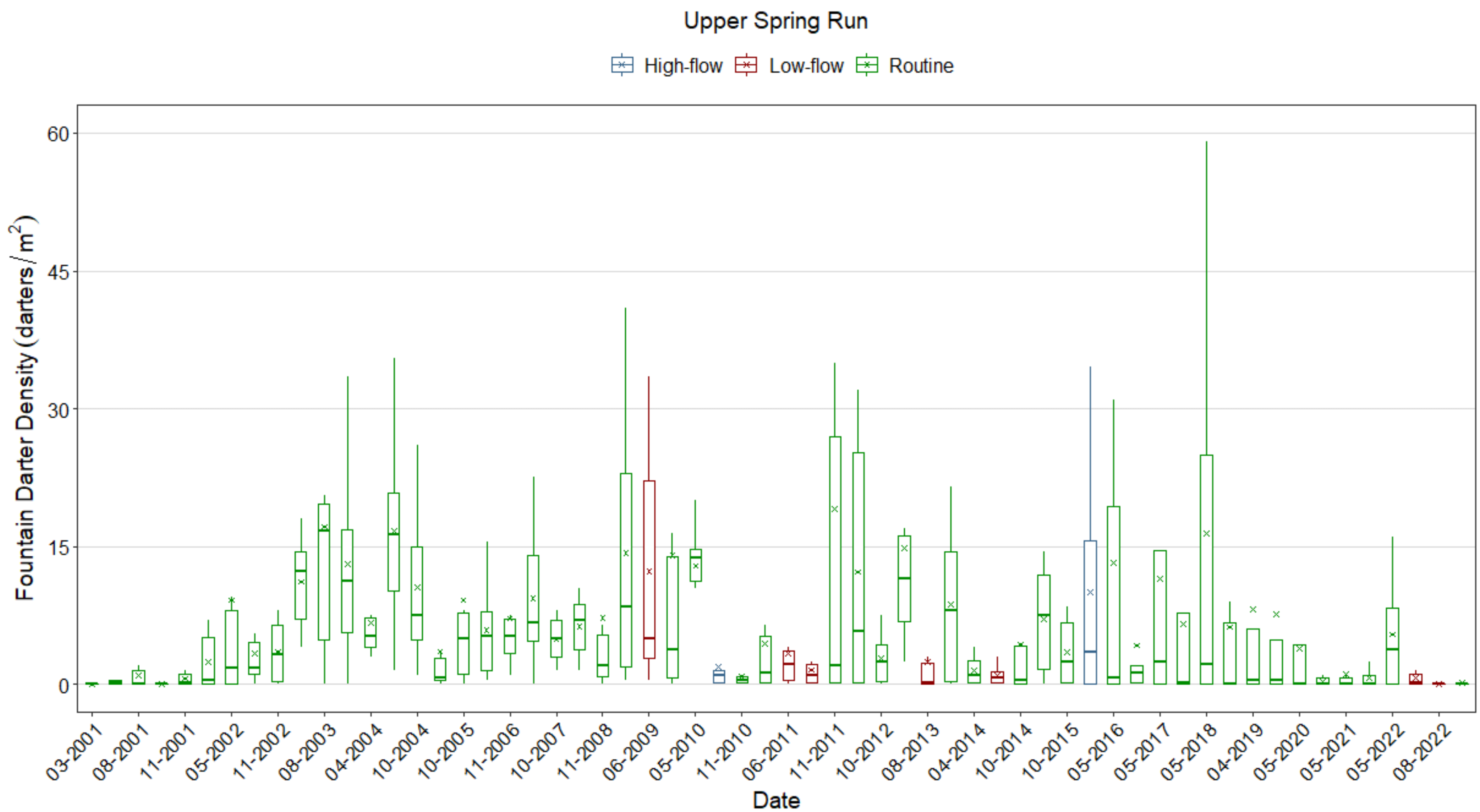

Figure E7. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) from 2001–2022 during drop-net sampling at Upper Spring Run. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

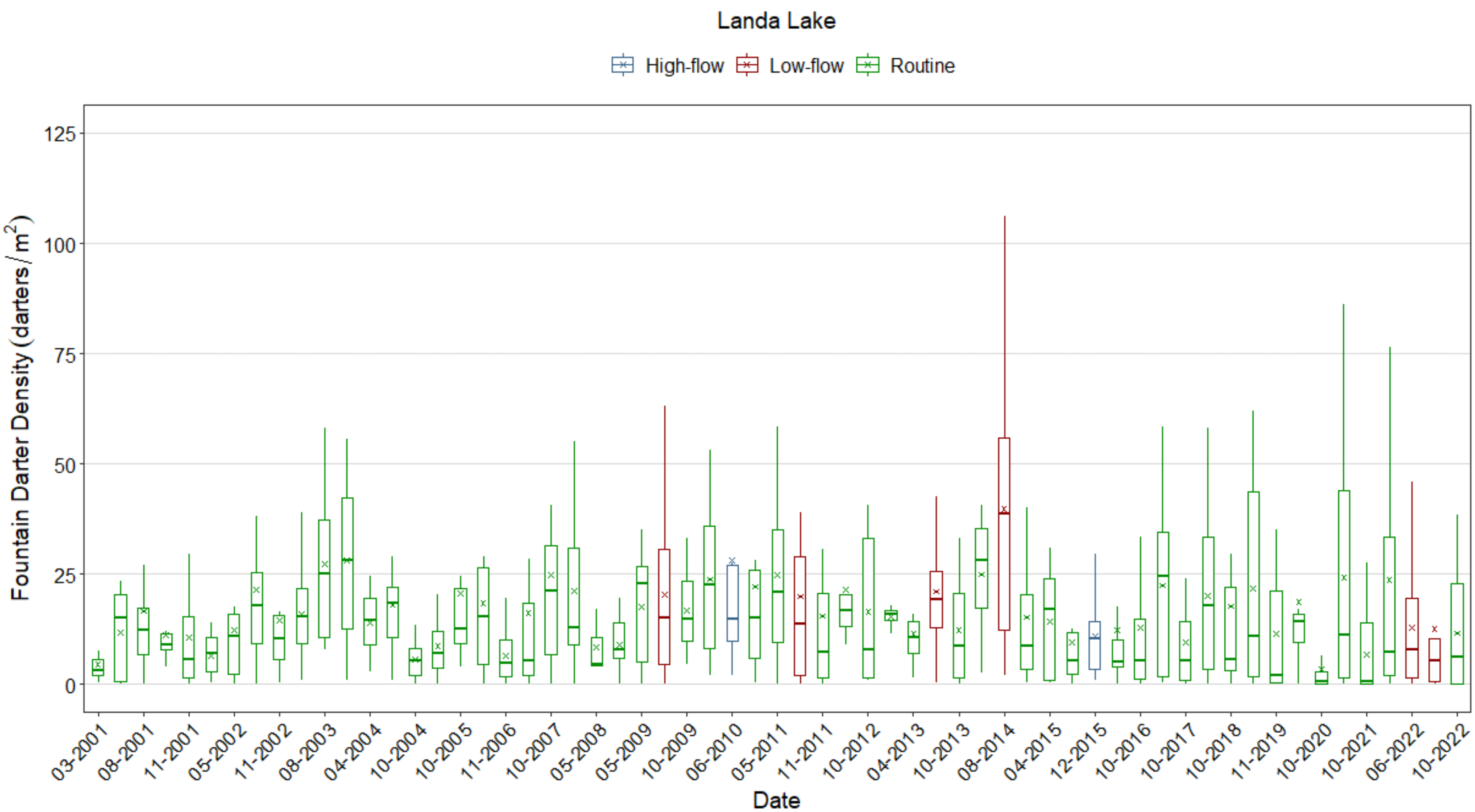

Figure E8. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) from 2001–2022 during drop-net sampling at Landa Lake. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

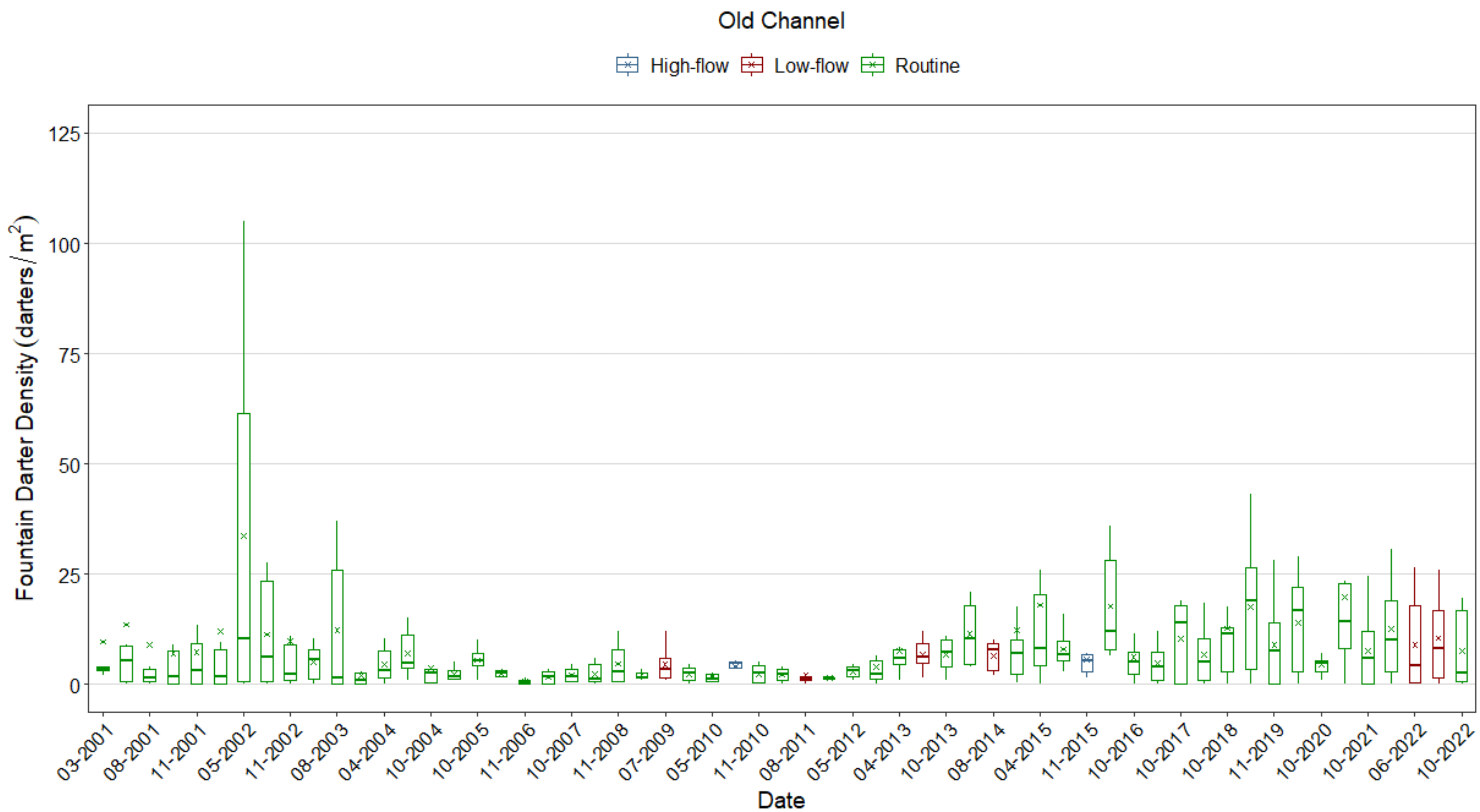

Figure E9. **Boxplots displaying temporal trends in Fountain Darter density (darters/m²) from 2001–2022 during drop-net sampling at Old Channel. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

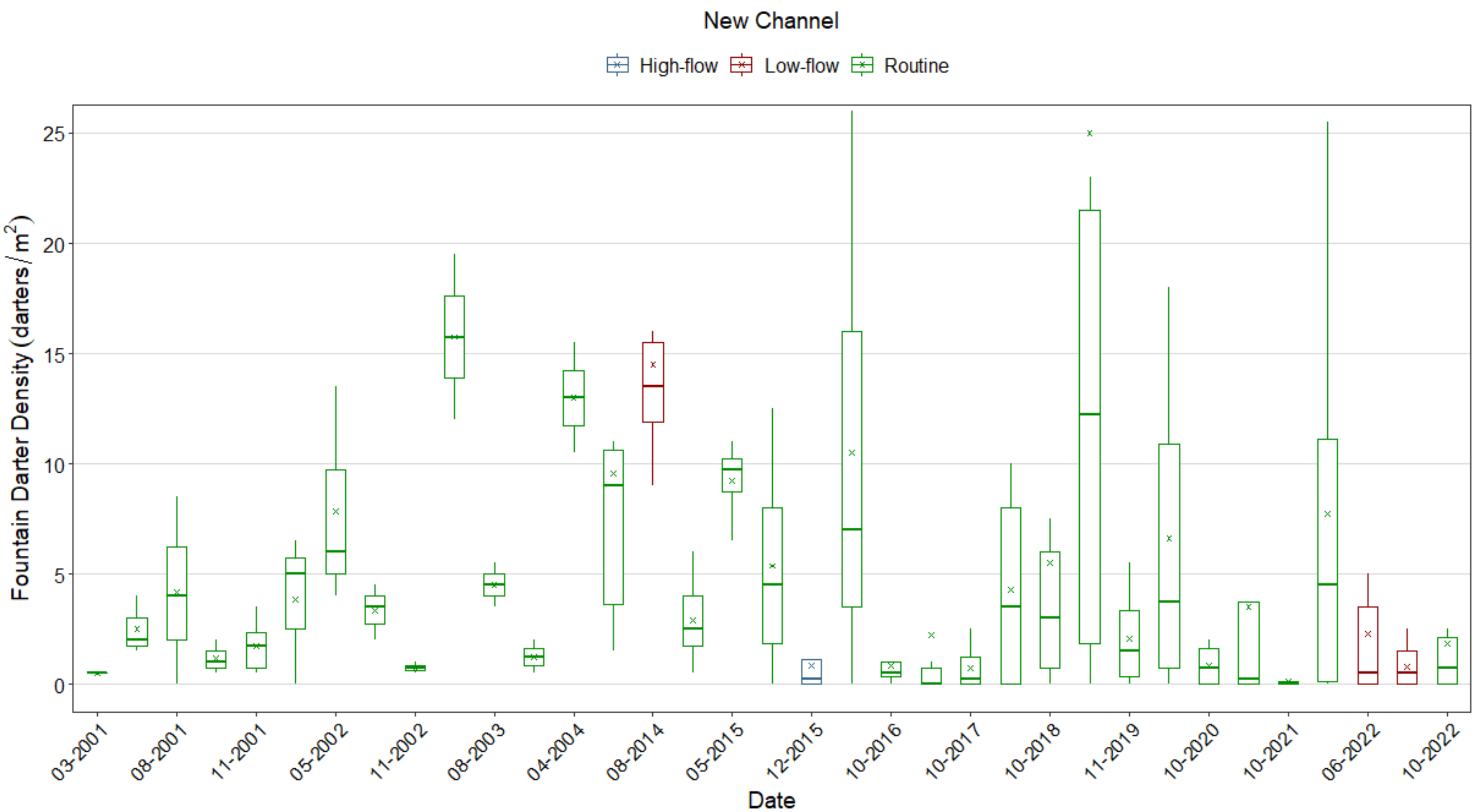

Figure E10. **Boxplots displaying temporal trends in Fountain Darter density (darters/m²) from 2001–2004 and 2014–2022 during drop-net sampling at New Channel. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

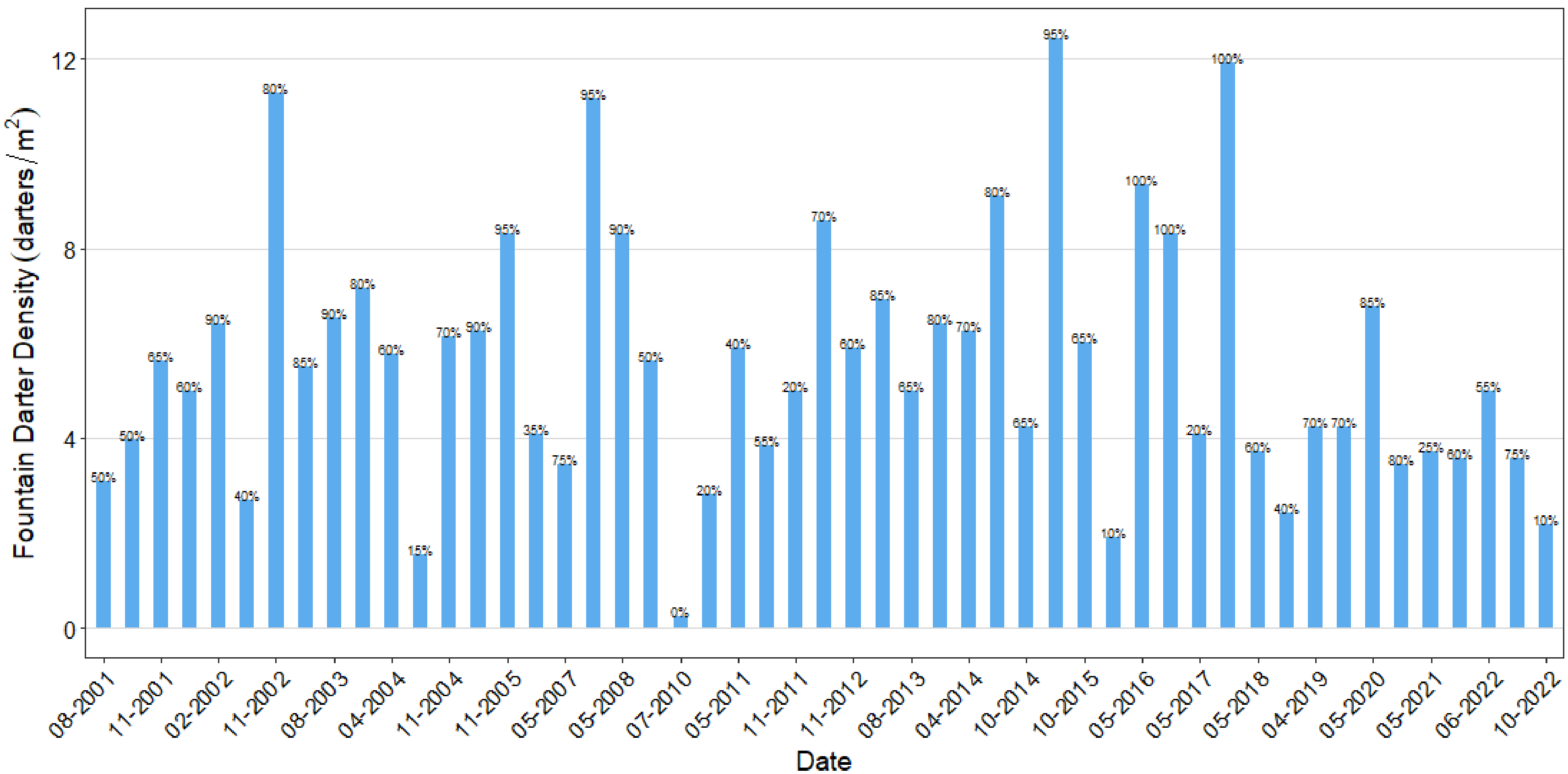

Figure E11. **Boxplots displaying temporal trends in Fountain Darter density (darters/m²) from 2001–2022 during visual surveys at Landa Lake. Percentages above the bars represent bryophyte coverage observed during each survey event.**

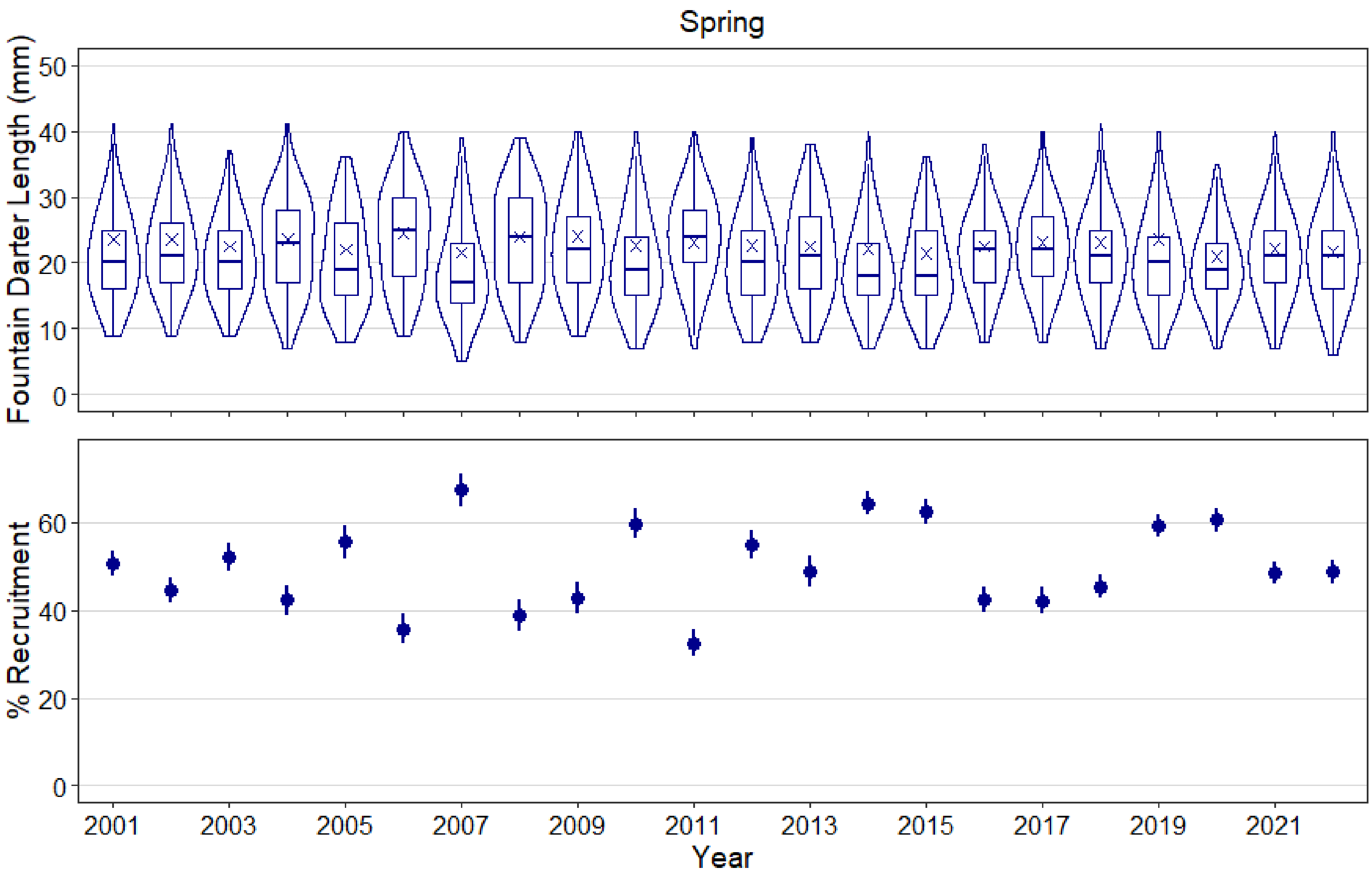

Figure E12. Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the Comal Springs and River during spring sampling (i.e., drop-net and timed dip-net data) events from 2001–2022. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability density; polygons outlining boxplots). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. Recruitment is the percent relative abundance (± 95% CI) of darters ≤20 mm.

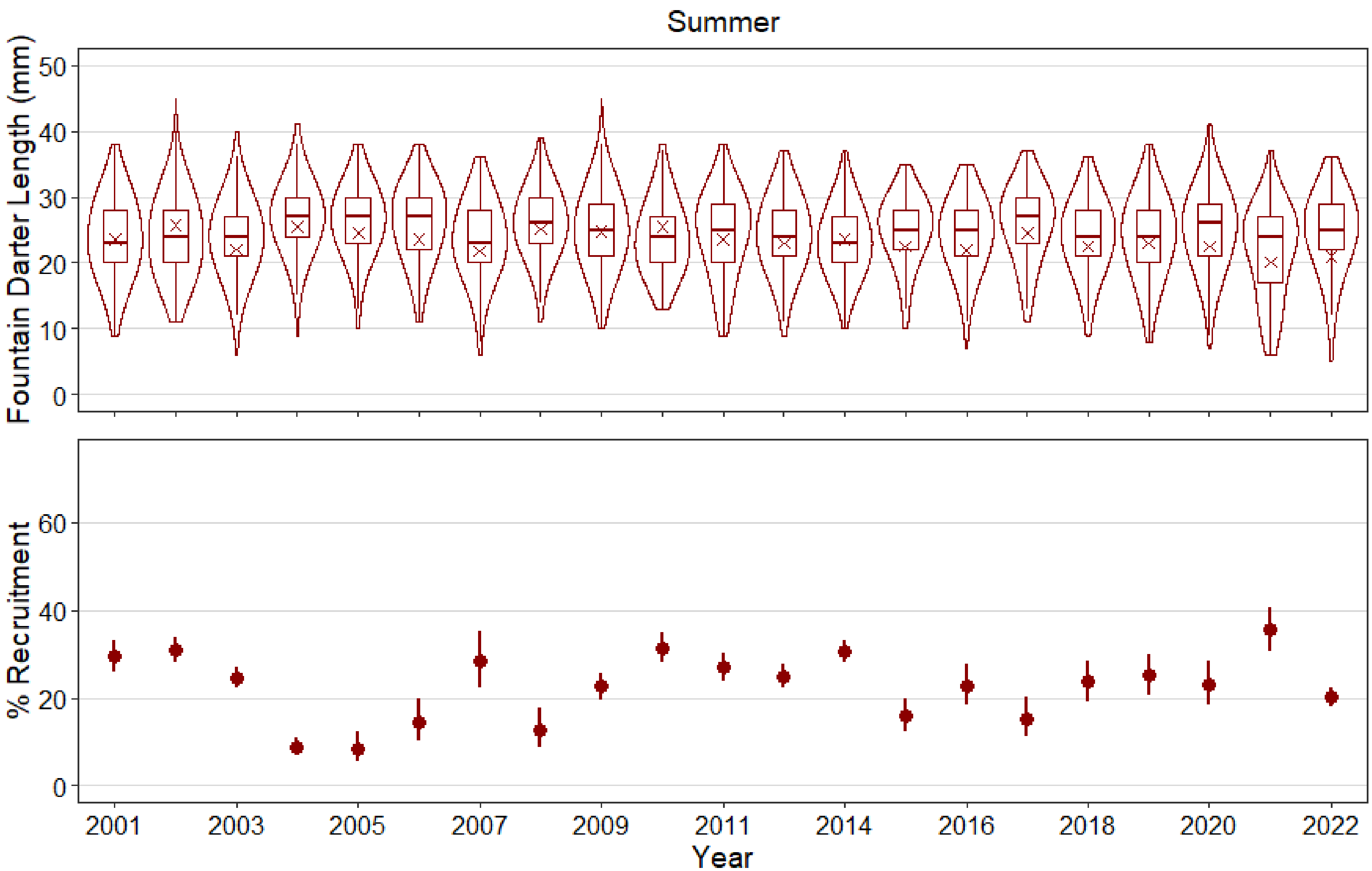

Figure E13. **Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the Comal Springs and River during summer sampling (i.e., drop-net and timed dip-net data) events from 2001–2022. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability density; polygons outlining boxplots). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. Recruitment is the percent relative abundance (± 95% CI) of darters ≤20 mm.**

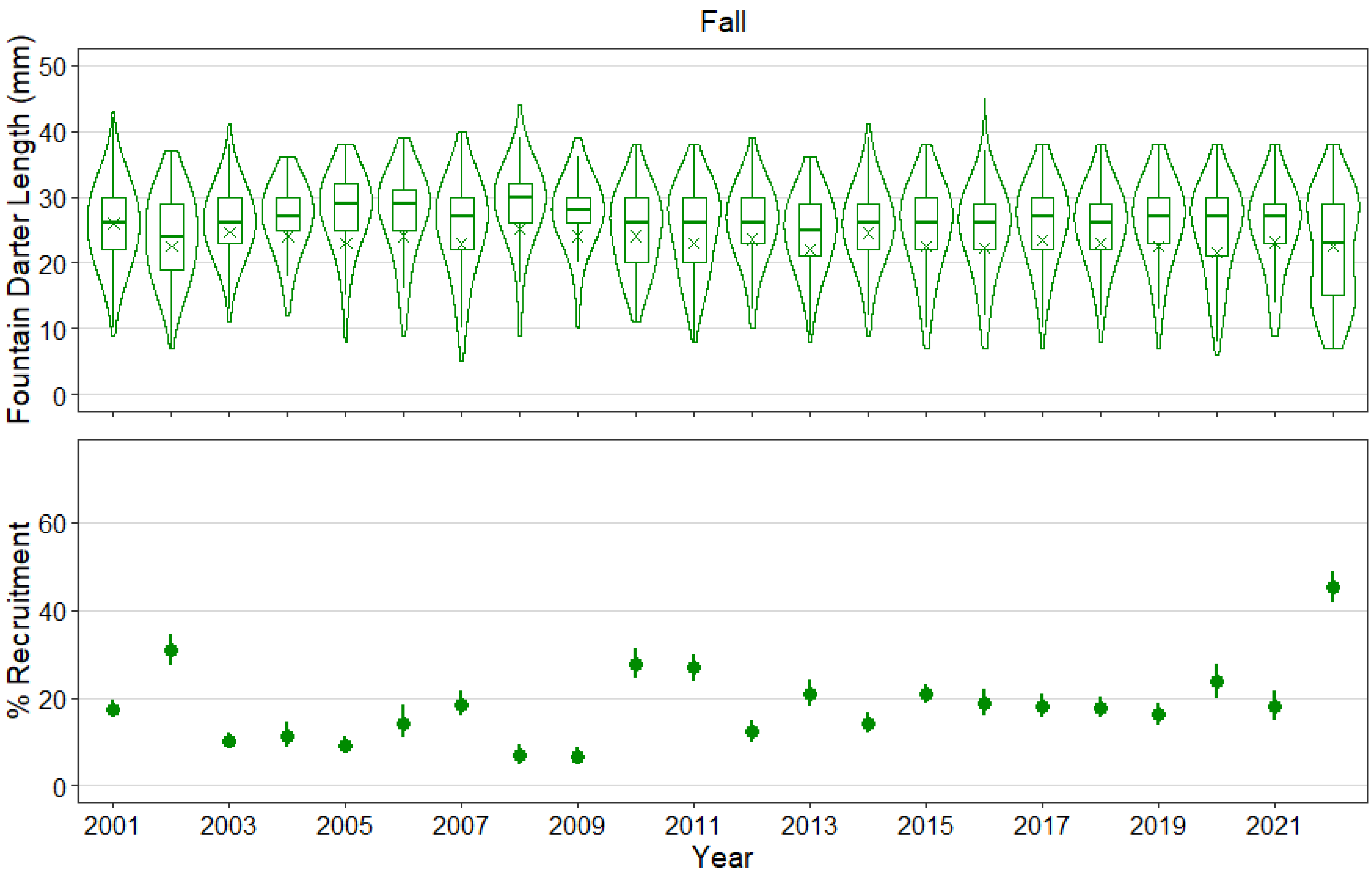

Figure E14. **Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the Comal Springs and River during fall sampling (i.e., drop-net and timed dip-net data) events from 2001–2022. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability density; polygons outlining boxplots). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. Recruitment is the percent relative abundance (± 95% CI) of darters ≤20 mm.**

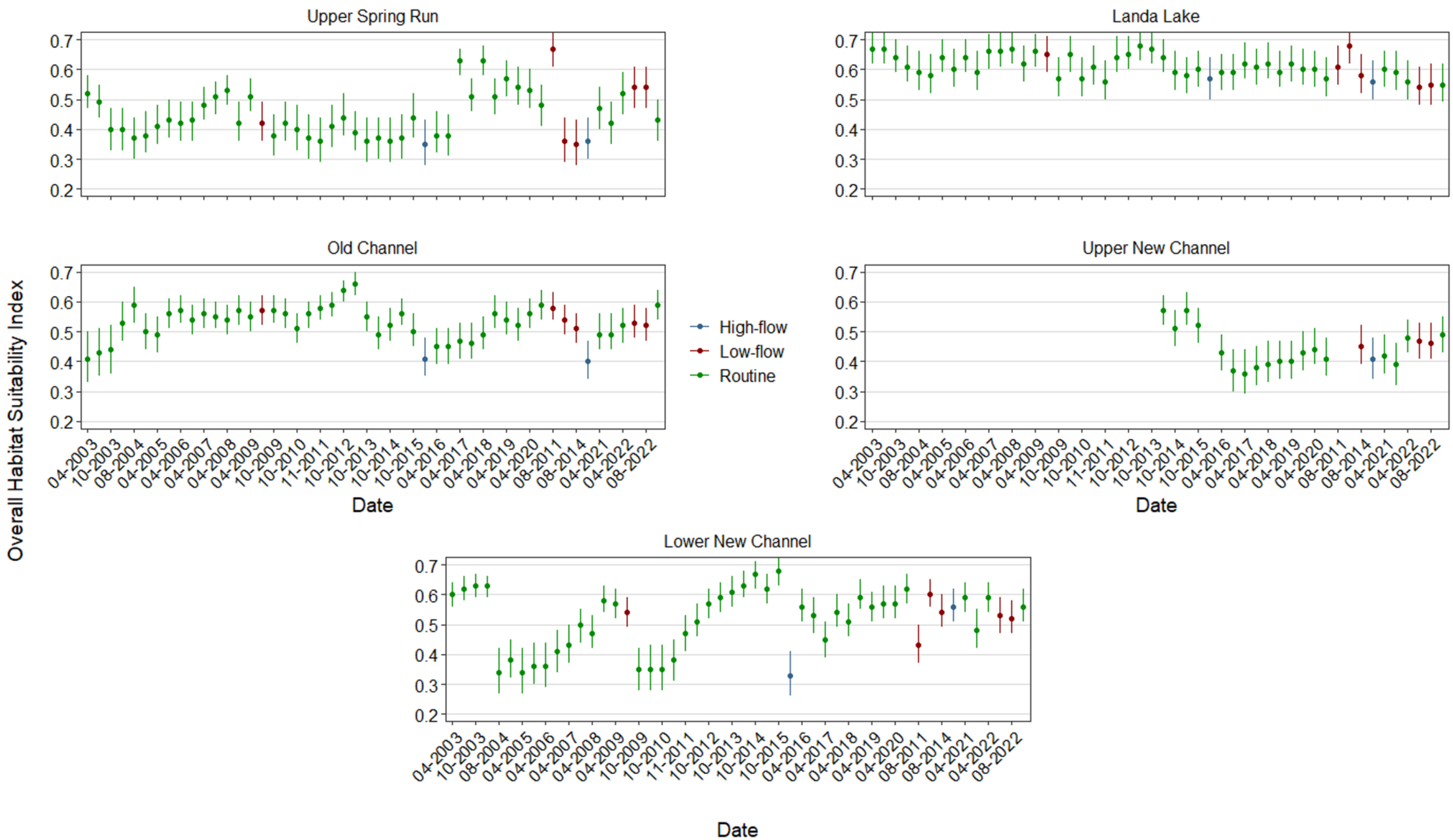

Figure E15. **Overall Habitat Suitability Index (OHSI) (±95% CI) from 2003–2022 among study reaches in the Comal Springs/River.**

Fish Community

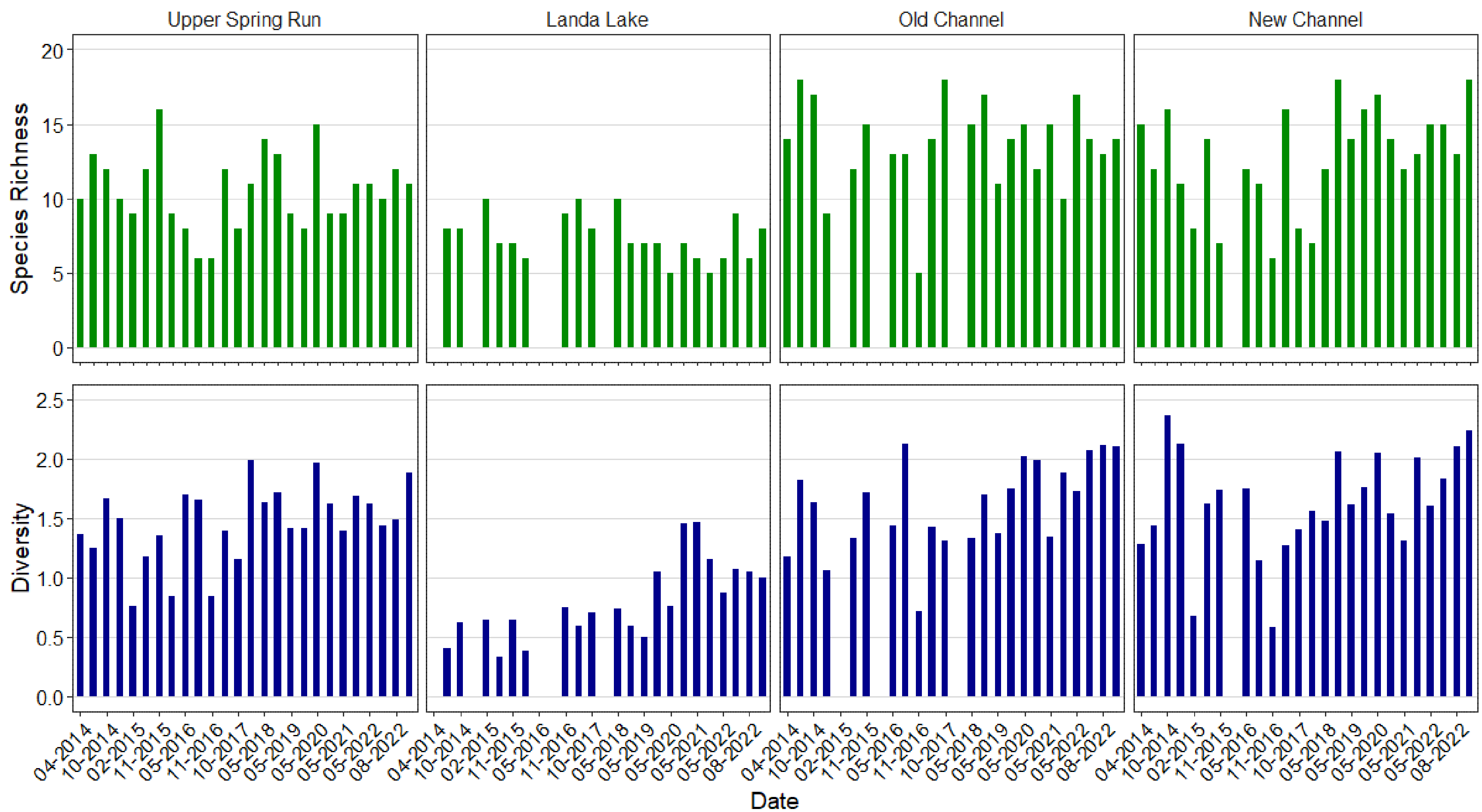

Figure E16. Bar graphs displaying temporal trends in species richness and diversity among study reaches from 2014–2022 during fish community sampling in the Comal Springs/River.

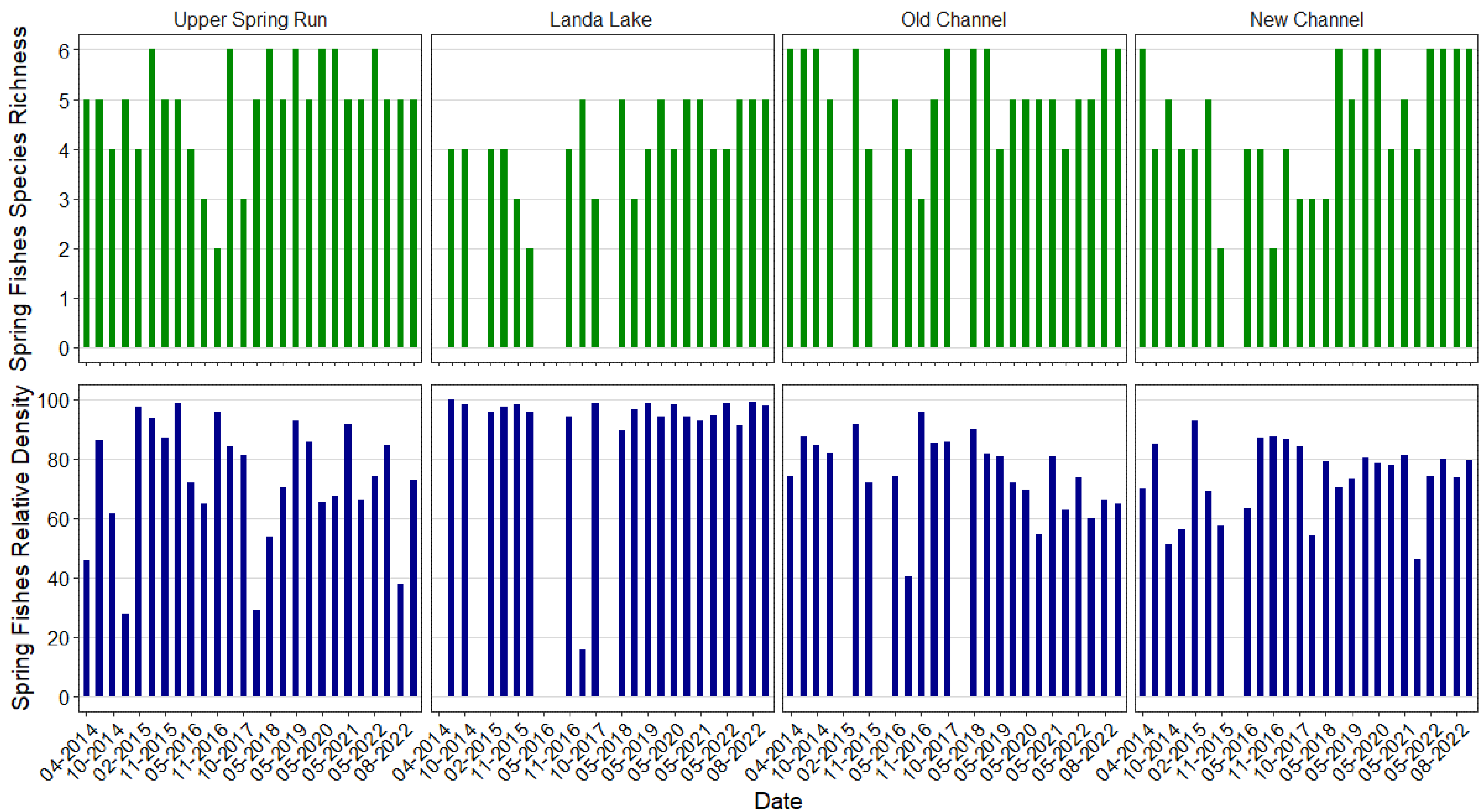

Figure E17. **Bar graphs displaying temporal trends in spring fishes species richness and percent relative density among study reaches from 2014–2022 during fish community sampling in the Comal Springs/River.**

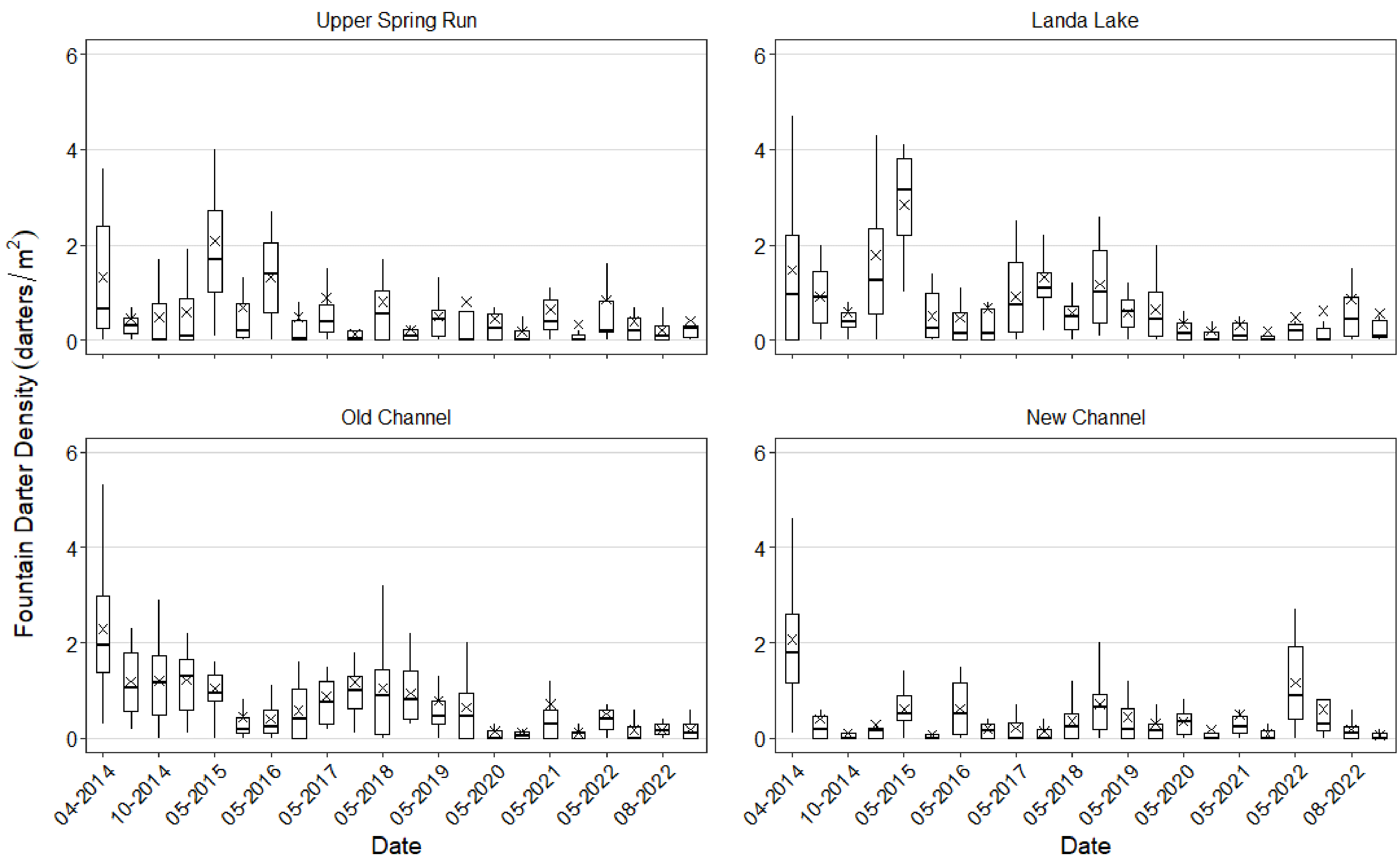

Figure E18. **Boxplots displaying temporal trends in Fountain Darter density (darters/m²) among study reaches from 2014–2022 during fish community microhabitat sampling in the Comal Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

Comal Springs Salamander

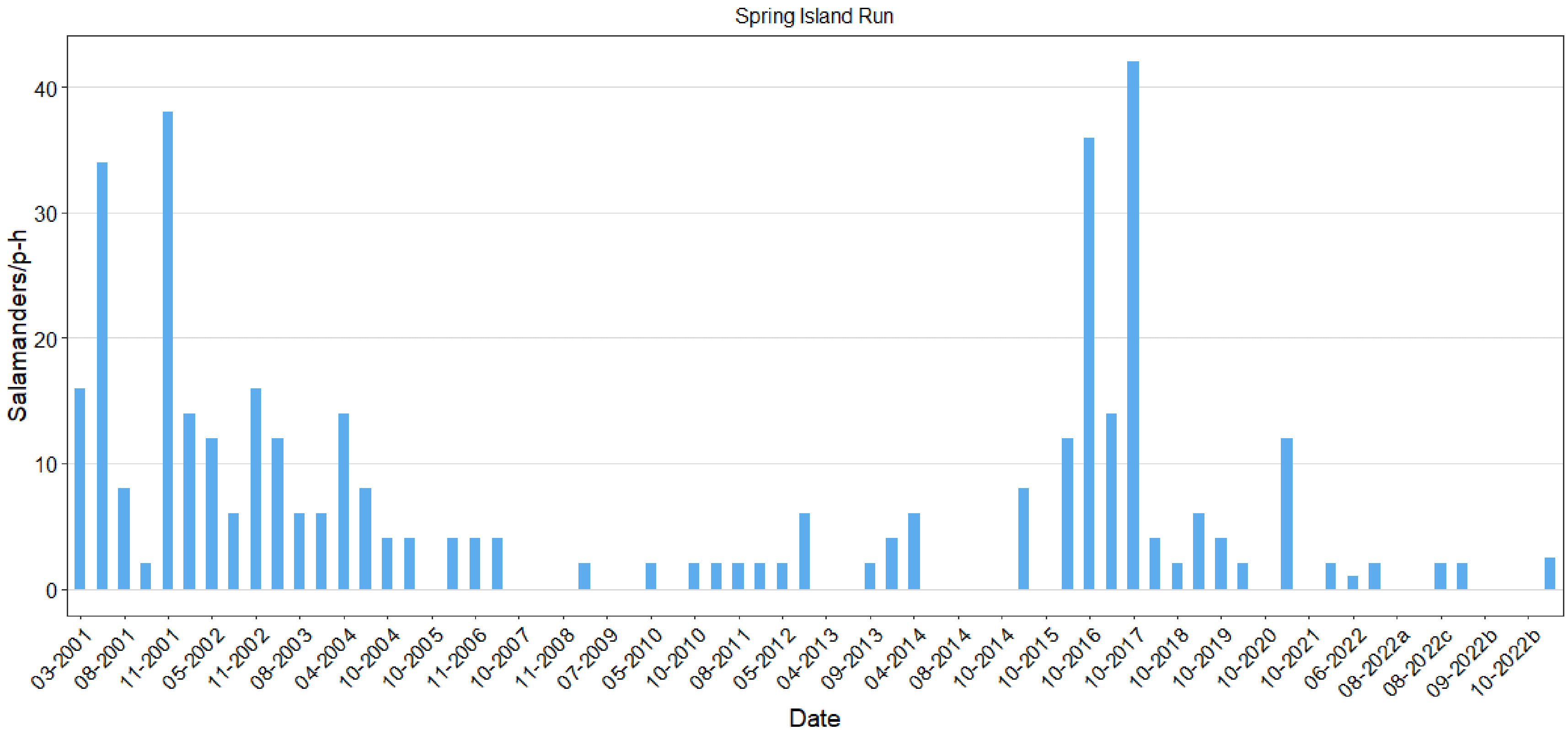

Figure E19. Comal Springs Salamander catch-per-unit-effort (CPUE; salamanders/person-hr) from 2001–2022 at Spring Island Run.

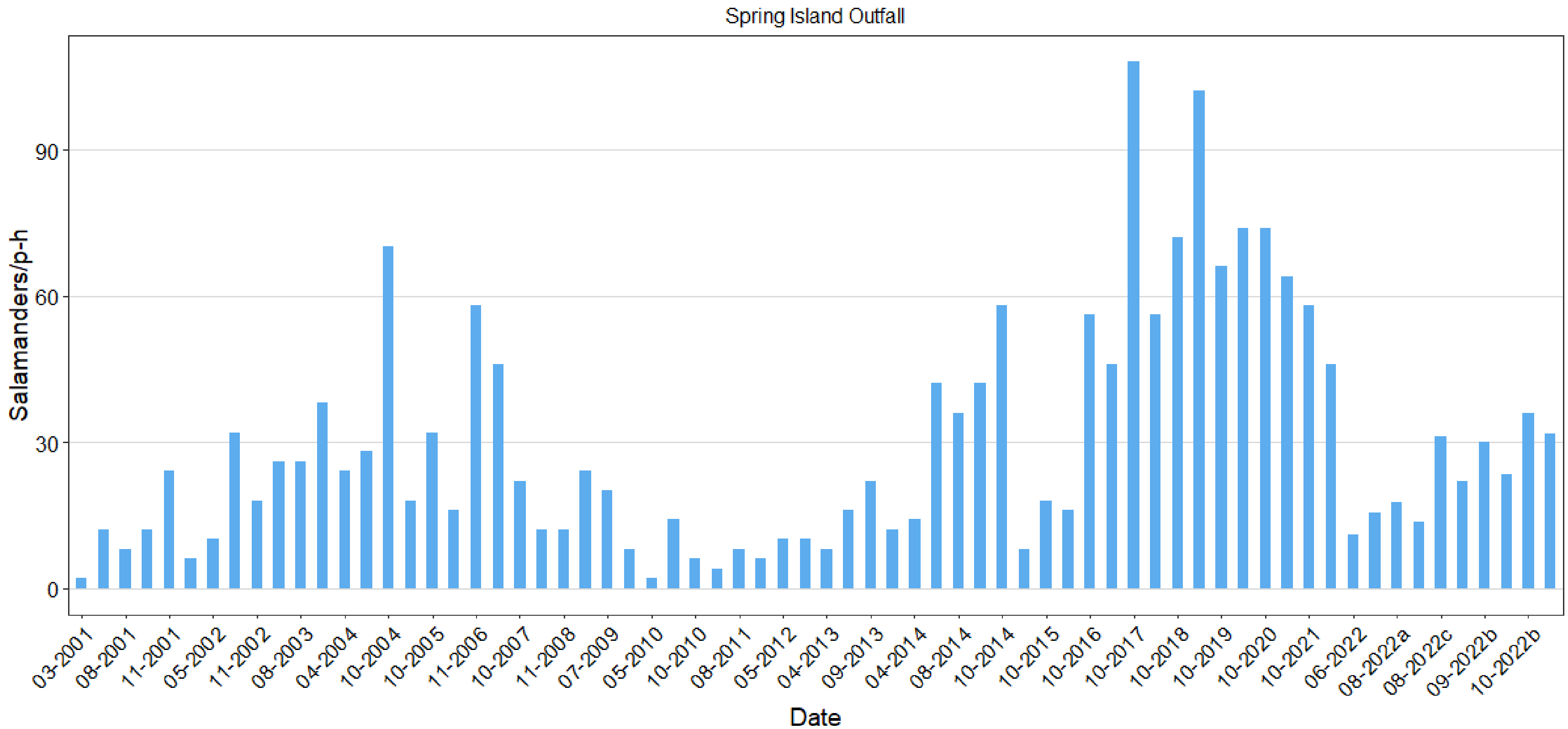

Figure E20. **Comal Springs Salamander catch-per-unit-effort (CPUE; salamanders/person-hr) from 2001–2022 at Spring Island Outfall.**

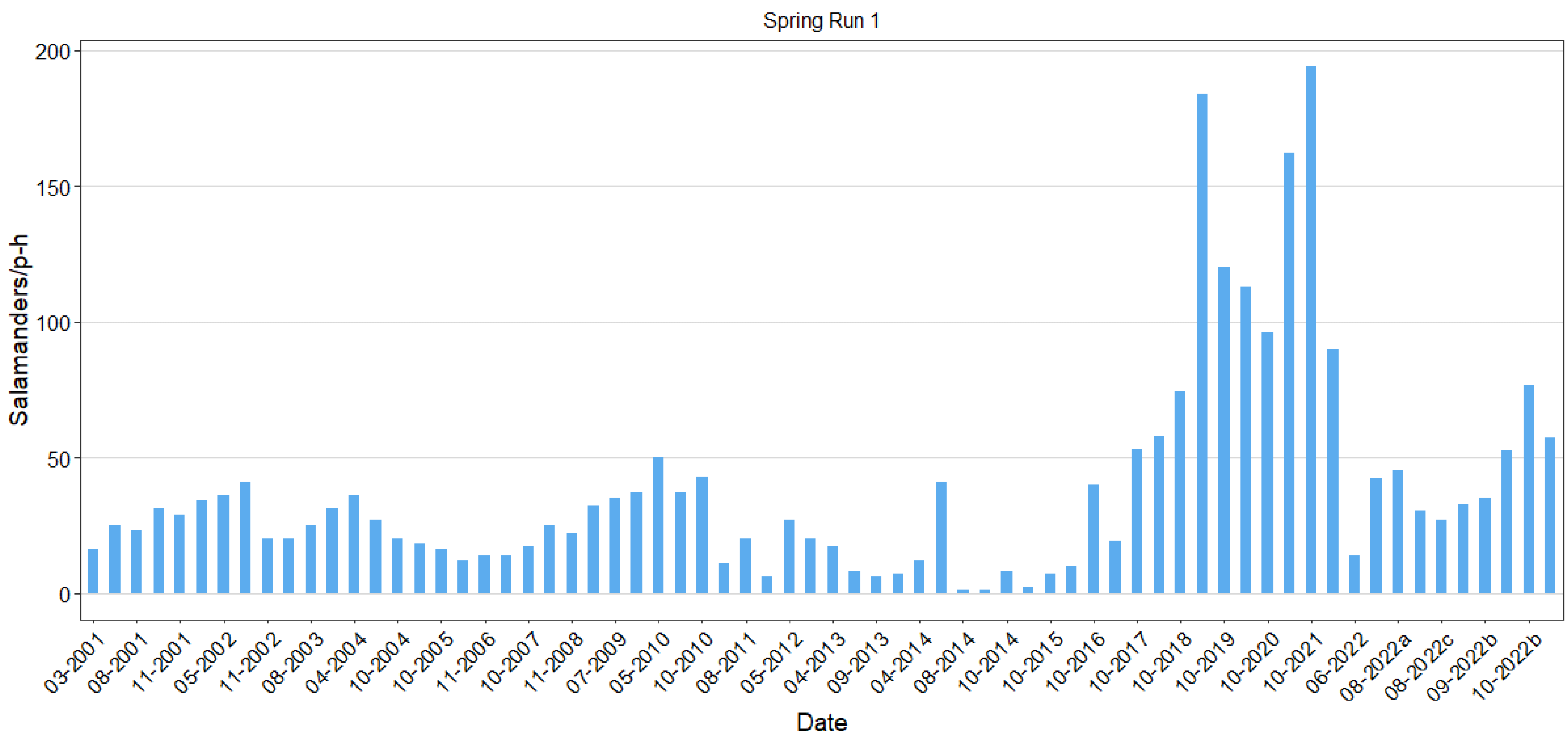

Figure E21. Comal Springs Salamander catch-per-unit-effort (CPUE; salamanders/person-hr) from 2001–2022 at Spring Run 1.

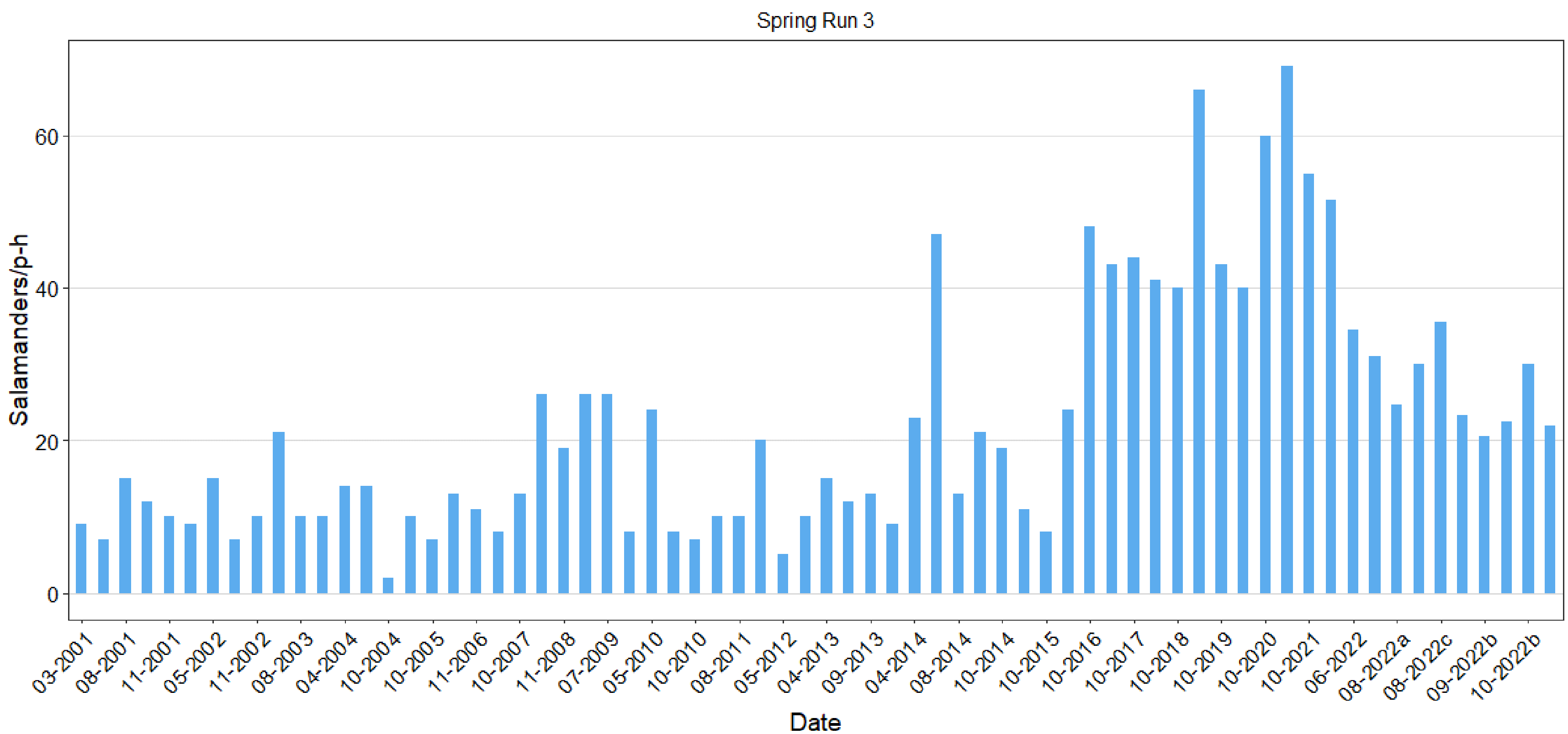

Figure E22. Comal Springs Salamander catch-per-unit-effort (CPUE; salamanders/person-hr) from 2001–2022 at Spring Run 3.

Macroinvertebrates

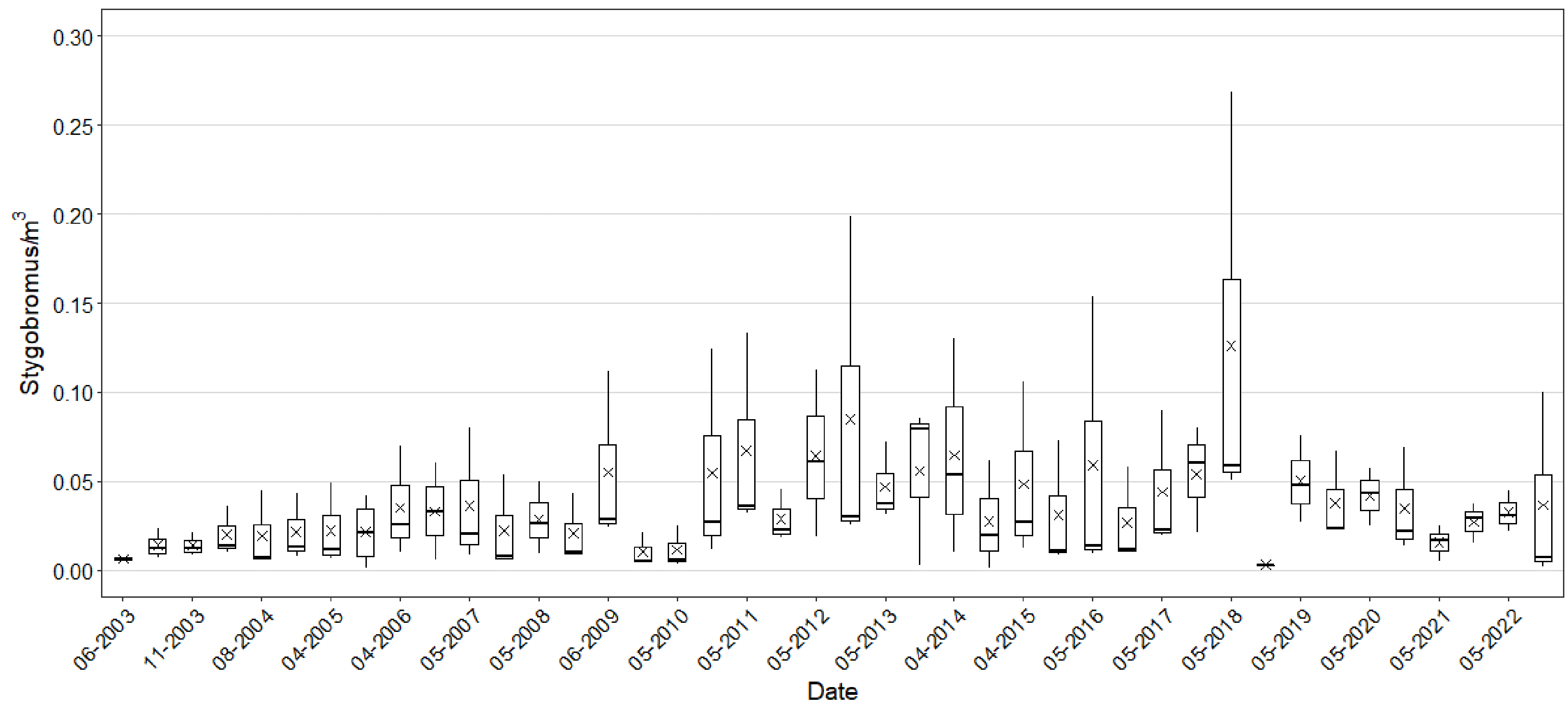

Figure E23. **Boxplots displaying *Stygobromus* sp. per cubic meters of water at Western Upwelling, Spring Run 1, and Spring Run 3 from 2003–2022. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

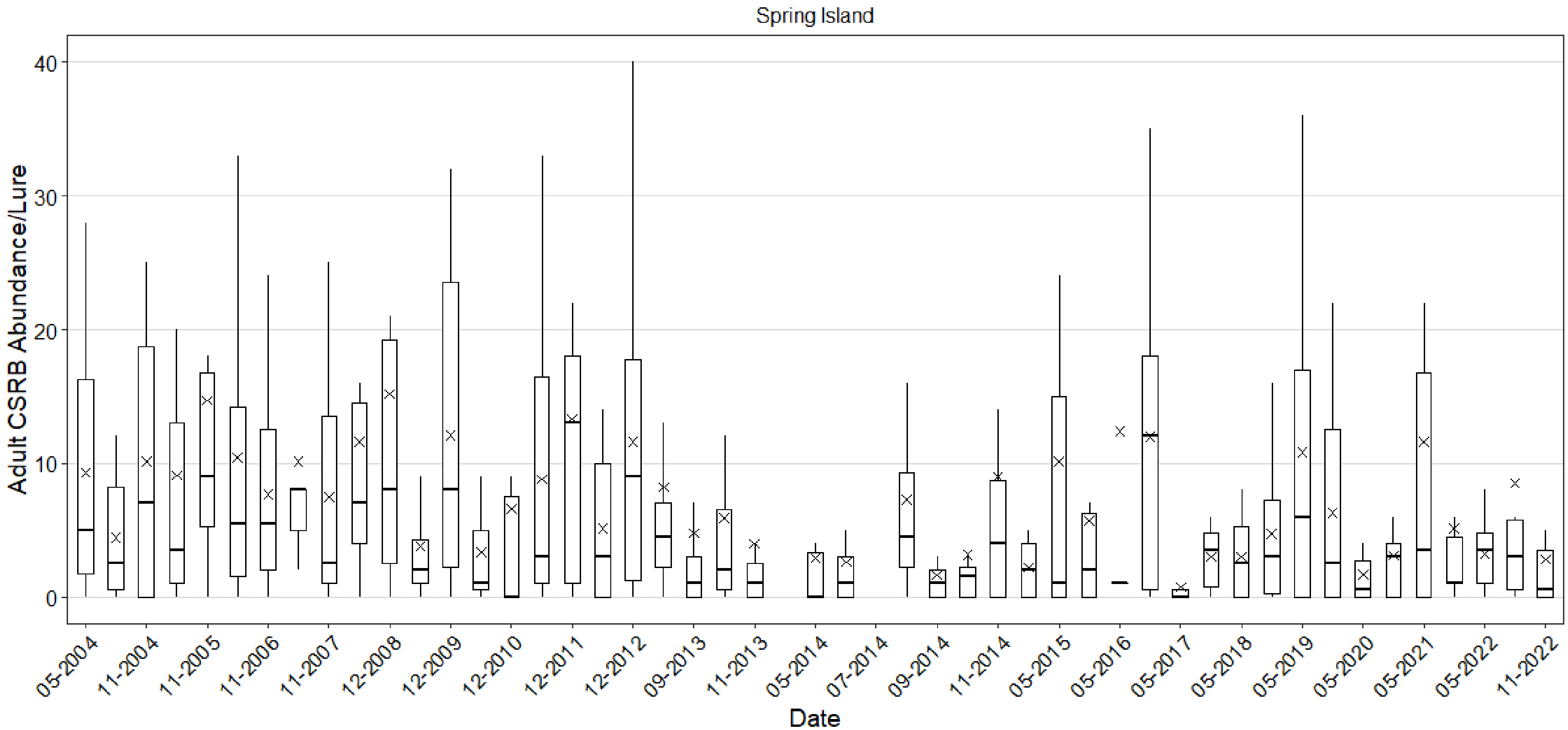

Figure E24. Boxplots displaying temporal trends in adult CSRB abundance per retrieved at Spring Island from 2004–2022 during lure sampling in Comal Springs. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.

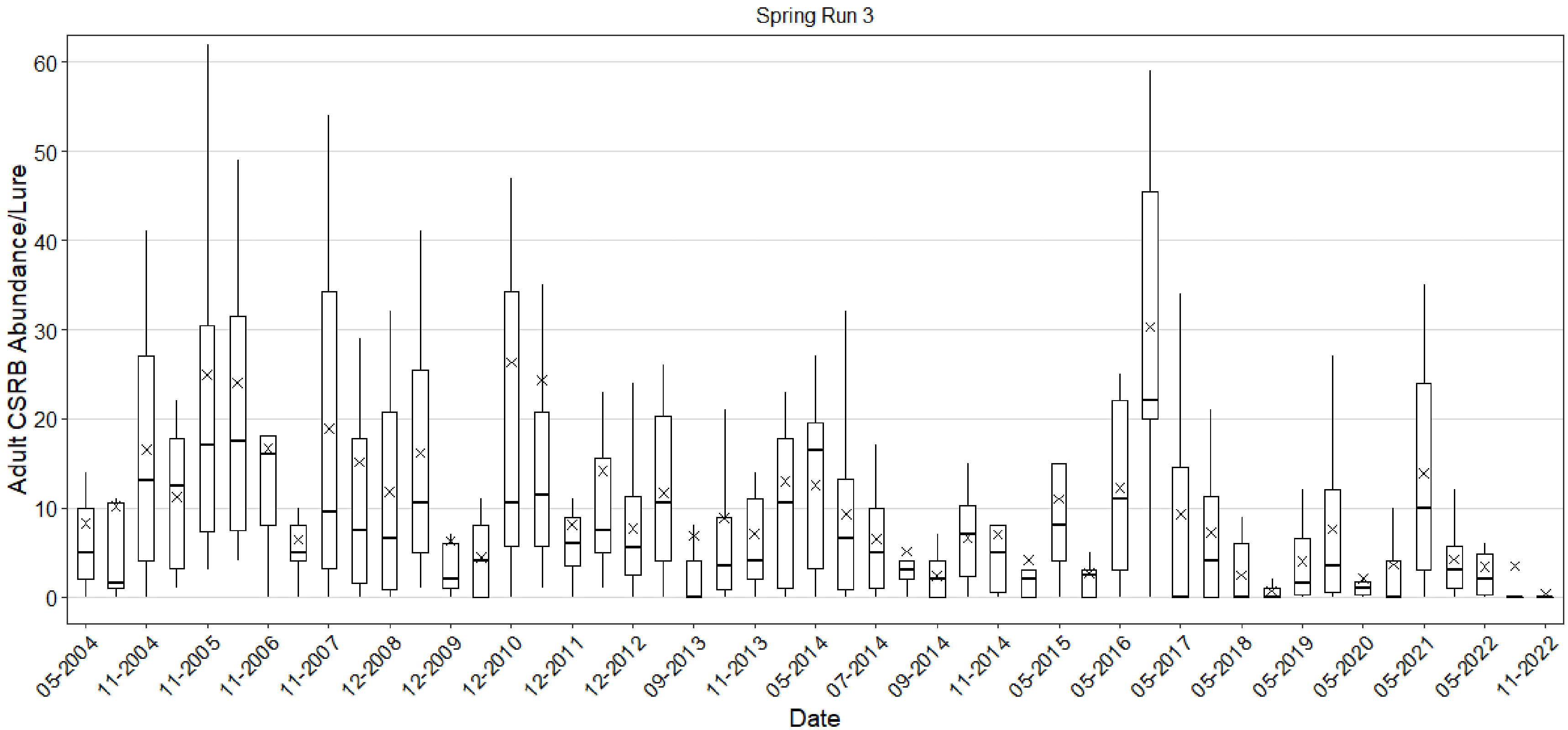

Figure E25. **Boxplots displaying temporal trends in adult CSRB abundance per retrieved at Spring Run 3 from 2004–2022 during lure sampling in Comal Springs. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

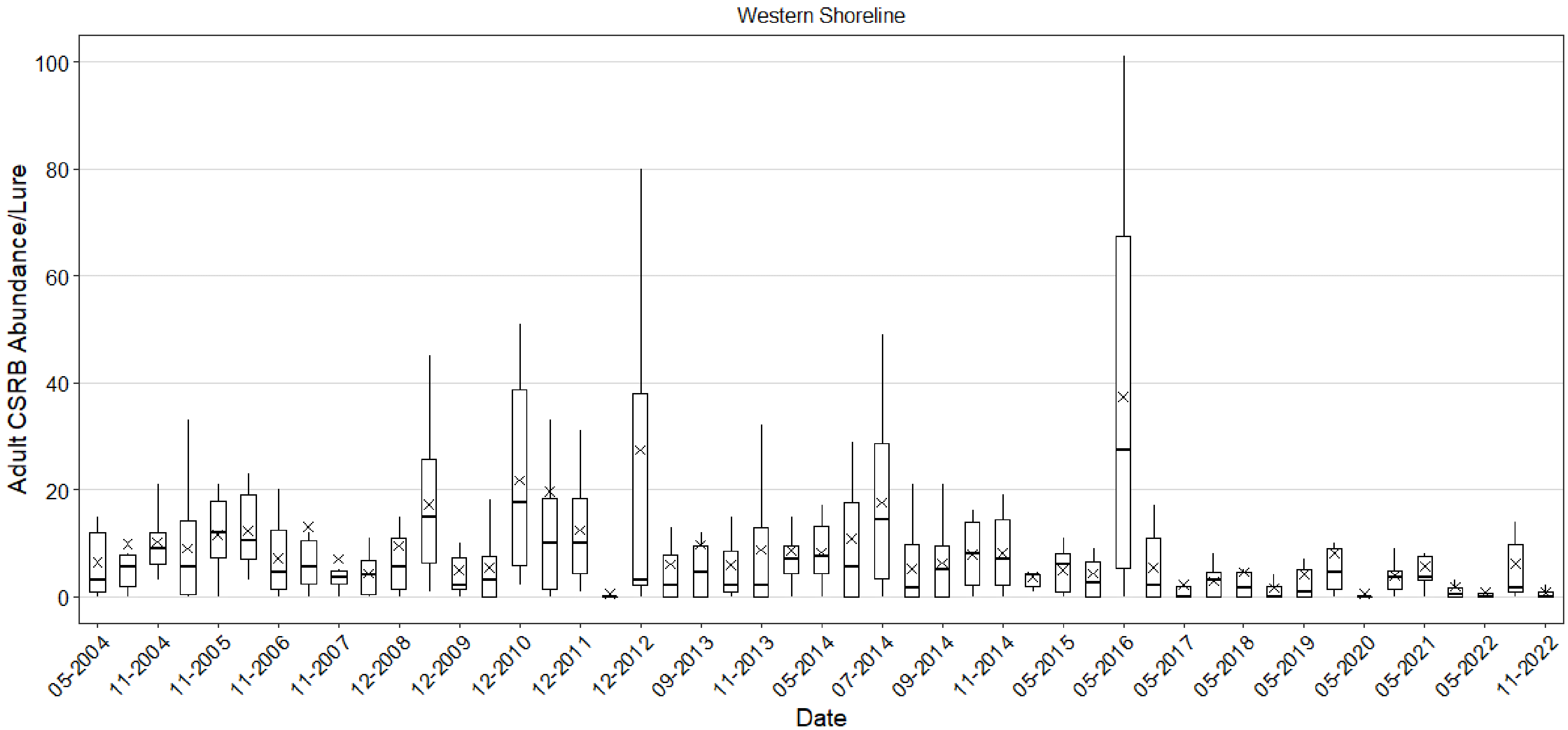

Figure E26. **Boxplots displaying temporal trends in adult CSRB abundance per retrieved at the Western Shoreline from 2004–2022 during lure sampling in Comal Springs. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

APPENDIX F: MACROINVERTEBRATE RAW DATA

Site	Date	Class	Order	Family	FinalID	Counts
Landa Lake	2022-05-29	Malacostraca	Amphipoda	Talitridae	Hyalella	116
Landa Lake	2022-05-29	Malacostraca	Decapoda	Palaemonidae	Palaemonetes	2
Landa Lake	2022-05-29	Malacostraca	Decapoda	Cambaridae	Cambaridae	3
Landa Lake	2022-05-29	Gastropoda	Basommatophora	Planorbidae	Helisoma	3
Landa Lake	2022-05-29	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	2
Landa Lake	2022-05-29	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	4
Landa Lake	2022-05-29	Insecta	Odonata	Coenagrionidae	Enallagma	2
Landa Lake	2022-05-29	Insecta	Coleoptera	Psephenidae	Psephenus	2
Landa Lake	2022-05-29	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	13
Landa Lake	2022-05-29	Insecta	Ephemeroptera	Baetidae	Callibaetis	6
Landa Lake	2022-05-29	Clitellata	Oligochaeta		Oligochaeta	3
Landa Lake	2022-05-29	Insecta	Ephemeroptera	Ephemeridae	Hexagenia	1
Landa Lake	2022-05-29	Insecta	Diptera	Chironomidae	Pseudochironomas	1
Landa Lake	2022-05-29	Clitellata	Rhynchobdellida	Glossiphoniidae	Plecobdella	1
Landa Lake	2022-10-17	Gastropoda	Neotaenioglossa	Thiaridae	Melanoides	46
Landa Lake	2022-10-17	Gastropoda	Basommatophora	Planorbidae	Planorbella	1
Landa Lake	2022-10-17	Gastropoda	Basommatophora	Physidae	Physa	1
Landa Lake	2022-10-17	Insecta	Odonata	Aeschnidae	Basiaeschna	1
Landa Lake	2022-10-17	Malacostraca	Decapoda	Palaemonidae	Palaemonetes	7
Landa Lake	2022-10-17	Malacostraca	Decopoda	Cambaridae	Cambaridae	4
Landa Lake	2022-10-17	Malacostraca	Amphipoda	Talitridae	Hyalella	81
Landa Lake	2022-10-17	Insecta	Diptera	Chironomidae	Chironomidae	5
Landa Lake	2022-10-17	Insecta	Ephemeroptera	Baetidae	Callibaetis	36
Landa Lake	2022-10-17	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	11
Landa Lake	2022-10-17	Insecta	Trichoptera	Hydroptildae	Oyxethira	1
Landa Lake	2022-10-17	Insecta	Trichoptera	Hydroptilidae	Hydroptila	1
Landa Lake	2022-10-17	Clitellata	Hirudinea	Glossosiphonidae	Hirudinea	1
Landa Lake	2022-10-17	Clitellata	Hirudinea	Hirudinidae	Hirudinidae	1
Landa Lake	2022-10-17	Insecta	Odonata	Coenagrionidae	Enallagma	15

Landa Lake	2022-10-17	Insecta	Diptera	Culicidae	Anopheles	3
Landa Lake	2022-10-17	Insecta	Lepidoptera	Crambidae	Petrophila	1
Lower New Channel	2022-05-29	Insecta	Coleoptera	Haliplidae	Peltodytes	1
Lower New Channel	2022-05-29	Malacostraca	Amphipoda	Talitridae	Hyalella	33
Lower New Channel	2022-05-29	Gastropoda	Basommatophora	Physidae	Physa	1
Lower New Channel	2022-05-29	Gastropoda	Neotaenioglossa	Hydrobiidae	Hydrobiidae	5
Lower New Channel	2022-05-29	Gastropoda	Neotaenioglossa	Thiaridae	Melanoides	1
Lower New Channel	2022-05-29	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	3
Lower New Channel	2022-05-29	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	5
Lower New Channel	2022-05-29	Insecta	Odonata	Libellulidae	Brechmorhoga	1
Lower New Channel	2022-05-29	Insecta	Hemiptera	Naucoridae	Ambrysus	1
Lower New Channel	2022-05-29	Insecta	Diptera	Tipulidae	Tipulidae	1
Lower New Channel	2022-05-29	Insecta	Coleoptera	Psephenidae	Psephenus	3
Lower New Channel	2022-05-29	Insecta	Odonata	Coenagrionidae	Argia	2
Lower New Channel	2022-05-29	Insecta	Odonata	Coenagrionidae	Enallagma	3
Lower New Channel	2022-05-29	Insecta	Ephemeroptera	Leptophlebiidae	Thraulodes	1
Lower New Channel	2022-05-29	Insecta	Ephemeroptera	Heptageniidae	Stenacron	1
Lower New Channel	2022-05-29	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	60
Lower New Channel	2022-05-29	Insecta	Ephemeroptera	Leptohyphidae	Vacupernius	2
Lower New Channel	2022-05-29	Insecta	Ephemeroptera	Baetidae	Fallceon	1
Lower New Channel	2022-05-29	Insecta	Trichoptera	Leptoceridae	Nectopsyche	4
Lower New Channel	2022-05-29	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	1
Lower New Channel	2022-05-29	Insecta	Trichoptera	Glossosomatidae	Protoptila	6
Lower New Channel	2022-05-29	Clitellata	Oligochaeta		Oligochaeta	5
Lower New Channel	2022-05-29	Turbellaria	Tricladida	Planarridae	Planarridae	4
Lower New Channel	2022-05-29	Insecta	Diptera	Chironomidae	Ablabesmyia	1
Lower New Channel	2022-05-29	Insecta	Diptera	Chironomidae	Rheotanytarsus	1
Lower New Channel	2022-05-29	Insecta	Coleoptera	Elmidae	Microcylloepus	3
Lower New Channel	2022-05-29	Insecta	Coleoptera	Elmidae	Hexacylloepus	1
Lower New Channel	2022-05-29	Insecta	Diptera	Ceratopogonidae	Probezzia	1

Lower New Channel	2022-05-29	Clitellata	Arhynchobdellida	Erpobdellidae	Erpobdellidae	1
Lower New Channel	2022-10-17	Bivalvia	Veneroida	Corbiculidae	Corbicula	1
Lower New Channel	2022-10-17	Gastropoda	Neotaenioglossa	Thiaridae	Melanoides	25
Lower New Channel	2022-10-17	Malacostraca	Decopoda	Cambaridae	Cambaridae	1
Lower New Channel	2022-10-17	Malacostraca	Amphipoda	Talitridae	Hyalella	45
Lower New Channel	2022-10-17	Insecta	Coleoptera	Haliplidae	Peltodytes	2
Lower New Channel	2022-10-17	Insecta	Odonata	Coenagrionidae	Enallagma	1
Lower New Channel	2022-10-17	Insecta	Odonata	Coenagrionidae	Argia	4
Lower New Channel	2022-10-17	Insecta	Diptera	Chironomidae	Chironomidae	9
Lower New Channel	2022-10-17	Clitellata	Oligochaeta		Oligochaeta	3
Lower New Channel	2022-10-17	Insecta	Coleoptera	Elimidae	Heterelmis	1
Lower New Channel	2022-10-17	Insecta	Ephemeroptera	Baetidae	Callibaetis	2
Lower New Channel	2022-10-17	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	31
Lower New Channel	2022-10-17	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	17
Lower New Channel	2022-10-17	Insecta	Lepidoptera	Crambidae	Oxyelophila	2
Old Channel	2022-05-29	Malacostraca	Amphipoda	Hyalellidae	Hayalella	54
Old Channel	2022-05-29	Insecta	Megaloptera	Corydalidae	Corydalus	1
Old Channel	2022-05-29	Insecta	Diptera	Simuliidae	Simuliidae	1
Old Channel	2022-05-29	Gastropoda	Neotaenioglossa	Hydrobiidae	Hydrobiidae	3
Old Channel	2022-05-29	Malacostraca	Decapoda	Cambaridae	Cambaridae	2
Old Channel	2022-05-29	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	4
Old Channel	2022-05-29	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	4
Old Channel	2022-05-29	Insecta	Odonata	Coenagrionidae	Argia	3
Old Channel	2022-05-29	Insecta	Odonata	Coenagrionidae	Enallagma	3
Old Channel	2022-05-29	Insecta	Trichoptera	Hydrobiosidae	Atopsyche	2
Old Channel	2022-05-29	Insecta	Ephemeroptera	Heptageniidae	Stenacron	2
Old Channel	2022-05-29	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	56
Old Channel	2022-05-29	Insecta	Ephemeroptera	Baetidae	Fallceon	1
Old Channel	2022-05-29	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	10
Old Channel	2022-05-29	Insecta	Coleoptera	Psephenidae	Psephenus	6

Old Channel	2022-05-29	Clitellata	Oligochaeta		Oligochaeta	5
Old Channel	2022-05-29	Clitellata	Rhynchobdellida	Glossiphoniidae	Helobdella	2
Old Channel	2022-05-29	Insecta	Diptera	Ceratopogonidae	Probezzia	1
Old Channel	2022-05-29	Insecta	Diptera	Chironomidae	Rheotanytarsus	1
Old Channel	2022-05-29	Insecta	Diptera	Chironomidae	Rheocricotopus	1
Old Channel	2022-05-29	Insecta	Coleoptera	Elimidae	Macrelmis	1
Old Channel	2022-05-29	Insecta	Coleoptera	Elmidae	Hexacylloepus	2
Old Channel	2022-05-29	Insecta	Coleoptera	Elimidae	Heterelmis	1
Old Channel	2022-05-29	Insecta	Coleoptera	Elmidae	Microcylloepus	1
Old Channel	2022-10-17	Malacostraca	Decopoda	Cambaridae	Cambaridae	6
Old Channel	2022-10-17	Gastropoda	Neotaenioglossa	Thiaridae	Melanoides	25
Old Channel	2022-10-17	Malacostraca	Decapoda	Palaemonidae	Palaemonetes	1
Old Channel	2022-10-17	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	2
Old Channel	2022-10-17	Gastropoda	Neotaenioglossa	Hydrobiidae	Hydrobiidae	2
Old Channel	2022-10-17	Insecta	Trichoptera	Leptoceridae	Nectopsyche	3
Old Channel	2022-10-17	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	3
Old Channel	2022-10-17	Malacostraca	Amphipoda	Talitridae	Hyalella	54
Old Channel	2022-10-17	Insecta	Coleoptera	Psephenidae	Psephenus	1
Old Channel	2022-10-17	Insecta	Odonata	Coenagrionidae	Argia	4
Old Channel	2022-10-17	Insecta	Odonata	Coenagrionidae	Enallagma	1
Old Channel	2022-10-17	Insecta	Diptera	Chironomidae	Chironomidae	2
Old Channel	2022-10-17	Insecta	Diptera	Ceratopogonidae	Bezzia complex	1
Old Channel	2022-10-17	Insecta	Ephemeroptera	Ephemeridae	Hexagenia	2
Old Channel	2022-10-17	Clitellata	Oligochaeta		Oligochaeta	2
Old Channel	2022-10-17	Insecta	Ephemeroptera	Baetidae	Callibaetis	2
Old Channel	2022-10-17	Insecta	Ephemeroptera	Baetidae	Baetis	1
Old Channel	2022-10-17	Insecta	Ephemeroptera	Caenidae	Caenis	1
Old Channel	2022-10-17	Insecta	Ephemeroptera	Heptageniidae	Stenonema	2
Old Channel	2022-10-17	Insecta	Odonata	Calopterygidae	Hetaerina	1
Old Channel	2022-10-17	Insecta	Odonata	Gomphidae	Phyllogomphoides sp.	1

Old Channel	2022-10-17	Insecta	Diptera	Simuliidae	Simulium	1
Old Channel	2022-10-17	Clitellata	Hirudinea	Glossosiphonidae	Hirudinea	1
Old Channel	2022-10-17	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	52
Upper New Channel	2022-05-29	Malacostraca	Amphipoda	Talitridae	Hyalella	35
Upper New Channel	2022-05-29	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	7
Upper New Channel	2022-05-29	Insecta	Ephemeroptera	Baetidae	Fallceon	16
Upper New Channel	2022-05-29	Insecta	Ephemeroptera	Leptophlebiidae	Thraulodes	1
Upper New Channel	2022-05-29	Insecta	Trichoptera	Hydroptilidae	Leucotrichia	5
Upper New Channel	2022-05-29	Turbellaria	Tricladida	Planarridae	Planarridae	10
Upper New Channel	2022-05-29	Clitellata	Oligochaeta		Oligochaeta	3
Upper New Channel	2022-05-29	Insecta	Diptera	Chironomidae	Rheotanytarsus	12
Upper New Channel	2022-05-29	Insecta	Coleoptera	Coccinelloidea	Harnichia complex	1
Upper New Channel	2022-05-29	Insecta	Diptera	Chironomidae	Orthocladiinae	1
Upper New Channel	2022-05-29	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	3
Upper New Channel	2022-05-29	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	3
Upper New Channel	2022-05-29	Insecta	Coleoptera	Elimidae	Macrelmis	34
Upper New Channel	2022-05-29	Insecta	Coleoptera	Psephenidae	Psephenus	4
Upper New Channel	2022-05-29	Insecta	Coleoptera	Elmidae	Microcylloepus	6
Upper New Channel	2022-05-29	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	7
Upper New Channel	2022-05-29	Insecta	Diptera	Simuliidae	Simuliidae	1
Upper New Channel	2022-05-29	Clitellata	Hirudinea	Glossosiphonidae	Hirudinea	1
Upper New Channel	2022-05-29	Insecta	Trichoptera	Leptoceridae	Nectopsyche	2
Upper New Channel	2022-05-29	Insecta	Odonata	Coenagrionidae	Argia	9
Upper New Channel	2022-05-29	Insecta	Trichoptera	Hydrobiosidae	Atopsyche	3
Upper New Channel	2022-05-29	Insecta	Lepidoptera	Crambidae	Petrophila	2
Upper New Channel	2022-10-17	Insecta	Megaloptera	Corydalidae	Corydalus	3
Upper New Channel	2022-10-17	Insecta	Trichoptera	Hydrobiosidae	Atopsyche	1
Upper New Channel	2022-10-17	Gastropoda	Neotaenioglossa	Thiaridae	Melanoides	24
Upper New Channel	2022-10-17	Malacostraca	Amphipoda	Talitridae	Hyalella	27
Upper New Channel	2022-10-17	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	4

Upper New Channel	2022-10-17	Insecta	Odonata	Libellulidae	Brechmorhoga	5
Upper New Channel	2022-10-17	Insecta	Trichoptera	Philopotamidae	Chimarra	4
Upper New Channel	2022-10-17	Turbellaria	Tricladida	Dugesiidae	Dugesia	10
Upper New Channel	2022-10-17	Insecta	Diptera	Chironomidae	Chironomidae	12
Upper New Channel	2022-10-17	Insecta	Coleoptera	Psephenidae	Psephenus	1
Upper New Channel	2022-10-17	Insecta	Odonata	Coenagrionidae	Argia	11
Upper New Channel	2022-10-17	Clitellata	Oligochaeta		Oligochaeta	4
Upper New Channel	2022-10-17	Insecta	Ephemeroptera	Baetidae	Baetis	11
Upper New Channel	2022-10-17	Insecta	Ephemeroptera	Baetidae	Baetodes	2
Upper New Channel	2022-10-17	Insecta	Ephemeroptera	Baetidae	Camelobaetidius	1
Upper New Channel	2022-10-17	Insecta	Ephemeroptera	Leptophlebiidae	Thraulodes	2
Upper New Channel	2022-10-17	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	3
Upper New Channel	2022-10-17	Insecta	Ephemeroptera	Heptageniidae	Stenonema	1
Upper New Channel	2022-10-17	Insecta	Trichoptera	Hydropsychidae	Potamyia	7
Upper New Channel	2022-10-17	Clitellata	Hirudinea	Glossosiphonidae	Hirudinea	1
Upper New Channel	2022-10-17	Insecta	Trichoptera	Hydroptilidae	Hydroptila	1
Upper New Channel	2022-10-17	Insecta	Diptera	Simuliidae	Simulium	1
Upper New Channel	2022-10-17	Insecta	Coleoptera	Dryopidae	Helichus	1
Upper New Channel	2022-10-17	Insecta	Coleoptera	Elimidae	Macrelmis	51
Upper New Channel	2022-10-17	Insecta	Coleoptera	Elimidae	Neoelmis	1
Upper Spring Run	2022-05-29	Malacostraca	Amphipoda	Hyalellidae	Hayalella	85
Upper Spring Run	2022-05-29	Clitellata	Oligochaeta		Oligochaeta	2
Upper Spring Run	2022-05-29	Insecta	Ephemeroptera	Baetidae	Callibaetis	21
Upper Spring Run	2022-05-29	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	10
Upper Spring Run	2022-05-29	Insecta	Ephemeroptera	Leptohyphidae	Allenhyphes	1
Upper Spring Run	2022-05-29	Insecta	Odonata	Coenagrionidae	Argia	1
Upper Spring Run	2022-05-29	Malacostraca	Decapoda	Cambaridae	Cambaridae	1
Upper Spring Run	2022-05-29	Insecta	Odonata	Coenagrionidae	Enallagma	1
Upper Spring Run	2022-05-29	Insecta	Coleoptera	Elmidae	Stenelmis	1
Upper Spring Run	2022-05-29	Insecta	Coleoptera	Psephenidae	Psephenus	6

Upper Spring Run	2022-05-29	Insecta	Diptera	Chironomidae	Dicrotendipas	2
Upper Spring Run	2022-05-29	Insecta	Diptera	Chironomidae	Cricotopas/Orthocladias	2
Upper Spring Run	2022-05-29	Insecta	Diptera	Chironomidae	Cladopelma/Cryptotendipes	3
Upper Spring Run	2022-05-29	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	1
Upper Spring Run	2022-05-29	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	3
Upper Spring Run	2022-05-29	Insecta	Diptera	Ceratopogonidae	Bezzia complex	2
Upper Spring Run	2022-05-29	Insecta	Diptera	Ceratopogonidae	Probezzia	2
Upper Spring Run	2022-10-17	Malacostraca	Decopoda	Cambaridae	Cambaridae	1
Upper Spring Run	2022-10-17	Insecta	Ephemeroptera	Baetidae	Callibaetis	95
Upper Spring Run	2022-10-17	Malacostraca	Amphipoda	Talitridae	Hyalella	85
Upper Spring Run	2022-10-17	Insecta	Diptera	Chironomidae	Chironomidae	27
Upper Spring Run	2022-10-17	Insecta	Diptera	Ceratopogonidae	Bezzia complex	3
Upper Spring Run	2022-10-17	Insecta	Coleoptera	Psephenidae	Psephenus	4
Upper Spring Run	2022-10-17	Gastropoda	Neotaenioglossa	Thiaridae	Melanoides	10
Upper Spring Run	2022-10-17	Ostracoda			Ostracoda	2
Upper Spring Run	2022-10-17	Branchiopoda	Anomopoda	Daphinidae	Daphinidae	4
Upper Spring Run	2022-10-17	Insecta	Ephemeroptera	Caenidae	Caenis	6
Upper Spring Run	2022-10-17	Arachnida	Hydrachinida		Hydrachinida	2
Upper Spring Run	2022-10-17	Clitellata	Oligochaeta		Oligochaeta	3
Upper Spring Run	2022-10-17	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	2
Upper Spring Run	2022-10-17	Hexanauplia	Copepoda		Copepoda	2
Upper Spring Run	2022-10-17	Insecta	Odonata	Coenagrionidae	Enallagma	1
Upper Spring Run	2022-10-17	Gastropoda	Basommatophora	Planorbidae	Gyraulus	1

APPENDIX G: DROP-NET RAW DATA

SiteCode	Reach	Site_No	Date	Dip_Net	Species	Length	Count
2951	Landa Lake	Open-2	2022-05-04	1	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	2	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	3	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	4	Etheostoma fonticola	26	1
2951	Landa Lake	Open-2	2022-05-04	5	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	6	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	7	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	8	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	9	Micropterus salmoides	111	1
2951	Landa Lake	Open-2	2022-05-04	10	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	11	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	12	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	13	Etheostoma fonticola	17	1
2951	Landa Lake	Open-2	2022-05-04	14	No fish collected		
2951	Landa Lake	Open-2	2022-05-04	15	Etheostoma fonticola	23	1
2951	Landa Lake	Open-2	2022-05-04	15	Etheostoma fonticola	26	1
2951	Landa Lake	Open-2	2022-05-04	15	Etheostoma fonticola	20	1
2951	Landa Lake	Open-2	2022-05-04	16	No fish collected		
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	26	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	18	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	18	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	25	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	20	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	25	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	19	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	13	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	29	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	21	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	19	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	18	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	14	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	17	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	14	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	19	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	14	1

2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	10	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	14	1
2793	Landa Lake	Bryo-1	2022-05-04	1	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Procambarus sp.		1
2793	Landa Lake	Bryo-1	2022-05-04	2	Micropterus salmoides	62	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Dionda nigrotaeniata	30	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Palaemonetes sp.		1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	26	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	18	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	25	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	20	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	10	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	22	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	21	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	17	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	25	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	13	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	10	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	17	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	14	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	10	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	11	1

2793	Landa Lake	Bryo-1	2022-05-04	2	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Micropterus salmoides	55	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Dionda nigrotaeniata	38	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Procambarus sp.		1
2793	Landa Lake	Bryo-1	2022-05-04	3	Etheostoma fonticola	26	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Etheostoma fonticola	31	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Etheostoma fonticola	24	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Etheostoma fonticola	23	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Etheostoma fonticola	13	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Etheostoma fonticola	9	1
2793	Landa Lake	Bryo-1	2022-05-04	3	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Palaemonetes sp.		3
2793	Landa Lake	Bryo-1	2022-05-04	4	Procambarus sp.		1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	19	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	26	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	19	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	21	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	14	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	17	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	25	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	20	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	21	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	18	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	20	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	21	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	13	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	18	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	20	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	21	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	11	1

2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	4	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	5	Palaemonetes sp.		1
2793	Landa Lake	Bryo-1	2022-05-04	5	Etheostoma fonticola	24	1
2793	Landa Lake	Bryo-1	2022-05-04	5	Etheostoma fonticola	20	1
2793	Landa Lake	Bryo-1	2022-05-04	6	Micropterus salmoides	55	1
2793	Landa Lake	Bryo-1	2022-05-04	6	Etheostoma fonticola	25	1
2793	Landa Lake	Bryo-1	2022-05-04	6	Etheostoma fonticola	22	1
2793	Landa Lake	Bryo-1	2022-05-04	6	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	6	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	6	Etheostoma fonticola	18	1
2793	Landa Lake	Bryo-1	2022-05-04	6	Etheostoma fonticola	14	1
2793	Landa Lake	Bryo-1	2022-05-04	6	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	6	Etheostoma fonticola	6	1
2793	Landa Lake	Bryo-1	2022-05-04	6	Palaemonetes sp.		1
2793	Landa Lake	Bryo-1	2022-05-04	7	Etheostoma fonticola	21	1
2793	Landa Lake	Bryo-1	2022-05-04	7	Etheostoma fonticola	24	1
2793	Landa Lake	Bryo-1	2022-05-04	7	Etheostoma fonticola	23	1
2793	Landa Lake	Bryo-1	2022-05-04	7	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	7	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	7	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	7	Etheostoma fonticola	10	1
2793	Landa Lake	Bryo-1	2022-05-04	8	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	8	Etheostoma fonticola	17	1
2793	Landa Lake	Bryo-1	2022-05-04	8	Etheostoma fonticola	20	1
2793	Landa Lake	Bryo-1	2022-05-04	8	Etheostoma fonticola	22	1
2793	Landa Lake	Bryo-1	2022-05-04	8	Etheostoma fonticola	7	1
2793	Landa Lake	Bryo-1	2022-05-04	9	Etheostoma fonticola	19	1
2793	Landa Lake	Bryo-1	2022-05-04	9	Etheostoma fonticola	16	1
2793	Landa Lake	Bryo-1	2022-05-04	9	Etheostoma fonticola	10	1
2793	Landa Lake	Bryo-1	2022-05-04	9	Etheostoma fonticola	10	1
2793	Landa Lake	Bryo-1	2022-05-04	9	Etheostoma fonticola	9	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	26	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	20	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	6	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	32	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	26	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	22	1

2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	7	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	9	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Lepomis sp.	9	1
2793	Landa Lake	Bryo-1	2022-05-04	10	Lepomis sp.	7	1
2793	Landa Lake	Bryo-1	2022-05-04	11	Procambarus sp.		1
2793	Landa Lake	Bryo-1	2022-05-04	11	Etheostoma fonticola	10	1
2793	Landa Lake	Bryo-1	2022-05-04	11	Etheostoma fonticola	27	1
2793	Landa Lake	Bryo-1	2022-05-04	11	Etheostoma fonticola	9	1
2793	Landa Lake	Bryo-1	2022-05-04	12	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	12	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	13	No fish collected		
2793	Landa Lake	Bryo-1	2022-05-04	14	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	14	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	14	Etheostoma fonticola	7	1
2793	Landa Lake	Bryo-1	2022-05-04	15	Etheostoma fonticola	20	1
2793	Landa Lake	Bryo-1	2022-05-04	15	Procambarus sp.		1
2793	Landa Lake	Bryo-1	2022-05-04	16	Etheostoma fonticola	30	1
2793	Landa Lake	Bryo-1	2022-05-04	16	Etheostoma fonticola	10	1
2793	Landa Lake	Bryo-1	2022-05-04	16	Etheostoma fonticola	10	1
2793	Landa Lake	Bryo-1	2022-05-04	16	Etheostoma fonticola	11	1
2793	Landa Lake	Bryo-1	2022-05-04	17	Etheostoma fonticola	12	1
2793	Landa Lake	Bryo-1	2022-05-04	18	Procambarus sp.		1
2793	Landa Lake	Bryo-1	2022-05-04	18	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	18	Etheostoma fonticola	15	1
2793	Landa Lake	Bryo-1	2022-05-04	19	No fish collected		
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	20	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	20	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	18	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	18	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	26	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	27	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	24	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	28	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	29	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	12	1

2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	24	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	25	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	21	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	25	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	25	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	25	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	8	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	14	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	21	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	24	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	20	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	26	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	16	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	21	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	20	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	16	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	16	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	13	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	16	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	19	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	8	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	9	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	10	1

2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	8	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	19	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	9	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	1	Procambarus sp.		5
2794	Landa Lake	Bryo-2	2022-05-04	1	Palaemonetes sp.		16
2794	Landa Lake	Bryo-2	2022-05-04	1	Lepomis sp.	12	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Palaemonetes sp.		7
2794	Landa Lake	Bryo-2	2022-05-04	2	Procambarus sp.		2
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	19	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	26	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	19	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	27	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	30	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	27	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	20	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	20	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	19	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	17	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	18	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	20	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	14	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	6	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	17	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	10	1

2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	7	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	14	1
2794	Landa Lake	Bryo-2	2022-05-04	2	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Procambarus sp.		2
2794	Landa Lake	Bryo-2	2022-05-04	3	Palaemonetes sp.		5
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	35	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	19	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	16	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	3	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Procambarus sp.		2
2794	Landa Lake	Bryo-2	2022-05-04	4	Palaemonetes sp.		3
2794	Landa Lake	Bryo-2	2022-05-04	4	Lepomis sp.	19	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	28	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	28	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	18	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	24	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	20	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	19	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	23	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	25	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	19	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	24	1
2794	Landa Lake	Bryo-2	2022-05-04	4	Etheostoma fonticola	14	1
2794	Landa Lake	Bryo-2	2022-05-04	5	Procambarus sp.		1
2794	Landa Lake	Bryo-2	2022-05-04	5	Palaemonetes sp.		3

2794	Landa Lake	Bryo-2	2022-05-04	5	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	5	Etheostoma fonticola	21	1
2794	Landa Lake	Bryo-2	2022-05-04	5	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	5	Etheostoma fonticola	18	1
2794	Landa Lake	Bryo-2	2022-05-04	5	Etheostoma fonticola	24	1
2794	Landa Lake	Bryo-2	2022-05-04	5	Etheostoma fonticola	23	1
2794	Landa Lake	Bryo-2	2022-05-04	5	Etheostoma fonticola	16	1
2794	Landa Lake	Bryo-2	2022-05-04	5	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	5	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	6	Etheostoma fonticola	20	1
2794	Landa Lake	Bryo-2	2022-05-04	6	Etheostoma fonticola	20	1
2794	Landa Lake	Bryo-2	2022-05-04	6	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	6	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	6	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	6	Etheostoma fonticola	8	1
2794	Landa Lake	Bryo-2	2022-05-04	7	Procambarus sp.		1
2794	Landa Lake	Bryo-2	2022-05-04	7	Etheostoma fonticola	23	1
2794	Landa Lake	Bryo-2	2022-05-04	7	Etheostoma fonticola	16	1
2794	Landa Lake	Bryo-2	2022-05-04	7	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	7	Etheostoma fonticola	16	1
2794	Landa Lake	Bryo-2	2022-05-04	7	Etheostoma fonticola	13	1
2794	Landa Lake	Bryo-2	2022-05-04	7	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	7	Etheostoma fonticola	18	1
2794	Landa Lake	Bryo-2	2022-05-04	7	Etheostoma fonticola	6	1
2794	Landa Lake	Bryo-2	2022-05-04	7	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	7	Etheostoma fonticola	10	1
2794	Landa Lake	Bryo-2	2022-05-04	8	Etheostoma fonticola	31	1
2794	Landa Lake	Bryo-2	2022-05-04	8	Etheostoma fonticola	12	1
2794	Landa Lake	Bryo-2	2022-05-04	8	Etheostoma fonticola	23	1
2794	Landa Lake	Bryo-2	2022-05-04	9	Etheostoma fonticola	22	1
2794	Landa Lake	Bryo-2	2022-05-04	9	Etheostoma fonticola	19	1
2794	Landa Lake	Bryo-2	2022-05-04	9	Etheostoma fonticola	15	1
2794	Landa Lake	Bryo-2	2022-05-04	10	Etheostoma fonticola	16	1
2794	Landa Lake	Bryo-2	2022-05-04	10	Etheostoma fonticola	19	1
2794	Landa Lake	Bryo-2	2022-05-04	11	Procambarus sp.		1
2794	Landa Lake	Bryo-2	2022-05-04	11	Etheostoma fonticola	27	1
2794	Landa Lake	Bryo-2	2022-05-04	11	Etheostoma fonticola	31	1
2794	Landa Lake	Bryo-2	2022-05-04	11	Etheostoma fonticola	21	1
2794	Landa Lake	Bryo-2	2022-05-04	12	Palaemonetes sp.		2
2794	Landa Lake	Bryo-2	2022-05-04	12	Etheostoma fonticola	24	1
2794	Landa Lake	Bryo-2	2022-05-04	12	Etheostoma fonticola	21	1

2794	Landa Lake	Bryo-2	2022-05-04	12	Etheostoma fonticola	14	1
2794	Landa Lake	Bryo-2	2022-05-04	12	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	13	Etheostoma fonticola	16	1
2794	Landa Lake	Bryo-2	2022-05-04	13	Etheostoma fonticola	31	1
2794	Landa Lake	Bryo-2	2022-05-04	14	Etheostoma fonticola	27	1
2794	Landa Lake	Bryo-2	2022-05-04	14	Etheostoma fonticola	21	1
2794	Landa Lake	Bryo-2	2022-05-04	15	Etheostoma fonticola	21	1
2794	Landa Lake	Bryo-2	2022-05-04	16	Etheostoma fonticola	11	1
2794	Landa Lake	Bryo-2	2022-05-04	17	Procambarus sp.		2
2794	Landa Lake	Bryo-2	2022-05-04	17	Palaemonetes sp.		1
2794	Landa Lake	Bryo-2	2022-05-04	17	No fish collected		
2795	Landa Lake	Open-1	2022-05-04	1	Procambarus sp.		1
2795	Landa Lake	Open-1	2022-05-04	1	Etheostoma fonticola	25	1
2795	Landa Lake	Open-1	2022-05-04	1	Etheostoma fonticola	16	1
2795	Landa Lake	Open-1	2022-05-04	1	Etheostoma fonticola	11	1
2795	Landa Lake	Open-1	2022-05-04	1	Etheostoma fonticola	20	1
2795	Landa Lake	Open-1	2022-05-04	2	Etheostoma fonticola	23	1
2795	Landa Lake	Open-1	2022-05-04	2	Etheostoma fonticola	11	1
2795	Landa Lake	Open-1	2022-05-04	2	Etheostoma fonticola	11	1
2795	Landa Lake	Open-1	2022-05-04	2	Etheostoma fonticola	16	1
2795	Landa Lake	Open-1	2022-05-04	3	Etheostoma fonticola	18	1
2795	Landa Lake	Open-1	2022-05-04	4	No fish collected		
2795	Landa Lake	Open-1	2022-05-04	5	No fish collected		
2795	Landa Lake	Open-1	2022-05-04	6	Etheostoma fonticola	13	1
2795	Landa Lake	Open-1	2022-05-04	6	Etheostoma fonticola	19	1
2795	Landa Lake	Open-1	2022-05-04	7	Etheostoma fonticola	19	1
2795	Landa Lake	Open-1	2022-05-04	8	No fish collected		
2795	Landa Lake	Open-1	2022-05-04	9	No fish collected		
2795	Landa Lake	Open-1	2022-05-04	10	No fish collected		
2795	Landa Lake	Open-1	2022-05-04	11	No fish collected		
2795	Landa Lake	Open-1	2022-05-04	12	No fish collected		
2795	Landa Lake	Open-1	2022-05-04	13	No fish collected		
2795	Landa Lake	Open-1	2022-05-04	14	No fish collected		
2795	Landa Lake	Open-1	2022-05-04	15	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	1	Procambarus sp.		1
2796	Landa Lake	Sag-1	2022-05-04	1	Micropterus salmoides	46	1
2796	Landa Lake	Sag-1	2022-05-04	2	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	3	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	4	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	5	Micropterus salmoides	55	1
2796	Landa Lake	Sag-1	2022-05-04	6	Micropterus salmoides	47	1

2796	Landa Lake	Sag-1	2022-05-04	7	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	8	Procambarus sp.		1
2796	Landa Lake	Sag-1	2022-05-04	8	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	9	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	10	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	11	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	12	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	13	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	14	No fish collected		
2796	Landa Lake	Sag-1	2022-05-04	15	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	1	Procambarus sp.		3
2797	Landa Lake	Sag-2	2022-05-04	2	Lepomis miniatus	25	1
2797	Landa Lake	Sag-2	2022-05-04	2	Gambusia sp.	45	1
2797	Landa Lake	Sag-2	2022-05-04	2	Lepomis sp.	12	1
2797	Landa Lake	Sag-2	2022-05-04	3	Procambarus sp.		2
2797	Landa Lake	Sag-2	2022-05-04	3	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	4	Procambarus sp.		2
2797	Landa Lake	Sag-2	2022-05-04	4	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	5	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	6	Etheostoma fonticola	16	1
2797	Landa Lake	Sag-2	2022-05-04	7	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	8	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	9	Procambarus sp.		1
2797	Landa Lake	Sag-2	2022-05-04	9	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	10	Procambarus sp.		1
2797	Landa Lake	Sag-2	2022-05-04	10	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	11	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	12	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	13	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	14	No fish collected		
2797	Landa Lake	Sag-2	2022-05-04	15	No fish collected		
2798	Landa Lake	Val-1	2022-05-04	13	Etheostoma fonticola	16	1
2798	Landa Lake	Val-1	2022-05-04	14	Etheostoma fonticola	14	1
2798	Landa Lake	Val-1	2022-05-04	15	Palaemonetes sp.		1
2798	Landa Lake	Val-1	2022-05-04	15	Etheostoma fonticola	16	1
2798	Landa Lake	Val-1	2022-05-04	16	Etheostoma fonticola	17	1
2798	Landa Lake	Val-1	2022-05-04	16	Etheostoma fonticola	16	1
2798	Landa Lake	Val-1	2022-05-04	17	Etheostoma fonticola	14	1
2798	Landa Lake	Val-1	2022-05-04	18	No fish collected		
2798	Landa Lake	Val-1	2022-05-04	1	Procambarus sp.		5
2798	Landa Lake	Val-1	2022-05-04	1	Lepomis sp.	20	1

2798	Landa Lake	Val-1	2022-05-04	1	Lepomis sp.	15	1
2798	Landa Lake	Val-1	2022-05-04	1	Palaemonetes sp.		6
2798	Landa Lake	Val-1	2022-05-04	1	Etheostoma fonticola	16	1
2798	Landa Lake	Val-1	2022-05-04	1	Etheostoma fonticola	16	1
2798	Landa Lake	Val-1	2022-05-04	2	Procambarus sp.		2
2798	Landa Lake	Val-1	2022-05-04	2	Palaemonetes sp.		2
2798	Landa Lake	Val-1	2022-05-04	2	No fish collected		
2798	Landa Lake	Val-1	2022-05-04	3	Procambarus sp.		1
2798	Landa Lake	Val-1	2022-05-04	3	Etheostoma fonticola	16	1
2798	Landa Lake	Val-1	2022-05-04	4	Procambarus sp.		1
2798	Landa Lake	Val-1	2022-05-04	4	Palaemonetes sp.		1
2798	Landa Lake	Val-1	2022-05-04	4	Lepomis sp.	11	1
2798	Landa Lake	Val-1	2022-05-04	4	Etheostoma fonticola	15	1
2798	Landa Lake	Val-1	2022-05-04	4	Etheostoma fonticola	16	1
2798	Landa Lake	Val-1	2022-05-04	5	Etheostoma fonticola	16	1
2798	Landa Lake	Val-1	2022-05-04	5	Etheostoma fonticola	14	1
2798	Landa Lake	Val-1	2022-05-04	5	Procambarus sp.		2
2798	Landa Lake	Val-1	2022-05-04	6	Etheostoma fonticola	18	1
2798	Landa Lake	Val-1	2022-05-04	6	Etheostoma fonticola	12	1
2798	Landa Lake	Val-1	2022-05-04	6	Etheostoma fonticola	6	1
2798	Landa Lake	Val-1	2022-05-04	7	Micropterus salmoides	122	1
2798	Landa Lake	Val-1	2022-05-04	7	Procambarus sp.		1
2798	Landa Lake	Val-1	2022-05-04	8	Procambarus sp.		1
2798	Landa Lake	Val-1	2022-05-04	8	No fish collected		
2798	Landa Lake	Val-1	2022-05-04	9	Lepomis sp.	19	1
2798	Landa Lake	Val-1	2022-05-04	10	No fish collected		
2798	Landa Lake	Val-1	2022-05-04	11	No fish collected		
2798	Landa Lake	Val-1	2022-05-04	12	No fish collected		
2798	Landa Lake	Val-1	2022-05-04	13	Palaemonetes sp.		1
2798	Landa Lake	Val-1	2022-05-04	13	Etheostoma fonticola	21	1
2799	Landa Lake	Lud-1	2022-05-04	1	Ameiurus natalis	41	1
2799	Landa Lake	Lud-1	2022-05-04	1	Ameiurus natalis	29	1
2799	Landa Lake	Lud-1	2022-05-04	1	Ameiurus natalis	27	1
2799	Landa Lake	Lud-1	2022-05-04	1	Ameiurus natalis	15	1
2799	Landa Lake	Lud-1	2022-05-04	1	Palaemonetes sp.		6
2799	Landa Lake	Lud-1	2022-05-04	1	Procambarus sp.		1
2799	Landa Lake	Lud-1	2022-05-04	1	Etheostoma fonticola	25	1
2799	Landa Lake	Lud-1	2022-05-04	2	Procambarus sp.		4
2799	Landa Lake	Lud-1	2022-05-04	2	Etheostoma fonticola	24	1
2799	Landa Lake	Lud-1	2022-05-04	2	Ameiurus natalis	25	1
2799	Landa Lake	Lud-1	2022-05-04	2	Ameiurus natalis	22	1

2799	Landa Lake	Lud-1	2022-05-04	2	Ameiurus natalis	10	1
2799	Landa Lake	Lud-1	2022-05-04	2	Ameiurus natalis	15	1
2799	Landa Lake	Lud-1	2022-05-04	2	Palaemonetes sp.		5
2799	Landa Lake	Lud-1	2022-05-04	2	Lepomis sp.	16	1
2799	Landa Lake	Lud-1	2022-05-04	3	Procambarus sp.		2
2799	Landa Lake	Lud-1	2022-05-04	3	No fish collected		
2799	Landa Lake	Lud-1	2022-05-04	4	Palaemonetes sp.		4
2799	Landa Lake	Lud-1	2022-05-04	4	No fish collected		
2799	Landa Lake	Lud-1	2022-05-04	5	Palaemonetes sp.		5
2799	Landa Lake	Lud-1	2022-05-04	5	Procambarus sp.		1
2799	Landa Lake	Lud-1	2022-05-04	5	Ameiurus natalis	43	1
2799	Landa Lake	Lud-1	2022-05-04	5	Gambusia sp.	18	1
2799	Landa Lake	Lud-1	2022-05-04	5	Gambusia sp.	8	1
2799	Landa Lake	Lud-1	2022-05-04	6	Palaemonetes sp.		4
2799	Landa Lake	Lud-1	2022-05-04	6	No fish collected		
2799	Landa Lake	Lud-1	2022-05-04	7	Etheostoma fonticola	16	1
2799	Landa Lake	Lud-1	2022-05-04	7	Palaemonetes sp.		2
2799	Landa Lake	Lud-1	2022-05-04	8	Palaemonetes sp.		1
2799	Landa Lake	Lud-1	2022-05-04	8	Etheostoma fonticola	16	1
2799	Landa Lake	Lud-1	2022-05-04	8	Etheostoma fonticola	20	1
2799	Landa Lake	Lud-1	2022-05-04	9	No fish collected		
2799	Landa Lake	Lud-1	2022-05-04	10	Procambarus sp.		1
2799	Landa Lake	Lud-1	2022-05-04	10	Etheostoma fonticola	20	1
2799	Landa Lake	Lud-1	2022-05-04	11	No fish collected		
2799	Landa Lake	Lud-1	2022-05-04	12	Ameiurus natalis	85	1
2799	Landa Lake	Lud-1	2022-05-04	12	Palaemonetes sp.		1
2799	Landa Lake	Lud-1	2022-05-04	13	No fish collected		
2799	Landa Lake	Lud-1	2022-05-04	14	No fish collected		
2799	Landa Lake	Lud-1	2022-05-04	15	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	1	Palaemonetes sp.		1
2800	Landa Lake	Val-2	2022-05-04	1	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	2	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	3	Lepomis miniatus	83	1
2800	Landa Lake	Val-2	2022-05-04	4	Lepomis sp.	14	1
2800	Landa Lake	Val-2	2022-05-04	4	Gambusia sp.	22	1
2800	Landa Lake	Val-2	2022-05-04	5	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	6	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	7	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	8	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	9	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	10	No fish collected		

2800	Landa Lake	Val-2	2022-05-04	11	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	12	Procambarus sp.		1
2800	Landa Lake	Val-2	2022-05-04	12	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	13	No fish collected		
2800	Landa Lake	Val-2	2022-05-04	14	Lepomis sp.	19	1
2800	Landa Lake	Val-2	2022-05-04	15	No fish collected		
2801	Landa Lake	Lud-2	2022-05-04	1	Procambarus sp.		3
2801	Landa Lake	Lud-2	2022-05-04	1	Palaemonetes sp.		11
2801	Landa Lake	Lud-2	2022-05-04	1	Dionda nigrotaeniata	35	1
2801	Landa Lake	Lud-2	2022-05-04	1	Lepomis miniatus	30	1
2801	Landa Lake	Lud-2	2022-05-04	1	Lepomis sp.	20	1
2801	Landa Lake	Lud-2	2022-05-04	1	Lepomis sp.	10	1
2801	Landa Lake	Lud-2	2022-05-04	1	Lepomis sp.	10	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	17	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	30	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	25	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	16	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	22	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	20	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	20	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	22	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	20	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	11	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	1	Etheostoma fonticola	16	1
2801	Landa Lake	Lud-2	2022-05-04	2	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	2	Etheostoma fonticola	20	1
2801	Landa Lake	Lud-2	2022-05-04	2	Etheostoma fonticola	19	1
2801	Landa Lake	Lud-2	2022-05-04	2	Etheostoma fonticola	16	1
2801	Landa Lake	Lud-2	2022-05-04	2	Etheostoma fonticola	17	1
2801	Landa Lake	Lud-2	2022-05-04	2	Etheostoma fonticola	15	1
2801	Landa Lake	Lud-2	2022-05-04	2	Etheostoma fonticola	16	1
2801	Landa Lake	Lud-2	2022-05-04	2	Etheostoma fonticola	17	1
2801	Landa Lake	Lud-2	2022-05-04	2	Etheostoma fonticola	16	1
2801	Landa Lake	Lud-2	2022-05-04	2	Procambarus sp.		4
2801	Landa Lake	Lud-2	2022-05-04	2	Palaemonetes sp.		12
2801	Landa Lake	Lud-2	2022-05-04	2	Astyanax mexicanus	18	1
2801	Landa Lake	Lud-2	2022-05-04	2	Dionda nigrotaeniata	24	1

2801	Landa Lake	Lud-2	2022-05-04	2	Lepomis sp.	10	1
2801	Landa Lake	Lud-2	2022-05-04	2	Lepomis sp.	6	1
2801	Landa Lake	Lud-2	2022-05-04	3	Etheostoma fonticola	16	1
2801	Landa Lake	Lud-2	2022-05-04	3	Etheostoma fonticola	34	1
2801	Landa Lake	Lud-2	2022-05-04	3	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	3	Etheostoma fonticola	15	1
2801	Landa Lake	Lud-2	2022-05-04	3	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	3	Etheostoma fonticola	12	1
2801	Landa Lake	Lud-2	2022-05-04	3	Etheostoma fonticola	14	1
2801	Landa Lake	Lud-2	2022-05-04	3	Lepomis miniatus	24	1
2801	Landa Lake	Lud-2	2022-05-04	3	Astyanax mexicanus	21	1
2801	Landa Lake	Lud-2	2022-05-04	3	Palaemonetes sp.		7
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	22	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	21	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	21	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	15	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	24	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	25	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	21	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	17	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	19	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	17	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	14	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	12	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	10	1
2801	Landa Lake	Lud-2	2022-05-04	4	Etheostoma fonticola	10	1
2801	Landa Lake	Lud-2	2022-05-04	4	Procambarus sp.		5
2801	Landa Lake	Lud-2	2022-05-04	4	Palaemonetes sp.		8
2801	Landa Lake	Lud-2	2022-05-04	4	Dionda nigrotaeniata	26	1
2801	Landa Lake	Lud-2	2022-05-04	4	Lepomis miniatus	25	1
2801	Landa Lake	Lud-2	2022-05-04	5	Etheostoma fonticola	21	1
2801	Landa Lake	Lud-2	2022-05-04	5	Etheostoma fonticola	17	1
2801	Landa Lake	Lud-2	2022-05-04	5	Etheostoma fonticola	23	1
2801	Landa Lake	Lud-2	2022-05-04	5	Etheostoma fonticola	22	1
2801	Landa Lake	Lud-2	2022-05-04	5	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	5	Etheostoma fonticola	15	1
2801	Landa Lake	Lud-2	2022-05-04	5	Procambarus sp.		5
2801	Landa Lake	Lud-2	2022-05-04	5	Palaemonetes sp.		5
2801	Landa Lake	Lud-2	2022-05-04	5	Gambusia sp.	11	1
2801	Landa Lake	Lud-2	2022-05-04	5	Gambusia sp.	12	1
2801	Landa Lake	Lud-2	2022-05-04	6	Lepomis sp.	26	1

2801	Landa Lake	Lud-2	2022-05-04	6	Etheostoma fonticola	19	1
2801	Landa Lake	Lud-2	2022-05-04	6	Etheostoma fonticola	21	1
2801	Landa Lake	Lud-2	2022-05-04	6	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	6	Etheostoma fonticola	28	1
2801	Landa Lake	Lud-2	2022-05-04	6	Etheostoma fonticola	16	1
2801	Landa Lake	Lud-2	2022-05-04	6	Procambarus sp.		4
2801	Landa Lake	Lud-2	2022-05-04	6	Palaemonetes sp.		4
2801	Landa Lake	Lud-2	2022-05-04	7	Procambarus sp.		1
2801	Landa Lake	Lud-2	2022-05-04	7	Palaemonetes sp.		7
2801	Landa Lake	Lud-2	2022-05-04	7	No fish collected		
2801	Landa Lake	Lud-2	2022-05-04	8	Etheostoma fonticola	26	1
2801	Landa Lake	Lud-2	2022-05-04	8	Etheostoma fonticola	14	1
2801	Landa Lake	Lud-2	2022-05-04	8	Etheostoma fonticola	22	1
2801	Landa Lake	Lud-2	2022-05-04	8	Etheostoma fonticola	19	1
2801	Landa Lake	Lud-2	2022-05-04	8	Etheostoma fonticola	20	1
2801	Landa Lake	Lud-2	2022-05-04	8	Etheostoma fonticola	13	1
2801	Landa Lake	Lud-2	2022-05-04	8	Etheostoma fonticola	19	1
2801	Landa Lake	Lud-2	2022-05-04	8	Procambarus sp.		1
2801	Landa Lake	Lud-2	2022-05-04	8	Palaemonetes sp.		1
2801	Landa Lake	Lud-2	2022-05-04	8	Gambusia sp.	23	1
2801	Landa Lake	Lud-2	2022-05-04	9	Etheostoma fonticola	22	1
2801	Landa Lake	Lud-2	2022-05-04	9	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	9	Palaemonetes sp.		1
2801	Landa Lake	Lud-2	2022-05-04	10	Procambarus sp.		3
2801	Landa Lake	Lud-2	2022-05-04	10	Palaemonetes sp.		4
2801	Landa Lake	Lud-2	2022-05-04	10	Lepomis sp.	20	1
2801	Landa Lake	Lud-2	2022-05-04	10	Etheostoma fonticola	19	1
2801	Landa Lake	Lud-2	2022-05-04	10	Etheostoma fonticola	20	1
2801	Landa Lake	Lud-2	2022-05-04	10	Etheostoma fonticola	22	1
2801	Landa Lake	Lud-2	2022-05-04	10	Etheostoma fonticola	20	1
2801	Landa Lake	Lud-2	2022-05-04	10	Etheostoma fonticola	21	1
2801	Landa Lake	Lud-2	2022-05-04	10	Etheostoma fonticola	21	1
2801	Landa Lake	Lud-2	2022-05-04	10	Etheostoma fonticola	10	1
2801	Landa Lake	Lud-2	2022-05-04	10	Etheostoma fonticola	12	1
2801	Landa Lake	Lud-2	2022-05-04	11	Procambarus sp.		1
2801	Landa Lake	Lud-2	2022-05-04	11	Lepomis sp.	16	1
2801	Landa Lake	Lud-2	2022-05-04	11	Etheostoma fonticola	27	1
2801	Landa Lake	Lud-2	2022-05-04	11	Etheostoma fonticola	25	1
2801	Landa Lake	Lud-2	2022-05-04	12	Procambarus sp.		1
2801	Landa Lake	Lud-2	2022-05-04	12	Etheostoma fonticola	15	1
2801	Landa Lake	Lud-2	2022-05-04	12	Etheostoma fonticola	12	1

2801	Landa Lake	Lud-2	2022-05-04	12	Etheostoma fonticola	11	1
2801	Landa Lake	Lud-2	2022-05-04	12	Etheostoma fonticola	15	1
2801	Landa Lake	Lud-2	2022-05-04	12	Etheostoma fonticola	15	1
2801	Landa Lake	Lud-2	2022-05-04	13	Lepomis miniatus	65	1
2801	Landa Lake	Lud-2	2022-05-04	13	Procambarus sp.		2
2801	Landa Lake	Lud-2	2022-05-04	13	Etheostoma fonticola	26	1
2801	Landa Lake	Lud-2	2022-05-04	13	Etheostoma fonticola	21	1
2801	Landa Lake	Lud-2	2022-05-04	13	Etheostoma fonticola	15	1
2801	Landa Lake	Lud-2	2022-05-04	13	Etheostoma fonticola	20	1
2801	Landa Lake	Lud-2	2022-05-04	13	Etheostoma fonticola	20	1
2801	Landa Lake	Lud-2	2022-05-04	13	Etheostoma fonticola	15	1
2801	Landa Lake	Lud-2	2022-05-04	13	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	13	Etheostoma fonticola	18	1
2801	Landa Lake	Lud-2	2022-05-04	13	Etheostoma fonticola	14	1
2801	Landa Lake	Lud-2	2022-05-04	13	Etheostoma fonticola	11	1
2801	Landa Lake	Lud-2	2022-05-04	14	Procambarus sp.		1
2801	Landa Lake	Lud-2	2022-05-04	14	Etheostoma fonticola	22	1
2801	Landa Lake	Lud-2	2022-05-04	14	Etheostoma fonticola	22	1
2801	Landa Lake	Lud-2	2022-05-04	14	Etheostoma fonticola	17	1
2801	Landa Lake	Lud-2	2022-05-04	14	Palaemonetes sp.		1
2801	Landa Lake	Lud-2	2022-05-04	15	Palaemonetes sp.		5
2801	Landa Lake	Lud-2	2022-05-04	15	Lepomis sp.	17	1
2802	Landa Lake	Cabo-1	2022-05-04	1	Etheostoma fonticola	18	1
2802	Landa Lake	Cabo-1	2022-05-04	1	Etheostoma fonticola	22	1
2802	Landa Lake	Cabo-1	2022-05-04	1	Etheostoma fonticola	30	1
2802	Landa Lake	Cabo-1	2022-05-04	1	Etheostoma fonticola	25	1
2802	Landa Lake	Cabo-1	2022-05-04	1	Etheostoma fonticola	25	1
2802	Landa Lake	Cabo-1	2022-05-04	1	Etheostoma fonticola	20	1
2802	Landa Lake	Cabo-1	2022-05-04	1	Etheostoma fonticola	12	1
2802	Landa Lake	Cabo-1	2022-05-04	1	Etheostoma fonticola	19	1
2802	Landa Lake	Cabo-1	2022-05-04	1	Etheostoma fonticola	16	1
2802	Landa Lake	Cabo-1	2022-05-04	1	Palaemonetes sp.		1
2802	Landa Lake	Cabo-1	2022-05-04	2	Procambarus sp.		1
2802	Landa Lake	Cabo-1	2022-05-04	2	Palaemonetes sp.		4
2802	Landa Lake	Cabo-1	2022-05-04	2	Lepomis sp.	21	1
2802	Landa Lake	Cabo-1	2022-05-04	2	Etheostoma fonticola	32	1
2802	Landa Lake	Cabo-1	2022-05-04	2	Etheostoma fonticola	22	1
2802	Landa Lake	Cabo-1	2022-05-04	2	Etheostoma fonticola	17	1
2802	Landa Lake	Cabo-1	2022-05-04	2	Etheostoma fonticola	17	1
2802	Landa Lake	Cabo-1	2022-05-04	2	Etheostoma fonticola	21	1
2802	Landa Lake	Cabo-1	2022-05-04	2	Etheostoma fonticola	20	1

2802	Landa Lake	Cabo-1	2022-05-04	2	Etheostoma fonticola	24	1
2802	Landa Lake	Cabo-1	2022-05-04	2	Etheostoma fonticola	22	1
2802	Landa Lake	Cabo-1	2022-05-04	2	Etheostoma fonticola	29	1
2802	Landa Lake	Cabo-1	2022-05-04	3	Procambarus sp.		1
2802	Landa Lake	Cabo-1	2022-05-04	3	Lepomis miniatus	30	1
2802	Landa Lake	Cabo-1	2022-05-04	3	Lepomis miniatus	36	1
2802	Landa Lake	Cabo-1	2022-05-04	3	Etheostoma fonticola	27	1
2802	Landa Lake	Cabo-1	2022-05-04	3	Etheostoma fonticola	24	1
2802	Landa Lake	Cabo-1	2022-05-04	3	Etheostoma fonticola	30	1
2802	Landa Lake	Cabo-1	2022-05-04	3	Etheostoma fonticola	22	1
2802	Landa Lake	Cabo-1	2022-05-04	3	Etheostoma fonticola	24	1
2802	Landa Lake	Cabo-1	2022-05-04	3	Etheostoma fonticola	24	1
2802	Landa Lake	Cabo-1	2022-05-04	3	Etheostoma fonticola	26	1
2802	Landa Lake	Cabo-1	2022-05-04	3	Etheostoma fonticola	22	1
2802	Landa Lake	Cabo-1	2022-05-04	4	Procambarus sp.		1
2802	Landa Lake	Cabo-1	2022-05-04	4	Micropterus salmoides	34	1
2802	Landa Lake	Cabo-1	2022-05-04	4	Etheostoma fonticola	19	1
2802	Landa Lake	Cabo-1	2022-05-04	4	Etheostoma fonticola	30	1
2802	Landa Lake	Cabo-1	2022-05-04	4	Etheostoma fonticola	28	1
2802	Landa Lake	Cabo-1	2022-05-04	4	Etheostoma fonticola	25	1
2802	Landa Lake	Cabo-1	2022-05-04	4	Etheostoma fonticola	35	1
2802	Landa Lake	Cabo-1	2022-05-04	4	Etheostoma fonticola	22	1
2802	Landa Lake	Cabo-1	2022-05-04	6	Procambarus sp.		1
2802	Landa Lake	Cabo-1	2022-05-04	6	Etheostoma fonticola	23	1
2802	Landa Lake	Cabo-1	2022-05-04	6	Etheostoma fonticola	20	1
2802	Landa Lake	Cabo-1	2022-05-04	7	Etheostoma fonticola	17	1
2802	Landa Lake	Cabo-1	2022-05-04	7	Etheostoma fonticola	20	1
2802	Landa Lake	Cabo-1	2022-05-04	7	Etheostoma fonticola	17	1
2802	Landa Lake	Cabo-1	2022-05-04	8	Etheostoma fonticola	21	1
2802	Landa Lake	Cabo-1	2022-05-04	8	Etheostoma fonticola	30	1
2802	Landa Lake	Cabo-1	2022-05-04	8	Etheostoma fonticola	15	1
2802	Landa Lake	Cabo-1	2022-05-04	9	Etheostoma fonticola	25	1
2802	Landa Lake	Cabo-1	2022-05-04	9	Etheostoma fonticola	16	1
2802	Landa Lake	Cabo-1	2022-05-04	9	Etheostoma fonticola	22	1
2802	Landa Lake	Cabo-1	2022-05-04	10	Procambarus sp.		2
2802	Landa Lake	Cabo-1	2022-05-04	10	Etheostoma fonticola	20	1
2802	Landa Lake	Cabo-1	2022-05-04	10	Etheostoma fonticola	20	1
2802	Landa Lake	Cabo-1	2022-05-04	10	Etheostoma fonticola	22	1
2802	Landa Lake	Cabo-1	2022-05-04	10	Dionda nigrotaeniata	25	1
2802	Landa Lake	Cabo-1	2022-05-04	11	Procambarus sp.		
2802	Landa Lake	Cabo-1	2022-05-04	11	Palaemonetes sp.		1

2802	Landa Lake	Cabo-1	2022-05-04	11	Etheostoma fonticola	25	1
2802	Landa Lake	Cabo-1	2022-05-04	11	Etheostoma fonticola	18	1
2802	Landa Lake	Cabo-1	2022-05-04	11	Etheostoma fonticola	17	1
2802	Landa Lake	Cabo-1	2022-05-04	12	Lepomis miniatus	30	1
2802	Landa Lake	Cabo-1	2022-05-04	12	Etheostoma fonticola	24	1
2802	Landa Lake	Cabo-1	2022-05-04	13	No fish collected		
2802	Landa Lake	Cabo-1	2022-05-04	14	No fish collected		
2802	Landa Lake	Cabo-1	2022-05-04	15	Etheostoma fonticola	25	1
2802	Landa Lake	Cabo-1	2022-05-04	16	No fish collected		
2802	Landa Lake	Cabo-1	2022-05-04	5	Dionda nigrotaeniata	23	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	29	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	20	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	30	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	24	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	32	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	28	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	18	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	30	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	22	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	24	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	33	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	24	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	32	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	28	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	18	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	19	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	28	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	22	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	21	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	20	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	25	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	25	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	22	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	24	1
2803	Landa Lake	Cab-2	2022-05-04	1	Etheostoma fonticola	20	1
2803	Landa Lake	Cab-2	2022-05-04	1	Lepomis miniatus	37	1
2803	Landa Lake	Cab-2	2022-05-04	1	Lepomis miniatus	37	1
2803	Landa Lake	Cab-2	2022-05-04	1	Lepomis miniatus	25	1
2803	Landa Lake	Cab-2	2022-05-04	1	Lepomis miniatus	24	1
2803	Landa Lake	Cab-2	2022-05-04	1	Micropterus salmoides	40	1
2803	Landa Lake	Cab-2	2022-05-04	1	Procambarus sp.		1

2803	Landa Lake	Cab-2	2022-05-04	1	Palaemonetes sp.		10
2803	Landa Lake	Cab-2	2022-05-04	2	Palaemonetes sp.		5
2803	Landa Lake	Cab-2	2022-05-04	2	Procambarus sp.		1
2803	Landa Lake	Cab-2	2022-05-04	2	Micropterus salmoides	37	1
2803	Landa Lake	Cab-2	2022-05-04	3	Lepomis miniatus	35	1
2803	Landa Lake	Cab-2	2022-05-04	3	Procambarus sp.		2
2803	Landa Lake	Cab-2	2022-05-04	3	Palaemonetes sp.		1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	32	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	34	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	28	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	23	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	20	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	32	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	29	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	24	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	17	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	20	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	22	1
2803	Landa Lake	Cab-2	2022-05-04	3	Etheostoma fonticola	24	1
2803	Landa Lake	Cab-2	2022-05-04	4	Procambarus sp.		1
2803	Landa Lake	Cab-2	2022-05-04	4	Palaemonetes sp.		1
2803	Landa Lake	Cab-2	2022-05-04	4	No fish collected		
2803	Landa Lake	Cab-2	2022-05-04	5	Palaemonetes sp.		1
2803	Landa Lake	Cab-2	2022-05-04	5	Procambarus sp.		3
2803	Landa Lake	Cab-2	2022-05-04	5	Etheostoma fonticola	24	1
2803	Landa Lake	Cab-2	2022-05-04	5	Etheostoma fonticola	25	1
2803	Landa Lake	Cab-2	2022-05-04	6	Etheostoma fonticola	34	1
2803	Landa Lake	Cab-2	2022-05-04	6	Etheostoma fonticola	24	1
2803	Landa Lake	Cab-2	2022-05-04	6	Etheostoma fonticola	32	1
2803	Landa Lake	Cab-2	2022-05-04	6	Etheostoma fonticola	28	1
2803	Landa Lake	Cab-2	2022-05-04	6	Etheostoma fonticola	22	1
2803	Landa Lake	Cab-2	2022-05-04	6	Etheostoma fonticola	14	1
2803	Landa Lake	Cab-2	2022-05-04	6	Etheostoma fonticola	20	1
2803	Landa Lake	Cab-2	2022-05-04	6	Etheostoma fonticola	21	1
2803	Landa Lake	Cab-2	2022-05-04	6	Astyanax mexicanus	22	1
2803	Landa Lake	Cab-2	2022-05-04	6	Palaemonetes sp.		1
2803	Landa Lake	Cab-2	2022-05-04	7	Procambarus sp.		1
2803	Landa Lake	Cab-2	2022-05-04	7	No fish collected		
2803	Landa Lake	Cab-2	2022-05-04	8	Procambarus sp.		2
2803	Landa Lake	Cab-2	2022-05-04	8	Etheostoma fonticola	30	1
2803	Landa Lake	Cab-2	2022-05-04	8	Lepomis miniatus	27	1

2803	Landa Lake	Cab-2	2022-05-04	9	Procambarus sp.		1
2803	Landa Lake	Cab-2	2022-05-04	9	No fish collected		
2803	Landa Lake	Cab-2	2022-05-04	10	Procambarus sp.		3
2803	Landa Lake	Cab-2	2022-05-04	10	Etheostoma fonticola	25	1
2803	Landa Lake	Cab-2	2022-05-04	11	Etheostoma fonticola	25	1
2803	Landa Lake	Cab-2	2022-05-04	11	Etheostoma fonticola	18	1
2803	Landa Lake	Cab-2	2022-05-04	11	Etheostoma fonticola	26	1
2803	Landa Lake	Cab-2	2022-05-04	11	Palaemonetes sp.		1
2803	Landa Lake	Cab-2	2022-05-04	12	Etheostoma fonticola	25	1
2803	Landa Lake	Cab-2	2022-05-04	12	Etheostoma fonticola	27	1
2803	Landa Lake	Cab-2	2022-05-04	12	Etheostoma fonticola	32	1
2803	Landa Lake	Cab-2	2022-05-04	13	Procambarus sp.		1
2803	Landa Lake	Cab-2	2022-05-04	13	Etheostoma fonticola	26	1
2803	Landa Lake	Cab-2	2022-05-04	13	Etheostoma fonticola	24	1
2803	Landa Lake	Cab-2	2022-05-04	14	Procambarus sp.		3
2803	Landa Lake	Cab-2	2022-05-04	14	Etheostoma fonticola	24	1
2803	Landa Lake	Cab-2	2022-05-04	15	Procambarus sp.		1
2803	Landa Lake	Cab-2	2022-05-04	15	No fish collected		
2856	Landa Lake	Bryo-1	2022-06-22	1	Palaemonetes sp.		3
2856	Landa Lake	Bryo-1	2022-06-22	1	Etheostoma fonticola	31	1
2856	Landa Lake	Bryo-1	2022-06-22	1	Etheostoma fonticola	16	1
2856	Landa Lake	Bryo-1	2022-06-22	1	Etheostoma fonticola	14	1
2856	Landa Lake	Bryo-1	2022-06-22	1	Etheostoma fonticola	11	1
2856	Landa Lake	Bryo-1	2022-06-22	1	Etheostoma fonticola	10	1
2856	Landa Lake	Bryo-1	2022-06-22	1	Etheostoma fonticola	11	1
2856	Landa Lake	Bryo-1	2022-06-22	2	Palaemonetes sp.		1
2856	Landa Lake	Bryo-1	2022-06-22	2	No fish collected		
2856	Landa Lake	Bryo-1	2022-06-22	3	Palaemonetes sp.		5
2856	Landa Lake	Bryo-1	2022-06-22	3	Lepomis sp.	8	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	21	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	26	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	22	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	22	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	18	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	21	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	20	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	12	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	23	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	24	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	19	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	18	1

2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	25	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	20	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	22	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	24	1
2856	Landa Lake	Bryo-1	2022-06-22	3	Etheostoma fonticola	24	1
2856	Landa Lake	Bryo-1	2022-06-22	4	Palaemonetes sp.		1
2856	Landa Lake	Bryo-1	2022-06-22	4	No fish collected		
2856	Landa Lake	Bryo-1	2022-06-22	5	Procambarus sp.		1
2856	Landa Lake	Bryo-1	2022-06-22	5	Etheostoma fonticola	25	1
2856	Landa Lake	Bryo-1	2022-06-22	5	Etheostoma fonticola	26	1
2856	Landa Lake	Bryo-1	2022-06-22	6	Procambarus sp.		2
2856	Landa Lake	Bryo-1	2022-06-22	6	Etheostoma fonticola	24	1
2856	Landa Lake	Bryo-1	2022-06-22	6	Lepomis sp.	10	1
2856	Landa Lake	Bryo-1	2022-06-22	7	Etheostoma fonticola	18	1
2856	Landa Lake	Bryo-1	2022-06-22	7	Etheostoma fonticola	24	1
2856	Landa Lake	Bryo-1	2022-06-22	8	Procambarus sp.		1
2856	Landa Lake	Bryo-1	2022-06-22	8	No fish collected		
2856	Landa Lake	Bryo-1	2022-06-22	9	Procambarus sp.		4
2856	Landa Lake	Bryo-1	2022-06-22	9	Etheostoma fonticola	22	1
2856	Landa Lake	Bryo-1	2022-06-22	9	Etheostoma fonticola	22	1
2856	Landa Lake	Bryo-1	2022-06-22	9	Etheostoma fonticola	19	1
2856	Landa Lake	Bryo-1	2022-06-22	9	Palaemonetes sp.		1
2856	Landa Lake	Bryo-1	2022-06-22	10	Procambarus sp.		1
2856	Landa Lake	Bryo-1	2022-06-22	10	Etheostoma fonticola	26	1
2856	Landa Lake	Bryo-1	2022-06-22	11	Etheostoma fonticola	23	1
2856	Landa Lake	Bryo-1	2022-06-22	11	Etheostoma fonticola	23	1
2856	Landa Lake	Bryo-1	2022-06-22	12	No fish collected		
2856	Landa Lake	Bryo-1	2022-06-22	13	Etheostoma fonticola	21	1
2856	Landa Lake	Bryo-1	2022-06-22	14	Lepomis sp.	11	1
2856	Landa Lake	Bryo-1	2022-06-22	15	Palaemonetes sp.		1
2856	Landa Lake	Bryo-1	2022-06-22	15	No fish collected		
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	26	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	18	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	28	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	22	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	21	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	22	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	24	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	22	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	22	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	11	1

2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	23	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	25	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	24	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	25	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	30	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	18	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Palaemonetes sp.		11
2857	Landa Lake	Bryo-2	2022-06-22	3	Procambarus sp.		2
2857	Landa Lake	Bryo-2	2022-06-22	4	Etheostoma fonticola	28	1
2857	Landa Lake	Bryo-2	2022-06-22	4	Etheostoma fonticola	31	1
2857	Landa Lake	Bryo-2	2022-06-22	4	Etheostoma fonticola	24	1
2857	Landa Lake	Bryo-2	2022-06-22	4	Etheostoma fonticola	16	1
2857	Landa Lake	Bryo-2	2022-06-22	4	Etheostoma fonticola	27	1
2857	Landa Lake	Bryo-2	2022-06-22	4	Etheostoma fonticola	16	1
2857	Landa Lake	Bryo-2	2022-06-22	4	Etheostoma fonticola	16	1
2857	Landa Lake	Bryo-2	2022-06-22	4	Etheostoma fonticola	9	1
2857	Landa Lake	Bryo-2	2022-06-22	4	Palaemonetes sp.		3
2857	Landa Lake	Bryo-2	2022-06-22	4	Procambarus sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	5	Etheostoma fonticola	18	1
2857	Landa Lake	Bryo-2	2022-06-22	5	Etheostoma fonticola	24	1
2857	Landa Lake	Bryo-2	2022-06-22	5	Etheostoma fonticola	22	1
2857	Landa Lake	Bryo-2	2022-06-22	5	Etheostoma fonticola	15	1
2857	Landa Lake	Bryo-2	2022-06-22	5	Etheostoma fonticola	22	1
2857	Landa Lake	Bryo-2	2022-06-22	5	Palaemonetes sp.		3
2857	Landa Lake	Bryo-2	2022-06-22	5	Procambarus sp.		2
2857	Landa Lake	Bryo-2	2022-06-22	6	Etheostoma fonticola	20	1
2857	Landa Lake	Bryo-2	2022-06-22	6	Etheostoma fonticola	22	1
2857	Landa Lake	Bryo-2	2022-06-22	6	Etheostoma fonticola	24	1
2857	Landa Lake	Bryo-2	2022-06-22	6	Etheostoma fonticola	20	1
2857	Landa Lake	Bryo-2	2022-06-22	6	Etheostoma fonticola	20	1
2857	Landa Lake	Bryo-2	2022-06-22	6	Etheostoma fonticola	21	1
2857	Landa Lake	Bryo-2	2022-06-22	6	Etheostoma fonticola	21	1
2857	Landa Lake	Bryo-2	2022-06-22	6	Etheostoma fonticola	18	1
2857	Landa Lake	Bryo-2	2022-06-22	6	Etheostoma fonticola	11	1
2857	Landa Lake	Bryo-2	2022-06-22	6	Palaemonetes sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	7	Etheostoma fonticola	29	1
2857	Landa Lake	Bryo-2	2022-06-22	7	Etheostoma fonticola	21	1
2857	Landa Lake	Bryo-2	2022-06-22	7	Etheostoma fonticola	29	1
2857	Landa Lake	Bryo-2	2022-06-22	7	Etheostoma fonticola	22	1
2857	Landa Lake	Bryo-2	2022-06-22	7	Etheostoma fonticola	25	1
2857	Landa Lake	Bryo-2	2022-06-22	7	Etheostoma fonticola	22	1

2857	Landa Lake	Bryo-2	2022-06-22	7	Etheostoma fonticola	31	1
2857	Landa Lake	Bryo-2	2022-06-22	7	Etheostoma fonticola	22	1
2857	Landa Lake	Bryo-2	2022-06-22	7	Etheostoma fonticola	23	1
2857	Landa Lake	Bryo-2	2022-06-22	7	Palaemonetes sp.		4
2857	Landa Lake	Bryo-2	2022-06-22	7	Procambarus sp.		4
2857	Landa Lake	Bryo-2	2022-06-22	8	Etheostoma fonticola	23	1
2857	Landa Lake	Bryo-2	2022-06-22	8	Etheostoma fonticola	15	1
2857	Landa Lake	Bryo-2	2022-06-22	8	Palaemonetes sp.		2
2857	Landa Lake	Bryo-2	2022-06-22	9	Etheostoma fonticola	26	1
2857	Landa Lake	Bryo-2	2022-06-22	9	Etheostoma fonticola	20	1
2857	Landa Lake	Bryo-2	2022-06-22	9	Etheostoma fonticola	29	1
2857	Landa Lake	Bryo-2	2022-06-22	9	Etheostoma fonticola	25	1
2857	Landa Lake	Bryo-2	2022-06-22	9	Etheostoma fonticola	10	1
2857	Landa Lake	Bryo-2	2022-06-22	9	Palaemonetes sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	9	Procambarus sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	10	Etheostoma fonticola	24	1
2857	Landa Lake	Bryo-2	2022-06-22	10	Etheostoma fonticola	20	1
2857	Landa Lake	Bryo-2	2022-06-22	10	Etheostoma fonticola	25	1
2857	Landa Lake	Bryo-2	2022-06-22	10	Etheostoma fonticola	11	1
2857	Landa Lake	Bryo-2	2022-06-22	10	Palaemonetes sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	11	Etheostoma fonticola	28	1
2857	Landa Lake	Bryo-2	2022-06-22	11	Etheostoma fonticola	32	1
2857	Landa Lake	Bryo-2	2022-06-22	11	Etheostoma fonticola	23	1
2857	Landa Lake	Bryo-2	2022-06-22	11	Etheostoma fonticola	21	1
2857	Landa Lake	Bryo-2	2022-06-22	11	Etheostoma fonticola	18	1
2857	Landa Lake	Bryo-2	2022-06-22	11	Palaemonetes sp.		2
2857	Landa Lake	Bryo-2	2022-06-22	12	Etheostoma fonticola	21	1
2857	Landa Lake	Bryo-2	2022-06-22	12	Etheostoma fonticola	26	1
2857	Landa Lake	Bryo-2	2022-06-22	12	Etheostoma fonticola	29	1
2857	Landa Lake	Bryo-2	2022-06-22	12	Palaemonetes sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	12	Procambarus sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	13	Palaemonetes sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	13	No fish collected		
2857	Landa Lake	Bryo-2	2022-06-22	14	Procambarus sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	14	Palaemonetes sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	14	Etheostoma fonticola	23	1
2857	Landa Lake	Bryo-2	2022-06-22	15	Etheostoma fonticola	11	1
2857	Landa Lake	Bryo-2	2022-06-22	16	Palaemonetes sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	16	No fish collected		
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	24	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	22	1

2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	21	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	24	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	23	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	28	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	11	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	29	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	24	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	32	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	19	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	11	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	11	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	9	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	25	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	11	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	13	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Etheostoma fonticola	11	1
2857	Landa Lake	Bryo-2	2022-06-22	1	Palaemonetes sp.		25
2857	Landa Lake	Bryo-2	2022-06-22	1	Procambarus sp.		1
2857	Landa Lake	Bryo-2	2022-06-22	2	Palaemonetes sp.		8
2857	Landa Lake	Bryo-2	2022-06-22	2	Procambarus sp.		2
2857	Landa Lake	Bryo-2	2022-06-22	2	Etheostoma fonticola	25	1
2857	Landa Lake	Bryo-2	2022-06-22	2	Etheostoma fonticola	14	1
2857	Landa Lake	Bryo-2	2022-06-22	2	Etheostoma fonticola	12	1
2857	Landa Lake	Bryo-2	2022-06-22	2	Etheostoma fonticola	12	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	26	1
2857	Landa Lake	Bryo-2	2022-06-22	3	Etheostoma fonticola	25	1
2858	Landa Lake	Sagi-1	2022-06-22	1	Procambarus sp.		1
2858	Landa Lake	Sagi-1	2022-06-22	1	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	2	Procambarus sp.		3
2858	Landa Lake	Sagi-1	2022-06-22	2	Lepomis miniatus	22	1
2858	Landa Lake	Sagi-1	2022-06-22	3	Procambarus sp.		1
2858	Landa Lake	Sagi-1	2022-06-22	3	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	4	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	5	Procambarus sp.		1
2858	Landa Lake	Sagi-1	2022-06-22	5	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	6	Procambarus sp.		1
2858	Landa Lake	Sagi-1	2022-06-22	6	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	7	Procambarus sp.		2
2858	Landa Lake	Sagi-1	2022-06-22	7	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	8	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	9	No fish collected		

2858	Landa Lake	Sagi-1	2022-06-22	10	Procambarus sp.		1
2858	Landa Lake	Sagi-1	2022-06-22	10	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	11	Procambarus sp.		2
2858	Landa Lake	Sagi-1	2022-06-22	11	Lepomis miniatus	71	1
2858	Landa Lake	Sagi-1	2022-06-22	12	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	13	Procambarus sp.		1
2858	Landa Lake	Sagi-1	2022-06-22	13	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	14	Procambarus sp.		1
2858	Landa Lake	Sagi-1	2022-06-22	14	No fish collected		
2858	Landa Lake	Sagi-1	2022-06-22	15	No fish collected		
2859	Landa Lake	Cabo-1	2022-06-22	1	Astyanax mexicanus	56	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Astyanax mexicanus	60	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Astyanax mexicanus	49	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Astyanax mexicanus	40	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Astyanax mexicanus	35	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Astyanax mexicanus	31	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Astyanax mexicanus	40	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Micropterus salmoides	44	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Micropterus salmoides	42	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Micropterus salmoides	57	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Micropterus salmoides	44	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Micropterus salmoides	35	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Gambusia sp.	31	1
2859	Landa Lake	Cabo-1	2022-06-22	1	Palaemonetes sp.		14
2859	Landa Lake	Cabo-1	2022-06-22	2	Lepomis miniatus	70	1
2859	Landa Lake	Cabo-1	2022-06-22	2	Lepomis miniatus	55	1
2859	Landa Lake	Cabo-1	2022-06-22	2	Lepomis miniatus	42	1
2859	Landa Lake	Cabo-1	2022-06-22	2	Astyanax mexicanus	20	1
2859	Landa Lake	Cabo-1	2022-06-22	2	Procambarus sp.		1
2859	Landa Lake	Cabo-1	2022-06-22	2	Palaemonetes sp.		1
2859	Landa Lake	Cabo-1	2022-06-22	3	Procambarus sp.		1
2859	Landa Lake	Cabo-1	2022-06-22	3	Palaemonetes sp.		1
2859	Landa Lake	Cabo-1	2022-06-22	3	Astyanax mexicanus	31	1
2859	Landa Lake	Cabo-1	2022-06-22	4	Procambarus sp.		1
2859	Landa Lake	Cabo-1	2022-06-22	4	Palaemonetes sp.		1
2859	Landa Lake	Cabo-1	2022-06-22	4	Micropterus salmoides	115	1
2859	Landa Lake	Cabo-1	2022-06-22	4	Astyanax mexicanus	22	1
2859	Landa Lake	Cabo-1	2022-06-22	4	Etheostoma fonticola	28	1
2859	Landa Lake	Cabo-1	2022-06-22	4	Etheostoma fonticola	32	1
2859	Landa Lake	Cabo-1	2022-06-22	4	Etheostoma fonticola	21	1
2859	Landa Lake	Cabo-1	2022-06-22	5	Astyanax mexicanus	45	1

2859	Landa Lake	Cabo-1	2022-06-22	5	Astyanax mexicanus	46	1
2859	Landa Lake	Cabo-1	2022-06-22	5	Astyanax mexicanus	42	1
2859	Landa Lake	Cabo-1	2022-06-22	5	Etheostoma fonticola	30	1
2859	Landa Lake	Cabo-1	2022-06-22	5	Palaemonetes sp.		2
2859	Landa Lake	Cabo-1	2022-06-22	6	Palaemonetes sp.		1
2859	Landa Lake	Cabo-1	2022-06-22	6	No fish collected		
2859	Landa Lake	Cabo-1	2022-06-22	7	No fish collected		
2859	Landa Lake	Cabo-1	2022-06-22	7	Palaemonetes sp.		3
2859	Landa Lake	Cabo-1	2022-06-22	7	Procambarus sp.		1
2859	Landa Lake	Cabo-1	2022-06-22	8	Lepomis miniatus	92	1
2859	Landa Lake	Cabo-1	2022-06-22	8	Dionda nigrotaeniata	32	1
2859	Landa Lake	Cabo-1	2022-06-22	8	Etheostoma fonticola	28	1
2859	Landa Lake	Cabo-1	2022-06-22	8	Procambarus sp.		2
2859	Landa Lake	Cabo-1	2022-06-22	9	No fish collected		
2859	Landa Lake	Cabo-1	2022-06-22	10	Micropterus salmoides	45	1
2859	Landa Lake	Cabo-1	2022-06-22	10	Palaemonetes sp.		1
2859	Landa Lake	Cabo-1	2022-06-22	11	No fish collected		
2859	Landa Lake	Cabo-1	2022-06-22	12	Procambarus sp.		1
2859	Landa Lake	Cabo-1	2022-06-22	12	Lepomis miniatus	32	1
2859	Landa Lake	Cabo-1	2022-06-22	12	Etheostoma fonticola	31	1
2859	Landa Lake	Cabo-1	2022-06-22	13	Etheostoma fonticola	25	1
2859	Landa Lake	Cabo-1	2022-06-22	14	No fish collected		
2859	Landa Lake	Cabo-1	2022-06-22	15	Procambarus sp.		2
2859	Landa Lake	Cabo-1	2022-06-22	15	No fish collected		
2860	Landa Lake	Cab-2	2022-06-22	6	Procambarus sp.		1
2860	Landa Lake	Cab-2	2022-06-22	6	Etheostoma fonticola	25	1
2860	Landa Lake	Cab-2	2022-06-22	6	Etheostoma fonticola	11	1
2860	Landa Lake	Cab-2	2022-06-22	7	Procambarus sp.		1
2860	Landa Lake	Cab-2	2022-06-22	8	Procambarus sp.		1
2860	Landa Lake	Cab-2	2022-06-22	8	Etheostoma fonticola	30	1
2860	Landa Lake	Cab-2	2022-06-22	9	Etheostoma fonticola	25	1
2860	Landa Lake	Cab-2	2022-06-22	9	Etheostoma fonticola	32	1
2860	Landa Lake	Cab-2	2022-06-22	9	Etheostoma fonticola	30	1
2860	Landa Lake	Cab-2	2022-06-22	9	Etheostoma fonticola	28	1
2860	Landa Lake	Cab-2	2022-06-22	9	Procambarus sp.		1
2860	Landa Lake	Cab-2	2022-06-22	10	No fish collected		
2860	Landa Lake	Cab-2	2022-06-22	11	Procambarus sp.		1
2860	Landa Lake	Cab-2	2022-06-22	11	Etheostoma fonticola	25	1
2860	Landa Lake	Cab-2	2022-06-22	12	No fish collected		
2860	Landa Lake	Cab-2	2022-06-22	13	Procambarus sp.		1
2860	Landa Lake	Cab-2	2022-06-22	13	Etheostoma fonticola	11	1

2860	Landa Lake	Cab-2	2022-06-22	14	Procambarus sp.		1
2860	Landa Lake	Cab-2	2022-06-22	14	Etheostoma fonticola	29	1
2860	Landa Lake	Cab-2	2022-06-22	14	Etheostoma fonticola	28	1
2860	Landa Lake	Cab-2	2022-06-22	15	Procambarus sp.		1
2860	Landa Lake	Cab-2	2022-06-22	15	No fish collected		
2860	Landa Lake	Cab-2	2022-06-22	7	Etheostoma fonticola	28	1
2860	Landa Lake	Cab-2	2022-06-22	7	Etheostoma fonticola	28	1
2860	Landa Lake	Cab-2	2022-06-22	1	Procambarus sp.		1
2860	Landa Lake	Cab-2	2022-06-22	1	Etheostoma fonticola	22	1
2860	Landa Lake	Cab-2	2022-06-22	2	Procambarus sp.		3
2860	Landa Lake	Cab-2	2022-06-22	2	Etheostoma fonticola	23	1
2860	Landa Lake	Cab-2	2022-06-22	2	Etheostoma fonticola	15	1
2860	Landa Lake	Cab-2	2022-06-22	2	Etheostoma fonticola	25	1
2860	Landa Lake	Cab-2	2022-06-22	3	Palaemonetes sp.		1
2860	Landa Lake	Cab-2	2022-06-22	3	Etheostoma fonticola	22	1
2860	Landa Lake	Cab-2	2022-06-22	3	Procambarus sp.		1
2860	Landa Lake	Cab-2	2022-06-22	4	Procambarus sp.		2
2860	Landa Lake	Cab-2	2022-06-22	4	Etheostoma fonticola	26	1
2860	Landa Lake	Cab-2	2022-06-22	4	Etheostoma fonticola	21	1
2860	Landa Lake	Cab-2	2022-06-22	5	Etheostoma fonticola	31	1
2860	Landa Lake	Cab-2	2022-06-22	5	Etheostoma fonticola	26	1
2860	Landa Lake	Cab-2	2022-06-22	5	Etheostoma fonticola	24	1
2860	Landa Lake	Cab-2	2022-06-22	5	Etheostoma fonticola	25	1
2860	Landa Lake	Cab-2	2022-06-22	5	Etheostoma fonticola	25	1
2860	Landa Lake	Cab-2	2022-06-22	5	Procambarus sp.		4
2861	Landa Lake	Sagi-2	2022-06-22	1	Procambarus sp.		3
2861	Landa Lake	Sagi-2	2022-06-22	1	Palaemonetes sp.		1
2861	Landa Lake	Sagi-2	2022-06-22	1	Etheostoma fonticola	24	1
2861	Landa Lake	Sagi-2	2022-06-22	1	Etheostoma fonticola	14	1
2861	Landa Lake	Sagi-2	2022-06-22	1	Etheostoma fonticola	30	1
2861	Landa Lake	Sagi-2	2022-06-22	1	Etheostoma fonticola	26	1
2861	Landa Lake	Sagi-2	2022-06-22	1	Etheostoma fonticola	25	1
2861	Landa Lake	Sagi-2	2022-06-22	1	Etheostoma fonticola	25	1
2861	Landa Lake	Sagi-2	2022-06-22	1	Etheostoma fonticola	29	1
2861	Landa Lake	Sagi-2	2022-06-22	1	Etheostoma fonticola	29	1
2861	Landa Lake	Sagi-2	2022-06-22	1	Etheostoma fonticola	9	1
2861	Landa Lake	Sagi-2	2022-06-22	1	Lepomis sp.	11	1
2861	Landa Lake	Sagi-2	2022-06-22	1	Lepomis sp.	11	1
2861	Landa Lake	Sagi-2	2022-06-22	2	Procambarus sp.		7
2861	Landa Lake	Sagi-2	2022-06-22	2	Etheostoma fonticola	27	1
2861	Landa Lake	Sagi-2	2022-06-22	2	Etheostoma fonticola	15	1

2861	Landa Lake	Sagi-2	2022-06-22	3	Etheostoma fonticola	25	1
2861	Landa Lake	Sagi-2	2022-06-22	3	Etheostoma fonticola	22	1
2861	Landa Lake	Sagi-2	2022-06-22	3	Etheostoma fonticola	22	1
2861	Landa Lake	Sagi-2	2022-06-22	3	Procambarus sp.		6
2861	Landa Lake	Sagi-2	2022-06-22	4	Etheostoma fonticola	23	1
2861	Landa Lake	Sagi-2	2022-06-22	4	Etheostoma fonticola	19	1
2861	Landa Lake	Sagi-2	2022-06-22	4	Etheostoma fonticola	24	1
2861	Landa Lake	Sagi-2	2022-06-22	4	Etheostoma fonticola	18	1
2861	Landa Lake	Sagi-2	2022-06-22	4	Etheostoma fonticola	21	1
2861	Landa Lake	Sagi-2	2022-06-22	4	Etheostoma fonticola	32	1
2861	Landa Lake	Sagi-2	2022-06-22	4	Etheostoma fonticola	18	1
2861	Landa Lake	Sagi-2	2022-06-22	4	Procambarus sp.		3
2861	Landa Lake	Sagi-2	2022-06-22	5	Procambarus sp.		6
2861	Landa Lake	Sagi-2	2022-06-22	5	No fish collected		
2861	Landa Lake	Sagi-2	2022-06-22	6	Procambarus sp.		5
2861	Landa Lake	Sagi-2	2022-06-22	6	Etheostoma fonticola	25	1
2861	Landa Lake	Sagi-2	2022-06-22	7	Procambarus sp.		3
2861	Landa Lake	Sagi-2	2022-06-22	7	No fish collected		
2861	Landa Lake	Sagi-2	2022-06-22	8	Procambarus sp.		6
2861	Landa Lake	Sagi-2	2022-06-22	8	No fish collected		
2861	Landa Lake	Sagi-2	2022-06-22	9	Procambarus sp.		3
2861	Landa Lake	Sagi-2	2022-06-22	9	Etheostoma fonticola	26	1
2861	Landa Lake	Sagi-2	2022-06-22	10	Procambarus sp.		4
2861	Landa Lake	Sagi-2	2022-06-22	10	Etheostoma fonticola	24	1
2861	Landa Lake	Sagi-2	2022-06-22	11	Procambarus sp.		2
2861	Landa Lake	Sagi-2	2022-06-22	11	Etheostoma fonticola	21	1
2861	Landa Lake	Sagi-2	2022-06-22	12	Procambarus sp.		2
2861	Landa Lake	Sagi-2	2022-06-22	12	Lepomis miniatus	46	1
2861	Landa Lake	Sagi-2	2022-06-22	13	No fish collected		
2861	Landa Lake	Sagi-2	2022-06-22	14	Procambarus sp.		5
2861	Landa Lake	Sagi-2	2022-06-22	14	Etheostoma fonticola	23	1
2861	Landa Lake	Sagi-2	2022-06-22	15	No fish collected		
2862	Landa Lake	Lud-1	2022-06-22	1	Etheostoma fonticola	25	1
2862	Landa Lake	Lud-1	2022-06-22	1	Etheostoma fonticola	26	1
2862	Landa Lake	Lud-1	2022-06-22	1	Etheostoma fonticola	28	1
2862	Landa Lake	Lud-1	2022-06-22	1	Etheostoma fonticola	21	1
2862	Landa Lake	Lud-1	2022-06-22	1	Etheostoma fonticola	21	1
2862	Landa Lake	Lud-1	2022-06-22	1	Etheostoma fonticola	22	1
2862	Landa Lake	Lud-1	2022-06-22	1	Lepomis sp.	12	1
2862	Landa Lake	Lud-1	2022-06-22	1	Lepomis sp.	11	1
2862	Landa Lake	Lud-1	2022-06-22	1	Lepomis sp.	11	1

2862	Landa Lake	Lud-1	2022-06-22	1	Lepomis sp.	14	1
2862	Landa Lake	Lud-1	2022-06-22	1	Lepomis sp.	12	1
2862	Landa Lake	Lud-1	2022-06-22	1	Palaemonetes sp.		51
2862	Landa Lake	Lud-1	2022-06-22	1	Procambarus sp.		12
2862	Landa Lake	Lud-1	2022-06-22	2	Procambarus sp.		7
2862	Landa Lake	Lud-1	2022-06-22	2	Palaemonetes sp.		8
2862	Landa Lake	Lud-1	2022-06-22	2	Etheostoma fonticola	34	1
2862	Landa Lake	Lud-1	2022-06-22	2	Etheostoma fonticola	19	1
2862	Landa Lake	Lud-1	2022-06-22	2	Astyanax mexicanus	15	1
2862	Landa Lake	Lud-1	2022-06-22	2	Astyanax mexicanus	8	1
2862	Landa Lake	Lud-1	2022-06-22	2	Gambusia sp.	20	1
2862	Landa Lake	Lud-1	2022-06-22	2	Lepomis sp.	7	1
2862	Landa Lake	Lud-1	2022-06-22	2	Lepomis sp.	7	1
2862	Landa Lake	Lud-1	2022-06-22	3	Procambarus sp.		4
2862	Landa Lake	Lud-1	2022-06-22	3	Palaemonetes sp.		9
2862	Landa Lake	Lud-1	2022-06-22	3	Etheostoma fonticola	30	1
2862	Landa Lake	Lud-1	2022-06-22	3	Etheostoma fonticola	22	1
2862	Landa Lake	Lud-1	2022-06-22	3	Etheostoma fonticola	30	1
2862	Landa Lake	Lud-1	2022-06-22	3	Etheostoma fonticola	22	1
2862	Landa Lake	Lud-1	2022-06-22	3	Etheostoma fonticola	28	1
2862	Landa Lake	Lud-1	2022-06-22	3	Etheostoma fonticola	28	1
2862	Landa Lake	Lud-1	2022-06-22	3	Astyanax mexicanus	50	1
2862	Landa Lake	Lud-1	2022-06-22	3	Astyanax mexicanus	12	1
2862	Landa Lake	Lud-1	2022-06-22	3	Lepomis sp.	10	1
2862	Landa Lake	Lud-1	2022-06-22	3	Lepomis sp.	11	1
2862	Landa Lake	Lud-1	2022-06-22	4	Palaemonetes sp.		8
2862	Landa Lake	Lud-1	2022-06-22	4	Procambarus sp.		12
2862	Landa Lake	Lud-1	2022-06-22	4	Etheostoma fonticola	24	1
2862	Landa Lake	Lud-1	2022-06-22	4	Etheostoma fonticola	21	1
2862	Landa Lake	Lud-1	2022-06-22	4	Etheostoma fonticola	30	1
2862	Landa Lake	Lud-1	2022-06-22	4	Etheostoma fonticola	19	1
2862	Landa Lake	Lud-1	2022-06-22	4	Etheostoma fonticola	22	1
2862	Landa Lake	Lud-1	2022-06-22	4	Etheostoma fonticola	25	1
2862	Landa Lake	Lud-1	2022-06-22	4	Etheostoma fonticola	27	1
2862	Landa Lake	Lud-1	2022-06-22	4	Etheostoma fonticola	26	1
2862	Landa Lake	Lud-1	2022-06-22	4	Etheostoma fonticola	20	1
2862	Landa Lake	Lud-1	2022-06-22	4	Etheostoma fonticola	28	1
2862	Landa Lake	Lud-1	2022-06-22	4	Lepomis sp.	9	1
2862	Landa Lake	Lud-1	2022-06-22	4	Lepomis sp.	13	1
2862	Landa Lake	Lud-1	2022-06-22	4	Astyanax mexicanus	19	1
2862	Landa Lake	Lud-1	2022-06-22	5	Palaemonetes sp.		10

2862	Landa Lake	Lud-1	2022-06-22	5	Procambarus sp.		3
2862	Landa Lake	Lud-1	2022-06-22	5	Etheostoma fonticola	18	1
2862	Landa Lake	Lud-1	2022-06-22	5	Astyanax mexicanus	16	1
2862	Landa Lake	Lud-1	2022-06-22	5	Lepomis sp.	12	1
2862	Landa Lake	Lud-1	2022-06-22	5	Lepomis sp.	11	1
2862	Landa Lake	Lud-1	2022-06-22	6	Palaemonetes sp.		9
2862	Landa Lake	Lud-1	2022-06-22	6	Procambarus sp.		2
2862	Landa Lake	Lud-1	2022-06-22	6	Etheostoma fonticola	20	1
2862	Landa Lake	Lud-1	2022-06-22	6	Etheostoma fonticola	21	1
2862	Landa Lake	Lud-1	2022-06-22	6	Gambusia sp.	18	1
2862	Landa Lake	Lud-1	2022-06-22	7	Palaemonetes sp.		2
2862	Landa Lake	Lud-1	2022-06-22	7	Procambarus sp.		2
2862	Landa Lake	Lud-1	2022-06-22	7	Etheostoma fonticola	26	1
2862	Landa Lake	Lud-1	2022-06-22	8	Astyanax mexicanus	15	1
2862	Landa Lake	Lud-1	2022-06-22	8	Etheostoma fonticola	25	1
2862	Landa Lake	Lud-1	2022-06-22	8	Etheostoma fonticola	18	1
2862	Landa Lake	Lud-1	2022-06-22	8	Etheostoma fonticola	22	1
2862	Landa Lake	Lud-1	2022-06-22	8	Etheostoma fonticola	21	1
2862	Landa Lake	Lud-1	2022-06-22	8	Procambarus sp.		1
2862	Landa Lake	Lud-1	2022-06-22	8	Palaemonetes sp.		2
2862	Landa Lake	Lud-1	2022-06-22	8	Gambusia sp.	18	1
2862	Landa Lake	Lud-1	2022-06-22	9	Palaemonetes sp.		2
2862	Landa Lake	Lud-1	2022-06-22	9	Procambarus sp.		1
2862	Landa Lake	Lud-1	2022-06-22	9	No fish collected		
2862	Landa Lake	Lud-1	2022-06-22	10	Procambarus sp.		1
2862	Landa Lake	Lud-1	2022-06-22	10	Palaemonetes sp.		2
2862	Landa Lake	Lud-1	2022-06-22	10	Etheostoma fonticola	26	1
2862	Landa Lake	Lud-1	2022-06-22	10	Etheostoma fonticola	20	1
2862	Landa Lake	Lud-1	2022-06-22	10	Etheostoma fonticola	21	1
2862	Landa Lake	Lud-1	2022-06-22	10	Etheostoma fonticola	14	1
2862	Landa Lake	Lud-1	2022-06-22	10	Lepomis sp.	10	1
2862	Landa Lake	Lud-1	2022-06-22	10	Lepomis sp.	14	1
2862	Landa Lake	Lud-1	2022-06-22	10	Gambusia sp.	23	1
2862	Landa Lake	Lud-1	2022-06-22	11	Etheostoma fonticola	19	1
2862	Landa Lake	Lud-1	2022-06-22	11	Etheostoma fonticola	21	1
2862	Landa Lake	Lud-1	2022-06-22	11	Procambarus sp.		2
2862	Landa Lake	Lud-1	2022-06-22	11	Palaemonetes sp.		1
2862	Landa Lake	Lud-1	2022-06-22	12	Procambarus sp.		1
2862	Landa Lake	Lud-1	2022-06-22	12	Lepomis sp.	10	1
2862	Landa Lake	Lud-1	2022-06-22	12	Lepomis sp.	10	1
2862	Landa Lake	Lud-1	2022-06-22	12	Etheostoma fonticola	27	1

2862	Landa Lake	Lud-1	2022-06-22	12	Etheostoma fonticola	16	1
2862	Landa Lake	Lud-1	2022-06-22	12	Palaemonetes sp.		1
2862	Landa Lake	Lud-1	2022-06-22	13	Palaemonetes sp.		3
2862	Landa Lake	Lud-1	2022-06-22	13	No fish collected		
2862	Landa Lake	Lud-1	2022-06-22	14	Procambarus sp.		5
2862	Landa Lake	Lud-1	2022-06-22	14	Etheostoma fonticola	24	1
2862	Landa Lake	Lud-1	2022-06-22	14	Etheostoma fonticola	19	1
2862	Landa Lake	Lud-1	2022-06-22	15	Procambarus sp.		1
2862	Landa Lake	Lud-1	2022-06-22	15	Etheostoma fonticola	19	1
2862	Landa Lake	Lud-1	2022-06-22	15	Etheostoma fonticola	25	1
2862	Landa Lake	Lud-1	2022-06-22	15	Etheostoma fonticola	20	1
2862	Landa Lake	Lud-1	2022-06-22	15	Etheostoma fonticola	18	1
2862	Landa Lake	Lud-1	2022-06-22	15	Palaemonetes sp.		1
2862	Landa Lake	Lud-1	2022-06-22	16	Procambarus sp.		2
2862	Landa Lake	Lud-1	2022-06-22	16	Etheostoma fonticola	24	1
2862	Landa Lake	Lud-1	2022-06-22	16	Etheostoma fonticola	22	1
2862	Landa Lake	Lud-1	2022-06-22	16	Etheostoma fonticola	25	1
2862	Landa Lake	Lud-1	2022-06-22	17	Procambarus sp.		6
2862	Landa Lake	Lud-1	2022-06-22	17	Etheostoma fonticola	20	1
2862	Landa Lake	Lud-1	2022-06-22	17	Gambusia sp.	15	1
2862	Landa Lake	Lud-1	2022-06-22	18	Procambarus sp.		4
2862	Landa Lake	Lud-1	2022-06-22	18	Palaemonetes sp.		4
2862	Landa Lake	Lud-1	2022-06-22	18	No fish collected		
2862	Landa Lake	Lud-1	2022-06-22	5	Etheostoma fonticola	32	1
2862	Landa Lake	Lud-1	2022-06-22	5	Etheostoma fonticola	20	1
2863	Landa Lake	Open-1	2022-06-23	1	Procambarus sp.		1
2863	Landa Lake	Open-1	2022-06-23	1	No fish collected		
2863	Landa Lake	Open-1	2022-06-23	2	No fish collected		
2863	Landa Lake	Open-1	2022-06-23	3	No fish collected		
2863	Landa Lake	Open-1	2022-06-23	4	No fish collected		
2863	Landa Lake	Open-1	2022-06-23	5	No fish collected		
2863	Landa Lake	Open-1	2022-06-23	6	No fish collected		
2863	Landa Lake	Open-1	2022-06-23	7	No fish collected		
2863	Landa Lake	Open-1	2022-06-23	8	No fish collected		
2863	Landa Lake	Open-1	2022-06-23	9	No fish collected		
2863	Landa Lake	Open-1	2022-06-23	10	No fish collected		
2864	Landa Lake	Open-2	2022-06-23	1	Etheostoma fonticola	25	1
2864	Landa Lake	Open-2	2022-06-23	1	Etheostoma fonticola	20	1
2864	Landa Lake	Open-2	2022-06-23	1	Gambusia sp.	12	1
2864	Landa Lake	Open-2	2022-06-23	1	Gambusia sp.	15	1
2864	Landa Lake	Open-2	2022-06-23	1	Gambusia sp.	12	1

2864	Landa Lake	Open-2	2022-06-23	1	Gambusia sp.	12	1
2864	Landa Lake	Open-2	2022-06-23	1	Gambusia sp.	12	1
2864	Landa Lake	Open-2	2022-06-23	1	Gambusia sp.	10	1
2864	Landa Lake	Open-2	2022-06-23	1	Gambusia sp.	10	1
2864	Landa Lake	Open-2	2022-06-23	2	Etheostoma fonticola	26	1
2864	Landa Lake	Open-2	2022-06-23	2	Gambusia sp.	23	1
2864	Landa Lake	Open-2	2022-06-23	3	Gambusia sp.	22	1
2864	Landa Lake	Open-2	2022-06-23	3	Gambusia sp.	32	1
2864	Landa Lake	Open-2	2022-06-23	3	Etheostoma fonticola	26	1
2864	Landa Lake	Open-2	2022-06-23	3	Etheostoma fonticola	27	1
2864	Landa Lake	Open-2	2022-06-23	4	Etheostoma fonticola	19	1
2864	Landa Lake	Open-2	2022-06-23	4	Gambusia sp.	15	1
2864	Landa Lake	Open-2	2022-06-23	4	Gambusia sp.	15	1
2864	Landa Lake	Open-2	2022-06-23	5	Gambusia sp.	30	1
2864	Landa Lake	Open-2	2022-06-23	5	Gambusia sp.	15	1
2864	Landa Lake	Open-2	2022-06-23	6	No fish collected		
2864	Landa Lake	Open-2	2022-06-23	7	Etheostoma fonticola	28	1
2864	Landa Lake	Open-2	2022-06-23	8	No fish collected		
2864	Landa Lake	Open-2	2022-06-23	9	No fish collected		
2864	Landa Lake	Open-2	2022-06-23	10	No fish collected		
2864	Landa Lake	Open-2	2022-06-23	11	No fish collected		
2864	Landa Lake	Open-2	2022-06-23	12	No fish collected		
2864	Landa Lake	Open-2	2022-06-23	13	No fish collected		
2864	Landa Lake	Open-2	2022-06-23	14	No fish collected		
2864	Landa Lake	Open-2	2022-06-23	15	No fish collected		
2865	Landa Lake	Val-1	2022-06-23	1	Dionda nigrotaeniata		1
2865	Landa Lake	Val-1	2022-06-23	2	Dionda nigrotaeniata		1
2865	Landa Lake	Val-1	2022-06-23	2	Dionda nigrotaeniata		1
2865	Landa Lake	Val-1	2022-06-23	2	Dionda nigrotaeniata		1
2865	Landa Lake	Val-1	2022-06-23	2	Dionda nigrotaeniata		1
2865	Landa Lake	Val-1	2022-06-23	2	Gambusia sp.		1
2865	Landa Lake	Val-1	2022-06-23	3	No fish collected		
2865	Landa Lake	Val-1	2022-06-23	4	Astyanax mexicanus		1
2865	Landa Lake	Val-1	2022-06-23	4	Gambusia sp.		1
2865	Landa Lake	Val-1	2022-06-23	5	No fish collected		
2865	Landa Lake	Val-1	2022-06-23	6	Procambarus sp.		1
2865	Landa Lake	Val-1	2022-06-23	6	Dionda nigrotaeniata	25	1
2865	Landa Lake	Val-1	2022-06-23	7	Astyanax mexicanus	25	1
2865	Landa Lake	Val-1	2022-06-23	8	No fish collected		
2865	Landa Lake	Val-1	2022-06-23	9	No fish collected		
2865	Landa Lake	Val-1	2022-06-23	10	No fish collected		

2865	Landa Lake	Val-1	2022-06-23	11	No fish collected		
2865	Landa Lake	Val-1	2022-06-23	12	No fish collected		
2865	Landa Lake	Val-1	2022-06-23	13	No fish collected		
2865	Landa Lake	Val-1	2022-06-23	14	No fish collected		
2865	Landa Lake	Val-1	2022-06-23	15	No fish collected		
2866	Landa Lake	Lud-2	2022-06-23	1	Etheostoma fonticola	31	1
2866	Landa Lake	Lud-2	2022-06-23	1	Etheostoma fonticola	25	1
2866	Landa Lake	Lud-2	2022-06-23	1	Etheostoma fonticola	24	1
2866	Landa Lake	Lud-2	2022-06-23	1	Etheostoma fonticola	25	1
2866	Landa Lake	Lud-2	2022-06-23	1	Etheostoma fonticola	21	1
2866	Landa Lake	Lud-2	2022-06-23	1	Etheostoma fonticola	23	1
2866	Landa Lake	Lud-2	2022-06-23	1	Etheostoma fonticola	26	1
2866	Landa Lake	Lud-2	2022-06-23	1	Procambarus sp.		9
2866	Landa Lake	Lud-2	2022-06-23	1	Palaemonetes sp.		7
2866	Landa Lake	Lud-2	2022-06-23	2	Procambarus sp.		13
2866	Landa Lake	Lud-2	2022-06-23	2	Palaemonetes sp.		3
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	24	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	25	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	32	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	26	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	21	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	25	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	26	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	26	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	26	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	24	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	24	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	25	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	23	1
2866	Landa Lake	Lud-2	2022-06-23	2	Etheostoma fonticola	20	1
2866	Landa Lake	Lud-2	2022-06-23	3	Procambarus sp.		11
2866	Landa Lake	Lud-2	2022-06-23	3	Palaemonetes sp.		1
2866	Landa Lake	Lud-2	2022-06-23	3	Etheostoma fonticola	21	1
2866	Landa Lake	Lud-2	2022-06-23	3	Etheostoma fonticola	15	1
2866	Landa Lake	Lud-2	2022-06-23	3	Etheostoma fonticola	27	1
2866	Landa Lake	Lud-2	2022-06-23	3	Etheostoma fonticola	26	1
2866	Landa Lake	Lud-2	2022-06-23	3	Etheostoma fonticola	22	1
2866	Landa Lake	Lud-2	2022-06-23	3	Etheostoma fonticola	25	1
2866	Landa Lake	Lud-2	2022-06-23	3	Etheostoma fonticola	21	1
2866	Landa Lake	Lud-2	2022-06-23	4	Procambarus sp.		7
2866	Landa Lake	Lud-2	2022-06-23	4	Palaemonetes sp.		3

2866	Landa Lake	Lud-2	2022-06-23	4	Lepomis miniatus	42	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	22	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	30	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	24	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	23	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	24	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	21	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	24	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	30	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	21	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	17	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	20	1
2866	Landa Lake	Lud-2	2022-06-23	4	Etheostoma fonticola	22	1
2866	Landa Lake	Lud-2	2022-06-23	5	Procambarus sp.		2
2866	Landa Lake	Lud-2	2022-06-23	5	Palaemonetes sp.		1
2866	Landa Lake	Lud-2	2022-06-23	5	Etheostoma fonticola	21	1
2866	Landa Lake	Lud-2	2022-06-23	5	Etheostoma fonticola	5	1
2866	Landa Lake	Lud-2	2022-06-23	6	Procambarus sp.		5
2866	Landa Lake	Lud-2	2022-06-23	6	Palaemonetes sp.		3
2866	Landa Lake	Lud-2	2022-06-23	6	Etheostoma fonticola	29	1
2866	Landa Lake	Lud-2	2022-06-23	6	Etheostoma fonticola	22	1
2866	Landa Lake	Lud-2	2022-06-23	6	Etheostoma fonticola	25	1
2866	Landa Lake	Lud-2	2022-06-23	6	Etheostoma fonticola	24	1
2866	Landa Lake	Lud-2	2022-06-23	6	Etheostoma fonticola	20	1
2866	Landa Lake	Lud-2	2022-06-23	6	Etheostoma fonticola	15	1
2866	Landa Lake	Lud-2	2022-06-23	7	No fish collected		
2866	Landa Lake	Lud-2	2022-06-23	8	Etheostoma fonticola	26	1
2866	Landa Lake	Lud-2	2022-06-23	8	Etheostoma fonticola	29	1
2866	Landa Lake	Lud-2	2022-06-23	8	Etheostoma fonticola	23	1
2866	Landa Lake	Lud-2	2022-06-23	8	Procambarus sp.		3
2866	Landa Lake	Lud-2	2022-06-23	8	Palaemonetes sp.		3
2866	Landa Lake	Lud-2	2022-06-23	9	Procambarus sp.		2
2866	Landa Lake	Lud-2	2022-06-23	9	Palaemonetes sp.		2
2866	Landa Lake	Lud-2	2022-06-23	9	No fish collected		
2866	Landa Lake	Lud-2	2022-06-23	10	Etheostoma fonticola	24	1
2866	Landa Lake	Lud-2	2022-06-23	10	Etheostoma fonticola	19	1
2866	Landa Lake	Lud-2	2022-06-23	10	Etheostoma fonticola	24	1
2866	Landa Lake	Lud-2	2022-06-23	10	Etheostoma fonticola	19	1
2866	Landa Lake	Lud-2	2022-06-23	10	Procambarus sp.		2
2866	Landa Lake	Lud-2	2022-06-23	11	Procambarus sp.		5
2866	Landa Lake	Lud-2	2022-06-23	11	Etheostoma fonticola	19	1

2866	Landa Lake	Lud-2	2022-06-23	12	Procambarus sp.		3
2866	Landa Lake	Lud-2	2022-06-23	12	Etheostoma fonticola	20	1
2866	Landa Lake	Lud-2	2022-06-23	12	Etheostoma fonticola	23	1
2866	Landa Lake	Lud-2	2022-06-23	13	Etheostoma fonticola	25	1
2866	Landa Lake	Lud-2	2022-06-23	13	Etheostoma fonticola	25	1
2866	Landa Lake	Lud-2	2022-06-23	13	Palaemonetes sp.		1
2866	Landa Lake	Lud-2	2022-06-23	13	Gambusia sp.	20	1
2866	Landa Lake	Lud-2	2022-06-23	13	Procambarus sp.		1
2866	Landa Lake	Lud-2	2022-06-23	14	Procambarus sp.		3
2866	Landa Lake	Lud-2	2022-06-23	14	Gambusia sp.	34	1
2866	Landa Lake	Lud-2	2022-06-23	15	Procambarus sp.		2
2866	Landa Lake	Lud-2	2022-06-23	15	No fish collected		
2867	Landa Lake	Val-2	2022-06-23	1	Palaemonetes sp.		8
2867	Landa Lake	Val-2	2022-06-23	1	Etheostoma fonticola	28	1
2867	Landa Lake	Val-2	2022-06-23	2	Procambarus sp.		2
2867	Landa Lake	Val-2	2022-06-23	2	Lepomis miniatus	148	1
2867	Landa Lake	Val-2	2022-06-23	3	Procambarus sp.		1
2867	Landa Lake	Val-2	2022-06-23	3	Palaemonetes sp.		2
2867	Landa Lake	Val-2	2022-06-23	3	No fish collected		
2867	Landa Lake	Val-2	2022-06-23	4	Procambarus sp.		3
2867	Landa Lake	Val-2	2022-06-23	4	No fish collected		
2867	Landa Lake	Val-2	2022-06-23	5	Procambarus sp.		1
2867	Landa Lake	Val-2	2022-06-23	5	Etheostoma fonticola	29	1
2867	Landa Lake	Val-2	2022-06-23	5	Lepomis sp.	8	1
2867	Landa Lake	Val-2	2022-06-23	6	Procambarus sp.		1
2867	Landa Lake	Val-2	2022-06-23	6	No fish collected		
2867	Landa Lake	Val-2	2022-06-23	7	Procambarus sp.		1
2867	Landa Lake	Val-2	2022-06-23	7	No fish collected		
2867	Landa Lake	Val-2	2022-06-23	8	Procambarus sp.		2
2867	Landa Lake	Val-2	2022-06-23	8	Lepomis miniatus	56	1
2867	Landa Lake	Val-2	2022-06-23	9	Procambarus sp.		4
2867	Landa Lake	Val-2	2022-06-23	9	Etheostoma fonticola	28	1
2867	Landa Lake	Val-2	2022-06-23	9	Palaemonetes sp.		1
2867	Landa Lake	Val-2	2022-06-23	10	Procambarus sp.		1
2867	Landa Lake	Val-2	2022-06-23	10	No fish collected		
2867	Landa Lake	Val-2	2022-06-23	11	Etheostoma fonticola	25	1
2867	Landa Lake	Val-2	2022-06-23	12	Procambarus sp.		1
2867	Landa Lake	Val-2	2022-06-23	12	No fish collected		
2867	Landa Lake	Val-2	2022-06-23	13	Procambarus sp.		1
2867	Landa Lake	Val-2	2022-06-23	13	No fish collected		
2867	Landa Lake	Val-2	2022-06-23	14	Procambarus sp.		3

2867	Landa Lake	Val-2	2022-06-23	14	No fish collected		
2867	Landa Lake	Val-2	2022-06-23	15	Gambusia sp.	15	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	15	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	18	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	12	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	19	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	18	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	22	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	31	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	28	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	15	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	11	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	12	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	16	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	20	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	31	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	19	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	16	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Etheostoma fonticola	12	1
2890	Landa Lake	Bryo-1	2022-08-24	1	Palaemonetes sp.		29
2890	Landa Lake	Bryo-1	2022-08-24	1	Procambarus sp.		6
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	18	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	35	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	29	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	16	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	29	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	25	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	21	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	22	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	32	1

2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	28	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	28	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	15	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	12	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	22	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	31	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	28	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	28	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	24	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	31	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	24	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	27	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	2	Procambarus sp.		10
2890	Landa Lake	Bryo-1	2022-08-24	2	Palaemonetes sp.		15
2890	Landa Lake	Bryo-1	2022-08-24	3	Micropterus salmoides		1
2890	Landa Lake	Bryo-1	2022-08-24	3	Palaemonetes sp.		13
2890	Landa Lake	Bryo-1	2022-08-24	3	Procambarus sp.		4
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	8	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	20	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	23	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	11	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	27	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	21	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	29	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	11	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	22	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	33	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	34	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	17	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	14	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	20	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	14	1

2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	27	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	33	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	29	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	27	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	31	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	22	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	27	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	12	1
2890	Landa Lake	Bryo-1	2022-08-24	3	Etheostoma fonticola	9	1
2890	Landa Lake	Bryo-1	2022-08-24	4	Procambarus sp.		1
2890	Landa Lake	Bryo-1	2022-08-24	4	Palaemonetes sp.		4
2890	Landa Lake	Bryo-1	2022-08-24	4	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	4	Etheostoma fonticola	25	1
2890	Landa Lake	Bryo-1	2022-08-24	4	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	4	Etheostoma fonticola	24	1
2890	Landa Lake	Bryo-1	2022-08-24	4	Etheostoma fonticola	18	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Palaemonetes sp.		6
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	24	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	25	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	25	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	27	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	28	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	28	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	25	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	21	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	18	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	22	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	25	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	31	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	24	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	6	Procambarus sp.		7
2890	Landa Lake	Bryo-1	2022-08-24	6	Palaemonetes sp.		5
2890	Landa Lake	Bryo-1	2022-08-24	6	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	6	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	6	Etheostoma fonticola	34	1

2890	Landa Lake	Bryo-1	2022-08-24	6	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	6	Etheostoma fonticola	25	1
2890	Landa Lake	Bryo-1	2022-08-24	6	Etheostoma fonticola	25	1
2890	Landa Lake	Bryo-1	2022-08-24	6	Etheostoma fonticola	24	1
2890	Landa Lake	Bryo-1	2022-08-24	6	Etheostoma fonticola	35	1
2890	Landa Lake	Bryo-1	2022-08-24	6	Etheostoma fonticola	13	1
2890	Landa Lake	Bryo-1	2022-08-24	6	Etheostoma fonticola	14	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Procambarus sp.		2
2890	Landa Lake	Bryo-1	2022-08-24	7	Palaemonetes sp.		3
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	21	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	29	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	15	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	25	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	20	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	28	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	23	1
2890	Landa Lake	Bryo-1	2022-08-24	7	Etheostoma fonticola	27	1
2890	Landa Lake	Bryo-1	2022-08-24	8	Procambarus sp.		4
2890	Landa Lake	Bryo-1	2022-08-24	8	Palaemonetes sp.		1
2890	Landa Lake	Bryo-1	2022-08-24	8	Etheostoma fonticola	28	1
2890	Landa Lake	Bryo-1	2022-08-24	8	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	8	Etheostoma fonticola	35	1
2890	Landa Lake	Bryo-1	2022-08-24	8	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	8	Etheostoma fonticola	34	1
2890	Landa Lake	Bryo-1	2022-08-24	8	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	8	Etheostoma fonticola	29	1
2890	Landa Lake	Bryo-1	2022-08-24	8	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	8	Etheostoma fonticola	18	1
2890	Landa Lake	Bryo-1	2022-08-24	9	Etheostoma fonticola	29	1
2890	Landa Lake	Bryo-1	2022-08-24	9	Etheostoma fonticola	27	1
2890	Landa Lake	Bryo-1	2022-08-24	5	Procambarus sp.		8
2890	Landa Lake	Bryo-1	2022-08-24	9	Procambarus sp.		1
2890	Landa Lake	Bryo-1	2022-08-24	9	Palaemonetes sp.		8
2890	Landa Lake	Bryo-1	2022-08-24	9	Etheostoma fonticola	25	1
2890	Landa Lake	Bryo-1	2022-08-24	9	Etheostoma fonticola	29	1
2890	Landa Lake	Bryo-1	2022-08-24	9	Etheostoma fonticola	32	1
2890	Landa Lake	Bryo-1	2022-08-24	9	Etheostoma fonticola	29	1
2890	Landa Lake	Bryo-1	2022-08-24	9	Etheostoma fonticola	25	1

2890	Landa Lake	Bryo-1	2022-08-24	9	Etheostoma fonticola	16	1
2890	Landa Lake	Bryo-1	2022-08-24	9	Etheostoma fonticola	11	1
2890	Landa Lake	Bryo-1	2022-08-24	9	Etheostoma fonticola	18	1
2890	Landa Lake	Bryo-1	2022-08-24	10	Etheostoma fonticola	30	1
2890	Landa Lake	Bryo-1	2022-08-24	10	Etheostoma fonticola	23	1
2890	Landa Lake	Bryo-1	2022-08-24	10	Etheostoma fonticola	16	1
2890	Landa Lake	Bryo-1	2022-08-24	10	Procambarus sp.		3
2890	Landa Lake	Bryo-1	2022-08-24	10	Palaemonetes sp.		1
2890	Landa Lake	Bryo-1	2022-08-24	11	Etheostoma fonticola	27	1
2890	Landa Lake	Bryo-1	2022-08-24	11	Etheostoma fonticola	26	1
2890	Landa Lake	Bryo-1	2022-08-24	11	Procambarus sp.		1
2890	Landa Lake	Bryo-1	2022-08-24	12	Procambarus sp.		2
2890	Landa Lake	Bryo-1	2022-08-24	12	Etheostoma fonticola	29	1
2890	Landa Lake	Bryo-1	2022-08-24	13	Etheostoma fonticola	34	1
2890	Landa Lake	Bryo-1	2022-08-24	13	Etheostoma fonticola	20	1
2890	Landa Lake	Bryo-1	2022-08-24	13	Procambarus sp.		2
2890	Landa Lake	Bryo-1	2022-08-24	13	Palaemonetes sp.		2
2890	Landa Lake	Bryo-1	2022-08-24	14	No fish collected		
2890	Landa Lake	Bryo-1	2022-08-24	15	Procambarus sp.		1
2890	Landa Lake	Bryo-1	2022-08-24	15	No fish collected		
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	32	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	30	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	27	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	35	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	27	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	14	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	34	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	28	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	24	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	15	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	28	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	30	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	22	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	23	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	34	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	28	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	16	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	15	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	20	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	28	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	34	1

2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	17	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	34	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	18	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	19	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Etheostoma fonticola	15	1
2891	Landa Lake	Bryo-2	2022-08-24	1	Procambarus sp.		6
2891	Landa Lake	Bryo-2	2022-08-24	1	Palaemonetes sp.		23
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	20	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	30	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	32	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	29	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	29	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	25	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	29	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	12	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	29	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	15	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Etheostoma fonticola	28	1
2891	Landa Lake	Bryo-2	2022-08-24	2	Palaemonetes sp.		7
2891	Landa Lake	Bryo-2	2022-08-24	3	Procambarus sp.		3
2891	Landa Lake	Bryo-2	2022-08-24	3	Palaemonetes sp.		5
2891	Landa Lake	Bryo-2	2022-08-24	3	Etheostoma fonticola	31	1
2891	Landa Lake	Bryo-2	2022-08-24	3	Etheostoma fonticola	15	1
2891	Landa Lake	Bryo-2	2022-08-24	3	Etheostoma fonticola	28	1
2891	Landa Lake	Bryo-2	2022-08-24	3	Etheostoma fonticola	20	1
2891	Landa Lake	Bryo-2	2022-08-24	3	Etheostoma fonticola	11	1
2891	Landa Lake	Bryo-2	2022-08-24	3	Etheostoma fonticola	11	1
2891	Landa Lake	Bryo-2	2022-08-24	4	Palaemonetes sp.		3
2891	Landa Lake	Bryo-2	2022-08-24	4	Etheostoma fonticola	31	1
2891	Landa Lake	Bryo-2	2022-08-24	4	Etheostoma fonticola	25	1
2891	Landa Lake	Bryo-2	2022-08-24	4	Etheostoma fonticola	14	1
2891	Landa Lake	Bryo-2	2022-08-24	4	Etheostoma fonticola	13	1
2891	Landa Lake	Bryo-2	2022-08-24	4	Etheostoma fonticola	11	1
2891	Landa Lake	Bryo-2	2022-08-24	4	Etheostoma fonticola	18	1
2891	Landa Lake	Bryo-2	2022-08-24	5	Palaemonetes sp.		5
2891	Landa Lake	Bryo-2	2022-08-24	5	Procambarus sp.		1
2891	Landa Lake	Bryo-2	2022-08-24	5	No fish collected		
2891	Landa Lake	Bryo-2	2022-08-24	6	Etheostoma fonticola	19	1
2891	Landa Lake	Bryo-2	2022-08-24	6	Etheostoma fonticola	18	1
2891	Landa Lake	Bryo-2	2022-08-24	7	No fish collected		
2891	Landa Lake	Bryo-2	2022-08-24	8	Etheostoma fonticola	30	1

2891	Landa Lake	Bryo-2	2022-08-24	8	Etheostoma fonticola	18	1
2891	Landa Lake	Bryo-2	2022-08-24	8	Etheostoma fonticola	10	1
2891	Landa Lake	Bryo-2	2022-08-24	8	Palaemonetes sp.		2
2891	Landa Lake	Bryo-2	2022-08-24	8	Lepomis sp.	10	1
2891	Landa Lake	Bryo-2	2022-08-24	9	Procambarus sp.		1
2891	Landa Lake	Bryo-2	2022-08-24	9	Palaemonetes sp.		2
2891	Landa Lake	Bryo-2	2022-08-24	9	Etheostoma fonticola	21	1
2891	Landa Lake	Bryo-2	2022-08-24	9	Etheostoma fonticola	11	1
2891	Landa Lake	Bryo-2	2022-08-24	9	Etheostoma fonticola	15	1
2891	Landa Lake	Bryo-2	2022-08-24	10	Etheostoma fonticola	15	1
2891	Landa Lake	Bryo-2	2022-08-24	10	Etheostoma fonticola	7	1
2891	Landa Lake	Bryo-2	2022-08-24	10	Etheostoma fonticola	16	1
2891	Landa Lake	Bryo-2	2022-08-24	11	Etheostoma fonticola	15	1
2891	Landa Lake	Bryo-2	2022-08-24	12	Palaemonetes sp.		1
2891	Landa Lake	Bryo-2	2022-08-24	12	No fish collected		
2891	Landa Lake	Bryo-2	2022-08-24	13	Etheostoma fonticola	14	1
2891	Landa Lake	Bryo-2	2022-08-24	14	No fish collected		
2891	Landa Lake	Bryo-2	2022-08-24	15	Palaemonetes sp.		1
2891	Landa Lake	Bryo-2	2022-08-24	15	No fish collected		
2892	Landa Lake	Cab-1	2022-08-24	1	Lepomis miniatus	58	1
2892	Landa Lake	Cab-1	2022-08-24	1	Lepomis miniatus	52	1
2892	Landa Lake	Cab-1	2022-08-24	1	Lepomis miniatus	50	1
2892	Landa Lake	Cab-1	2022-08-24	1	Lepomis miniatus	10	1
2892	Landa Lake	Cab-1	2022-08-24	1	Lepomis miniatus	38	1
2892	Landa Lake	Cab-1	2022-08-24	1	Lepomis miniatus	45	1
2892	Landa Lake	Cab-1	2022-08-24	1	Lepomis sp.	11	1
2892	Landa Lake	Cab-1	2022-08-24	1	Etheostoma fonticola	9	1
2892	Landa Lake	Cab-1	2022-08-24	1	Palaemonetes sp.		19
2892	Landa Lake	Cab-1	2022-08-24	2	Palaemonetes sp.		14
2892	Landa Lake	Cab-1	2022-08-24	2	Procambarus sp.		4
2892	Landa Lake	Cab-1	2022-08-24	2	Micropterus salmoides	38	1
2892	Landa Lake	Cab-1	2022-08-24	2	Etheostoma fonticola	25	1
2892	Landa Lake	Cab-1	2022-08-24	2	Etheostoma fonticola	11	1
2892	Landa Lake	Cab-1	2022-08-24	2	Lepomis miniatus	50	1
2892	Landa Lake	Cab-1	2022-08-24	2	Lepomis sp.	9	1
2892	Landa Lake	Cab-1	2022-08-24	2	Lepomis sp.	11	1
2892	Landa Lake	Cab-1	2022-08-24	3	Procambarus sp.		1
2892	Landa Lake	Cab-1	2022-08-24	3	Palaemonetes sp.		5
2892	Landa Lake	Cab-1	2022-08-24	3	Lepomis sp.	9	1
2892	Landa Lake	Cab-1	2022-08-24	3	Lepomis miniatus	72	1
2892	Landa Lake	Cab-1	2022-08-24	4	Procambarus sp.		3

2892	Landa Lake	Cab-1	2022-08-24	4	Palaemonetes sp.		2
2892	Landa Lake	Cab-1	2022-08-24	4	Etheostoma fonticola	26	1
2892	Landa Lake	Cab-1	2022-08-24	5	Procambarus sp.		4
2892	Landa Lake	Cab-1	2022-08-24	5	Palaemonetes sp.		1
2892	Landa Lake	Cab-1	2022-08-24	5	No fish collected		
2892	Landa Lake	Cab-1	2022-08-24	6	Procambarus sp.		4
2892	Landa Lake	Cab-1	2022-08-24	6	Palaemonetes sp.		4
2892	Landa Lake	Cab-1	2022-08-24	6	Etheostoma fonticola	33	1
2892	Landa Lake	Cab-1	2022-08-24	7	Palaemonetes sp.		3
2892	Landa Lake	Cab-1	2022-08-24	7	Etheostoma fonticola	28	1
2892	Landa Lake	Cab-1	2022-08-24	7	Etheostoma fonticola	30	1
2892	Landa Lake	Cab-1	2022-08-24	8	Palaemonetes sp.		3
2892	Landa Lake	Cab-1	2022-08-24	8	No fish collected		
2892	Landa Lake	Cab-1	2022-08-24	9	Etheostoma fonticola	30	1
2892	Landa Lake	Cab-1	2022-08-24	9	Etheostoma fonticola	28	1
2892	Landa Lake	Cab-1	2022-08-24	9	Palaemonetes sp.		2
2892	Landa Lake	Cab-1	2022-08-24	9	Procambarus sp.		1
2892	Landa Lake	Cab-1	2022-08-24	10	Palaemonetes sp.		3
2892	Landa Lake	Cab-1	2022-08-24	10	Lepomis miniatus		1
2892	Landa Lake	Cab-1	2022-08-24	11	Palaemonetes sp.		4
2892	Landa Lake	Cab-1	2022-08-24	11	Procambarus sp.		1
2892	Landa Lake	Cab-1	2022-08-24	11	No fish collected		
2892	Landa Lake	Cab-1	2022-08-24	12	No fish collected		
2892	Landa Lake	Cab-1	2022-08-24	13	Procambarus sp.		5
2892	Landa Lake	Cab-1	2022-08-24	13	No fish collected		
2892	Landa Lake	Cab-1	2022-08-24	14	Lepomis miniatus	132	1
2892	Landa Lake	Cab-1	2022-08-24	15	Lepomis miniatus	80	1
2892	Landa Lake	Cab-1	2022-08-24	15	Etheostoma fonticola	29	1
2892	Landa Lake	Cab-1	2022-08-24	16	Palaemonetes sp.		1
2892	Landa Lake	Cab-1	2022-08-24	16	No fish collected		
2893	Landa Lake	Cab-2	2022-08-24	1	Lepomis miniatus	115	1
2893	Landa Lake	Cab-2	2022-08-24	1	Etheostoma fonticola	30	1
2893	Landa Lake	Cab-2	2022-08-24	1	Etheostoma fonticola	28	1
2893	Landa Lake	Cab-2	2022-08-24	1	Etheostoma fonticola	27	1
2893	Landa Lake	Cab-2	2022-08-24	1	Lepomis sp.	15	1
2893	Landa Lake	Cab-2	2022-08-24	1	Palaemonetes sp.		6
2893	Landa Lake	Cab-2	2022-08-24	1	Procambarus sp.		1
2893	Landa Lake	Cab-2	2022-08-24	2	Procambarus sp.		6
2893	Landa Lake	Cab-2	2022-08-24	2	Palaemonetes sp.		5
2893	Landa Lake	Cab-2	2022-08-24	2	Etheostoma fonticola	30	1
2893	Landa Lake	Cab-2	2022-08-24	2	Etheostoma fonticola	15	1

2893	Landa Lake	Cab-2	2022-08-24	3	Procambarus sp.		6
2893	Landa Lake	Cab-2	2022-08-24	3	Lepomis sp.	9	1
2893	Landa Lake	Cab-2	2022-08-24	4	Procambarus sp.		2
2893	Landa Lake	Cab-2	2022-08-24	4	Etheostoma fonticola	27	1
2893	Landa Lake	Cab-2	2022-08-24	4	Etheostoma fonticola	18	1
2893	Landa Lake	Cab-2	2022-08-24	5	Etheostoma fonticola	29	1
2893	Landa Lake	Cab-2	2022-08-24	5	Etheostoma fonticola	31	1
2893	Landa Lake	Cab-2	2022-08-24	5	Etheostoma fonticola	18	1
2893	Landa Lake	Cab-2	2022-08-24	5	Procambarus sp.		2
2893	Landa Lake	Cab-2	2022-08-24	5	Palaemonetes sp.		1
2893	Landa Lake	Cab-2	2022-08-24	6	Etheostoma fonticola	32	1
2893	Landa Lake	Cab-2	2022-08-24	6	Etheostoma fonticola	30	1
2893	Landa Lake	Cab-2	2022-08-24	6	Etheostoma fonticola	27	1
2893	Landa Lake	Cab-2	2022-08-24	6	Etheostoma fonticola	22	1
2893	Landa Lake	Cab-2	2022-08-24	6	Etheostoma fonticola	26	1
2893	Landa Lake	Cab-2	2022-08-24	6	Procambarus sp.		1
2893	Landa Lake	Cab-2	2022-08-24	7	Procambarus sp.		1
2893	Landa Lake	Cab-2	2022-08-24	7	Palaemonetes sp.		2
2893	Landa Lake	Cab-2	2022-08-24	7	No fish collected		
2893	Landa Lake	Cab-2	2022-08-24	8	Procambarus sp.		2
2893	Landa Lake	Cab-2	2022-08-24	8	Lepomis miniatus	116	1
2893	Landa Lake	Cab-2	2022-08-24	9	Procambarus sp.		2
2893	Landa Lake	Cab-2	2022-08-24	9	No fish collected		
2893	Landa Lake	Cab-2	2022-08-24	10	Procambarus sp.		1
2893	Landa Lake	Cab-2	2022-08-24	10	Etheostoma fonticola	27	1
2893	Landa Lake	Cab-2	2022-08-24	11	Procambarus sp.		1
2893	Landa Lake	Cab-2	2022-08-24	11	No fish collected		
2893	Landa Lake	Cab-2	2022-08-24	12	Procambarus sp.		2
2893	Landa Lake	Cab-2	2022-08-24	12	No fish collected		
2893	Landa Lake	Cab-2	2022-08-24	13	Etheostoma fonticola	28	1
2893	Landa Lake	Cab-2	2022-08-24	13	Procambarus sp.		1
2893	Landa Lake	Cab-2	2022-08-24	14	Palaemonetes sp.		1
2893	Landa Lake	Cab-2	2022-08-24	14	Etheostoma fonticola	30	1
2893	Landa Lake	Cab-2	2022-08-24	15	No fish collected		
2894	Landa Lake	Val-1	2022-08-24	1	Etheostoma fonticola	26	1
2894	Landa Lake	Val-1	2022-08-24	1	Gambusia sp.	21	1
2894	Landa Lake	Val-1	2022-08-24	1	Gambusia sp.	25	1
2894	Landa Lake	Val-1	2022-08-24	1	Gambusia sp.	15	1
2894	Landa Lake	Val-1	2022-08-24	2	No fish collected		
2894	Landa Lake	Val-1	2022-08-24	3	Lepomis miniatus	115	1
2894	Landa Lake	Val-1	2022-08-24	3	Astyanax mexicanus	62	1

2894	Landa Lake	Val-1	2022-08-24	4	No fish collected		
2894	Landa Lake	Val-1	2022-08-24	5	Lepomis sp.		1
2894	Landa Lake	Val-1	2022-08-24	6	Gambusia sp.	11	1
2894	Landa Lake	Val-1	2022-08-24	6	Etheostoma fonticola	28	1
2894	Landa Lake	Val-1	2022-08-24	7	Etheostoma fonticola	28	1
2894	Landa Lake	Val-1	2022-08-24	8	Procambarus sp.		1
2894	Landa Lake	Val-1	2022-08-24	8	No fish collected		
2894	Landa Lake	Val-1	2022-08-24	9	No fish collected		
2894	Landa Lake	Val-1	2022-08-24	10	Procambarus sp.		2
2894	Landa Lake	Val-1	2022-08-24	10	Etheostoma fonticola	27	1
2894	Landa Lake	Val-1	2022-08-24	10	Gambusia sp.	18	1
2894	Landa Lake	Val-1	2022-08-24	11	Procambarus sp.		1
2894	Landa Lake	Val-1	2022-08-24	11	No fish collected		
2894	Landa Lake	Val-1	2022-08-24	12	No fish collected		
2894	Landa Lake	Val-1	2022-08-24	13	No fish collected		
2894	Landa Lake	Val-1	2022-08-24	14	Procambarus sp.		2
2894	Landa Lake	Val-1	2022-08-24	14	No fish collected		
2894	Landa Lake	Val-1	2022-08-24	15	No fish collected		
2900	Landa Lake	Open-2	2022-08-24	1	No fish collected		
2900	Landa Lake	Open-2	2022-08-24	2	No fish collected		
2900	Landa Lake	Open-2	2022-08-24	3	No fish collected		
2900	Landa Lake	Open-2	2022-08-24	4	No fish collected		
2900	Landa Lake	Open-2	2022-08-24	5	No fish collected		
2900	Landa Lake	Open-2	2022-08-24	6	No fish collected		
2900	Landa Lake	Open-2	2022-08-24	7	No fish collected		
2900	Landa Lake	Open-2	2022-08-24	8	No fish collected		
2900	Landa Lake	Open-2	2022-08-24	9	No fish collected		
2900	Landa Lake	Open-2	2022-08-24	10	No fish collected		
2952	Landa Lake	Lud-2	2022-08-25	1	Palaemonetes sp.		16
2952	Landa Lake	Lud-2	2022-08-25	1	Lepomis miniatus	95	1
2952	Landa Lake	Lud-2	2022-08-25	1	Etheostoma fonticola	30	1
2952	Landa Lake	Lud-2	2022-08-25	2	Palaemonetes sp.		8
2952	Landa Lake	Lud-2	2022-08-25	2	Procambarus sp.		3
2952	Landa Lake	Lud-2	2022-08-25	2	No fish collected		
2952	Landa Lake	Lud-2	2022-08-25	3	Palaemonetes sp.		6
2952	Landa Lake	Lud-2	2022-08-25	3	Lepomis miniatus	55	1
2952	Landa Lake	Lud-2	2022-08-25	3	Etheostoma fonticola	29	1
2952	Landa Lake	Lud-2	2022-08-25	4	No fish collected		
2952	Landa Lake	Lud-2	2022-08-25	5	Palaemonetes sp.		14
2952	Landa Lake	Lud-2	2022-08-25	5	Etheostoma fonticola	31	1
2952	Landa Lake	Lud-2	2022-08-25	5	Etheostoma fonticola	29	1

2952	Landa Lake	Lud-2	2022-08-25	5	Etheostoma fonticola	28	1
2952	Landa Lake	Lud-2	2022-08-25	6	Procambarus sp.		1
2952	Landa Lake	Lud-2	2022-08-25	6	No fish collected		
2952	Landa Lake	Lud-2	2022-08-25	7	Procambarus sp.		2
2952	Landa Lake	Lud-2	2022-08-25	7	Palaemonetes sp.		2
2952	Landa Lake	Lud-2	2022-08-25	7	No fish collected		
2952	Landa Lake	Lud-2	2022-08-25	8	Etheostoma fonticola	32	1
2952	Landa Lake	Lud-2	2022-08-25	8	Procambarus sp.		2
2952	Landa Lake	Lud-2	2022-08-25	9	Lepomis miniatus	42	1
2952	Landa Lake	Lud-2	2022-08-25	9	Procambarus sp.		3
2952	Landa Lake	Lud-2	2022-08-25	10	Procambarus sp.		3
2952	Landa Lake	Lud-2	2022-08-25	10	Etheostoma fonticola	22	1
2952	Landa Lake	Lud-2	2022-08-25	11	Palaemonetes sp.		1
2952	Landa Lake	Lud-2	2022-08-25	11	Etheostoma fonticola	27	1
2952	Landa Lake	Lud-2	2022-08-25	11	Etheostoma fonticola	25	1
2952	Landa Lake	Lud-2	2022-08-25	11	Etheostoma fonticola	14	1
2952	Landa Lake	Lud-2	2022-08-25	12	No fish collected		
2952	Landa Lake	Lud-2	2022-08-25	13	Procambarus sp.		2
2952	Landa Lake	Lud-2	2022-08-25	13	No fish collected		
2952	Landa Lake	Lud-2	2022-08-25	14	Procambarus sp.		2
2952	Landa Lake	Lud-2	2022-08-25	14	Palaemonetes sp.		2
2952	Landa Lake	Lud-2	2022-08-25	14	No fish collected		
2952	Landa Lake	Lud-2	2022-08-25	15	Etheostoma fonticola	22	1
2952	Landa Lake	Lud-2	2022-08-25	16	Procambarus sp.		1
2952	Landa Lake	Lud-2	2022-08-25	16	No fish collected		
2895	Landa Lake	Lud-1	2022-08-25	1	Etheostoma fonticola	30	1
2895	Landa Lake	Lud-1	2022-08-25	1	Etheostoma fonticola	31	1
2895	Landa Lake	Lud-1	2022-08-25	1	Etheostoma fonticola	30	1
2895	Landa Lake	Lud-1	2022-08-25	1	Etheostoma fonticola	25	1
2895	Landa Lake	Lud-1	2022-08-25	1	Etheostoma fonticola	27	1
2895	Landa Lake	Lud-1	2022-08-25	1	Etheostoma fonticola	24	1
2895	Landa Lake	Lud-1	2022-08-25	1	Micropterus salmoides	39	1
2895	Landa Lake	Lud-1	2022-08-25	1	Micropterus salmoides	35	1
2895	Landa Lake	Lud-1	2022-08-25	1	Procambarus sp.		10
2895	Landa Lake	Lud-1	2022-08-25	1	Palaemonetes sp.		12
2895	Landa Lake	Lud-1	2022-08-25	2	Etheostoma fonticola	23	1
2895	Landa Lake	Lud-1	2022-08-25	2	Etheostoma fonticola	16	1
2895	Landa Lake	Lud-1	2022-08-25	2	Lepomis miniatus	27	1
2895	Landa Lake	Lud-1	2022-08-25	2	Procambarus sp.		5
2895	Landa Lake	Lud-1	2022-08-25	3	Etheostoma fonticola	30	1
2895	Landa Lake	Lud-1	2022-08-25	3	Etheostoma fonticola	25	1

2895	Landa Lake	Lud-1	2022-08-25	3	Procambarus sp.		11
2895	Landa Lake	Lud-1	2022-08-25	3	Palaemonetes sp.		2
2895	Landa Lake	Lud-1	2022-08-25	4	Etheostoma fonticola	24	1
2895	Landa Lake	Lud-1	2022-08-25	4	Procambarus sp.		9
2895	Landa Lake	Lud-1	2022-08-25	4	Lepomis miniatus	60	1
2895	Landa Lake	Lud-1	2022-08-25	4	Lepomis miniatus	37	1
2895	Landa Lake	Lud-1	2022-08-25	5	Etheostoma fonticola	16	1
2895	Landa Lake	Lud-1	2022-08-25	5	Etheostoma fonticola	22	1
2895	Landa Lake	Lud-1	2022-08-25	5	Etheostoma fonticola	18	1
2895	Landa Lake	Lud-1	2022-08-25	5	Etheostoma fonticola	21	1
2895	Landa Lake	Lud-1	2022-08-25	5	Procambarus sp.		9
2895	Landa Lake	Lud-1	2022-08-25	5	Palaemonetes sp.		2
2895	Landa Lake	Lud-1	2022-08-25	6	Procambarus sp.		5
2895	Landa Lake	Lud-1	2022-08-25	6	Palaemonetes sp.		2
2895	Landa Lake	Lud-1	2022-08-25	6	No fish collected		
2895	Landa Lake	Lud-1	2022-08-25	7	Procambarus sp.		6
2895	Landa Lake	Lud-1	2022-08-25	7	Lepomis miniatus	88	1
2895	Landa Lake	Lud-1	2022-08-25	7	Etheostoma fonticola	27	1
2895	Landa Lake	Lud-1	2022-08-25	8	Procambarus sp.		4
2895	Landa Lake	Lud-1	2022-08-25	8	No fish collected		
2895	Landa Lake	Lud-1	2022-08-25	9	Procambarus sp.		5
2895	Landa Lake	Lud-1	2022-08-25	9	Lepomis miniatus	44	1
2895	Landa Lake	Lud-1	2022-08-25	10	Etheostoma fonticola	31	1
2895	Landa Lake	Lud-1	2022-08-25	10	Etheostoma fonticola	25	1
2895	Landa Lake	Lud-1	2022-08-25	10	Etheostoma fonticola	26	1
2895	Landa Lake	Lud-1	2022-08-25	10	Procambarus sp.		2
2895	Landa Lake	Lud-1	2022-08-25	11	Procambarus sp.		3
2895	Landa Lake	Lud-1	2022-08-25	11	No fish collected		
2895	Landa Lake	Lud-1	2022-08-25	12	Procambarus sp.		1
2895	Landa Lake	Lud-1	2022-08-25	12	Lepomis sp.	11	1
2895	Landa Lake	Lud-1	2022-08-25	13	Procambarus sp.		1
2895	Landa Lake	Lud-1	2022-08-25	13	Dionda nigrotaeniata	27	1
2895	Landa Lake	Lud-1	2022-08-25	13	Etheostoma fonticola	25	1
2895	Landa Lake	Lud-1	2022-08-25	13	Etheostoma fonticola	25	1
2895	Landa Lake	Lud-1	2022-08-25	14	No fish collected		
2895	Landa Lake	Lud-1	2022-08-25	15	Procambarus sp.		1
2895	Landa Lake	Lud-1	2022-08-25	15	No fish collected		
2896	Landa Lake	Val-2	2022-08-25	1	Procambarus sp.		9
2896	Landa Lake	Val-2	2022-08-25	1	Etheostoma fonticola	31	1
2896	Landa Lake	Val-2	2022-08-25	1	Etheostoma fonticola	28	1
2896	Landa Lake	Val-2	2022-08-25	1	Etheostoma fonticola	27	1

2896	Landa Lake	Val-2	2022-08-25	2	Procambarus sp.		2
2896	Landa Lake	Val-2	2022-08-25	2	Etheostoma fonticola	24	1
2896	Landa Lake	Val-2	2022-08-25	2	Etheostoma fonticola	25	1
2896	Landa Lake	Val-2	2022-08-25	2	Etheostoma fonticola	22	1
2896	Landa Lake	Val-2	2022-08-25	2	Etheostoma fonticola	25	1
2896	Landa Lake	Val-2	2022-08-25	3	Etheostoma fonticola	22	1
2896	Landa Lake	Val-2	2022-08-25	3	Etheostoma fonticola	26	1
2896	Landa Lake	Val-2	2022-08-25	3	Etheostoma fonticola	28	1
2896	Landa Lake	Val-2	2022-08-25	3	Etheostoma fonticola	30	1
2896	Landa Lake	Val-2	2022-08-25	3	Etheostoma fonticola	25	1
2896	Landa Lake	Val-2	2022-08-25	3	Procambarus sp.		2
2896	Landa Lake	Val-2	2022-08-25	4	Procambarus sp.		3
2896	Landa Lake	Val-2	2022-08-25	4	Etheostoma fonticola	21	1
2896	Landa Lake	Val-2	2022-08-25	5	Procambarus sp.		1
2896	Landa Lake	Val-2	2022-08-25	5	Etheostoma fonticola	26	1
2896	Landa Lake	Val-2	2022-08-25	5	Etheostoma fonticola	29	1
2896	Landa Lake	Val-2	2022-08-25	5	Etheostoma fonticola	22	1
2896	Landa Lake	Val-2	2022-08-25	6	Procambarus sp.		3
2896	Landa Lake	Val-2	2022-08-25	6	Palaemonetes sp.		3
2896	Landa Lake	Val-2	2022-08-25	6	No fish collected		
2896	Landa Lake	Val-2	2022-08-25	7	Procambarus sp.		1
2896	Landa Lake	Val-2	2022-08-25	7	Etheostoma fonticola	27	1
2896	Landa Lake	Val-2	2022-08-25	7	Etheostoma fonticola	30	1
2896	Landa Lake	Val-2	2022-08-25	8	No fish collected		
2896	Landa Lake	Val-2	2022-08-25	9	Procambarus sp.		2
2896	Landa Lake	Val-2	2022-08-25	9	Palaemonetes sp.		1
2896	Landa Lake	Val-2	2022-08-25	9	No fish collected		
2896	Landa Lake	Val-2	2022-08-25	10	Procambarus sp.		1
2896	Landa Lake	Val-2	2022-08-25	10	Etheostoma fonticola	26	1
2896	Landa Lake	Val-2	2022-08-25	11	Procambarus sp.		1
2896	Landa Lake	Val-2	2022-08-25	11	Etheostoma fonticola	22	1
2896	Landa Lake	Val-2	2022-08-25	12	No fish collected		
2896	Landa Lake	Val-2	2022-08-25	13	Procambarus sp.		1
2896	Landa Lake	Val-2	2022-08-25	13	No fish collected		
2896	Landa Lake	Val-2	2022-08-25	14	Etheostoma fonticola	22	1
2896	Landa Lake	Val-2	2022-08-25	15	No fish collected		
2896	Landa Lake	Val-2	2022-08-25	8	Palaemonetes sp.		1
2896	Landa Lake	Val-2	2022-08-25	8	Procambarus sp.		2
2897	Landa Lake	Sag-1	2022-08-25	1	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	2	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	3	Procambarus sp.		1

2897	Landa Lake	Sag-1	2022-08-25	3	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	4	Procambarus sp.		1
2897	Landa Lake	Sag-1	2022-08-25	4	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	5	Procambarus sp.		1
2897	Landa Lake	Sag-1	2022-08-25	5	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	6	Lepomis miniatus	75	1
2897	Landa Lake	Sag-1	2022-08-25	7	Procambarus sp.		1
2897	Landa Lake	Sag-1	2022-08-25	7	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	8	Micropterus salmoides	55	1
2897	Landa Lake	Sag-1	2022-08-25	8	Procambarus sp.		1
2897	Landa Lake	Sag-1	2022-08-25	9	Procambarus sp.		1
2897	Landa Lake	Sag-1	2022-08-25	9	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	10	Procambarus sp.		1
2897	Landa Lake	Sag-1	2022-08-25	10	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	11	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	12	Procambarus sp.		1
2897	Landa Lake	Sag-1	2022-08-25	12	Lepomis miniatus	55	1
2897	Landa Lake	Sag-1	2022-08-25	13	Procambarus sp.		1
2897	Landa Lake	Sag-1	2022-08-25	13	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	14	Procambarus sp.		1
2897	Landa Lake	Sag-1	2022-08-25	14	No fish collected		
2897	Landa Lake	Sag-1	2022-08-25	15	Procambarus sp.		1
2897	Landa Lake	Sag-1	2022-08-25	15	No fish collected		
2898	Landa Lake	Sag-2	2022-08-25	1	Lepomis miniatus	51	1
2898	Landa Lake	Sag-2	2022-08-25	1	Etheostoma fonticola	22	1
2898	Landa Lake	Sag-2	2022-08-25	1	Etheostoma fonticola	30	1
2898	Landa Lake	Sag-2	2022-08-25	1	Lepomis sp.	15	1
2898	Landa Lake	Sag-2	2022-08-25	2	Lepomis miniatus	30	1
2898	Landa Lake	Sag-2	2022-08-25	3	Procambarus sp.		1
2898	Landa Lake	Sag-2	2022-08-25	3	No fish collected		
2898	Landa Lake	Sag-2	2022-08-25	4	Procambarus sp.		1
2898	Landa Lake	Sag-2	2022-08-25	4	No fish collected		
2898	Landa Lake	Sag-2	2022-08-25	5	Procambarus sp.		4
2898	Landa Lake	Sag-2	2022-08-25	5	No fish collected		
2898	Landa Lake	Sag-2	2022-08-25	6	Lepomis miniatus	89	1
2898	Landa Lake	Sag-2	2022-08-25	6	Palaemonetes sp.		1
2898	Landa Lake	Sag-2	2022-08-25	7	Procambarus sp.		1
2898	Landa Lake	Sag-2	2022-08-25	7	No fish collected		
2898	Landa Lake	Sag-2	2022-08-25	8	No fish collected		
2898	Landa Lake	Sag-2	2022-08-25	9	Procambarus sp.		2
2898	Landa Lake	Sag-2	2022-08-25	9	No fish collected		

2898	Landa Lake	Sag-2	2022-08-25	10	Procambarus sp.		2
2898	Landa Lake	Sag-2	2022-08-25	10	No fish collected		
2898	Landa Lake	Sag-2	2022-08-25	11	No fish collected		
2898	Landa Lake	Sag-2	2022-08-25	12	No fish collected		
2898	Landa Lake	Sag-2	2022-08-25	13	Lepomis miniatus	35	1
2898	Landa Lake	Sag-2	2022-08-25	14	No fish collected		
2898	Landa Lake	Sag-2	2022-08-25	15	No fish collected		
2899	Landa Lake	Open-1	2022-08-25	1	No fish collected		
2899	Landa Lake	Open-1	2022-08-25	2	No fish collected		
2899	Landa Lake	Open-1	2022-08-25	3	No fish collected		
2899	Landa Lake	Open-1	2022-08-25	4	No fish collected		
2899	Landa Lake	Open-1	2022-08-25	5	No fish collected		
2899	Landa Lake	Open-1	2022-08-25	6	No fish collected		
2899	Landa Lake	Open-1	2022-08-25	7	No fish collected		
2899	Landa Lake	Open-1	2022-08-25	8	No fish collected		
2899	Landa Lake	Open-1	2022-08-25	9	No fish collected		
2899	Landa Lake	Open-1	2022-08-25	10	No fish collected		
2923	Landa Lake	Cab-1	2022-10-24	1	Etheostoma fonticola	21	1
2923	Landa Lake	Cab-1	2022-10-24	2	Etheostoma fonticola	34	1
2923	Landa Lake	Cab-1	2022-10-24	2	Lepomis sp.	19	1
2923	Landa Lake	Cab-1	2022-10-24	3	No fish collected		
2923	Landa Lake	Cab-1	2022-10-24	4	No fish collected		
2923	Landa Lake	Cab-1	2022-10-24	5	Procambarus sp.		1
2923	Landa Lake	Cab-1	2022-10-24	5	Etheostoma fonticola	21	1
2923	Landa Lake	Cab-1	2022-10-24	5	Etheostoma fonticola	29	1
2923	Landa Lake	Cab-1	2022-10-24	5	Palaemonetes sp.		1
2923	Landa Lake	Cab-1	2022-10-24	6	Etheostoma fonticola	11	1
2923	Landa Lake	Cab-1	2022-10-24	7	Etheostoma fonticola	29	1
2923	Landa Lake	Cab-1	2022-10-24	8	Etheostoma fonticola	29	1
2923	Landa Lake	Cab-1	2022-10-24	9	No fish collected		
2923	Landa Lake	Cab-1	2022-10-24	10	Lepomis miniatus	33	1
2923	Landa Lake	Cab-1	2022-10-24	10	Etheostoma fonticola	26	1
2923	Landa Lake	Cab-1	2022-10-24	10	Etheostoma fonticola	26	1
2923	Landa Lake	Cab-1	2022-10-24	10	Etheostoma fonticola	29	1
2923	Landa Lake	Cab-1	2022-10-24	10	Palaemonetes sp.		1
2923	Landa Lake	Cab-1	2022-10-24	11	Etheostoma fonticola	32	1
2923	Landa Lake	Cab-1	2022-10-24	12	No fish collected		
2923	Landa Lake	Cab-1	2022-10-24	13	Procambarus sp.		1
2923	Landa Lake	Cab-1	2022-10-24	13	No fish collected		
2923	Landa Lake	Cab-1	2022-10-24	14	No fish collected		
2923	Landa Lake	Cab-1	2022-10-24	15	Etheostoma fonticola	31	1

2923	Landa Lake	Cab-1	2022-10-24	15	Etheostoma fonticola	28	1
2923	Landa Lake	Cab-1	2022-10-24	15	Etheostoma fonticola	11	1
2923	Landa Lake	Cab-1	2022-10-24	16	Etheostoma fonticola	17	1
2923	Landa Lake	Cab-1	2022-10-24	17	Procambarus sp.		1
2923	Landa Lake	Cab-1	2022-10-24	17	No fish collected		
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	34	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	30	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	26	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	30	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	31	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	32	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	14	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	14	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	13	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	23	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	30	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	11	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	7	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	7	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	11	1
2924	Landa Lake	Cab-2	2022-10-24	1	Etheostoma fonticola	11	1
2924	Landa Lake	Cab-2	2022-10-24	1	Procambarus sp.		1
2924	Landa Lake	Cab-2	2022-10-24	1	Palaemonetes sp.		2
2924	Landa Lake	Cab-2	2022-10-24	2	Procambarus sp.		1
2924	Landa Lake	Cab-2	2022-10-24	2	Palaemonetes sp.		2
2924	Landa Lake	Cab-2	2022-10-24	2	Etheostoma fonticola	33	1
2924	Landa Lake	Cab-2	2022-10-24	2	Etheostoma fonticola	16	1
2924	Landa Lake	Cab-2	2022-10-24	2	Etheostoma fonticola	36	1
2924	Landa Lake	Cab-2	2022-10-24	2	Etheostoma fonticola	32	1
2924	Landa Lake	Cab-2	2022-10-24	2	Etheostoma fonticola	24	1
2924	Landa Lake	Cab-2	2022-10-24	3	Procambarus sp.		3
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	28	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	26	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	27	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	31	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	18	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	30	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	16	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	34	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	31	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	25	1

2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	25	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	7	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	15	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	29	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	27	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	12	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	15	1
2924	Landa Lake	Cab-2	2022-10-24	3	Etheostoma fonticola	20	1
2924	Landa Lake	Cab-2	2022-10-24	4	Procambarus sp.		3
2924	Landa Lake	Cab-2	2022-10-24	4	Palaemonetes sp.		1
2924	Landa Lake	Cab-2	2022-10-24	4	Etheostoma fonticola	31	1
2924	Landa Lake	Cab-2	2022-10-24	4	Etheostoma fonticola	28	1
2924	Landa Lake	Cab-2	2022-10-24	4	Etheostoma fonticola	15	1
2924	Landa Lake	Cab-2	2022-10-24	4	Etheostoma fonticola	35	1
2924	Landa Lake	Cab-2	2022-10-24	4	Etheostoma fonticola	27	1
2924	Landa Lake	Cab-2	2022-10-24	4	Etheostoma fonticola	16	1
2924	Landa Lake	Cab-2	2022-10-24	4	Etheostoma fonticola	10	1
2924	Landa Lake	Cab-2	2022-10-24	4	Etheostoma fonticola	10	1
2924	Landa Lake	Cab-2	2022-10-24	5	Etheostoma fonticola	29	1
2924	Landa Lake	Cab-2	2022-10-24	5	Etheostoma fonticola	31	1
2924	Landa Lake	Cab-2	2022-10-24	5	Etheostoma fonticola	31	1
2924	Landa Lake	Cab-2	2022-10-24	5	Etheostoma fonticola	30	1
2924	Landa Lake	Cab-2	2022-10-24	5	Etheostoma fonticola	16	1
2924	Landa Lake	Cab-2	2022-10-24	6	Procambarus sp.		2
2924	Landa Lake	Cab-2	2022-10-24	6	Etheostoma fonticola	38	1
2924	Landa Lake	Cab-2	2022-10-24	6	Etheostoma fonticola	12	1
2924	Landa Lake	Cab-2	2022-10-24	6	Etheostoma fonticola	11	1
2924	Landa Lake	Cab-2	2022-10-24	7	Lepomis sp.	9	1
2924	Landa Lake	Cab-2	2022-10-24	7	Etheostoma fonticola	24	1
2924	Landa Lake	Cab-2	2022-10-24	7	Etheostoma fonticola	31	1
2924	Landa Lake	Cab-2	2022-10-24	7	Palaemonetes sp.		1
2924	Landa Lake	Cab-2	2022-10-24	8	Procambarus sp.		2
2924	Landa Lake	Cab-2	2022-10-24	8	Etheostoma fonticola	24	1
2924	Landa Lake	Cab-2	2022-10-24	9	Etheostoma fonticola	30	1
2924	Landa Lake	Cab-2	2022-10-24	9	Etheostoma fonticola	34	1
2924	Landa Lake	Cab-2	2022-10-24	9	Etheostoma fonticola	24	1
2924	Landa Lake	Cab-2	2022-10-24	10	Etheostoma fonticola	23	1
2924	Landa Lake	Cab-2	2022-10-24	10	Etheostoma fonticola	28	1
2924	Landa Lake	Cab-2	2022-10-24	11	Procambarus sp.		1
2924	Landa Lake	Cab-2	2022-10-24	11	Etheostoma fonticola	31	1
2924	Landa Lake	Cab-2	2022-10-24	11	Etheostoma fonticola	29	1

2924	Landa Lake	Cab-2	2022-10-24	11	Etheostoma fonticola	28	1
2924	Landa Lake	Cab-2	2022-10-24	11	Etheostoma fonticola	28	1
2924	Landa Lake	Cab-2	2022-10-24	11	Etheostoma fonticola	16	1
2924	Landa Lake	Cab-2	2022-10-24	11	Etheostoma fonticola	12	1
2924	Landa Lake	Cab-2	2022-10-24	12	Etheostoma fonticola	27	1
2924	Landa Lake	Cab-2	2022-10-24	12	Etheostoma fonticola	10	1
2924	Landa Lake	Cab-2	2022-10-24	12	Etheostoma fonticola	14	1
2924	Landa Lake	Cab-2	2022-10-24	12	Etheostoma fonticola	10	1
2924	Landa Lake	Cab-2	2022-10-24	13	Etheostoma fonticola	31	1
2924	Landa Lake	Cab-2	2022-10-24	14	Etheostoma fonticola	23	1
2924	Landa Lake	Cab-2	2022-10-24	14	Etheostoma fonticola	30	1
2924	Landa Lake	Cab-2	2022-10-24	15	Procambarus sp.		2
2924	Landa Lake	Cab-2	2022-10-24	15	Etheostoma fonticola	30	1
2924	Landa Lake	Cab-2	2022-10-24	16	No fish collected		
2925	Landa Lake	Lud-1	2022-10-24	1	Procambarus sp.		7
2925	Landa Lake	Lud-1	2022-10-24	1	Palaemonetes sp.		12
2925	Landa Lake	Lud-1	2022-10-24	1	Etheostoma fonticola	20	1
2925	Landa Lake	Lud-1	2022-10-24	1	Etheostoma fonticola	30	1
2925	Landa Lake	Lud-1	2022-10-24	1	Etheostoma fonticola	27	1
2925	Landa Lake	Lud-1	2022-10-24	1	Etheostoma fonticola	12	1
2925	Landa Lake	Lud-1	2022-10-24	1	Etheostoma fonticola	31	1
2925	Landa Lake	Lud-1	2022-10-24	1	Etheostoma fonticola	11	1
2925	Landa Lake	Lud-1	2022-10-24	1	Gambusia sp.	24	1
2925	Landa Lake	Lud-1	2022-10-24	1	Gambusia sp.	28	1
2925	Landa Lake	Lud-1	2022-10-24	1	Gambusia sp.	22	1
2925	Landa Lake	Lud-1	2022-10-24	1	Gambusia sp.	33	1
2925	Landa Lake	Lud-1	2022-10-24	1	Gambusia sp.	24	1
2925	Landa Lake	Lud-1	2022-10-24	2	Etheostoma fonticola	14	1
2925	Landa Lake	Lud-1	2022-10-24	2	Etheostoma fonticola	18	1
2925	Landa Lake	Lud-1	2022-10-24	2	Etheostoma fonticola	14	1
2925	Landa Lake	Lud-1	2022-10-24	2	Etheostoma fonticola	30	1
2925	Landa Lake	Lud-1	2022-10-24	2	Procambarus sp.		2
2925	Landa Lake	Lud-1	2022-10-24	3	Etheostoma fonticola	27	1
2925	Landa Lake	Lud-1	2022-10-24	3	Etheostoma fonticola	25	1
2925	Landa Lake	Lud-1	2022-10-24	3	Etheostoma fonticola	10	1
2925	Landa Lake	Lud-1	2022-10-24	3	Palaemonetes sp.		8
2925	Landa Lake	Lud-1	2022-10-24	3	Procambarus sp.		1
2925	Landa Lake	Lud-1	2022-10-24	3	Gambusia sp.	22	1
2925	Landa Lake	Lud-1	2022-10-24	4	Procambarus sp.		5
2925	Landa Lake	Lud-1	2022-10-24	4	Palaemonetes sp.		2
2925	Landa Lake	Lud-1	2022-10-24	4	Etheostoma fonticola	30	1

2925	Landa Lake	Lud-1	2022-10-24	4	Etheostoma fonticola	31	1
2925	Landa Lake	Lud-1	2022-10-24	4	Etheostoma fonticola	15	1
2925	Landa Lake	Lud-1	2022-10-24	4	Etheostoma fonticola	28	1
2925	Landa Lake	Lud-1	2022-10-24	4	Etheostoma fonticola	20	1
2925	Landa Lake	Lud-1	2022-10-24	4	Etheostoma fonticola	25	1
2925	Landa Lake	Lud-1	2022-10-24	4	Etheostoma fonticola	14	1
2925	Landa Lake	Lud-1	2022-10-24	4	Gambusia sp.	35	1
2925	Landa Lake	Lud-1	2022-10-24	5	Procambarus sp.		1
2925	Landa Lake	Lud-1	2022-10-24	5	Palaemonetes sp.		1
2925	Landa Lake	Lud-1	2022-10-24	5	No fish collected		
2925	Landa Lake	Lud-1	2022-10-24	6	Etheostoma fonticola	29	1
2925	Landa Lake	Lud-1	2022-10-24	6	Etheostoma fonticola	28	1
2925	Landa Lake	Lud-1	2022-10-24	6	Etheostoma fonticola	29	1
2925	Landa Lake	Lud-1	2022-10-24	6	Etheostoma fonticola	33	1
2925	Landa Lake	Lud-1	2022-10-24	6	Etheostoma fonticola	30	1
2925	Landa Lake	Lud-1	2022-10-24	6	Etheostoma fonticola	14	1
2925	Landa Lake	Lud-1	2022-10-24	6	Etheostoma fonticola	25	1
2925	Landa Lake	Lud-1	2022-10-24	6	Etheostoma fonticola	13	1
2925	Landa Lake	Lud-1	2022-10-24	6	Etheostoma fonticola	20	1
2925	Landa Lake	Lud-1	2022-10-24	6	Procambarus sp.		2
2925	Landa Lake	Lud-1	2022-10-24	6	Palaemonetes sp.		1
2925	Landa Lake	Lud-1	2022-10-24	7	Etheostoma fonticola	29	1
2925	Landa Lake	Lud-1	2022-10-24	7	Etheostoma fonticola	26	1
2925	Landa Lake	Lud-1	2022-10-24	7	Procambarus sp.		1
2925	Landa Lake	Lud-1	2022-10-24	8	Etheostoma fonticola	35	1
2925	Landa Lake	Lud-1	2022-10-24	8	Etheostoma fonticola	27	1
2925	Landa Lake	Lud-1	2022-10-24	9	Procambarus sp.		4
2925	Landa Lake	Lud-1	2022-10-24	9	Etheostoma fonticola	31	1
2925	Landa Lake	Lud-1	2022-10-24	9	Etheostoma fonticola	28	1
2925	Landa Lake	Lud-1	2022-10-24	9	Etheostoma fonticola	31	1
2925	Landa Lake	Lud-1	2022-10-24	9	Etheostoma fonticola	33	1
2925	Landa Lake	Lud-1	2022-10-24	9	Etheostoma fonticola	33	1
2925	Landa Lake	Lud-1	2022-10-24	9	Palaemonetes sp.		2
2925	Landa Lake	Lud-1	2022-10-24	10	Procambarus sp.		4
2925	Landa Lake	Lud-1	2022-10-24	10	Etheostoma fonticola	34	1
2925	Landa Lake	Lud-1	2022-10-24	10	Etheostoma fonticola	30	1
2925	Landa Lake	Lud-1	2022-10-24	10	Lepomis sp.	19	1
2925	Landa Lake	Lud-1	2022-10-24	11	Etheostoma fonticola	20	1
2925	Landa Lake	Lud-1	2022-10-24	12	Etheostoma fonticola	27	1
2925	Landa Lake	Lud-1	2022-10-24	13	Procambarus sp.		1
2925	Landa Lake	Lud-1	2022-10-24	13	No fish collected		

2925	Landa Lake	Lud-1	2022-10-24	14	Etheostoma fonticola	32	1
2925	Landa Lake	Lud-1	2022-10-24	14	Procambarus sp.		1
2925	Landa Lake	Lud-1	2022-10-24	15	Procambarus sp.		2
2925	Landa Lake	Lud-1	2022-10-24	15	No fish collected		
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	32	1
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	28	1
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	31	1
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	19	1
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	30	1
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	12	1
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	11	1
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	12	1
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	15	1
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	14	1
2926	Landa Lake	Lud-2	2022-10-24	1	Etheostoma fonticola	11	1
2926	Landa Lake	Lud-2	2022-10-24	1	Procambarus sp.		3
2926	Landa Lake	Lud-2	2022-10-24	1	Palaemonetes sp.		5
2926	Landa Lake	Lud-2	2022-10-24	2	Etheostoma fonticola	14	1
2926	Landa Lake	Lud-2	2022-10-24	2	Etheostoma fonticola	30	1
2926	Landa Lake	Lud-2	2022-10-24	2	Etheostoma fonticola	31	1
2926	Landa Lake	Lud-2	2022-10-24	2	Etheostoma fonticola	14	1
2926	Landa Lake	Lud-2	2022-10-24	2	Etheostoma fonticola	30	1
2926	Landa Lake	Lud-2	2022-10-24	2	Palaemonetes sp.		5
2926	Landa Lake	Lud-2	2022-10-24	2	Procambarus sp.		2
2926	Landa Lake	Lud-2	2022-10-24	3	Palaemonetes sp.		3
2926	Landa Lake	Lud-2	2022-10-24	3	Etheostoma fonticola	9	1
2926	Landa Lake	Lud-2	2022-10-24	4	Procambarus sp.		1
2926	Landa Lake	Lud-2	2022-10-24	4	Etheostoma fonticola	30	1
2926	Landa Lake	Lud-2	2022-10-24	4	Etheostoma fonticola	15	1
2926	Landa Lake	Lud-2	2022-10-24	4	Etheostoma fonticola	30	1
2926	Landa Lake	Lud-2	2022-10-24	4	Etheostoma fonticola	16	1
2926	Landa Lake	Lud-2	2022-10-24	4	Lepomis miniatus	47	1
2926	Landa Lake	Lud-2	2022-10-24	5	Palaemonetes sp.		1
2926	Landa Lake	Lud-2	2022-10-24	5	Procambarus sp.		2
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	31	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	32	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	34	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	11	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	15	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	12	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	12	1

2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	12	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	11	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	30	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	10	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	9	1
2926	Landa Lake	Lud-2	2022-10-24	5	Etheostoma fonticola	10	1
2926	Landa Lake	Lud-2	2022-10-24	6	Etheostoma fonticola	35	1
2926	Landa Lake	Lud-2	2022-10-24	6	Etheostoma fonticola	31	1
2926	Landa Lake	Lud-2	2022-10-24	6	Etheostoma fonticola	34	1
2926	Landa Lake	Lud-2	2022-10-24	6	Etheostoma fonticola	30	1
2926	Landa Lake	Lud-2	2022-10-24	6	Etheostoma fonticola	16	1
2926	Landa Lake	Lud-2	2022-10-24	6	Etheostoma fonticola	14	1
2926	Landa Lake	Lud-2	2022-10-24	6	Palaemonetes sp.		1
2926	Landa Lake	Lud-2	2022-10-24	6	Procambarus sp.		1
2926	Landa Lake	Lud-2	2022-10-24	7	Etheostoma fonticola	31	1
2926	Landa Lake	Lud-2	2022-10-24	8	Procambarus sp.		1
2926	Landa Lake	Lud-2	2022-10-24	8	Etheostoma fonticola	14	1
2926	Landa Lake	Lud-2	2022-10-24	9	Etheostoma fonticola	34	1
2926	Landa Lake	Lud-2	2022-10-24	9	Etheostoma fonticola	34	1
2926	Landa Lake	Lud-2	2022-10-24	9	Etheostoma fonticola	30	1
2926	Landa Lake	Lud-2	2022-10-24	9	Etheostoma fonticola	14	1
2926	Landa Lake	Lud-2	2022-10-24	9	Etheostoma fonticola	13	1
2926	Landa Lake	Lud-2	2022-10-24	10	Etheostoma fonticola	26	1
2926	Landa Lake	Lud-2	2022-10-24	10	Procambarus sp.		1
2926	Landa Lake	Lud-2	2022-10-24	11	Etheostoma fonticola	12	1
2926	Landa Lake	Lud-2	2022-10-24	11	Etheostoma fonticola	21	1
2926	Landa Lake	Lud-2	2022-10-24	11	Procambarus sp.		1
2926	Landa Lake	Lud-2	2022-10-24	12	Etheostoma fonticola	31	1
2926	Landa Lake	Lud-2	2022-10-24	12	Etheostoma fonticola	10	1
2926	Landa Lake	Lud-2	2022-10-24	13	No fish collected		
2926	Landa Lake	Lud-2	2022-10-24	14	Etheostoma fonticola	18	1
2926	Landa Lake	Lud-2	2022-10-24	15	Etheostoma fonticola	14	1
2926	Landa Lake	Lud-2	2022-10-24	15	Etheostoma fonticola	12	1
2926	Landa Lake	Lud-2	2022-10-24	16	No fish collected		
2927	Landa Lake	Sagi-1	2022-10-24	1	Palaemonetes sp.		6
2927	Landa Lake	Sagi-1	2022-10-24	1	Procambarus sp.		1
2927	Landa Lake	Sagi-1	2022-10-24	1	Lepomis miniatus	48	1
2927	Landa Lake	Sagi-1	2022-10-24	2	Lepomis miniatus	49	1
2927	Landa Lake	Sagi-1	2022-10-24	2	Lepomis miniatus	29	1
2927	Landa Lake	Sagi-1	2022-10-24	2	Lepomis miniatus	25	1
2927	Landa Lake	Sagi-1	2022-10-24	2	Etheostoma fonticola	32	1

2927	Landa Lake	Sagi-1	2022-10-24	2	Etheostoma fonticola	31	1
2927	Landa Lake	Sagi-1	2022-10-24	2	Palaemonetes sp.		6
2927	Landa Lake	Sagi-1	2022-10-24	2	Lepomis sp.	13	1
2927	Landa Lake	Sagi-1	2022-10-24	3	Procambarus sp.		4
2927	Landa Lake	Sagi-1	2022-10-24	3	Palaemonetes sp.		3
2927	Landa Lake	Sagi-1	2022-10-24	3	Lepomis sp.	16	1
2927	Landa Lake	Sagi-1	2022-10-24	3	Etheostoma fonticola	12	1
2927	Landa Lake	Sagi-1	2022-10-24	4	Palaemonetes sp.		3
2927	Landa Lake	Sagi-1	2022-10-24	4	Procambarus sp.		1
2927	Landa Lake	Sagi-1	2022-10-24	4	Lepomis sp.	13	1
2927	Landa Lake	Sagi-1	2022-10-24	5	Procambarus sp.		3
2927	Landa Lake	Sagi-1	2022-10-24	5	Palaemonetes sp.		1
2927	Landa Lake	Sagi-1	2022-10-24	5	Etheostoma fonticola	16	1
2927	Landa Lake	Sagi-1	2022-10-24	5	Lepomis sp.	12	1
2927	Landa Lake	Sagi-1	2022-10-24	6	Lepomis miniatus	34	1
2927	Landa Lake	Sagi-1	2022-10-24	6	Etheostoma fonticola	16	1
2927	Landa Lake	Sagi-1	2022-10-24	6	Etheostoma fonticola	30	1
2927	Landa Lake	Sagi-1	2022-10-24	6	Etheostoma fonticola	34	1
2927	Landa Lake	Sagi-1	2022-10-24	6	Procambarus sp.		2
2927	Landa Lake	Sagi-1	2022-10-24	6	Palaemonetes sp.		3
2927	Landa Lake	Sagi-1	2022-10-24	7	Procambarus sp.		6
2927	Landa Lake	Sagi-1	2022-10-24	7	Ameiurus natalis	54	1
2927	Landa Lake	Sagi-1	2022-10-24	7	Palaemonetes sp.		1
2927	Landa Lake	Sagi-1	2022-10-24	8	Procambarus sp.		3
2927	Landa Lake	Sagi-1	2022-10-24	8	Ameiurus natalis	85	1
2927	Landa Lake	Sagi-1	2022-10-24	9	Ameiurus natalis	157	1
2927	Landa Lake	Sagi-1	2022-10-24	9	Procambarus sp.		2
2927	Landa Lake	Sagi-1	2022-10-24	9	Palaemonetes sp.		3
2927	Landa Lake	Sagi-1	2022-10-24	10	Lepomis miniatus	37	1
2927	Landa Lake	Sagi-1	2022-10-24	10	Lepomis miniatus	25	1
2927	Landa Lake	Sagi-1	2022-10-24	11	Etheostoma fonticola	33	1
2927	Landa Lake	Sagi-1	2022-10-24	11	Etheostoma fonticola	21	1
2927	Landa Lake	Sagi-1	2022-10-24	11	Etheostoma fonticola	20	1
2927	Landa Lake	Sagi-1	2022-10-24	11	Procambarus sp.		3
2927	Landa Lake	Sagi-1	2022-10-24	11	Palaemonetes sp.		2
2927	Landa Lake	Sagi-1	2022-10-24	12	Palaemonetes sp.		1
2927	Landa Lake	Sagi-1	2022-10-24	12	Procambarus sp.		2
2927	Landa Lake	Sagi-1	2022-10-24	12	No fish collected		
2927	Landa Lake	Sagi-1	2022-10-24	13	No fish collected		
2927	Landa Lake	Sagi-1	2022-10-24	14	Procambarus sp.		2
2927	Landa Lake	Sagi-1	2022-10-24	14	No fish collected		

2927	Landa Lake	Sagi-1	2022-10-24	15	Procambarus sp.		1
2927	Landa Lake	Sagi-1	2022-10-24	15	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	5	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	6	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	7	Procambarus sp.		2
2928	Landa Lake	Sag-2	2022-10-24	7	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	8	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	9	Procambarus sp.		1
2928	Landa Lake	Sag-2	2022-10-24	9	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	10	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	11	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	12	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	13	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	14	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	15	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	1	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	2	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	3	No fish collected		
2928	Landa Lake	Sag-2	2022-10-24	4	Dionda nigrotaeniata	12	1
2928	Landa Lake	Sag-2	2022-10-24	4	Procambarus sp.		1
2929	Landa Lake	Open-1	2022-10-24	1	No fish collected		
2929	Landa Lake	Open-1	2022-10-24	2	No fish collected		
2929	Landa Lake	Open-1	2022-10-24	3	No fish collected		
2929	Landa Lake	Open-1	2022-10-24	4	No fish collected		
2929	Landa Lake	Open-1	2022-10-24	5	No fish collected		
2929	Landa Lake	Open-1	2022-10-24	6	No fish collected		
2929	Landa Lake	Open-1	2022-10-24	7	No fish collected		
2929	Landa Lake	Open-1	2022-10-24	8	No fish collected		
2929	Landa Lake	Open-1	2022-10-24	9	No fish collected		
2929	Landa Lake	Open-1	2022-10-24	10	No fish collected		
2930	Landa Lake	Open-2	2022-10-24	1	No fish collected		
2930	Landa Lake	Open-2	2022-10-24	2	No fish collected		
2930	Landa Lake	Open-2	2022-10-24	3	No fish collected		
2930	Landa Lake	Open-2	2022-10-24	4	No fish collected		
2930	Landa Lake	Open-2	2022-10-24	5	No fish collected		
2930	Landa Lake	Open-2	2022-10-24	6	No fish collected		
2930	Landa Lake	Open-2	2022-10-24	7	No fish collected		
2930	Landa Lake	Open-2	2022-10-24	8	No fish collected		
2930	Landa Lake	Open-2	2022-10-24	9	No fish collected		
2930	Landa Lake	Open-2	2022-10-24	10	No fish collected		
2931	Landa Lake	Val-1	2022-10-25	1	Gambusia sp.	30	1

2931	Landa Lake	Val-1	2022-10-25	1	Gambusia sp.	15	1
2931	Landa Lake	Val-1	2022-10-25	1	Gambusia sp.	35	1
2931	Landa Lake	Val-1	2022-10-25	1	Gambusia sp.	26	1
2931	Landa Lake	Val-1	2022-10-25	2	Gambusia sp.	25	1
2931	Landa Lake	Val-1	2022-10-25	3	Gambusia sp.	23	1
2931	Landa Lake	Val-1	2022-10-25	3	Lepomis miniatus	95	1
2931	Landa Lake	Val-1	2022-10-25	4	Gambusia sp.	26	1
2931	Landa Lake	Val-1	2022-10-25	4	Gambusia sp.	21	1
2931	Landa Lake	Val-1	2022-10-25	5	Gambusia sp.	24	1
2931	Landa Lake	Val-1	2022-10-25	5	Procambarus sp.		1
2931	Landa Lake	Val-1	2022-10-25	6	No fish collected		
2931	Landa Lake	Val-1	2022-10-25	7	Procambarus sp.		1
2931	Landa Lake	Val-1	2022-10-25	7	No fish collected		
2931	Landa Lake	Val-1	2022-10-25	8	No fish collected		
2931	Landa Lake	Val-1	2022-10-25	9	No fish collected		
2931	Landa Lake	Val-1	2022-10-25	10	No fish collected		
2931	Landa Lake	Val-1	2022-10-25	11	Etheostoma fonticola	34	1
2931	Landa Lake	Val-1	2022-10-25	12	No fish collected		
2931	Landa Lake	Val-1	2022-10-25	13	No fish collected		
2931	Landa Lake	Val-1	2022-10-25	14	No fish collected		
2931	Landa Lake	Val-1	2022-10-25	15	No fish collected		
2932	Landa Lake	Val-2	2022-10-25	9	No fish collected		
2932	Landa Lake	Val-2	2022-10-25	10	No fish collected		
2932	Landa Lake	Val-2	2022-10-25	11	No fish collected		
2932	Landa Lake	Val-2	2022-10-25	12	Lepomis miniatus	93	1
2932	Landa Lake	Val-2	2022-10-25	13	No fish collected		
2932	Landa Lake	Val-2	2022-10-25	14	No fish collected		
2932	Landa Lake	Val-2	2022-10-25	15	Ameiurus natalis	110	1
2932	Landa Lake	Val-2	2022-10-25	15	Palaemonetes sp.		1
2932	Landa Lake	Val-2	2022-10-25	1	Lepomis miniatus	84	1
2932	Landa Lake	Val-2	2022-10-25	1	Lepomis miniatus	93	1
2932	Landa Lake	Val-2	2022-10-25	1	Lepomis miniatus	89	1
2932	Landa Lake	Val-2	2022-10-25	1	Astyanax mexicanus	76	1
2932	Landa Lake	Val-2	2022-10-25	1	Palaemonetes sp.		11
2932	Landa Lake	Val-2	2022-10-25	1	Lepomis sp.	15	1
2932	Landa Lake	Val-2	2022-10-25	2	Lepomis miniatus	111	1
2932	Landa Lake	Val-2	2022-10-25	2	Lepomis miniatus	151	1
2932	Landa Lake	Val-2	2022-10-25	2	Astyanax mexicanus	67	1
2932	Landa Lake	Val-2	2022-10-25	2	Ameiurus natalis	176	1
2932	Landa Lake	Val-2	2022-10-25	2	Procambarus sp.		1
2932	Landa Lake	Val-2	2022-10-25	2	Palaemonetes sp.		3

2932	Landa Lake	Val-2	2022-10-25	2	Gambusia sp.	17	1
2932	Landa Lake	Val-2	2022-10-25	3	Lepomis miniatus	136	1
2932	Landa Lake	Val-2	2022-10-25	3	Lepomis miniatus	94	1
2932	Landa Lake	Val-2	2022-10-25	3	Palaemonetes sp.		2
2932	Landa Lake	Val-2	2022-10-25	4	Astyanax mexicanus	82	1
2932	Landa Lake	Val-2	2022-10-25	5	Lepomis miniatus	94	1
2932	Landa Lake	Val-2	2022-10-25	6	Lepomis miniatus	143	1
2932	Landa Lake	Val-2	2022-10-25	6	Procambarus sp.		1
2932	Landa Lake	Val-2	2022-10-25	7	No fish collected		
2932	Landa Lake	Val-2	2022-10-25	8	Lepomis miniatus	89	1
2932	Landa Lake	Val-2	2022-10-25	8	Lepomis miniatus	120	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	14	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	29	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	21	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	28	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	25	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	28	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	14	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	16	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	21	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	22	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	16	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	25	1
2933	Landa Lake	Bryo-1	2022-10-25	1	Etheostoma fonticola	12	1
2933	Landa Lake	Bryo-1	2022-10-25	2	Etheostoma fonticola	12	1
2933	Landa Lake	Bryo-1	2022-10-25	3	No fish collected		
2933	Landa Lake	Bryo-1	2022-10-25	4	Etheostoma fonticola	18	1
2933	Landa Lake	Bryo-1	2022-10-25	4	Etheostoma fonticola	12	1
2933	Landa Lake	Bryo-1	2022-10-25	5	Etheostoma fonticola	15	1
2933	Landa Lake	Bryo-1	2022-10-25	5	Etheostoma fonticola	18	1
2933	Landa Lake	Bryo-1	2022-10-25	5	Etheostoma fonticola	17	1
2933	Landa Lake	Bryo-1	2022-10-25	5	Procambarus sp.		1
2933	Landa Lake	Bryo-1	2022-10-25	6	No fish collected		
2933	Landa Lake	Bryo-1	2022-10-25	7	No fish collected		
2933	Landa Lake	Bryo-1	2022-10-25	8	Etheostoma fonticola	30	1
2933	Landa Lake	Bryo-1	2022-10-25	8	Etheostoma fonticola	12	1
2933	Landa Lake	Bryo-1	2022-10-25	9	Etheostoma fonticola	31	1
2933	Landa Lake	Bryo-1	2022-10-25	9	Procambarus sp.		1
2933	Landa Lake	Bryo-1	2022-10-25	10	No fish collected		
2933	Landa Lake	Bryo-1	2022-10-25	11	No fish collected		
2933	Landa Lake	Bryo-1	2022-10-25	12	No fish collected		

2933	Landa Lake	Bryo-1	2022-10-25	13	No fish collected		
2933	Landa Lake	Bryo-1	2022-10-25	14	No fish collected		
2933	Landa Lake	Bryo-1	2022-10-25	15	No fish collected		
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	26	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	22	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	17	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	29	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	20	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	34	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	24	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	19	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	19	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	15	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	14	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	12	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	15	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	13	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	11	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Etheostoma fonticola	10	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Lepomis sp.	20	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Lepomis sp.	16	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Lepomis sp.	20	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Lepomis sp.	19	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Lepomis sp.	13	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Lepomis sp.	14	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Lepomis sp.	18	1
2934	Landa Lake	Bryo-2	2022-10-25	1	Procambarus sp.		3
2934	Landa Lake	Bryo-2	2022-10-25	1	Palaemonetes sp.		13
2934	Landa Lake	Bryo-2	2022-10-25	1	Lepomis miniatus	30	1
2934	Landa Lake	Bryo-2	2022-10-25	2	Etheostoma fonticola	23	1
2934	Landa Lake	Bryo-2	2022-10-25	2	Etheostoma fonticola	19	1
2934	Landa Lake	Bryo-2	2022-10-25	2	Etheostoma fonticola	37	1
2934	Landa Lake	Bryo-2	2022-10-25	2	Etheostoma fonticola	15	1
2934	Landa Lake	Bryo-2	2022-10-25	2	Etheostoma fonticola	23	1
2934	Landa Lake	Bryo-2	2022-10-25	2	Etheostoma fonticola	11	1
2934	Landa Lake	Bryo-2	2022-10-25	2	Procambarus sp.		1
2934	Landa Lake	Bryo-2	2022-10-25	2	Palaemonetes sp.		1
2934	Landa Lake	Bryo-2	2022-10-25	3	Etheostoma fonticola	36	1
2934	Landa Lake	Bryo-2	2022-10-25	3	Etheostoma fonticola	22	1
2934	Landa Lake	Bryo-2	2022-10-25	3	Etheostoma fonticola	27	1
2934	Landa Lake	Bryo-2	2022-10-25	3	Etheostoma fonticola	24	1

2934	Landa Lake	Bryo-2	2022-10-25	3	Etheostoma fonticola	16	1
2934	Landa Lake	Bryo-2	2022-10-25	3	Etheostoma fonticola	16	1
2934	Landa Lake	Bryo-2	2022-10-25	3	Palaemonetes sp.		3
2934	Landa Lake	Bryo-2	2022-10-25	3	Procambarus sp.		1
2934	Landa Lake	Bryo-2	2022-10-25	3	Lepomis sp.	12	1
2934	Landa Lake	Bryo-2	2022-10-25	3	Etheostoma fonticola	33	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	11	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	23	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	15	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	15	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	27	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	30	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	29	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	26	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	18	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	31	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	21	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	30	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Etheostoma fonticola	34	1
2934	Landa Lake	Bryo-2	2022-10-25	4	Palaemonetes sp.		3
2934	Landa Lake	Bryo-2	2022-10-25	5	Etheostoma fonticola	15	1
2934	Landa Lake	Bryo-2	2022-10-25	5	Etheostoma fonticola	19	1
2934	Landa Lake	Bryo-2	2022-10-25	5	Etheostoma fonticola	21	1
2934	Landa Lake	Bryo-2	2022-10-25	5	Etheostoma fonticola	31	1
2934	Landa Lake	Bryo-2	2022-10-25	5	Palaemonetes sp.		1
2934	Landa Lake	Bryo-2	2022-10-25	6	Etheostoma fonticola	17	1
2934	Landa Lake	Bryo-2	2022-10-25	7	Etheostoma fonticola	30	1
2934	Landa Lake	Bryo-2	2022-10-25	7	Etheostoma fonticola	11	1
2934	Landa Lake	Bryo-2	2022-10-25	7	Etheostoma fonticola	16	1
2934	Landa Lake	Bryo-2	2022-10-25	7	Etheostoma fonticola	30	1
2934	Landa Lake	Bryo-2	2022-10-25	7	Lepomis sp.	15	1
2934	Landa Lake	Bryo-2	2022-10-25	7	Lepomis sp.	14	1
2934	Landa Lake	Bryo-2	2022-10-25	7	Lepomis sp.	18	1
2934	Landa Lake	Bryo-2	2022-10-25	7	Procambarus sp.		1
2934	Landa Lake	Bryo-2	2022-10-25	7	Palaemonetes sp.		1
2934	Landa Lake	Bryo-2	2022-10-25	8	Etheostoma fonticola	26	1
2934	Landa Lake	Bryo-2	2022-10-25	8	Etheostoma fonticola	33	1
2934	Landa Lake	Bryo-2	2022-10-25	8	Etheostoma fonticola	14	1
2934	Landa Lake	Bryo-2	2022-10-25	8	Palaemonetes sp.		1
2934	Landa Lake	Bryo-2	2022-10-25	9	Lepomis sp.	8	1
2934	Landa Lake	Bryo-2	2022-10-25	9	Palaemonetes sp.		1

2934	Landa Lake	Bryo-2	2022-10-25	10	Palaemonetes sp.		2
2934	Landa Lake	Bryo-2	2022-10-25	10	Etheostoma fonticola	27	1
2934	Landa Lake	Bryo-2	2022-10-25	11	Micropterus salmoides	78	1
2934	Landa Lake	Bryo-2	2022-10-25	12	Etheostoma fonticola	29	1
2934	Landa Lake	Bryo-2	2022-10-25	13	Lepomis miniatus	30	1
2934	Landa Lake	Bryo-2	2022-10-25	13	Procambarus sp.		1
2934	Landa Lake	Bryo-2	2022-10-25	14	Lepomis sp.	14	1
2934	Landa Lake	Bryo-2	2022-10-25	15	No fish collected		
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	25	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	20	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	24	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	22	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	17	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	24	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	30	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	30	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	15	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	14	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	16	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	15	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	15	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	23	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	20	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	18	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	14	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	16	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	13	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	18	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	18	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	14	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	12	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	14	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Astyanax mexicanus	9	1
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Palaemonetes sp.		13
2785	Old Channel Reach	Cabo-1	2022-05-05	1	Procambarus sp.		1
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Procambarus sp.		3
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Palaemonetes sp.		10
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Etheostoma fonticola	24	1
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Etheostoma fonticola	24	1
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Etheostoma fonticola	12	1
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Etheostoma fonticola	20	1

2785	Old Channel Reach	Cabo-1	2022-05-05	2	Etheostoma fonticola	18	1
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Etheostoma fonticola	18	1
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Etheostoma fonticola	20	1
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Etheostoma fonticola	22	1
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Etheostoma fonticola	21	1
2785	Old Channel Reach	Cabo-1	2022-05-05	2	Etheostoma fonticola	15	1
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Etheostoma fonticola	16	1
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Etheostoma fonticola	20	1
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Etheostoma fonticola	20	1
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Etheostoma fonticola	20	1
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Etheostoma fonticola	22	1
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Etheostoma fonticola	14	1
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Etheostoma fonticola	17	1
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Etheostoma fonticola	16	1
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Etheostoma fonticola	13	1
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Procambarus sp.		4
2785	Old Channel Reach	Cabo-1	2022-05-05	3	Palaemonetes sp.		2
2785	Old Channel Reach	Cabo-1	2022-05-05	4	Etheostoma fonticola	15	1
2785	Old Channel Reach	Cabo-1	2022-05-05	4	Etheostoma fonticola	14	1
2785	Old Channel Reach	Cabo-1	2022-05-05	4	Procambarus sp.		2
2785	Old Channel Reach	Cabo-1	2022-05-05	5	Palaemonetes sp.		1
2785	Old Channel Reach	Cabo-1	2022-05-05	5	Etheostoma fonticola	21	1
2785	Old Channel Reach	Cabo-1	2022-05-05	5	Etheostoma fonticola	15	1
2785	Old Channel Reach	Cabo-1	2022-05-05	5	Etheostoma fonticola	20	1
2785	Old Channel Reach	Cabo-1	2022-05-05	6	Etheostoma fonticola	18	1
2785	Old Channel Reach	Cabo-1	2022-05-05	6	Etheostoma fonticola	18	1
2785	Old Channel Reach	Cabo-1	2022-05-05	6	Etheostoma fonticola	15	1
2785	Old Channel Reach	Cabo-1	2022-05-05	6	Etheostoma fonticola	16	1
2785	Old Channel Reach	Cabo-1	2022-05-05	6	Etheostoma fonticola	17	1
2785	Old Channel Reach	Cabo-1	2022-05-05	6	Etheostoma fonticola	24	1
2785	Old Channel Reach	Cabo-1	2022-05-05	6	Etheostoma fonticola	13	1
2785	Old Channel Reach	Cabo-1	2022-05-05	6	Procambarus sp.		3
2785	Old Channel Reach	Cabo-1	2022-05-05	7	Procambarus sp.		1
2785	Old Channel Reach	Cabo-1	2022-05-05	7	Etheostoma fonticola	15	1
2785	Old Channel Reach	Cabo-1	2022-05-05	8	Procambarus sp.		4
2785	Old Channel Reach	Cabo-1	2022-05-05	8	Palaemonetes sp.		1
2785	Old Channel Reach	Cabo-1	2022-05-05	8	No fish collected		
2785	Old Channel Reach	Cabo-1	2022-05-05	9	Etheostoma fonticola	16	1
2785	Old Channel Reach	Cabo-1	2022-05-05	10	No fish collected		
2785	Old Channel Reach	Cabo-1	2022-05-05	11	Etheostoma fonticola	21	1
2785	Old Channel Reach	Cabo-1	2022-05-05	12	Lepomis sp.	11	1

2785	Old Channel Reach	Cabo-1	2022-05-05	13	Palaemonetes sp.		2
2785	Old Channel Reach	Cabo-1	2022-05-05	13	No fish collected		
2785	Old Channel Reach	Cabo-1	2022-05-05	14	Procambarus sp.		2
2785	Old Channel Reach	Cabo-1	2022-05-05	14	No fish collected		
2785	Old Channel Reach	Cabo-1	2022-05-05	15	No fish collected		
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	18	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	31	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	17	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	26	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	22	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	14	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	18	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	18	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	16	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	22	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Micropterus salmoides	39	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Dionda nigrotaeniata	26	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Dionda nigrotaeniata	27	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Dionda nigrotaeniata	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Herichthys cyanoguttatus	14	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Astyanax mexicanus	21	1
2786	Old Channel Reach	Cab-2	2022-05-05	1	Procambarus sp.		18
2786	Old Channel Reach	Cab-2	2022-05-05	1	Palaemonetes sp.		21
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	22	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	20	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	19	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	26	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	29	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	30	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	29	1

2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	30	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Etheostoma fonticola	26	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Lepomis miniatus	80	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Lepomis sp.	14	1
2786	Old Channel Reach	Cab-2	2022-05-05	2	Palaemonetes sp.		8
2786	Old Channel Reach	Cab-2	2022-05-05	2	Procambarus sp.		8
2786	Old Channel Reach	Cab-2	2022-05-05	3	Palaemonetes sp.		4
2786	Old Channel Reach	Cab-2	2022-05-05	3	Dionda nigrotaeniata		1
2786	Old Channel Reach	Cab-2	2022-05-05	3	Etheostoma fonticola	26	1
2786	Old Channel Reach	Cab-2	2022-05-05	3	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	3	Etheostoma fonticola	14	1
2786	Old Channel Reach	Cab-2	2022-05-05	3	Etheostoma fonticola	23	1
2786	Old Channel Reach	Cab-2	2022-05-05	4	Procambarus sp.		2
2786	Old Channel Reach	Cab-2	2022-05-05	4	Palaemonetes sp.		1
2786	Old Channel Reach	Cab-2	2022-05-05	4	Dionda nigrotaeniata	21	1
2786	Old Channel Reach	Cab-2	2022-05-05	4	Dionda nigrotaeniata	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	4	Dionda nigrotaeniata	31	1
2786	Old Channel Reach	Cab-2	2022-05-05	4	Herichthys cyanoguttatus	72	1
2786	Old Channel Reach	Cab-2	2022-05-05	4	Etheostoma fonticola	20	1
2786	Old Channel Reach	Cab-2	2022-05-05	4	Etheostoma fonticola	23	1
2786	Old Channel Reach	Cab-2	2022-05-05	4	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	4	Etheostoma fonticola	23	1
2786	Old Channel Reach	Cab-2	2022-05-05	4	Etheostoma fonticola	14	1
2786	Old Channel Reach	Cab-2	2022-05-05	5	Procambarus sp.		3
2786	Old Channel Reach	Cab-2	2022-05-05	5	Palaemonetes sp.		4
2786	Old Channel Reach	Cab-2	2022-05-05	5	Lepomis miniatus	61	1
2786	Old Channel Reach	Cab-2	2022-05-05	5	Lepomis miniatus	30	1
2786	Old Channel Reach	Cab-2	2022-05-05	5	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	5	Etheostoma fonticola	27	1
2786	Old Channel Reach	Cab-2	2022-05-05	5	Etheostoma fonticola	22	1
2786	Old Channel Reach	Cab-2	2022-05-05	5	Etheostoma fonticola	22	1
2786	Old Channel Reach	Cab-2	2022-05-05	5	Astyanax mexicanus	17	1
2786	Old Channel Reach	Cab-2	2022-05-05	5	Lepomis sp.	17	1
2786	Old Channel Reach	Cab-2	2022-05-05	5	Dionda nigrotaeniata	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	6	Procambarus sp.		3
2786	Old Channel Reach	Cab-2	2022-05-05	6	No fish collected		
2786	Old Channel Reach	Cab-2	2022-05-05	7	Procambarus sp.		1
2786	Old Channel Reach	Cab-2	2022-05-05	7	Lepomis miniatus	85	1
2786	Old Channel Reach	Cab-2	2022-05-05	7	Dionda nigrotaeniata	21	1
2786	Old Channel Reach	Cab-2	2022-05-05	7	Etheostoma fonticola	22	1

2786	Old Channel Reach	Cab-2	2022-05-05	7	Etheostoma fonticola	23	1
2786	Old Channel Reach	Cab-2	2022-05-05	7	Palaemonetes sp.		2
2786	Old Channel Reach	Cab-2	2022-05-05	8	Palaemonetes sp.		1
2786	Old Channel Reach	Cab-2	2022-05-05	8	Procambarus sp.		3
2786	Old Channel Reach	Cab-2	2022-05-05	8	Etheostoma fonticola	12	1
2786	Old Channel Reach	Cab-2	2022-05-05	8	Etheostoma fonticola	13	1
2786	Old Channel Reach	Cab-2	2022-05-05	9	Palaemonetes sp.		1
2786	Old Channel Reach	Cab-2	2022-05-05	9	Procambarus sp.		1
2786	Old Channel Reach	Cab-2	2022-05-05	9	No fish collected		
2786	Old Channel Reach	Cab-2	2022-05-05	10	Lepomis miniatus	75	1
2786	Old Channel Reach	Cab-2	2022-05-05	10	Lepomis miniatus	60	1
2786	Old Channel Reach	Cab-2	2022-05-05	10	Procambarus sp.		3
2786	Old Channel Reach	Cab-2	2022-05-05	10	Palaemonetes sp.		4
2786	Old Channel Reach	Cab-2	2022-05-05	10	Dionda nigrotaeniata	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	10	Etheostoma fonticola	30	1
2786	Old Channel Reach	Cab-2	2022-05-05	11	Lepomis miniatus	60	1
2786	Old Channel Reach	Cab-2	2022-05-05	11	Palaemonetes sp.		6
2786	Old Channel Reach	Cab-2	2022-05-05	11	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	11	Dionda nigrotaeniata	27	1
2786	Old Channel Reach	Cab-2	2022-05-05	12	Lepomis miniatus	63	1
2786	Old Channel Reach	Cab-2	2022-05-05	12	Lepomis miniatus	52	1
2786	Old Channel Reach	Cab-2	2022-05-05	12	Etheostoma fonticola	23	1
2786	Old Channel Reach	Cab-2	2022-05-05	12	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	12	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	12	Procambarus sp.		3
2786	Old Channel Reach	Cab-2	2022-05-05	12	Palaemonetes sp.		2
2786	Old Channel Reach	Cab-2	2022-05-05	13	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	13	Etheostoma fonticola	24	1
2786	Old Channel Reach	Cab-2	2022-05-05	13	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	13	Etheostoma fonticola	28	1
2786	Old Channel Reach	Cab-2	2022-05-05	13	Etheostoma fonticola	21	1
2786	Old Channel Reach	Cab-2	2022-05-05	13	Palaemonetes sp.		3
2786	Old Channel Reach	Cab-2	2022-05-05	14	Procambarus sp.		3
2786	Old Channel Reach	Cab-2	2022-05-05	14	Etheostoma fonticola	26	1
2786	Old Channel Reach	Cab-2	2022-05-05	14	Etheostoma fonticola	25	1
2786	Old Channel Reach	Cab-2	2022-05-05	15	Etheostoma fonticola	26	1
2786	Old Channel Reach	Cab-2	2022-05-05	16	No fish collected		
2787	Old Channel Reach	Lud-1	2022-05-05	1	Gambusia sp.	26	1
2787	Old Channel Reach	Lud-1	2022-05-05	1	Procambarus sp.		2
2787	Old Channel Reach	Lud-1	2022-05-05	1	Palaemonetes sp.		1
2787	Old Channel Reach	Lud-1	2022-05-05	2	Palaemonetes sp.		5

2787	Old Channel Reach	Lud-1	2022-05-05	2	Procambarus sp.		12
2787	Old Channel Reach	Lud-1	2022-05-05	2	Lepomis miniatus	60	1
2787	Old Channel Reach	Lud-1	2022-05-05	2	Etheostoma fonticola	24	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Gambusia sp.	15	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Procambarus sp.		13
2787	Old Channel Reach	Lud-1	2022-05-05	3	Palaemonetes sp.		12
2787	Old Channel Reach	Lud-1	2022-05-05	3	Hypostomus plecostomus	20	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Gambusia sp.	26	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Dionda nigrotaeniata	26	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Lepomis miniatus	34	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Etheostoma fonticola	27	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Etheostoma fonticola	24	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Etheostoma fonticola	26	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Etheostoma fonticola	20	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Etheostoma fonticola	25	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Etheostoma fonticola	23	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Etheostoma fonticola	25	1
2787	Old Channel Reach	Lud-1	2022-05-05	3	Etheostoma fonticola	20	1
2787	Old Channel Reach	Lud-1	2022-05-05	4	Palaemonetes sp.		3
2787	Old Channel Reach	Lud-1	2022-05-05	4	Etheostoma fonticola	19	1
2787	Old Channel Reach	Lud-1	2022-05-05	4	Etheostoma fonticola	23	1
2787	Old Channel Reach	Lud-1	2022-05-05	4	Procambarus sp.		2
2787	Old Channel Reach	Lud-1	2022-05-05	4	Lepomis miniatus	70	1
2787	Old Channel Reach	Lud-1	2022-05-05	5	Procambarus sp.		15
2787	Old Channel Reach	Lud-1	2022-05-05	5	Lepomis miniatus	24	1
2787	Old Channel Reach	Lud-1	2022-05-05	5	Dionda nigrotaeniata	24	1
2787	Old Channel Reach	Lud-1	2022-05-05	6	Etheostoma fonticola	24	1
2787	Old Channel Reach	Lud-1	2022-05-05	6	Etheostoma fonticola	20	1
2787	Old Channel Reach	Lud-1	2022-05-05	6	Procambarus sp.		7
2787	Old Channel Reach	Lud-1	2022-05-05	6	Gambusia sp.	24	1
2787	Old Channel Reach	Lud-1	2022-05-05	7	Procambarus sp.		5
2787	Old Channel Reach	Lud-1	2022-05-05	7	Etheostoma fonticola	30	1
2787	Old Channel Reach	Lud-1	2022-05-05	7	Etheostoma fonticola	27	1
2787	Old Channel Reach	Lud-1	2022-05-05	7	Etheostoma fonticola	25	1
2787	Old Channel Reach	Lud-1	2022-05-05	8	Etheostoma fonticola	22	1
2787	Old Channel Reach	Lud-1	2022-05-05	8	Etheostoma fonticola	30	1
2787	Old Channel Reach	Lud-1	2022-05-05	8	Etheostoma fonticola	28	1
2787	Old Channel Reach	Lud-1	2022-05-05	8	Etheostoma fonticola	23	1
2787	Old Channel Reach	Lud-1	2022-05-05	8	Etheostoma fonticola	25	1
2787	Old Channel Reach	Lud-1	2022-05-05	8	Etheostoma fonticola	24	1
2787	Old Channel Reach	Lud-1	2022-05-05	8	Etheostoma fonticola	18	1

2787	Old Channel Reach	Lud-1	2022-05-05	8	Procambarus sp.		1
2787	Old Channel Reach	Lud-1	2022-05-05	9	Procambarus sp.		5
2787	Old Channel Reach	Lud-1	2022-05-05	9	Etheostoma fonticola	27	1
2787	Old Channel Reach	Lud-1	2022-05-05	9	Etheostoma fonticola	29	1
2787	Old Channel Reach	Lud-1	2022-05-05	9	Etheostoma fonticola	26	1
2787	Old Channel Reach	Lud-1	2022-05-05	9	Palaemonetes sp.		1
2787	Old Channel Reach	Lud-1	2022-05-05	10	Procambarus sp.		1
2787	Old Channel Reach	Lud-1	2022-05-05	10	Etheostoma fonticola	28	1
2787	Old Channel Reach	Lud-1	2022-05-05	10	Etheostoma fonticola	23	1
2787	Old Channel Reach	Lud-1	2022-05-05	11	Procambarus sp.		3
2787	Old Channel Reach	Lud-1	2022-05-05	11	No fish collected		
2787	Old Channel Reach	Lud-1	2022-05-05	12	Etheostoma fonticola	22	1
2787	Old Channel Reach	Lud-1	2022-05-05	13	Procambarus sp.		1
2787	Old Channel Reach	Lud-1	2022-05-05	13	Etheostoma fonticola	21	1
2787	Old Channel Reach	Lud-1	2022-05-05	14	Procambarus sp.		2
2787	Old Channel Reach	Lud-1	2022-05-05	14	No fish collected		
2787	Old Channel Reach	Lud-1	2022-05-05	15	Etheostoma fonticola	23	1
2787	Old Channel Reach	Lud-1	2022-05-05	16	Procambarus sp.		3
2787	Old Channel Reach	Lud-1	2022-05-05	16	No fish collected		
2788	Old Channel Reach	Bryo-1	2022-05-05	1	Etheostoma fonticola	24	1
2788	Old Channel Reach	Bryo-1	2022-05-05	1	Procambarus sp.		9
2788	Old Channel Reach	Bryo-1	2022-05-05	1	Palaemonetes sp.		3
2788	Old Channel Reach	Bryo-1	2022-05-05	1	Herichthys cyanoguttatus	20	1
2788	Old Channel Reach	Bryo-1	2022-05-05	2	Procambarus sp.		7
2788	Old Channel Reach	Bryo-1	2022-05-05	2	Etheostoma fonticola	25	1
2788	Old Channel Reach	Bryo-1	2022-05-05	2	Palaemonetes sp.		2
2788	Old Channel Reach	Bryo-1	2022-05-05	2	Astyanax mexicanus	15	1
2788	Old Channel Reach	Bryo-1	2022-05-05	3	Procambarus sp.		11
2788	Old Channel Reach	Bryo-1	2022-05-05	3	Palaemonetes sp.		2
2788	Old Channel Reach	Bryo-1	2022-05-05	3	No fish collected		
2788	Old Channel Reach	Bryo-1	2022-05-05	4	Etheostoma fonticola	30	1
2788	Old Channel Reach	Bryo-1	2022-05-05	4	Procambarus sp.		2
2788	Old Channel Reach	Bryo-1	2022-05-05	4	Palaemonetes sp.		6
2788	Old Channel Reach	Bryo-1	2022-05-05	5	Palaemonetes sp.		2
2788	Old Channel Reach	Bryo-1	2022-05-05	5	Etheostoma fonticola	20	1
2788	Old Channel Reach	Bryo-1	2022-05-05	5	Etheostoma fonticola	25	1
2788	Old Channel Reach	Bryo-1	2022-05-05	5	Etheostoma fonticola	26	1
2788	Old Channel Reach	Bryo-1	2022-05-05	5	Procambarus sp.		1
2788	Old Channel Reach	Bryo-1	2022-05-05	6	Palaemonetes sp.		1
2788	Old Channel Reach	Bryo-1	2022-05-05	6	No fish collected		
2788	Old Channel Reach	Bryo-1	2022-05-05	7	Procambarus sp.		1

2788	Old Channel Reach	Bryo-1	2022-05-05	7	Astyanax mexicanus	22	1
2788	Old Channel Reach	Bryo-1	2022-05-05	7	Palaemonetes sp.		2
2788	Old Channel Reach	Bryo-1	2022-05-05	8	Procambarus sp.		2
2788	Old Channel Reach	Bryo-1	2022-05-05	8	No fish collected		
2788	Old Channel Reach	Bryo-1	2022-05-05	9	Procambarus sp.		1
2788	Old Channel Reach	Bryo-1	2022-05-05	9	No fish collected		
2788	Old Channel Reach	Bryo-1	2022-05-05	10	Etheostoma fonticola	25	1
2788	Old Channel Reach	Bryo-1	2022-05-05	10	Procambarus sp.		1
2788	Old Channel Reach	Bryo-1	2022-05-05	10	Palaemonetes sp.		1
2788	Old Channel Reach	Bryo-1	2022-05-05	11	No fish collected		
2788	Old Channel Reach	Bryo-1	2022-05-05	12	No fish collected		
2788	Old Channel Reach	Bryo-1	2022-05-05	13	No fish collected		
2788	Old Channel Reach	Bryo-1	2022-05-05	14	No fish collected		
2788	Old Channel Reach	Bryo-1	2022-05-05	15	Micropterus salmoides	35	1
2789	Old Channel Reach	Open-1	2022-05-05	12	Etheostoma fonticola	13	1
2789	Old Channel Reach	Open-1	2022-05-05	13	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	14	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	15	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	1	Etheostoma fonticola	15	1
2789	Old Channel Reach	Open-1	2022-05-05	1	Procambarus sp.		2
2789	Old Channel Reach	Open-1	2022-05-05	2	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	3	Etheostoma fonticola	28	1
2789	Old Channel Reach	Open-1	2022-05-05	4	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	5	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	6	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	7	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	8	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	9	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	10	No fish collected		
2789	Old Channel Reach	Open-1	2022-05-05	11	No fish collected		
2790	Old Channel Reach	Lud-2	2022-05-05	1	Lepomis miniatus	70	1
2790	Old Channel Reach	Lud-2	2022-05-05	1	Palaemonetes sp.		7
2790	Old Channel Reach	Lud-2	2022-05-05	1	Etheostoma fonticola	28	1
2790	Old Channel Reach	Lud-2	2022-05-05	1	Etheostoma fonticola	23	1
2790	Old Channel Reach	Lud-2	2022-05-05	1	Etheostoma fonticola	13	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Lepomis miniatus	77	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Lepomis miniatus	57	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Astyanax mexicanus	22	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Astyanax mexicanus	22	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Procambarus sp.		9
2790	Old Channel Reach	Lud-2	2022-05-05	2	Palaemonetes sp.		3

2790	Old Channel Reach	Lud-2	2022-05-05	2	Etheostoma fonticola	22	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Etheostoma fonticola	32	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Etheostoma fonticola	27	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Etheostoma fonticola	26	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Etheostoma fonticola	27	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Etheostoma fonticola	23	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Etheostoma fonticola	25	1
2790	Old Channel Reach	Lud-2	2022-05-05	2	Dionda nigrotaeniata	25	1
2790	Old Channel Reach	Lud-2	2022-05-05	1	Lepomis miniatus	61	1
2790	Old Channel Reach	Lud-2	2022-05-05	1	Lepomis miniatus	66	1
2790	Old Channel Reach	Lud-2	2022-05-05	3	Herichthys cyanoguttatus	21	1
2790	Old Channel Reach	Lud-2	2022-05-05	3	Herichthys cyanoguttatus	18	1
2790	Old Channel Reach	Lud-2	2022-05-05	3	Herichthys cyanoguttatus	21	1
2790	Old Channel Reach	Lud-2	2022-05-05	3	Dionda nigrotaeniata	25	1
2790	Old Channel Reach	Lud-2	2022-05-05	3	Procambarus sp.		13
2790	Old Channel Reach	Lud-2	2022-05-05	3	Etheostoma fonticola	25	1
2790	Old Channel Reach	Lud-2	2022-05-05	4	Palaemonetes sp.		2
2790	Old Channel Reach	Lud-2	2022-05-05	4	Procambarus sp.		3
2790	Old Channel Reach	Lud-2	2022-05-05	4	No fish collected		
2790	Old Channel Reach	Lud-2	2022-05-05	5	Procambarus sp.		4
2790	Old Channel Reach	Lud-2	2022-05-05	5	Etheostoma fonticola	15	1
2790	Old Channel Reach	Lud-2	2022-05-05	5	Etheostoma fonticola	32	1
2790	Old Channel Reach	Lud-2	2022-05-05	6	Lepomis sp.	17	1
2790	Old Channel Reach	Lud-2	2022-05-05	7	Procambarus sp.		6
2790	Old Channel Reach	Lud-2	2022-05-05	7	No fish collected		
2790	Old Channel Reach	Lud-2	2022-05-05	8	No fish collected		
2790	Old Channel Reach	Lud-2	2022-05-05	9	No fish collected		
2790	Old Channel Reach	Lud-2	2022-05-05	10	Procambarus sp.		1
2790	Old Channel Reach	Lud-2	2022-05-05	10	No fish collected		
2790	Old Channel Reach	Lud-2	2022-05-05	11	Procambarus sp.		2
2790	Old Channel Reach	Lud-2	2022-05-05	11	No fish collected		
2790	Old Channel Reach	Lud-2	2022-05-05	12	Etheostoma fonticola	30	1
2790	Old Channel Reach	Lud-2	2022-05-05	12	Etheostoma fonticola	17	1
2790	Old Channel Reach	Lud-2	2022-05-05	12	Procambarus sp.		2
2790	Old Channel Reach	Lud-2	2022-05-05	13	Procambarus sp.		2
2790	Old Channel Reach	Lud-2	2022-05-05	13	Palaemonetes sp.		1
2790	Old Channel Reach	Lud-2	2022-05-05	13	No fish collected		
2790	Old Channel Reach	Lud-2	2022-05-05	14	Herichthys cyanoguttatus	20	1
2790	Old Channel Reach	Lud-2	2022-05-05	15	Dionda nigrotaeniata	29	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Etheostoma fonticola	24	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Etheostoma fonticola	22	1

2791	Old Channel Reach	Bryo-2	2022-05-05	1	Etheostoma fonticola	28	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Etheostoma fonticola	29	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Etheostoma fonticola	27	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Etheostoma fonticola	25	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Etheostoma fonticola	29	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Etheostoma fonticola	30	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Procambarus sp.		10
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Palaemonetes sp.		2
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Astyanax mexicanus	13	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Astyanax mexicanus	26	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Astyanax mexicanus	25	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Astyanax mexicanus	20	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Astyanax mexicanus	21	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Herichthys cyanoguttatus	22	1
2791	Old Channel Reach	Bryo-2	2022-05-05	1	Herichthys cyanoguttatus	15	1
2791	Old Channel Reach	Bryo-2	2022-05-05	2	Procambarus sp.		
2791	Old Channel Reach	Bryo-2	2022-05-05	2	Etheostoma fonticola	27	1
2791	Old Channel Reach	Bryo-2	2022-05-05	3	Etheostoma fonticola	29	1
2791	Old Channel Reach	Bryo-2	2022-05-05	3	Etheostoma fonticola	31	1
2791	Old Channel Reach	Bryo-2	2022-05-05	3	Etheostoma fonticola	26	1
2791	Old Channel Reach	Bryo-2	2022-05-05	3	Procambarus sp.		5
2791	Old Channel Reach	Bryo-2	2022-05-05	3	Astyanax mexicanus	32	1
2791	Old Channel Reach	Bryo-2	2022-05-05	3	Astyanax mexicanus	28	1
2791	Old Channel Reach	Bryo-2	2022-05-05	3	Palaemonetes sp.		1
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Procambarus sp.		2
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Astyanax mexicanus	30	1
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Etheostoma fonticola	28	1
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Etheostoma fonticola	24	1
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Etheostoma fonticola	21	1
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Etheostoma fonticola	12	1
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Etheostoma fonticola	26	1
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Etheostoma fonticola	17	1
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Dionda nigrotaeniata	25	1
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Dionda nigrotaeniata	27	1
2791	Old Channel Reach	Bryo-2	2022-05-05	4	Palaemonetes sp.		2
2791	Old Channel Reach	Bryo-2	2022-05-05	5	Procambarus sp.		9
2791	Old Channel Reach	Bryo-2	2022-05-05	5	Astyanax mexicanus	51	1
2791	Old Channel Reach	Bryo-2	2022-05-05	5	Etheostoma fonticola	32	1
2791	Old Channel Reach	Bryo-2	2022-05-05	5	Etheostoma fonticola	30	1
2791	Old Channel Reach	Bryo-2	2022-05-05	5	Etheostoma fonticola	22	1
2791	Old Channel Reach	Bryo-2	2022-05-05	5	Etheostoma fonticola	22	1

2791	Old Channel Reach	Bryo-2	2022-05-05	6	Procambarus sp.		3
2791	Old Channel Reach	Bryo-2	2022-05-05	6	Etheostoma fonticola	29	1
2791	Old Channel Reach	Bryo-2	2022-05-05	6	Etheostoma fonticola	20	1
2791	Old Channel Reach	Bryo-2	2022-05-05	7	Procambarus sp.		4
2791	Old Channel Reach	Bryo-2	2022-05-05	7	Palaemonetes sp.		3
2791	Old Channel Reach	Bryo-2	2022-05-05	7	No fish collected		
2791	Old Channel Reach	Bryo-2	2022-05-05	8	No fish collected		
2791	Old Channel Reach	Bryo-2	2022-05-05	9	Procambarus sp.		2
2791	Old Channel Reach	Bryo-2	2022-05-05	9	No fish collected		
2791	Old Channel Reach	Bryo-2	2022-05-05	10	Etheostoma fonticola	28	1
2791	Old Channel Reach	Bryo-2	2022-05-05	11	Palaemonetes sp.		1
2791	Old Channel Reach	Bryo-2	2022-05-05	11	No fish collected		
2791	Old Channel Reach	Bryo-2	2022-05-05	12	Procambarus sp.		4
2791	Old Channel Reach	Bryo-2	2022-05-05	12	No fish collected		
2791	Old Channel Reach	Bryo-2	2022-05-05	13	No fish collected		
2791	Old Channel Reach	Bryo-2	2022-05-05	14	Palaemonetes sp.		1
2791	Old Channel Reach	Bryo-2	2022-05-05	14	No fish collected		
2791	Old Channel Reach	Bryo-2	2022-05-05	15	Procambarus sp.		1
2791	Old Channel Reach	Bryo-2	2022-05-05	15	No fish collected		
2792	Old Channel Reach	Open-2	2022-05-05	1	No fish collected		
2792	Old Channel Reach	Open-2	2022-05-05	2	No fish collected		
2792	Old Channel Reach	Open-2	2022-05-05	3	No fish collected		
2792	Old Channel Reach	Open-2	2022-05-05	4	No fish collected		
2792	Old Channel Reach	Open-2	2022-05-05	5	No fish collected		
2792	Old Channel Reach	Open-2	2022-05-05	6	No fish collected		
2792	Old Channel Reach	Open-2	2022-05-05	7	No fish collected		
2792	Old Channel Reach	Open-2	2022-05-05	8	No fish collected		
2792	Old Channel Reach	Open-2	2022-05-05	9	No fish collected		
2792	Old Channel Reach	Open-2	2022-05-05	10	No fish collected		
2868	Old Channel Reach	Open-1	2022-06-23	1	No fish collected		
2868	Old Channel Reach	Open-1	2022-06-23	2	No fish collected		
2868	Old Channel Reach	Open-1	2022-06-23	3	No fish collected		
2868	Old Channel Reach	Open-1	2022-06-23	4	No fish collected		
2868	Old Channel Reach	Open-1	2022-06-23	5	No fish collected		
2868	Old Channel Reach	Open-1	2022-06-23	6	No fish collected		
2868	Old Channel Reach	Open-1	2022-06-23	7	No fish collected		
2868	Old Channel Reach	Open-1	2022-06-23	8	No fish collected		
2868	Old Channel Reach	Open-1	2022-06-23	9	No fish collected		
2868	Old Channel Reach	Open-1	2022-06-23	10	No fish collected		
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Etheostoma fonticola	19	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Etheostoma fonticola	20	1

2869	Old Channel Reach	Bryo-1	2022-06-23	1	Etheostoma fonticola	25	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Etheostoma fonticola	21	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Etheostoma fonticola	20	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Etheostoma fonticola	15	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Etheostoma fonticola	18	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Etheostoma fonticola	16	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Etheostoma fonticola	16	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Etheostoma fonticola	13	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Gambusia sp.	23	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Gambusia sp.	24	1
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Palaemonetes sp.		5
2869	Old Channel Reach	Bryo-1	2022-06-23	1	Procambarus sp.		3
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	18	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	24	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	17	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	20	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	26	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	20	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	23	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	18	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	21	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	24	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	16	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	27	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	20	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	15	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	17	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Etheostoma fonticola	18	1
2869	Old Channel Reach	Bryo-1	2022-06-23	2	Procambarus sp.		2
2869	Old Channel Reach	Bryo-1	2022-06-23	3	Etheostoma fonticola	24	1
2869	Old Channel Reach	Bryo-1	2022-06-23	3	Etheostoma fonticola	15	1
2869	Old Channel Reach	Bryo-1	2022-06-23	3	Notropis amabilis	23	1
2869	Old Channel Reach	Bryo-1	2022-06-23	3	Palaemonetes sp.		1
2869	Old Channel Reach	Bryo-1	2022-06-23	4	Procambarus sp.		1
2869	Old Channel Reach	Bryo-1	2022-06-23	4	Etheostoma fonticola	22	1
2869	Old Channel Reach	Bryo-1	2022-06-23	5	No fish collected		
2869	Old Channel Reach	Bryo-1	2022-06-23	6	Etheostoma fonticola	22	1
2869	Old Channel Reach	Bryo-1	2022-06-23	6	Etheostoma fonticola	21	1
2869	Old Channel Reach	Bryo-1	2022-06-23	7	Procambarus sp.		1
2869	Old Channel Reach	Bryo-1	2022-06-23	7	Etheostoma fonticola	10	1
2869	Old Channel Reach	Bryo-1	2022-06-23	8	Etheostoma fonticola	25	1

2869	Old Channel Reach	Bryo-1	2022-06-23	9	Procambarus sp.		1
2869	Old Channel Reach	Bryo-1	2022-06-23	9	Etheostoma fonticola	18	1
2869	Old Channel Reach	Bryo-1	2022-06-23	10	Etheostoma fonticola	28	1
2869	Old Channel Reach	Bryo-1	2022-06-23	10	Procambarus sp.		2
2869	Old Channel Reach	Bryo-1	2022-06-23	11	No fish collected		
2869	Old Channel Reach	Bryo-1	2022-06-23	12	No fish collected		
2869	Old Channel Reach	Bryo-1	2022-06-23	13	Etheostoma fonticola	28	1
2869	Old Channel Reach	Bryo-1	2022-06-23	13	Etheostoma fonticola	25	1
2869	Old Channel Reach	Bryo-1	2022-06-23	13	Etheostoma fonticola	18	1
2869	Old Channel Reach	Bryo-1	2022-06-23	13	Procambarus sp.		1
2869	Old Channel Reach	Bryo-1	2022-06-23	14	No fish collected		
2869	Old Channel Reach	Bryo-1	2022-06-23	15	Etheostoma fonticola	20	1
2869	Old Channel Reach	Bryo-1	2022-06-23	15	Etheostoma fonticola	16	1
2869	Old Channel Reach	Bryo-1	2022-06-23	16	No fish collected		
2870	Old Channel Reach	Cab-1	2022-06-23	1	Etheostoma fonticola	19	1
2870	Old Channel Reach	Cab-1	2022-06-23	1	Etheostoma fonticola	21	1
2870	Old Channel Reach	Cab-1	2022-06-23	1	Etheostoma fonticola	14	1
2870	Old Channel Reach	Cab-1	2022-06-23	1	Etheostoma fonticola	19	1
2870	Old Channel Reach	Cab-1	2022-06-23	1	Etheostoma fonticola	27	1
2870	Old Channel Reach	Cab-1	2022-06-23	1	Etheostoma fonticola	30	1
2870	Old Channel Reach	Cab-1	2022-06-23	1	Etheostoma fonticola	20	1
2870	Old Channel Reach	Cab-1	2022-06-23	1	Etheostoma fonticola	14	1
2870	Old Channel Reach	Cab-1	2022-06-23	1	Etheostoma fonticola	13	1
2870	Old Channel Reach	Cab-1	2022-06-23	1	Palaemonetes sp.		3
2870	Old Channel Reach	Cab-1	2022-06-23	1	Procambarus sp.		1
2870	Old Channel Reach	Cab-1	2022-06-23	2	Lepomis sp.	18	1
2870	Old Channel Reach	Cab-1	2022-06-23	2	Lepomis sp.	14	1
2870	Old Channel Reach	Cab-1	2022-06-23	3	Etheostoma fonticola	26	1
2870	Old Channel Reach	Cab-1	2022-06-23	3	Etheostoma fonticola	32	1
2870	Old Channel Reach	Cab-1	2022-06-23	3	Etheostoma fonticola	14	1
2870	Old Channel Reach	Cab-1	2022-06-23	3	Lepomis sp.	24	1
2870	Old Channel Reach	Cab-1	2022-06-23	4	Lepomis miniatus	32	1
2870	Old Channel Reach	Cab-1	2022-06-23	4	Lepomis miniatus	34	1
2870	Old Channel Reach	Cab-1	2022-06-23	4	Lepomis miniatus	42	1
2870	Old Channel Reach	Cab-1	2022-06-23	4	Lepomis sp.	13	1
2870	Old Channel Reach	Cab-1	2022-06-23	4	Etheostoma fonticola	21	1
2870	Old Channel Reach	Cab-1	2022-06-23	4	Procambarus sp.		1
2870	Old Channel Reach	Cab-1	2022-06-23	5	Etheostoma fonticola	28	1
2870	Old Channel Reach	Cab-1	2022-06-23	5	Etheostoma fonticola	20	1
2870	Old Channel Reach	Cab-1	2022-06-23	6	Lepomis miniatus	68	1
2870	Old Channel Reach	Cab-1	2022-06-23	6	Etheostoma fonticola	26	1

2870	Old Channel Reach	Cab-1	2022-06-23	7	Etheostoma fonticola	21	1
2870	Old Channel Reach	Cab-1	2022-06-23	7	Etheostoma fonticola	17	1
2870	Old Channel Reach	Cab-1	2022-06-23	7	Etheostoma fonticola	15	1
2870	Old Channel Reach	Cab-1	2022-06-23	7	Etheostoma fonticola	30	1
2870	Old Channel Reach	Cab-1	2022-06-23	7	Etheostoma fonticola	24	1
2870	Old Channel Reach	Cab-1	2022-06-23	7	Etheostoma fonticola	19	1
2870	Old Channel Reach	Cab-1	2022-06-23	8	Etheostoma fonticola	32	1
2870	Old Channel Reach	Cab-1	2022-06-23	8	Etheostoma fonticola	19	1
2870	Old Channel Reach	Cab-1	2022-06-23	8	Etheostoma fonticola	18	1
2870	Old Channel Reach	Cab-1	2022-06-23	8	Etheostoma fonticola	16	1
2870	Old Channel Reach	Cab-1	2022-06-23	8	Etheostoma fonticola	23	1
2870	Old Channel Reach	Cab-1	2022-06-23	8	Palaemonetes sp.		1
2870	Old Channel Reach	Cab-1	2022-06-23	9	Procambarus sp.		1
2870	Old Channel Reach	Cab-1	2022-06-23	9	Lepomis miniatus	35	1
2870	Old Channel Reach	Cab-1	2022-06-23	9	Etheostoma fonticola	25	1
2870	Old Channel Reach	Cab-1	2022-06-23	9	Etheostoma fonticola	11	1
2870	Old Channel Reach	Cab-1	2022-06-23	10	Procambarus sp.		2
2870	Old Channel Reach	Cab-1	2022-06-23	10	Etheostoma fonticola	23	1
2870	Old Channel Reach	Cab-1	2022-06-23	10	Etheostoma fonticola	18	1
2870	Old Channel Reach	Cab-1	2022-06-23	11	Etheostoma fonticola	22	1
2870	Old Channel Reach	Cab-1	2022-06-23	12	No fish collected		
2870	Old Channel Reach	Cab-1	2022-06-23	13	Procambarus sp.		1
2870	Old Channel Reach	Cab-1	2022-06-23	13	Etheostoma fonticola	21	1
2870	Old Channel Reach	Cab-1	2022-06-23	14	Procambarus sp.		1
2870	Old Channel Reach	Cab-1	2022-06-23	14	Etheostoma fonticola	22	1
2870	Old Channel Reach	Cab-1	2022-06-23	14	Palaemonetes sp.		1
2870	Old Channel Reach	Cab-1	2022-06-23	15	No fish collected		
2871	Old Channel Reach	Cab-2	2022-06-23	1	Etheostoma fonticola	18	1
2871	Old Channel Reach	Cab-2	2022-06-23	1	Etheostoma fonticola	22	1
2871	Old Channel Reach	Cab-2	2022-06-23	1	Etheostoma fonticola	20	1
2871	Old Channel Reach	Cab-2	2022-06-23	1	Etheostoma fonticola	21	1
2871	Old Channel Reach	Cab-2	2022-06-23	1	Etheostoma fonticola	20	1
2871	Old Channel Reach	Cab-2	2022-06-23	1	Etheostoma fonticola	19	1
2871	Old Channel Reach	Cab-2	2022-06-23	1	Etheostoma fonticola	18	1
2871	Old Channel Reach	Cab-2	2022-06-23	1	Lepomis sp.	18	1
2871	Old Channel Reach	Cab-2	2022-06-23	1	Astyanax mexicanus	30	1
2871	Old Channel Reach	Cab-2	2022-06-23	1	Palaemonetes sp.		9
2871	Old Channel Reach	Cab-2	2022-06-23	2	Astyanax mexicanus	28	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Lepomis miniatus	82	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Lepomis miniatus	32	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Lepomis miniatus	30	1

2871	Old Channel Reach	Cab-2	2022-06-23	2	Etheostoma fonticola	19	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Etheostoma fonticola	30	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Etheostoma fonticola	22	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Etheostoma fonticola	20	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Etheostoma fonticola	24	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Etheostoma fonticola	26	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Etheostoma fonticola	20	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Etheostoma fonticola	17	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Etheostoma fonticola	21	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Etheostoma fonticola	23	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Procambarus sp.		2
2871	Old Channel Reach	Cab-2	2022-06-23	2	Palaemonetes sp.		3
2871	Old Channel Reach	Cab-2	2022-06-23	3	Palaemonetes sp.		5
2871	Old Channel Reach	Cab-2	2022-06-23	3	Procambarus sp.		1
2871	Old Channel Reach	Cab-2	2022-06-23	3	Etheostoma fonticola	30	1
2871	Old Channel Reach	Cab-2	2022-06-23	3	Etheostoma fonticola	23	1
2871	Old Channel Reach	Cab-2	2022-06-23	3	Etheostoma fonticola	24	1
2871	Old Channel Reach	Cab-2	2022-06-23	3	Etheostoma fonticola	25	1
2871	Old Channel Reach	Cab-2	2022-06-23	3	Etheostoma fonticola	28	1
2871	Old Channel Reach	Cab-2	2022-06-23	3	Etheostoma fonticola	7	1
2871	Old Channel Reach	Cab-2	2022-06-23	3	Lepomis miniatus	30	1
2871	Old Channel Reach	Cab-2	2022-06-23	4	Procambarus sp.		2
2871	Old Channel Reach	Cab-2	2022-06-23	4	Palaemonetes sp.		2
2871	Old Channel Reach	Cab-2	2022-06-23	4	Lepomis sp.	15	1
2871	Old Channel Reach	Cab-2	2022-06-23	4	Lepomis sp.	8	1
2871	Old Channel Reach	Cab-2	2022-06-23	4	Lepomis sp.	34	1
2871	Old Channel Reach	Cab-2	2022-06-23	4	Etheostoma fonticola	24	1
2871	Old Channel Reach	Cab-2	2022-06-23	4	Etheostoma fonticola	18	1
2871	Old Channel Reach	Cab-2	2022-06-23	4	Etheostoma fonticola	19	1
2871	Old Channel Reach	Cab-2	2022-06-23	5	Etheostoma fonticola	24	1
2871	Old Channel Reach	Cab-2	2022-06-23	5	Etheostoma fonticola	19	1
2871	Old Channel Reach	Cab-2	2022-06-23	5	Procambarus sp.		1
2871	Old Channel Reach	Cab-2	2022-06-23	6	Procambarus sp.		2
2871	Old Channel Reach	Cab-2	2022-06-23	6	Lepomis miniatus	35	1
2871	Old Channel Reach	Cab-2	2022-06-23	6	Etheostoma fonticola	19	1
2871	Old Channel Reach	Cab-2	2022-06-23	7	Procambarus sp.		1
2871	Old Channel Reach	Cab-2	2022-06-23	7	Palaemonetes sp.		1
2871	Old Channel Reach	Cab-2	2022-06-23	7	Lepomis miniatus	35	1
2871	Old Channel Reach	Cab-2	2022-06-23	7	Lepomis miniatus	30	1
2871	Old Channel Reach	Cab-2	2022-06-23	7	Etheostoma fonticola	19	1
2871	Old Channel Reach	Cab-2	2022-06-23	7	Etheostoma fonticola	26	1

2871	Old Channel Reach	Cab-2	2022-06-23	7	Astyanax mexicanus	10	1
2871	Old Channel Reach	Cab-2	2022-06-23	8	Etheostoma fonticola	18	1
2871	Old Channel Reach	Cab-2	2022-06-23	8	Palaemonetes sp.		1
2871	Old Channel Reach	Cab-2	2022-06-23	9	Procambarus sp.		2
2871	Old Channel Reach	Cab-2	2022-06-23	9	Palaemonetes sp.		3
2871	Old Channel Reach	Cab-2	2022-06-23	9	Etheostoma fonticola	30	1
2871	Old Channel Reach	Cab-2	2022-06-23	9	Etheostoma fonticola	24	1
2871	Old Channel Reach	Cab-2	2022-06-23	10	Etheostoma fonticola	26	1
2871	Old Channel Reach	Cab-2	2022-06-23	10	Etheostoma fonticola	21	1
2871	Old Channel Reach	Cab-2	2022-06-23	10	Etheostoma fonticola	13	1
2871	Old Channel Reach	Cab-2	2022-06-23	10	Etheostoma fonticola	21	1
2871	Old Channel Reach	Cab-2	2022-06-23	10	Etheostoma fonticola	20	1
2871	Old Channel Reach	Cab-2	2022-06-23	10	Lepomis sp.	10	1
2871	Old Channel Reach	Cab-2	2022-06-23	10	Procambarus sp.		2
2871	Old Channel Reach	Cab-2	2022-06-23	10	Palaemonetes sp.		1
2871	Old Channel Reach	Cab-2	2022-06-23	11	Palaemonetes sp.		2
2871	Old Channel Reach	Cab-2	2022-06-23	11	Lepomis sp.	12	1
2871	Old Channel Reach	Cab-2	2022-06-23	12	Etheostoma fonticola	30	1
2871	Old Channel Reach	Cab-2	2022-06-23	12	Etheostoma fonticola	28	1
2871	Old Channel Reach	Cab-2	2022-06-23	12	Etheostoma fonticola	20	1
2871	Old Channel Reach	Cab-2	2022-06-23	12	Lepomis sp.	20	1
2871	Old Channel Reach	Cab-2	2022-06-23	12	Procambarus sp.		1
2871	Old Channel Reach	Cab-2	2022-06-23	12	Palaemonetes sp.		2
2871	Old Channel Reach	Cab-2	2022-06-23	13	Etheostoma fonticola	19	1
2871	Old Channel Reach	Cab-2	2022-06-23	14	Procambarus sp.		1
2871	Old Channel Reach	Cab-2	2022-06-23	14	Palaemonetes sp.		3
2871	Old Channel Reach	Cab-2	2022-06-23	14	Etheostoma fonticola	21	1
2871	Old Channel Reach	Cab-2	2022-06-23	14	Etheostoma fonticola	20	1
2871	Old Channel Reach	Cab-2	2022-06-23	14	Etheostoma fonticola	27	1
2871	Old Channel Reach	Cab-2	2022-06-23	15	Procambarus sp.		1
2871	Old Channel Reach	Cab-2	2022-06-23	15	Etheostoma fonticola	32	1
2871	Old Channel Reach	Cab-2	2022-06-23	15	Etheostoma fonticola	15	1
2871	Old Channel Reach	Cab-2	2022-06-23	16	Etheostoma fonticola	14	1
2871	Old Channel Reach	Cab-2	2022-06-23	2	Astyanax mexicanus	32	1
2871	Old Channel Reach	Cab-2	2022-06-23	4	Lepomis sp.	10	1
2871	Old Channel Reach	Cab-2	2022-06-23	16	Etheostoma fonticola	16	1
2871	Old Channel Reach	Cab-2	2022-06-23	16	Procambarus sp.		1
2871	Old Channel Reach	Cab-2	2022-06-23	17	Lepomis miniatus	35	1
2871	Old Channel Reach	Cab-2	2022-06-23	17	Etheostoma fonticola	31	1
2871	Old Channel Reach	Cab-2	2022-06-23	17	Etheostoma fonticola	20	1
2871	Old Channel Reach	Cab-2	2022-06-23	17	Etheostoma fonticola	20	1

2871	Old Channel Reach	Cab-2	2022-06-23	18	No fish collected		
2872	Old Channel Reach	Open-2	2022-06-23	1	No fish collected		
2872	Old Channel Reach	Open-2	2022-06-23	2	No fish collected		
2872	Old Channel Reach	Open-2	2022-06-23	3	No fish collected		
2872	Old Channel Reach	Open-2	2022-06-23	4	No fish collected		
2872	Old Channel Reach	Open-2	2022-06-23	5	No fish collected		
2872	Old Channel Reach	Open-2	2022-06-23	6	No fish collected		
2872	Old Channel Reach	Open-2	2022-06-23	7	No fish collected		
2872	Old Channel Reach	Open-2	2022-06-23	8	No fish collected		
2872	Old Channel Reach	Open-2	2022-06-23	9	No fish collected		
2872	Old Channel Reach	Open-2	2022-06-23	10	No fish collected		
2873	Old Channel Reach	Bryo-2	2022-06-23	1	Etheostoma fonticola	28	1
2873	Old Channel Reach	Bryo-2	2022-06-23	1	Etheostoma fonticola	25	1
2873	Old Channel Reach	Bryo-2	2022-06-23	1	Etheostoma fonticola	26	1
2873	Old Channel Reach	Bryo-2	2022-06-23	1	Etheostoma fonticola	32	1
2873	Old Channel Reach	Bryo-2	2022-06-23	1	Etheostoma fonticola	34	1
2873	Old Channel Reach	Bryo-2	2022-06-23	1	Etheostoma fonticola	32	1
2873	Old Channel Reach	Bryo-2	2022-06-23	1	Lepomis sp.	12	1
2873	Old Channel Reach	Bryo-2	2022-06-23	1	Palaemonetes sp.		23
2873	Old Channel Reach	Bryo-2	2022-06-23	1	Procambarus sp.		3
2873	Old Channel Reach	Bryo-2	2022-06-23	2	Etheostoma fonticola	31	1
2873	Old Channel Reach	Bryo-2	2022-06-23	2	Etheostoma fonticola	26	1
2873	Old Channel Reach	Bryo-2	2022-06-23	2	Etheostoma fonticola	26	1
2873	Old Channel Reach	Bryo-2	2022-06-23	2	Procambarus sp.		8
2873	Old Channel Reach	Bryo-2	2022-06-23	2	Palaemonetes sp.		4
2873	Old Channel Reach	Bryo-2	2022-06-23	3	Palaemonetes sp.		4
2873	Old Channel Reach	Bryo-2	2022-06-23	3	Procambarus sp.		5
2873	Old Channel Reach	Bryo-2	2022-06-23	3	Etheostoma fonticola	24	1
2873	Old Channel Reach	Bryo-2	2022-06-23	3	Etheostoma fonticola	26	1
2873	Old Channel Reach	Bryo-2	2022-06-23	4	Palaemonetes sp.		2
2873	Old Channel Reach	Bryo-2	2022-06-23	4	Procambarus sp.		3
2873	Old Channel Reach	Bryo-2	2022-06-23	4	Lepomis sp.	10	1
2873	Old Channel Reach	Bryo-2	2022-06-23	5	Palaemonetes sp.		6
2873	Old Channel Reach	Bryo-2	2022-06-23	5	Procambarus sp.		4
2873	Old Channel Reach	Bryo-2	2022-06-23	5	Etheostoma fonticola	25	1
2873	Old Channel Reach	Bryo-2	2022-06-23	6	Lepomis sp.	11	1
2873	Old Channel Reach	Bryo-2	2022-06-23	6	Lepomis sp.	12	1
2873	Old Channel Reach	Bryo-2	2022-06-23	6	Herichthys cyanoguttatus	18	1
2873	Old Channel Reach	Bryo-2	2022-06-23	6	Palaemonetes sp.		2
2873	Old Channel Reach	Bryo-2	2022-06-23	6	Procambarus sp.		3
2873	Old Channel Reach	Bryo-2	2022-06-23	7	Procambarus sp.		3

2873	Old Channel Reach	Bryo-2	2022-06-23	7	No fish collected		
2873	Old Channel Reach	Bryo-2	2022-06-23	8	Procambarus sp.		1
2873	Old Channel Reach	Bryo-2	2022-06-23	8	Etheostoma fonticola	27	1
2873	Old Channel Reach	Bryo-2	2022-06-23	9	Palaemonetes sp.		2
2873	Old Channel Reach	Bryo-2	2022-06-23	9	Procambarus sp.		5
2873	Old Channel Reach	Bryo-2	2022-06-23	9	No fish collected		
2873	Old Channel Reach	Bryo-2	2022-06-23	10	Procambarus sp.		2
2873	Old Channel Reach	Bryo-2	2022-06-23	10	No fish collected		
2873	Old Channel Reach	Bryo-2	2022-06-23	11	Palaemonetes sp.		1
2873	Old Channel Reach	Bryo-2	2022-06-23	11	No fish collected		
2873	Old Channel Reach	Bryo-2	2022-06-23	12	Palaemonetes sp.		2
2873	Old Channel Reach	Bryo-2	2022-06-23	12	No fish collected		
2873	Old Channel Reach	Bryo-2	2022-06-23	13	Palaemonetes sp.		2
2873	Old Channel Reach	Bryo-2	2022-06-23	13	Etheostoma fonticola	27	1
2873	Old Channel Reach	Bryo-2	2022-06-23	14	Palaemonetes sp.		3
2873	Old Channel Reach	Bryo-2	2022-06-23	14	Procambarus sp.		2
2873	Old Channel Reach	Bryo-2	2022-06-23	14	Etheostoma fonticola	28	1
2873	Old Channel Reach	Bryo-2	2022-06-23	15	Procambarus sp.		1
2873	Old Channel Reach	Bryo-2	2022-06-23	15	Palaemonetes sp.		1
2873	Old Channel Reach	Bryo-2	2022-06-23	15	No fish collected		
2874	Old Channel Reach	Lud-1	2022-06-23	1	Etheostoma fonticola	29	1
2874	Old Channel Reach	Lud-1	2022-06-23	1	Astyanax mexicanus	32	1
2874	Old Channel Reach	Lud-1	2022-06-23	1	Lepomis sp.	12	1
2874	Old Channel Reach	Lud-1	2022-06-23	1	Herichthys cyanoguttatus	40	1
2874	Old Channel Reach	Lud-1	2022-06-23	1	Herichthys cyanoguttatus	21	1
2874	Old Channel Reach	Lud-1	2022-06-23	1	Palaemonetes sp.		2
2874	Old Channel Reach	Lud-1	2022-06-23	2	Herichthys cyanoguttatus	19	1
2874	Old Channel Reach	Lud-1	2022-06-23	3	Etheostoma fonticola	28	1
2874	Old Channel Reach	Lud-1	2022-06-23	3	Astyanax mexicanus	38	1
2874	Old Channel Reach	Lud-1	2022-06-23	3	Astyanax mexicanus	35	1
2874	Old Channel Reach	Lud-1	2022-06-23	3	Herichthys cyanoguttatus	22	1
2874	Old Channel Reach	Lud-1	2022-06-23	3	Palaemonetes sp.		2
2874	Old Channel Reach	Lud-1	2022-06-23	4	No fish collected		
2874	Old Channel Reach	Lud-1	2022-06-23	5	Palaemonetes sp.		4
2874	Old Channel Reach	Lud-1	2022-06-23	5	No fish collected		
2874	Old Channel Reach	Lud-1	2022-06-23	6	Dionda nigrotaeniata	42	1
2874	Old Channel Reach	Lud-1	2022-06-23	6	Dionda nigrotaeniata	35	1
2874	Old Channel Reach	Lud-1	2022-06-23	6	Palaemonetes sp.		2
2874	Old Channel Reach	Lud-1	2022-06-23	7	No fish collected		
2874	Old Channel Reach	Lud-1	2022-06-23	8	Palaemonetes sp.		1
2874	Old Channel Reach	Lud-1	2022-06-23	8	No fish collected		

2874	Old Channel Reach	Lud-1	2022-06-23	9	Dionda nigrotaeniata	37	1
2874	Old Channel Reach	Lud-1	2022-06-23	9	Palaemonetes sp.		1
2874	Old Channel Reach	Lud-1	2022-06-23	10	No fish collected		
2874	Old Channel Reach	Lud-1	2022-06-23	11	No fish collected		
2874	Old Channel Reach	Lud-1	2022-06-23	12	No fish collected		
2874	Old Channel Reach	Lud-1	2022-06-23	13	Astyanax mexicanus	35	1
2874	Old Channel Reach	Lud-1	2022-06-23	14	No fish collected		
2874	Old Channel Reach	Lud-1	2022-06-23	15	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	5	Procambarus sp.		3
2875	Old Channel Reach	Lud-2	2022-06-23	6	Palaemonetes sp.		3
2875	Old Channel Reach	Lud-2	2022-06-23	6	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	7	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	8	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	9	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	10	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	11	Etheostoma fonticola	27	1
2875	Old Channel Reach	Lud-2	2022-06-23	12	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	13	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	14	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	15	Procambarus sp.		1
2875	Old Channel Reach	Lud-2	2022-06-23	15	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	1	Herichthys cyanoguttatus	23	1
2875	Old Channel Reach	Lud-2	2022-06-23	1	Herichthys cyanoguttatus	24	1
2875	Old Channel Reach	Lud-2	2022-06-23	1	Herichthys cyanoguttatus	20	1
2875	Old Channel Reach	Lud-2	2022-06-23	1	Herichthys cyanoguttatus	18	1
2875	Old Channel Reach	Lud-2	2022-06-23	1	Lepomis miniatus	65	1
2875	Old Channel Reach	Lud-2	2022-06-23	1	Palaemonetes sp.		11
2875	Old Channel Reach	Lud-2	2022-06-23	2	Palaemonetes sp.		15
2875	Old Channel Reach	Lud-2	2022-06-23	2	Lepomis miniatus	76	1
2875	Old Channel Reach	Lud-2	2022-06-23	2	Lepomis miniatus	30	1
2875	Old Channel Reach	Lud-2	2022-06-23	2	Lepomis miniatus	26	1
2875	Old Channel Reach	Lud-2	2022-06-23	3	Palaemonetes sp.		5
2875	Old Channel Reach	Lud-2	2022-06-23	3	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	4	Palaemonetes sp.		2
2875	Old Channel Reach	Lud-2	2022-06-23	4	No fish collected		
2875	Old Channel Reach	Lud-2	2022-06-23	5	Herichthys cyanoguttatus	23	1
2875	Old Channel Reach	Lud-2	2022-06-23	5	Herichthys cyanoguttatus	17	1
2875	Old Channel Reach	Lud-2	2022-06-23	5	Palaemonetes sp.		6
2901	Old Channel Reach	Bryo-1	2022-08-25	9	Etheostoma fonticola	25	1
2901	Old Channel Reach	Bryo-1	2022-08-25	10	Palaemonetes sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	10	Procambarus sp.		6

2901	Old Channel Reach	Bryo-1	2022-08-25	10	Etheostoma fonticola	26	1
2901	Old Channel Reach	Bryo-1	2022-08-25	11	Procambarus sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	11	No fish collected		
2901	Old Channel Reach	Bryo-1	2022-08-25	12	Procambarus sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	12	Etheostoma fonticola	32	1
2901	Old Channel Reach	Bryo-1	2022-08-25	13	Procambarus sp.		3
2901	Old Channel Reach	Bryo-1	2022-08-25	13	Palaemonetes sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	13	Etheostoma fonticola	29	1
2901	Old Channel Reach	Bryo-1	2022-08-25	13	Etheostoma fonticola	18	1
2901	Old Channel Reach	Bryo-1	2022-08-25	13	Etheostoma fonticola	28	1
2901	Old Channel Reach	Bryo-1	2022-08-25	14	Etheostoma fonticola	29	1
2901	Old Channel Reach	Bryo-1	2022-08-25	15	Procambarus sp.		5
2901	Old Channel Reach	Bryo-1	2022-08-25	15	Palaemonetes sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	15	No fish collected		
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	29	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	24	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	28	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	26	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	30	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	21	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	26	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	27	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	25	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	29	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	25	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	22	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	23	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	31	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	26	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	26	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	20	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	25	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	26	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	25	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	30	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	26	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	25	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	24	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	26	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Etheostoma fonticola	30	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Lepomis miniatus	39	1

2901	Old Channel Reach	Bryo-1	2022-08-25	1	Lepomis miniatus	51	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Lepomis sp.	11	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Lepomis sp.	15	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Lepomis sp.	14	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Herichthys cyanoguttatus	29	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Gambusia sp.	15	1
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Palaemonetes sp.		24
2901	Old Channel Reach	Bryo-1	2022-08-25	1	Procambarus sp.		7
2901	Old Channel Reach	Bryo-1	2022-08-25	2	Etheostoma fonticola	29	1
2901	Old Channel Reach	Bryo-1	2022-08-25	2	Etheostoma fonticola	33	1
2901	Old Channel Reach	Bryo-1	2022-08-25	2	Procambarus sp.		16
2901	Old Channel Reach	Bryo-1	2022-08-25	2	Palaemonetes sp.		2
2901	Old Channel Reach	Bryo-1	2022-08-25	2	Etheostoma fonticola	13	1
2901	Old Channel Reach	Bryo-1	2022-08-25	3	Etheostoma fonticola	32	1
2901	Old Channel Reach	Bryo-1	2022-08-25	3	Etheostoma fonticola	18	1
2901	Old Channel Reach	Bryo-1	2022-08-25	3	Procambarus sp.		13
2901	Old Channel Reach	Bryo-1	2022-08-25	3	Palaemonetes sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	4	Etheostoma fonticola	29	1
2901	Old Channel Reach	Bryo-1	2022-08-25	4	Etheostoma fonticola	30	1
2901	Old Channel Reach	Bryo-1	2022-08-25	4	Etheostoma fonticola	24	1
2901	Old Channel Reach	Bryo-1	2022-08-25	4	Procambarus sp.		7
2901	Old Channel Reach	Bryo-1	2022-08-25	4	Palaemonetes sp.		4
2901	Old Channel Reach	Bryo-1	2022-08-25	5	Palaemonetes sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	5	Procambarus sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	5	Lepomis miniatus	38	1
2901	Old Channel Reach	Bryo-1	2022-08-25	6	Procambarus sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	6	Palaemonetes sp.		4
2901	Old Channel Reach	Bryo-1	2022-08-25	6	Etheostoma fonticola	28	1
2901	Old Channel Reach	Bryo-1	2022-08-25	6	Etheostoma fonticola	30	1
2901	Old Channel Reach	Bryo-1	2022-08-25	7	Etheostoma fonticola	32	1
2901	Old Channel Reach	Bryo-1	2022-08-25	7	Etheostoma fonticola	31	1
2901	Old Channel Reach	Bryo-1	2022-08-25	7	Etheostoma fonticola	26	1
2901	Old Channel Reach	Bryo-1	2022-08-25	7	Etheostoma fonticola	26	1
2901	Old Channel Reach	Bryo-1	2022-08-25	7	Palaemonetes sp.		3
2901	Old Channel Reach	Bryo-1	2022-08-25	7	Procambarus sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	8	Etheostoma fonticola	24	1
2901	Old Channel Reach	Bryo-1	2022-08-25	8	Etheostoma fonticola	11	1
2901	Old Channel Reach	Bryo-1	2022-08-25	9	Procambarus sp.		1
2901	Old Channel Reach	Bryo-1	2022-08-25	9	Etheostoma fonticola	26	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	31	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	26	1

2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	28	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	22	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	31	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	32	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	28	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	31	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	27	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	26	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	25	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	27	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	28	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	31	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	27	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Etheostoma fonticola	30	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Lepomis miniatus	40	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Lepomis sp.	17	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Lepomis sp.	15	1
2902	Old Channel Reach	Cab-1	2022-08-25	1	Palaemonetes sp.		4
2902	Old Channel Reach	Cab-1	2022-08-25	1	Procambarus sp.		6
2902	Old Channel Reach	Cab-1	2022-08-25	2	Etheostoma fonticola	26	1
2902	Old Channel Reach	Cab-1	2022-08-25	2	Etheostoma fonticola	26	1
2902	Old Channel Reach	Cab-1	2022-08-25	2	Etheostoma fonticola	30	1
2902	Old Channel Reach	Cab-1	2022-08-25	2	Etheostoma fonticola	28	1
2902	Old Channel Reach	Cab-1	2022-08-25	2	Etheostoma fonticola	22	1
2902	Old Channel Reach	Cab-1	2022-08-25	2	Etheostoma fonticola	24	1
2902	Old Channel Reach	Cab-1	2022-08-25	2	Etheostoma fonticola	28	1
2902	Old Channel Reach	Cab-1	2022-08-25	2	Etheostoma fonticola	29	1
2902	Old Channel Reach	Cab-1	2022-08-25	2	Etheostoma fonticola	25	1
2902	Old Channel Reach	Cab-1	2022-08-25	2	Procambarus sp.		12
2902	Old Channel Reach	Cab-1	2022-08-25	2	Palaemonetes sp.		12
2902	Old Channel Reach	Cab-1	2022-08-25	3	Etheostoma fonticola	25	1
2902	Old Channel Reach	Cab-1	2022-08-25	3	Etheostoma fonticola	25	1
2902	Old Channel Reach	Cab-1	2022-08-25	3	Etheostoma fonticola	32	1
2902	Old Channel Reach	Cab-1	2022-08-25	3	Procambarus sp.		3
2902	Old Channel Reach	Cab-1	2022-08-25	3	Palaemonetes sp.		6
2902	Old Channel Reach	Cab-1	2022-08-25	4	Procambarus sp.		1
2902	Old Channel Reach	Cab-1	2022-08-25	4	Palaemonetes sp.		1
2902	Old Channel Reach	Cab-1	2022-08-25	4	No fish collected		
2902	Old Channel Reach	Cab-1	2022-08-25	5	Etheostoma fonticola	26	1
2902	Old Channel Reach	Cab-1	2022-08-25	5	Etheostoma fonticola	30	1
2902	Old Channel Reach	Cab-1	2022-08-25	5	Etheostoma fonticola	27	1

2902	Old Channel Reach	Cab-1	2022-08-25	5	Etheostoma fonticola	26	1
2902	Old Channel Reach	Cab-1	2022-08-25	5	Etheostoma fonticola	28	1
2902	Old Channel Reach	Cab-1	2022-08-25	5	Procambarus sp.		11
2902	Old Channel Reach	Cab-1	2022-08-25	5	Palaemonetes sp.		2
2902	Old Channel Reach	Cab-1	2022-08-25	6	Etheostoma fonticola	24	1
2902	Old Channel Reach	Cab-1	2022-08-25	6	Etheostoma fonticola	30	1
2902	Old Channel Reach	Cab-1	2022-08-25	6	Etheostoma fonticola	25	1
2902	Old Channel Reach	Cab-1	2022-08-25	6	Etheostoma fonticola	26	1
2902	Old Channel Reach	Cab-1	2022-08-25	6	Procambarus sp.		4
2902	Old Channel Reach	Cab-1	2022-08-25	6	Palaemonetes sp.		2
2902	Old Channel Reach	Cab-1	2022-08-25	7	Etheostoma fonticola	24	1
2902	Old Channel Reach	Cab-1	2022-08-25	7	Procambarus sp.		5
2902	Old Channel Reach	Cab-1	2022-08-25	7	Palaemonetes sp.		1
2902	Old Channel Reach	Cab-1	2022-08-25	8	Etheostoma fonticola	25	1
2902	Old Channel Reach	Cab-1	2022-08-25	8	Etheostoma fonticola	26	1
2902	Old Channel Reach	Cab-1	2022-08-25	8	Etheostoma fonticola	23	1
2902	Old Channel Reach	Cab-1	2022-08-25	8	Etheostoma fonticola	30	1
2902	Old Channel Reach	Cab-1	2022-08-25	8	Etheostoma fonticola	34	1
2902	Old Channel Reach	Cab-1	2022-08-25	8	Etheostoma fonticola	25	1
2902	Old Channel Reach	Cab-1	2022-08-25	8	Procambarus sp.		8
2902	Old Channel Reach	Cab-1	2022-08-25	8	Palaemonetes sp.		3
2902	Old Channel Reach	Cab-1	2022-08-25	9	Etheostoma fonticola	25	1
2902	Old Channel Reach	Cab-1	2022-08-25	9	Etheostoma fonticola	27	1
2902	Old Channel Reach	Cab-1	2022-08-25	9	Palaemonetes sp.		1
2902	Old Channel Reach	Cab-1	2022-08-25	9	Procambarus sp.		1
2902	Old Channel Reach	Cab-1	2022-08-25	10	Procambarus sp.		1
2902	Old Channel Reach	Cab-1	2022-08-25	10	Etheostoma fonticola	27	1
2902	Old Channel Reach	Cab-1	2022-08-25	11	Procambarus sp.		1
2902	Old Channel Reach	Cab-1	2022-08-25	11	Palaemonetes sp.		1
2902	Old Channel Reach	Cab-1	2022-08-25	11	Etheostoma fonticola	26	1
2902	Old Channel Reach	Cab-1	2022-08-25	12	Etheostoma fonticola	28	1
2902	Old Channel Reach	Cab-1	2022-08-25	13	Procambarus sp.		1
2902	Old Channel Reach	Cab-1	2022-08-25	13	Etheostoma fonticola	26	1
2902	Old Channel Reach	Cab-1	2022-08-25	13	Etheostoma fonticola	25	1
2902	Old Channel Reach	Cab-1	2022-08-25	13	Etheostoma fonticola	25	1
2902	Old Channel Reach	Cab-1	2022-08-25	14	Procambarus sp.		1
2902	Old Channel Reach	Cab-1	2022-08-25	14	No fish collected		
2902	Old Channel Reach	Cab-1	2022-08-25	15	Procambarus sp.		2
2902	Old Channel Reach	Cab-1	2022-08-25	15	No fish collected		
2903	Old Channel Reach	Cab-2	2022-08-25	1	Etheostoma fonticola	26	1
2903	Old Channel Reach	Cab-2	2022-08-25	1	Etheostoma fonticola	28	1

2903	Old Channel Reach	Cab-2	2022-08-25	1	Etheostoma fonticola	25	1
2903	Old Channel Reach	Cab-2	2022-08-25	1	Etheostoma fonticola	25	1
2903	Old Channel Reach	Cab-2	2022-08-25	1	Etheostoma fonticola	20	1
2903	Old Channel Reach	Cab-2	2022-08-25	1	Etheostoma fonticola	25	1
2903	Old Channel Reach	Cab-2	2022-08-25	1	Etheostoma fonticola	32	1
2903	Old Channel Reach	Cab-2	2022-08-25	1	Etheostoma fonticola	24	1
2903	Old Channel Reach	Cab-2	2022-08-25	1	Etheostoma fonticola	30	1
2903	Old Channel Reach	Cab-2	2022-08-25	1	Lepomis sp.	11	1
2903	Old Channel Reach	Cab-2	2022-08-25	1	Procambarus sp.		4
2903	Old Channel Reach	Cab-2	2022-08-25	1	Palaemonetes sp.		16
2903	Old Channel Reach	Cab-2	2022-08-25	2	Procambarus sp.		2
2903	Old Channel Reach	Cab-2	2022-08-25	2	Palaemonetes sp.		4
2903	Old Channel Reach	Cab-2	2022-08-25	2	Etheostoma fonticola	30	1
2903	Old Channel Reach	Cab-2	2022-08-25	2	Etheostoma fonticola	29	1
2903	Old Channel Reach	Cab-2	2022-08-25	2	Gambusia sp.	19	1
2903	Old Channel Reach	Cab-2	2022-08-25	3	Etheostoma fonticola	25	1
2903	Old Channel Reach	Cab-2	2022-08-25	3	Etheostoma fonticola	22	1
2903	Old Channel Reach	Cab-2	2022-08-25	3	Etheostoma fonticola	28	1
2903	Old Channel Reach	Cab-2	2022-08-25	3	Etheostoma fonticola	25	1
2903	Old Channel Reach	Cab-2	2022-08-25	3	Etheostoma fonticola	28	1
2903	Old Channel Reach	Cab-2	2022-08-25	3	Herichthys cyanoguttatus	22	1
2903	Old Channel Reach	Cab-2	2022-08-25	3	Procambarus sp.		4
2903	Old Channel Reach	Cab-2	2022-08-25	3	Palaemonetes sp.		4
2903	Old Channel Reach	Cab-2	2022-08-25	4	Procambarus sp.		1
2903	Old Channel Reach	Cab-2	2022-08-25	4	Palaemonetes sp.		2
2903	Old Channel Reach	Cab-2	2022-08-25	4	No fish collected		
2903	Old Channel Reach	Cab-2	2022-08-25	5	Palaemonetes sp.		5
2903	Old Channel Reach	Cab-2	2022-08-25	5	Procambarus sp.		3
2903	Old Channel Reach	Cab-2	2022-08-25	5	Herichthys cyanoguttatus	24	1
2903	Old Channel Reach	Cab-2	2022-08-25	5	Etheostoma fonticola	26	1
2903	Old Channel Reach	Cab-2	2022-08-25	6	Etheostoma fonticola	28	1
2903	Old Channel Reach	Cab-2	2022-08-25	6	Etheostoma fonticola	26	1
2903	Old Channel Reach	Cab-2	2022-08-25	6	Etheostoma fonticola	25	1
2903	Old Channel Reach	Cab-2	2022-08-25	6	Etheostoma fonticola	29	1
2903	Old Channel Reach	Cab-2	2022-08-25	6	Etheostoma fonticola	29	1
2903	Old Channel Reach	Cab-2	2022-08-25	6	Lepomis sp.	17	1
2903	Old Channel Reach	Cab-2	2022-08-25	6	Procambarus sp.		4
2903	Old Channel Reach	Cab-2	2022-08-25	6	Palaemonetes sp.		2
2903	Old Channel Reach	Cab-2	2022-08-25	7	Palaemonetes sp.		2
2903	Old Channel Reach	Cab-2	2022-08-25	7	Etheostoma fonticola	30	1
2903	Old Channel Reach	Cab-2	2022-08-25	7	Etheostoma fonticola	27	1

2903	Old Channel Reach	Cab-2	2022-08-25	8	Procambarus sp.		4
2903	Old Channel Reach	Cab-2	2022-08-25	8	Palaemonetes sp.		1
2903	Old Channel Reach	Cab-2	2022-08-25	8	No fish collected		
2903	Old Channel Reach	Cab-2	2022-08-25	9	Palaemonetes sp.		4
2903	Old Channel Reach	Cab-2	2022-08-25	9	Procambarus sp.		1
2903	Old Channel Reach	Cab-2	2022-08-25	9	No fish collected		
2903	Old Channel Reach	Cab-2	2022-08-25	10	Palaemonetes sp.		1
2903	Old Channel Reach	Cab-2	2022-08-25	10	No fish collected		
2903	Old Channel Reach	Cab-2	2022-08-25	11	Palaemonetes sp.		2
2903	Old Channel Reach	Cab-2	2022-08-25	11	Procambarus sp.		2
2903	Old Channel Reach	Cab-2	2022-08-25	11	No fish collected		
2903	Old Channel Reach	Cab-2	2022-08-25	12	Etheostoma fonticola	30	1
2903	Old Channel Reach	Cab-2	2022-08-25	12	Palaemonetes sp.		2
2903	Old Channel Reach	Cab-2	2022-08-25	13	Procambarus sp.		2
2903	Old Channel Reach	Cab-2	2022-08-25	13	No fish collected		
2903	Old Channel Reach	Cab-2	2022-08-25	14	Etheostoma fonticola	29	1
2903	Old Channel Reach	Cab-2	2022-08-25	14	Etheostoma fonticola	20	1
2903	Old Channel Reach	Cab-2	2022-08-25	14	Procambarus sp.		1
2903	Old Channel Reach	Cab-2	2022-08-25	15	Etheostoma fonticola	26	1
2903	Old Channel Reach	Cab-2	2022-08-25	16	Procambarus sp.		2
2903	Old Channel Reach	Cab-2	2022-08-25	16	Palaemonetes sp.		1
2903	Old Channel Reach	Cab-2	2022-08-25	16	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	1	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	2	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	3	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	4	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	5	Etheostoma fonticola	27	1
2904	Old Channel Reach	Open-1	2022-08-25	6	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	7	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	8	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	9	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	10	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	11	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	12	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	13	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	14	No fish collected		
2904	Old Channel Reach	Open-1	2022-08-25	15	No fish collected		
2905	Old Channel Reach	Bryo-2	2022-08-25	11	Procambarus sp.		3
2905	Old Channel Reach	Bryo-2	2022-08-25	11	Palaemonetes sp.		1
2905	Old Channel Reach	Bryo-2	2022-08-25	11	Etheostoma fonticola	24	1
2905	Old Channel Reach	Bryo-2	2022-08-25	11	Etheostoma fonticola	32	1

2905	Old Channel Reach	Bryo-2	2022-08-25	12	Procambarus sp.		2
2905	Old Channel Reach	Bryo-2	2022-08-25	12	No fish collected		
2905	Old Channel Reach	Bryo-2	2022-08-25	13	Procambarus sp.		4
2905	Old Channel Reach	Bryo-2	2022-08-25	13	No fish collected		
2905	Old Channel Reach	Bryo-2	2022-08-25	14	Procambarus sp.		3
2905	Old Channel Reach	Bryo-2	2022-08-25	14	Palaemonetes sp.		1
2905	Old Channel Reach	Bryo-2	2022-08-25	14	Etheostoma fonticola	29	1
2905	Old Channel Reach	Bryo-2	2022-08-25	14	Etheostoma fonticola	28	1
2905	Old Channel Reach	Bryo-2	2022-08-25	15	Procambarus sp.		3
2905	Old Channel Reach	Bryo-2	2022-08-25	15	No fish collected		
2905	Old Channel Reach	Bryo-2	2022-08-25	1	Etheostoma fonticola	36	1
2905	Old Channel Reach	Bryo-2	2022-08-25	1	Etheostoma fonticola	26	1
2905	Old Channel Reach	Bryo-2	2022-08-25	1	Etheostoma fonticola	30	1
2905	Old Channel Reach	Bryo-2	2022-08-25	1	Palaemonetes sp.		5
2905	Old Channel Reach	Bryo-2	2022-08-25	1	Procambarus sp.		30
2905	Old Channel Reach	Bryo-2	2022-08-25	2	Etheostoma fonticola	27	1
2905	Old Channel Reach	Bryo-2	2022-08-25	2	Etheostoma fonticola	30	1
2905	Old Channel Reach	Bryo-2	2022-08-25	2	Etheostoma fonticola	30	1
2905	Old Channel Reach	Bryo-2	2022-08-25	2	Etheostoma fonticola	32	1
2905	Old Channel Reach	Bryo-2	2022-08-25	2	Etheostoma fonticola	30	1
2905	Old Channel Reach	Bryo-2	2022-08-25	2	Etheostoma fonticola	25	1
2905	Old Channel Reach	Bryo-2	2022-08-25	2	Procambarus sp.		23
2905	Old Channel Reach	Bryo-2	2022-08-25	2	Palaemonetes sp.		3
2905	Old Channel Reach	Bryo-2	2022-08-25	3	Procambarus sp.		5
2905	Old Channel Reach	Bryo-2	2022-08-25	3	Palaemonetes sp.		3
2905	Old Channel Reach	Bryo-2	2022-08-25	3	Etheostoma fonticola	29	1
2905	Old Channel Reach	Bryo-2	2022-08-25	4	Procambarus sp.		13
2905	Old Channel Reach	Bryo-2	2022-08-25	4	Palaemonetes sp.		1
2905	Old Channel Reach	Bryo-2	2022-08-25	4	Etheostoma fonticola	30	1
2905	Old Channel Reach	Bryo-2	2022-08-25	4	Etheostoma fonticola	35	1
2905	Old Channel Reach	Bryo-2	2022-08-25	5	Procambarus sp.		3
2905	Old Channel Reach	Bryo-2	2022-08-25	5	Palaemonetes sp.		1
2905	Old Channel Reach	Bryo-2	2022-08-25	5	No fish collected		
2905	Old Channel Reach	Bryo-2	2022-08-25	6	Palaemonetes sp.		1
2905	Old Channel Reach	Bryo-2	2022-08-25	6	Etheostoma fonticola	31	1
2905	Old Channel Reach	Bryo-2	2022-08-25	7	Procambarus sp.		1
2905	Old Channel Reach	Bryo-2	2022-08-25	7	Etheostoma fonticola	30	1
2905	Old Channel Reach	Bryo-2	2022-08-25	7	Etheostoma fonticola	30	1
2905	Old Channel Reach	Bryo-2	2022-08-25	8	Etheostoma fonticola	32	1
2905	Old Channel Reach	Bryo-2	2022-08-25	8	Procambarus sp.		2
2905	Old Channel Reach	Bryo-2	2022-08-25	9	Procambarus sp.		4

2905	Old Channel Reach	Bryo-2	2022-08-25	9	Etheostoma fonticola	34	1
2905	Old Channel Reach	Bryo-2	2022-08-25	10	Palaemonetes sp.		2
2905	Old Channel Reach	Bryo-2	2022-08-25	10	Procambarus sp.		8
2905	Old Channel Reach	Bryo-2	2022-08-25	10	Etheostoma fonticola	33	1
2906	Old Channel Reach	Open-2	2022-08-25	1	No fish collected		
2906	Old Channel Reach	Open-2	2022-08-25	2	No fish collected		
2906	Old Channel Reach	Open-2	2022-08-25	3	No fish collected		
2906	Old Channel Reach	Open-2	2022-08-25	4	No fish collected		
2906	Old Channel Reach	Open-2	2022-08-25	5	Procambarus sp.		1
2906	Old Channel Reach	Open-2	2022-08-25	5	No fish collected		
2906	Old Channel Reach	Open-2	2022-08-25	6	No fish collected		
2906	Old Channel Reach	Open-2	2022-08-25	7	No fish collected		
2906	Old Channel Reach	Open-2	2022-08-25	8	No fish collected		
2906	Old Channel Reach	Open-2	2022-08-25	9	No fish collected		
2906	Old Channel Reach	Open-2	2022-08-25	10	No fish collected		
2907	Old Channel Reach	Lud-1	2022-08-25	1	Procambarus sp.		6
2907	Old Channel Reach	Lud-1	2022-08-25	1	Palaemonetes sp.		6
2907	Old Channel Reach	Lud-1	2022-08-25	1	No fish collected		
2907	Old Channel Reach	Lud-1	2022-08-25	2	Palaemonetes sp.		2
2907	Old Channel Reach	Lud-1	2022-08-25	2	Procambarus sp.		6
2907	Old Channel Reach	Lud-1	2022-08-25	2	Lepomis miniatus	50	1
2907	Old Channel Reach	Lud-1	2022-08-25	2	Etheostoma fonticola	29	1
2907	Old Channel Reach	Lud-1	2022-08-25	2	Etheostoma fonticola	30	1
2907	Old Channel Reach	Lud-1	2022-08-25	2	Etheostoma fonticola	30	1
2907	Old Channel Reach	Lud-1	2022-08-25	3	Procambarus sp.		4
2907	Old Channel Reach	Lud-1	2022-08-25	3	Etheostoma fonticola	30	1
2907	Old Channel Reach	Lud-1	2022-08-25	4	Procambarus sp.		5
2907	Old Channel Reach	Lud-1	2022-08-25	4	Palaemonetes sp.		2
2907	Old Channel Reach	Lud-1	2022-08-25	4	Etheostoma fonticola	26	1
2907	Old Channel Reach	Lud-1	2022-08-25	4	Etheostoma fonticola	24	1
2907	Old Channel Reach	Lud-1	2022-08-25	5	Palaemonetes sp.		2
2907	Old Channel Reach	Lud-1	2022-08-25	5	No fish collected		
2907	Old Channel Reach	Lud-1	2022-08-25	6	Etheostoma fonticola	19	1
2907	Old Channel Reach	Lud-1	2022-08-25	6	Etheostoma fonticola	30	1
2907	Old Channel Reach	Lud-1	2022-08-25	7	Procambarus sp.		2
2907	Old Channel Reach	Lud-1	2022-08-25	7	No fish collected		
2907	Old Channel Reach	Lud-1	2022-08-25	8	Procambarus sp.		1
2907	Old Channel Reach	Lud-1	2022-08-25	8	Herichthys cyanoguttatus	35	1
2907	Old Channel Reach	Lud-1	2022-08-25	8	Etheostoma fonticola	29	1
2907	Old Channel Reach	Lud-1	2022-08-25	9	Procambarus sp.		1
2907	Old Channel Reach	Lud-1	2022-08-25	9	No fish collected		

2907	Old Channel Reach	Lud-1	2022-08-25	10	Procambarus sp.		1
2907	Old Channel Reach	Lud-1	2022-08-25	10	Palaemonetes sp.		1
2907	Old Channel Reach	Lud-1	2022-08-25	10	No fish collected		
2907	Old Channel Reach	Lud-1	2022-08-25	11	Etheostoma fonticola	30	1
2907	Old Channel Reach	Lud-1	2022-08-25	11	Etheostoma fonticola	28	1
2907	Old Channel Reach	Lud-1	2022-08-25	11	Palaemonetes sp.		1
2907	Old Channel Reach	Lud-1	2022-08-25	12	No fish collected		
2907	Old Channel Reach	Lud-1	2022-08-25	13	Procambarus sp.		3
2907	Old Channel Reach	Lud-1	2022-08-25	13	No fish collected		
2907	Old Channel Reach	Lud-1	2022-08-25	14	No fish collected		
2907	Old Channel Reach	Lud-1	2022-08-25	15	No fish collected		
2908	Old Channel Reach	Lud-2	2022-08-25	1	Procambarus sp.		7
2908	Old Channel Reach	Lud-2	2022-08-25	1	Palaemonetes sp.		10
2908	Old Channel Reach	Lud-2	2022-08-25	1	Dionda nigrotaeniata	59	1
2908	Old Channel Reach	Lud-2	2022-08-25	2	Palaemonetes sp.		3
2908	Old Channel Reach	Lud-2	2022-08-25	2	No fish collected		
2908	Old Channel Reach	Lud-2	2022-08-25	3	Palaemonetes sp.		5
2908	Old Channel Reach	Lud-2	2022-08-25	3	Etheostoma fonticola	25	1
2908	Old Channel Reach	Lud-2	2022-08-25	3	Herichthys cyanoguttatus	22	1
2908	Old Channel Reach	Lud-2	2022-08-25	4	Lepomis miniatus	83	1
2908	Old Channel Reach	Lud-2	2022-08-25	5	Palaemonetes sp.		1
2908	Old Channel Reach	Lud-2	2022-08-25	5	Etheostoma fonticola	28	1
2908	Old Channel Reach	Lud-2	2022-08-25	6	Lepomis miniatus	75	1
2908	Old Channel Reach	Lud-2	2022-08-25	6	Etheostoma fonticola	30	1
2908	Old Channel Reach	Lud-2	2022-08-25	6	Palaemonetes sp.		1
2908	Old Channel Reach	Lud-2	2022-08-25	7	Palaemonetes sp.		5
2908	Old Channel Reach	Lud-2	2022-08-25	7	Procambarus sp.		1
2908	Old Channel Reach	Lud-2	2022-08-25	8	Herichthys cyanoguttatus	40	1
2908	Old Channel Reach	Lud-2	2022-08-25	8	Lepomis miniatus	45	1
2908	Old Channel Reach	Lud-2	2022-08-25	9	Palaemonetes sp.		2
2908	Old Channel Reach	Lud-2	2022-08-25	9	No fish collected		
2908	Old Channel Reach	Lud-2	2022-08-25	10	Palaemonetes sp.		1
2908	Old Channel Reach	Lud-2	2022-08-25	10	Procambarus sp.		1
2908	Old Channel Reach	Lud-2	2022-08-25	10	No fish collected		
2908	Old Channel Reach	Lud-2	2022-08-25	11	Astyanax mexicanus	65	1
2908	Old Channel Reach	Lud-2	2022-08-25	11	Herichthys cyanoguttatus	46	1
2908	Old Channel Reach	Lud-2	2022-08-25	11	Palaemonetes sp.		2
2908	Old Channel Reach	Lud-2	2022-08-25	12	Procambarus sp.		2
2908	Old Channel Reach	Lud-2	2022-08-25	12	Palaemonetes sp.		2
2908	Old Channel Reach	Lud-2	2022-08-25	12	Etheostoma fonticola	30	1
2908	Old Channel Reach	Lud-2	2022-08-25	13	Palaemonetes sp.		1

2908	Old Channel Reach	Lud-2	2022-08-25	13	Procambarus sp.		1
2908	Old Channel Reach	Lud-2	2022-08-25	13	No fish collected		
2908	Old Channel Reach	Lud-2	2022-08-25	14	No fish collected		
2908	Old Channel Reach	Lud-2	2022-08-25	15	No fish collected		
2908	Old Channel Reach	Lud-2	2022-08-25	7	Dionda nigrotaeniata	52	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Lepomis miniatus	30	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Lepomis miniatus	36	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Lepomis miniatus	30	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Lepomis miniatus	48	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Lepomis sp.	19	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Herichthys cyanoguttatus	21	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	32	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	31	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	34	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	15	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	27	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	16	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	26	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	16	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	23	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	26	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	30	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	21	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Etheostoma fonticola	15	1
2935	Old Channel Reach	Cab-1	2022-10-25	1	Palaemonetes sp.		49
2935	Old Channel Reach	Cab-1	2022-10-25	1	Procambarus sp.		4
2935	Old Channel Reach	Cab-1	2022-10-25	2	Palaemonetes sp.		8
2935	Old Channel Reach	Cab-1	2022-10-25	2	Procambarus sp.		4
2935	Old Channel Reach	Cab-1	2022-10-25	2	Herichthys cyanoguttatus	21	1
2935	Old Channel Reach	Cab-1	2022-10-25	2	Etheostoma fonticola	32	1
2935	Old Channel Reach	Cab-1	2022-10-25	2	Etheostoma fonticola	16	1
2935	Old Channel Reach	Cab-1	2022-10-25	2	Etheostoma fonticola	32	1
2935	Old Channel Reach	Cab-1	2022-10-25	2	Etheostoma fonticola	30	1
2935	Old Channel Reach	Cab-1	2022-10-25	3	Procambarus sp.		2
2935	Old Channel Reach	Cab-1	2022-10-25	3	Palaemonetes sp.		5
2935	Old Channel Reach	Cab-1	2022-10-25	3	Etheostoma fonticola	25	1
2935	Old Channel Reach	Cab-1	2022-10-25	3	Herichthys cyanoguttatus	29	1
2935	Old Channel Reach	Cab-1	2022-10-25	4	Palaemonetes sp.		3
2935	Old Channel Reach	Cab-1	2022-10-25	4	Etheostoma fonticola	25	1
2935	Old Channel Reach	Cab-1	2022-10-25	4	Etheostoma fonticola	32	1
2935	Old Channel Reach	Cab-1	2022-10-25	4	Etheostoma fonticola	31	1

2935	Old Channel Reach	Cab-1	2022-10-25	5	Palaemonetes sp.		2
2935	Old Channel Reach	Cab-1	2022-10-25	5	Procambarus sp.		2
2935	Old Channel Reach	Cab-1	2022-10-25	5	No fish collected		
2935	Old Channel Reach	Cab-1	2022-10-25	6	Palaemonetes sp.		2
2935	Old Channel Reach	Cab-1	2022-10-25	6	Procambarus sp.		1
2935	Old Channel Reach	Cab-1	2022-10-25	6	Herichthys cyanoguttatus	30	1
2935	Old Channel Reach	Cab-1	2022-10-25	6	Etheostoma fonticola	22	1
2935	Old Channel Reach	Cab-1	2022-10-25	6	Etheostoma fonticola	33	1
2935	Old Channel Reach	Cab-1	2022-10-25	6	Etheostoma fonticola	18	1
2935	Old Channel Reach	Cab-1	2022-10-25	6	Etheostoma fonticola	29	1
2935	Old Channel Reach	Cab-1	2022-10-25	6	Etheostoma fonticola	15	1
2935	Old Channel Reach	Cab-1	2022-10-25	7	Procambarus sp.		1
2935	Old Channel Reach	Cab-1	2022-10-25	7	Palaemonetes sp.		2
2935	Old Channel Reach	Cab-1	2022-10-25	7	No fish collected		
2935	Old Channel Reach	Cab-1	2022-10-25	8	Palaemonetes sp.		2
2935	Old Channel Reach	Cab-1	2022-10-25	8	Etheostoma fonticola	24	1
2935	Old Channel Reach	Cab-1	2022-10-25	8	Etheostoma fonticola	18	1
2935	Old Channel Reach	Cab-1	2022-10-25	9	Palaemonetes sp.		1
2935	Old Channel Reach	Cab-1	2022-10-25	9	Etheostoma fonticola	13	1
2935	Old Channel Reach	Cab-1	2022-10-25	10	Procambarus sp.		1
2935	Old Channel Reach	Cab-1	2022-10-25	10	No fish collected		
2935	Old Channel Reach	Cab-1	2022-10-25	11	No fish collected		
2935	Old Channel Reach	Cab-1	2022-10-25	12	Etheostoma fonticola	20	1
2935	Old Channel Reach	Cab-1	2022-10-25	12	Palaemonetes sp.		4
2935	Old Channel Reach	Cab-1	2022-10-25	12	Procambarus sp.		2
2935	Old Channel Reach	Cab-1	2022-10-25	13	Procambarus sp.		1
2935	Old Channel Reach	Cab-1	2022-10-25	13	No fish collected		
2935	Old Channel Reach	Cab-1	2022-10-25	14	Procambarus sp.		3
2935	Old Channel Reach	Cab-1	2022-10-25	14	Etheostoma fonticola	30	1
2935	Old Channel Reach	Cab-1	2022-10-25	14	Etheostoma fonticola	22	1
2935	Old Channel Reach	Cab-1	2022-10-25	14	Etheostoma fonticola	34	1
2935	Old Channel Reach	Cab-1	2022-10-25	15	Palaemonetes sp.		1
2935	Old Channel Reach	Cab-1	2022-10-25	15	No fish collected		
2936	Old Channel Reach	Cab-2	2022-10-25	11	Palaemonetes sp.		1
2936	Old Channel Reach	Cab-2	2022-10-25	11	No fish collected		
2936	Old Channel Reach	Cab-2	2022-10-25	12	Etheostoma fonticola	14	1
2936	Old Channel Reach	Cab-2	2022-10-25	12	Procambarus sp.		3
2936	Old Channel Reach	Cab-2	2022-10-25	12	Palaemonetes sp.		3
2936	Old Channel Reach	Cab-2	2022-10-25	13	Palaemonetes sp.		5
2936	Old Channel Reach	Cab-2	2022-10-25	13	Lepomis sp.	23	1
2936	Old Channel Reach	Cab-2	2022-10-25	14	Palaemonetes sp.		6

2936	Old Channel Reach	Cab-2	2022-10-25	14	Etheostoma fonticola	29	1
2936	Old Channel Reach	Cab-2	2022-10-25	15	Palaemonetes sp.		2
2936	Old Channel Reach	Cab-2	2022-10-25	15	Etheostoma fonticola	29	1
2936	Old Channel Reach	Cab-2	2022-10-25	15	Etheostoma fonticola	12	1
2936	Old Channel Reach	Cab-2	2022-10-25	15	Etheostoma fonticola	30	1
2936	Old Channel Reach	Cab-2	2022-10-25	16	No fish collected		
2936	Old Channel Reach	Cab-2	2022-10-25	1	Palaemonetes sp.		21
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	29	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	28	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	32	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	16	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	28	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	29	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	32	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	21	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	33	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	28	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Etheostoma fonticola	10	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Lepomis miniatus	41	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Lepomis miniatus	47	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Gambusia sp.	25	1
2936	Old Channel Reach	Cab-2	2022-10-25	1	Gambusia sp.	10	1
2936	Old Channel Reach	Cab-2	2022-10-25	2	Palaemonetes sp.		17
2936	Old Channel Reach	Cab-2	2022-10-25	2	Herichthys cyanoguttatus	24	1
2936	Old Channel Reach	Cab-2	2022-10-25	2	Etheostoma fonticola	31	1
2936	Old Channel Reach	Cab-2	2022-10-25	2	Etheostoma fonticola	35	1
2936	Old Channel Reach	Cab-2	2022-10-25	2	Etheostoma fonticola	33	1
2936	Old Channel Reach	Cab-2	2022-10-25	2	Etheostoma fonticola	19	1
2936	Old Channel Reach	Cab-2	2022-10-25	3	Procambarus sp.		9
2936	Old Channel Reach	Cab-2	2022-10-25	3	Palaemonetes sp.		8
2936	Old Channel Reach	Cab-2	2022-10-25	3	Gambusia sp.	28	1
2936	Old Channel Reach	Cab-2	2022-10-25	3	Etheostoma fonticola	17	1
2936	Old Channel Reach	Cab-2	2022-10-25	3	Etheostoma fonticola	16	1
2936	Old Channel Reach	Cab-2	2022-10-25	3	Etheostoma fonticola	10	1
2936	Old Channel Reach	Cab-2	2022-10-25	4	Palaemonetes sp.		12
2936	Old Channel Reach	Cab-2	2022-10-25	4	Procambarus sp.		1
2936	Old Channel Reach	Cab-2	2022-10-25	4	Herichthys cyanoguttatus	21	1
2936	Old Channel Reach	Cab-2	2022-10-25	4	Etheostoma fonticola	24	1
2936	Old Channel Reach	Cab-2	2022-10-25	4	Etheostoma fonticola	25	1
2936	Old Channel Reach	Cab-2	2022-10-25	4	Etheostoma fonticola	19	1
2936	Old Channel Reach	Cab-2	2022-10-25	5	Palaemonetes sp.		5

2936	Old Channel Reach	Cab-2	2022-10-25	5	Procambarus sp.		2
2936	Old Channel Reach	Cab-2	2022-10-25	5	Herichthys cyanoguttatus	22	1
2936	Old Channel Reach	Cab-2	2022-10-25	5	Etheostoma fonticola	30	1
2936	Old Channel Reach	Cab-2	2022-10-25	5	Etheostoma fonticola	25	1
2936	Old Channel Reach	Cab-2	2022-10-25	5	Etheostoma fonticola	12	1
2936	Old Channel Reach	Cab-2	2022-10-25	5	Etheostoma fonticola	13	1
2936	Old Channel Reach	Cab-2	2022-10-25	6	Palaemonetes sp.		4
2936	Old Channel Reach	Cab-2	2022-10-25	6	Gambusia sp.	17	1
2936	Old Channel Reach	Cab-2	2022-10-25	7	Palaemonetes sp.		6
2936	Old Channel Reach	Cab-2	2022-10-25	7	Etheostoma fonticola	35	1
2936	Old Channel Reach	Cab-2	2022-10-25	7	Etheostoma fonticola	17	1
2936	Old Channel Reach	Cab-2	2022-10-25	8	Palaemonetes sp.		2
2936	Old Channel Reach	Cab-2	2022-10-25	8	Lepomis miniatus	25	1
2936	Old Channel Reach	Cab-2	2022-10-25	8	Etheostoma fonticola	28	1
2936	Old Channel Reach	Cab-2	2022-10-25	8	Etheostoma fonticola	12	1
2936	Old Channel Reach	Cab-2	2022-10-25	9	Etheostoma fonticola	13	1
2936	Old Channel Reach	Cab-2	2022-10-25	9	Palaemonetes sp.		2
2936	Old Channel Reach	Cab-2	2022-10-25	10	Etheostoma fonticola	30	1
2937	Old Channel Reach	Bryo-1	2022-10-25	1	Etheostoma fonticola	20	1
2937	Old Channel Reach	Bryo-1	2022-10-25	1	Etheostoma fonticola	20	1
2937	Old Channel Reach	Bryo-1	2022-10-25	1	Etheostoma fonticola	20	1
2937	Old Channel Reach	Bryo-1	2022-10-25	1	Etheostoma fonticola	18	1
2937	Old Channel Reach	Bryo-1	2022-10-25	1	Etheostoma fonticola	18	1
2937	Old Channel Reach	Bryo-1	2022-10-25	1	Etheostoma fonticola	19	1
2937	Old Channel Reach	Bryo-1	2022-10-25	1	Etheostoma fonticola	33	1
2937	Old Channel Reach	Bryo-1	2022-10-25	1	Etheostoma fonticola	12	1
2937	Old Channel Reach	Bryo-1	2022-10-25	1	Etheostoma fonticola	17	1
2937	Old Channel Reach	Bryo-1	2022-10-25	1	Palaemonetes sp.		4
2937	Old Channel Reach	Bryo-1	2022-10-25	2	Palaemonetes sp.		5
2937	Old Channel Reach	Bryo-1	2022-10-25	2	Lepomis miniatus	26	1
2937	Old Channel Reach	Bryo-1	2022-10-25	2	Etheostoma fonticola	16	1
2937	Old Channel Reach	Bryo-1	2022-10-25	2	Etheostoma fonticola	17	1
2937	Old Channel Reach	Bryo-1	2022-10-25	2	Etheostoma fonticola	14	1
2937	Old Channel Reach	Bryo-1	2022-10-25	3	Palaemonetes sp.		7
2937	Old Channel Reach	Bryo-1	2022-10-25	3	Etheostoma fonticola	31	1
2937	Old Channel Reach	Bryo-1	2022-10-25	3	Etheostoma fonticola	13	1
2937	Old Channel Reach	Bryo-1	2022-10-25	3	Etheostoma fonticola	13	1
2937	Old Channel Reach	Bryo-1	2022-10-25	3	Etheostoma fonticola	10	1
2937	Old Channel Reach	Bryo-1	2022-10-25	4	Etheostoma fonticola	30	1
2937	Old Channel Reach	Bryo-1	2022-10-25	4	Etheostoma fonticola	15	1
2937	Old Channel Reach	Bryo-1	2022-10-25	4	Etheostoma fonticola	27	1

2937	Old Channel Reach	Bryo-1	2022-10-25	4	Etheostoma fonticola	10	1
2937	Old Channel Reach	Bryo-1	2022-10-25	5	Palaemonetes sp.		1
2937	Old Channel Reach	Bryo-1	2022-10-25	5	Procambarus sp.		1
2937	Old Channel Reach	Bryo-1	2022-10-25	5	Etheostoma fonticola	19	1
2937	Old Channel Reach	Bryo-1	2022-10-25	5	Etheostoma fonticola	21	1
2937	Old Channel Reach	Bryo-1	2022-10-25	5	Etheostoma fonticola	12	1
2937	Old Channel Reach	Bryo-1	2022-10-25	6	Palaemonetes sp.		2
2937	Old Channel Reach	Bryo-1	2022-10-25	6	Procambarus sp.		1
2937	Old Channel Reach	Bryo-1	2022-10-25	6	Lepomis sp.	14	1
2937	Old Channel Reach	Bryo-1	2022-10-25	6	Etheostoma fonticola	28	1
2937	Old Channel Reach	Bryo-1	2022-10-25	6	Etheostoma fonticola	13	1
2937	Old Channel Reach	Bryo-1	2022-10-25	6	Etheostoma fonticola	10	1
2937	Old Channel Reach	Bryo-1	2022-10-25	6	Etheostoma fonticola	11	1
2937	Old Channel Reach	Bryo-1	2022-10-25	6	Etheostoma fonticola	18	1
2937	Old Channel Reach	Bryo-1	2022-10-25	6	Etheostoma fonticola	13	1
2937	Old Channel Reach	Bryo-1	2022-10-25	7	Procambarus sp.		2
2937	Old Channel Reach	Bryo-1	2022-10-25	7	Palaemonetes sp.		1
2937	Old Channel Reach	Bryo-1	2022-10-25	7	Etheostoma fonticola	31	1
2937	Old Channel Reach	Bryo-1	2022-10-25	7	Etheostoma fonticola	16	1
2937	Old Channel Reach	Bryo-1	2022-10-25	8	Procambarus sp.		1
2937	Old Channel Reach	Bryo-1	2022-10-25	8	Palaemonetes sp.		3
2937	Old Channel Reach	Bryo-1	2022-10-25	8	Etheostoma fonticola	30	1
2937	Old Channel Reach	Bryo-1	2022-10-25	8	Etheostoma fonticola	18	1
2937	Old Channel Reach	Bryo-1	2022-10-25	8	Etheostoma fonticola	15	1
2937	Old Channel Reach	Bryo-1	2022-10-25	9	Palaemonetes sp.		1
2937	Old Channel Reach	Bryo-1	2022-10-25	9	No fish collected		
2937	Old Channel Reach	Bryo-1	2022-10-25	10	Procambarus sp.		2
2937	Old Channel Reach	Bryo-1	2022-10-25	10	Etheostoma fonticola	16	1
2937	Old Channel Reach	Bryo-1	2022-10-25	11	Etheostoma fonticola	31	1
2937	Old Channel Reach	Bryo-1	2022-10-25	12	Procambarus sp.		1
2937	Old Channel Reach	Bryo-1	2022-10-25	12	Etheostoma fonticola	34	1
2937	Old Channel Reach	Bryo-1	2022-10-25	13	Palaemonetes sp.		2
2937	Old Channel Reach	Bryo-1	2022-10-25	13	Etheostoma fonticola	10	1
2937	Old Channel Reach	Bryo-1	2022-10-25	14	Palaemonetes sp.		2
2937	Old Channel Reach	Bryo-1	2022-10-25	14	Procambarus sp.		1
2937	Old Channel Reach	Bryo-1	2022-10-25	14	No fish collected		
2937	Old Channel Reach	Bryo-1	2022-10-25	15	Etheostoma fonticola	10	1
2937	Old Channel Reach	Bryo-1	2022-10-25	16	Palaemonetes sp.		2
2937	Old Channel Reach	Bryo-1	2022-10-25	16	No fish collected		
2938	Old Channel Reach	Bryo-2	2022-10-25	1	Procambarus sp.		18
2938	Old Channel Reach	Bryo-2	2022-10-25	1	Palaemonetes sp.		6

2938	Old Channel Reach	Bryo-2	2022-10-25	1	Lepomis miniatus	122	1
2938	Old Channel Reach	Bryo-2	2022-10-25	1	Etheostoma fonticola	28	1
2938	Old Channel Reach	Bryo-2	2022-10-25	1	Lepomis sp.	13	1
2938	Old Channel Reach	Bryo-2	2022-10-25	2	Procambarus sp.		7
2938	Old Channel Reach	Bryo-2	2022-10-25	2	Palaemonetes sp.		5
2938	Old Channel Reach	Bryo-2	2022-10-25	2	Etheostoma fonticola	15	1
2938	Old Channel Reach	Bryo-2	2022-10-25	3	Procambarus sp.		11
2938	Old Channel Reach	Bryo-2	2022-10-25	3	Palaemonetes sp.		3
2938	Old Channel Reach	Bryo-2	2022-10-25	3	Herichthys cyanoguttatus	18	1
2938	Old Channel Reach	Bryo-2	2022-10-25	3	Herichthys cyanoguttatus	31	1
2938	Old Channel Reach	Bryo-2	2022-10-25	3	Etheostoma fonticola	19	1
2938	Old Channel Reach	Bryo-2	2022-10-25	4	Procambarus sp.		4
2938	Old Channel Reach	Bryo-2	2022-10-25	4	Palaemonetes sp.		3
2938	Old Channel Reach	Bryo-2	2022-10-25	4	No fish collected		
2938	Old Channel Reach	Bryo-2	2022-10-25	5	Procambarus sp.		3
2938	Old Channel Reach	Bryo-2	2022-10-25	5	Etheostoma fonticola	30	1
2938	Old Channel Reach	Bryo-2	2022-10-25	5	Lepomis sp.	11	1
2938	Old Channel Reach	Bryo-2	2022-10-25	6	Etheostoma fonticola	30	1
2938	Old Channel Reach	Bryo-2	2022-10-25	6	Procambarus sp.		1
2938	Old Channel Reach	Bryo-2	2022-10-25	6	Lepomis sp.	12	1
2938	Old Channel Reach	Bryo-2	2022-10-25	7	Procambarus sp.		6
2938	Old Channel Reach	Bryo-2	2022-10-25	7	No fish collected		
2938	Old Channel Reach	Bryo-2	2022-10-25	8	Etheostoma fonticola	20	1
2938	Old Channel Reach	Bryo-2	2022-10-25	8	Palaemonetes sp.		1
2938	Old Channel Reach	Bryo-2	2022-10-25	9	Procambarus sp.		2
2938	Old Channel Reach	Bryo-2	2022-10-25	9	Palaemonetes sp.		1
2938	Old Channel Reach	Bryo-2	2022-10-25	9	No fish collected		
2938	Old Channel Reach	Bryo-2	2022-10-25	10	No fish collected		
2938	Old Channel Reach	Bryo-2	2022-10-25	11	Procambarus sp.		1
2938	Old Channel Reach	Bryo-2	2022-10-25	11	Etheostoma fonticola	30	1
2938	Old Channel Reach	Bryo-2	2022-10-25	11	Etheostoma fonticola	33	1
2938	Old Channel Reach	Bryo-2	2022-10-25	12	No fish collected		
2938	Old Channel Reach	Bryo-2	2022-10-25	13	No fish collected		
2938	Old Channel Reach	Bryo-2	2022-10-25	14	Procambarus sp.		3
2938	Old Channel Reach	Bryo-2	2022-10-25	14	No fish collected		
2938	Old Channel Reach	Bryo-2	2022-10-25	15	Procambarus sp.		3
2938	Old Channel Reach	Bryo-2	2022-10-25	15	No fish collected		
2939	Old Channel Reach	Lud-1	2022-10-25	1	Palaemonetes sp.		1
2939	Old Channel Reach	Lud-1	2022-10-25	1	No fish collected		
2939	Old Channel Reach	Lud-1	2022-10-25	2	No fish collected		
2939	Old Channel Reach	Lud-1	2022-10-25	3	No fish collected		

2939	Old Channel Reach	Lud-1	2022-10-25	4	No fish collected		
2939	Old Channel Reach	Lud-1	2022-10-25	5	No fish collected		
2939	Old Channel Reach	Lud-1	2022-10-25	6	No fish collected		
2939	Old Channel Reach	Lud-1	2022-10-25	7	No fish collected		
2939	Old Channel Reach	Lud-1	2022-10-25	8	No fish collected		
2939	Old Channel Reach	Lud-1	2022-10-25	9	No fish collected		
2939	Old Channel Reach	Lud-1	2022-10-25	10	No fish collected		
2940	Old Channel Reach	Open-1	2022-10-25	9	No fish collected		
2940	Old Channel Reach	Open-1	2022-10-25	10	No fish collected		
2940	Old Channel Reach	Open-1	2022-10-25	1	No fish collected		
2940	Old Channel Reach	Open-1	2022-10-25	2	No fish collected		
2940	Old Channel Reach	Open-1	2022-10-25	3	No fish collected		
2940	Old Channel Reach	Open-1	2022-10-25	4	No fish collected		
2940	Old Channel Reach	Open-1	2022-10-25	5	No fish collected		
2940	Old Channel Reach	Open-1	2022-10-25	6	No fish collected		
2940	Old Channel Reach	Open-1	2022-10-25	7	No fish collected		
2940	Old Channel Reach	Open-1	2022-10-25	8	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	1	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	2	Etheostoma fonticola	29	1
2941	Old Channel Reach	Open-2	2022-10-25	3	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	4	Etheostoma fonticola	30	1
2941	Old Channel Reach	Open-2	2022-10-25	5	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	6	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	7	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	8	Palaemonetes sp.		1
2941	Old Channel Reach	Open-2	2022-10-25	8	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	9	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	10	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	11	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	12	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	13	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	14	No fish collected		
2941	Old Channel Reach	Open-2	2022-10-25	15	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	1	Palaemonetes sp.		3
2942	Old Channel Reach	Lud-2	2022-10-25	1	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	2	Procambarus sp.		1
2942	Old Channel Reach	Lud-2	2022-10-25	2	Palaemonetes sp.		2
2942	Old Channel Reach	Lud-2	2022-10-25	2	Gambusia sp.	24	1
2942	Old Channel Reach	Lud-2	2022-10-25	3	Lepomis miniatus	90	1
2942	Old Channel Reach	Lud-2	2022-10-25	3	Lepomis miniatus	92	1
2942	Old Channel Reach	Lud-2	2022-10-25	3	Lepomis miniatus	38	1

2942	Old Channel Reach	Lud-2	2022-10-25	3	Procambarus sp.		1
2942	Old Channel Reach	Lud-2	2022-10-25	4	Palaemonetes sp.		9
2942	Old Channel Reach	Lud-2	2022-10-25	4	Procambarus sp.		1
2942	Old Channel Reach	Lud-2	2022-10-25	4	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	5	Palaemonetes sp.		2
2942	Old Channel Reach	Lud-2	2022-10-25	5	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	6	Etheostoma fonticola	31	1
2942	Old Channel Reach	Lud-2	2022-10-25	7	Procambarus sp.		1
2942	Old Channel Reach	Lud-2	2022-10-25	7	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	8	Etheostoma fonticola	23	1
2942	Old Channel Reach	Lud-2	2022-10-25	8	Herichthys cyanoguttatus	39	1
2942	Old Channel Reach	Lud-2	2022-10-25	8	Palaemonetes sp.		1
2942	Old Channel Reach	Lud-2	2022-10-25	9	Palaemonetes sp.		1
2942	Old Channel Reach	Lud-2	2022-10-25	9	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	10	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	11	Palaemonetes sp.		1
2942	Old Channel Reach	Lud-2	2022-10-25	11	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	12	Palaemonetes sp.		1
2942	Old Channel Reach	Lud-2	2022-10-25	12	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	13	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	14	No fish collected		
2942	Old Channel Reach	Lud-2	2022-10-25	15	No fish collected		
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Procambarus sp.		21
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Palaemonetes sp.		10
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Herichthys cyanoguttatus	24	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Herichthys cyanoguttatus	24	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	23	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	22	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	32	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	29	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	24	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	30	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	20	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	14	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	24	1

2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	23	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	31	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	16	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	28	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	20	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	24	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	16	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	22	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	19	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	21	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Etheostoma fonticola	28	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	1	Ameiurus natalis	31	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	2	Procambarus sp.		5
2779	Upper New Channel Reach	Hyg-1	2022-05-05	2	Palaemonetes sp.		2
2779	Upper New Channel Reach	Hyg-1	2022-05-05	2	Lepomis miniatus	27	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	2	Herichthys cyanoguttatus	20	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	2	Etheostoma fonticola	31	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	2	Etheostoma fonticola	27	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	2	Etheostoma fonticola	28	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	2	Etheostoma fonticola	28	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	2	Etheostoma fonticola	13	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	2	Etheostoma fonticola	15	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	3	Procambarus sp.		2
2779	Upper New Channel Reach	Hyg-1	2022-05-05	3	Palaemonetes sp.		4
2779	Upper New Channel Reach	Hyg-1	2022-05-05	3	Lepomis miniatus	31	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	3	Lepomis miniatus	41	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	3	Micropterus salmoides	45	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	3	Etheostoma fonticola	21	1

2779	Upper New Channel Reach	Hyg-1	2022-05-05	3	Etheostoma fonticola	22	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	3	Etheostoma fonticola	13	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	3	Etheostoma fonticola	26	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	4	Procambarus sp.		1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	4	Palaemonetes sp.		2
2779	Upper New Channel Reach	Hyg-1	2022-05-05	4	Lepomis miniatus	28	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	4	Etheostoma fonticola	19	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	4	Etheostoma fonticola	18	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	5	Procambarus sp.		1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	5	No fish collected		
2779	Upper New Channel Reach	Hyg-1	2022-05-05	6	Procambarus sp.		11
2779	Upper New Channel Reach	Hyg-1	2022-05-05	6	Lepomis miniatus	34	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	6	Palaemonetes sp.		6
2779	Upper New Channel Reach	Hyg-1	2022-05-05	6	Herichthys cyanoguttatus	26	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	6	Etheostoma fonticola	30	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	6	Etheostoma fonticola	28	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	7	Etheostoma fonticola	18	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	7	Etheostoma fonticola	22	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	7	Etheostoma fonticola	24	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	7	Etheostoma fonticola	24	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	7	Etheostoma fonticola	24	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	7	Procambarus sp.		2
2779	Upper New Channel Reach	Hyg-1	2022-05-05	7	Lepomis miniatus	26	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	7	Palaemonetes sp.		1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	8	Procambarus sp.		1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	8	Palaemonetes sp.		1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	8	Etheostoma fonticola	19	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	9	Procambarus sp.		1

2779	Upper New Channel Reach	Hyg-1	2022-05-05	9	Palaemonetes sp.		1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	9	No fish collected		
2779	Upper New Channel Reach	Hyg-1	2022-05-05	10	Procambarus sp.		2
2779	Upper New Channel Reach	Hyg-1	2022-05-05	10	Etheostoma fonticola	25	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	11	Etheostoma fonticola	23	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	11	Etheostoma fonticola	23	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	11	Etheostoma fonticola	18	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	11	Procambarus sp.		1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	11	Palaemonetes sp.		2
2779	Upper New Channel Reach	Hyg-1	2022-05-05	12	No fish collected		
2779	Upper New Channel Reach	Hyg-1	2022-05-05	13	Procambarus sp.		3
2779	Upper New Channel Reach	Hyg-1	2022-05-05	13	Etheostoma fonticola	35	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	14	Procambarus sp.		1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	14	Etheostoma fonticola	20	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	15	Etheostoma fonticola	15	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	15	Etheostoma fonticola	31	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	15	Etheostoma fonticola	20	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	16	Etheostoma fonticola	26	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	16	Etheostoma fonticola	26	1
2779	Upper New Channel Reach	Hyg-1	2022-05-05	16	Procambarus sp.		3
2779	Upper New Channel Reach	Hyg-1	2022-05-05	17	No fish collected		
2780	Upper New Channel Reach	Open-1	2022-05-05	1	No fish collected		
2780	Upper New Channel Reach	Open-1	2022-05-05	2	No fish collected		
2780	Upper New Channel Reach	Open-1	2022-05-05	3	No fish collected		
2780	Upper New Channel Reach	Open-1	2022-05-05	4	No fish collected		
2780	Upper New Channel Reach	Open-1	2022-05-05	5	No fish collected		
2780	Upper New Channel Reach	Open-1	2022-05-05	6	No fish collected		
2780	Upper New Channel Reach	Open-1	2022-05-05	7	No fish collected		

2780	Upper New Channel Reach	Open-1	2022-05-05	8	No fish collected		
2780	Upper New Channel Reach	Open-1	2022-05-05	9	No fish collected		
2780	Upper New Channel Reach	Open-1	2022-05-05	10	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	1	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	2	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	3	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	4	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	5	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	6	Dionda nigrotaeniata	16	1
2781	Upper New Channel Reach	Open-2	2022-05-05	7	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	8	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	9	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	10	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	11	Dionda nigrotaeniata	10	1
2781	Upper New Channel Reach	Open-2	2022-05-05	11	Dionda nigrotaeniata	15	1
2781	Upper New Channel Reach	Open-2	2022-05-05	12	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	13	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	14	No fish collected		
2781	Upper New Channel Reach	Open-2	2022-05-05	15	No fish collected		
2782	Upper New Channel Reach	Hyg-2	2022-05-05	1	Procambarus sp.		1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	1	Palaemonetes sp.		13
2782	Upper New Channel Reach	Hyg-2	2022-05-05	1	Dionda nigrotaeniata	39	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	1	Dionda nigrotaeniata	30	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	1	Herichthys cyanoguttatus	65	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	1	Etheostoma fonticola	24	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	1	Etheostoma fonticola	24	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	1	Micropterus salmoides	65	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	2	Palaemonetes sp.		6

2782	Upper New Channel Reach	Hyg-2	2022-05-05	2	Procambarus sp.		6
2782	Upper New Channel Reach	Hyg-2	2022-05-05	2	Lepomis miniatus	96	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	2	Lepomis miniatus	30	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	2	Etheostoma fonticola	20	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	2	Dionda nigrotaeniata	39	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	3	Palaemonetes sp.		8
2782	Upper New Channel Reach	Hyg-2	2022-05-05	3	Procambarus sp.		1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	3	Etheostoma fonticola	21	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	3	Etheostoma fonticola	20	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	3	Etheostoma fonticola	18	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	3	Etheostoma fonticola	18	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	4	Procambarus sp.		3
2782	Upper New Channel Reach	Hyg-2	2022-05-05	4	Micropterus salmoides	22	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	4	Etheostoma fonticola	33	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	4	Etheostoma fonticola	24	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	4	Lepomis miniatus	64	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	5	Lepomis miniatus	52	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	5	Etheostoma fonticola	31	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	5	Etheostoma fonticola	20	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	5	Procambarus sp.		1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	6	Lepomis cyanellus	70	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	6	Etheostoma fonticola	13	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	6	Procambarus sp.		4
2782	Upper New Channel Reach	Hyg-2	2022-05-05	7	Etheostoma fonticola	33	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	7	Etheostoma fonticola	16	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	8	Lepomis miniatus	25	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	8	Etheostoma fonticola	26	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	9	Procambarus sp.		1

2782	Upper New Channel Reach	Hyg-2	2022-05-05	9	Etheostoma fonticola		1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	10	Procambarus sp.		1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	10	No fish collected		
2782	Upper New Channel Reach	Hyg-2	2022-05-05	11	Ameiurus natalis	36	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	12	Procambarus sp.		3
2782	Upper New Channel Reach	Hyg-2	2022-05-05	12	Herichthys cyanoguttatus	69	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	13	Procambarus sp.		2
2782	Upper New Channel Reach	Hyg-2	2022-05-05	13	No fish collected		
2782	Upper New Channel Reach	Hyg-2	2022-05-05	14	Procambarus sp.		1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	14	No fish collected		
2782	Upper New Channel Reach	Hyg-2	2022-05-05	15	Etheostoma fonticola	24	1
2782	Upper New Channel Reach	Hyg-2	2022-05-05	16	Lepomis miniatus	45	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Procambarus sp.		4
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Palaemonetes sp.		26
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Lepomis miniatus	46	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Lepomis miniatus	28	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Lepomis miniatus	23	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Lepomis miniatus	23	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Micropterus salmoides	29	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Micropterus salmoides	30	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Micropterus salmoides	25	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Micropterus salmoides	27	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Dionda nigrotaeniata	40	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Etheostoma fonticola	32	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Lepomis sp.	17	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Lepomis sp.	15	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Lepomis sp.	18	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Lepomis sp.	19	1

2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Lepomis sp.	11	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Gambusia sp.	20	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Gambusia sp.	20	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	1	Astyanax mexicanus	19	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Procambarus sp.		4
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Palaemonetes sp.		4
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Lepomis miniatus	125	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Lepomis miniatus	85	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Lepomis miniatus	25	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Lepomis miniatus	28	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Lepomis cyanellus	72	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Lepomis gulosus	123	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Micropterus salmoides	42	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Micropterus salmoides	51	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Micropterus salmoides	27	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Micropterus salmoides	25	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Micropterus salmoides	24	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Micropterus salmoides	30	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	2	Dionda nigrotaeniata	33	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	3	Procambarus sp.		3
2783	Upper New Channel Reach	Cabo-1	2022-05-05	3	Palaemonetes sp.		5
2783	Upper New Channel Reach	Cabo-1	2022-05-05	3	Lepomis miniatus	25	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	3	Lepomis miniatus	22	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	4	Dionda nigrotaeniata	25	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	4	Dionda nigrotaeniata	31	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	4	Dionda nigrotaeniata	32	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	4	Gambusia sp.	20	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	4	Lepomis sp.	12	1

2783	Upper New Channel Reach	Cabo-1	2022-05-05	4	Lepomis miniatus	30	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	5	Lepomis miniatus	96	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	5	Palaemonetes sp.		1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	6	Procambarus sp.		4
2783	Upper New Channel Reach	Cabo-1	2022-05-05	6	Palaemonetes sp.		1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	6	No fish collected		
2783	Upper New Channel Reach	Cabo-1	2022-05-05	7	Lepomis cyanellus	73	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	7	Procambarus sp.		1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	8	Lepomis miniatus	65	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	8	Palaemonetes sp.		1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	9	Procambarus sp.		2
2783	Upper New Channel Reach	Cabo-1	2022-05-05	9	Lepomis miniatus	65	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	9	Lepomis cyanellus	65	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	10	Lepomis miniatus	88	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	11	No fish collected		
2783	Upper New Channel Reach	Cabo-1	2022-05-05	12	Lepomis miniatus	102	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	12	Lepomis miniatus	114	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	12	Lepomis miniatus	60	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	13	Lepomis miniatus	30	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	14	Dionda nigrotaeniata	32	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	15	Lepomis miniatus	30	1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	4	Procambarus sp.		1
2783	Upper New Channel Reach	Cabo-1	2022-05-05	4	Palaemonetes sp.		4
2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	22	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	28	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	26	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	19	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	24	1

2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Etheostoma fonticola	28	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Lepomis miniatus	35	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Micropterus salmoides	25	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Lepomis sp.	17	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Gambusia sp.	21	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	1	Palaemonetes sp.		2
2784	Upper New Channel Reach	Cab-2	2022-05-05	2	Gambusia sp.	26	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	2	Lepomis miniatus	75	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	2	Procambarus sp.		1
2784	Upper New Channel Reach	Cab-2	2022-05-05	3	Procambarus sp.		2
2784	Upper New Channel Reach	Cab-2	2022-05-05	3	Palaemonetes sp.		1
2784	Upper New Channel Reach	Cab-2	2022-05-05	3	Micropterus salmoides	28	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	3	Micropterus salmoides	35	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	3	Etheostoma fonticola	32	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	3	Gambusia sp.	25	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	3	Lepomis miniatus	24	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	4	Etheostoma fonticola	21	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	4	Etheostoma fonticola	30	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	4	Etheostoma fonticola	22	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	4	Etheostoma fonticola	15	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	4	Etheostoma fonticola	26	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	4	Micropterus salmoides	38	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	4	Procambarus sp.		1
2784	Upper New Channel Reach	Cab-2	2022-05-05	5	Micropterus salmoides	25	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	5	Micropterus salmoides	35	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	5	Micropterus salmoides	40	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	5	Etheostoma fonticola	22	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	5	Etheostoma fonticola	25	1

2784	Upper New Channel Reach	Cab-2	2022-05-05	5	Gambusia sp.	30	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	5	Palaemonetes sp.		1
2784	Upper New Channel Reach	Cab-2	2022-05-05	6	Lepomis miniatus	30	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	6	Gambusia sp.	20	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	6	Etheostoma fonticola	32	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	6	Etheostoma fonticola	22	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	6	Etheostoma fonticola	23	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	6	Etheostoma fonticola	22	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	6	Procambarus sp.		1
2784	Upper New Channel Reach	Cab-2	2022-05-05	7	Etheostoma fonticola	18	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	7	Etheostoma fonticola	23	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	8	Micropterus salmoides	22	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	9	Etheostoma fonticola	24	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	10	No fish collected		
2784	Upper New Channel Reach	Cab-2	2022-05-05	11	Palaemonetes sp.		1
2784	Upper New Channel Reach	Cab-2	2022-05-05	11	Etheostoma fonticola	22	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	11	Procambarus sp.		1
2784	Upper New Channel Reach	Cab-2	2022-05-05	12	Gambusia sp.	20	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	12	Palaemonetes sp.		1
2784	Upper New Channel Reach	Cab-2	2022-05-05	12	Etheostoma fonticola	20	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	13	Etheostoma fonticola	29	1
2784	Upper New Channel Reach	Cab-2	2022-05-05	13	Procambarus sp.		1
2784	Upper New Channel Reach	Cab-2	2022-05-05	14	Procambarus sp.		1
2784	Upper New Channel Reach	Cab-2	2022-05-05	14	No fish collected		
2784	Upper New Channel Reach	Cab-2	2022-05-05	15	Etheostoma lepidum	25	1
2876	Upper New Channel Reach	Open-1	2022-06-24	1	No fish collected		
2876	Upper New Channel Reach	Open-1	2022-06-24	2	No fish collected		
2876	Upper New Channel Reach	Open-1	2022-06-24	3	No fish collected		

2876	Upper New Channel Reach	Open-1	2022-06-24	4	No fish collected		
2876	Upper New Channel Reach	Open-1	2022-06-24	5	No fish collected		
2876	Upper New Channel Reach	Open-1	2022-06-24	6	No fish collected		
2876	Upper New Channel Reach	Open-1	2022-06-24	7	No fish collected		
2876	Upper New Channel Reach	Open-1	2022-06-24	8	No fish collected		
2876	Upper New Channel Reach	Open-1	2022-06-24	9	No fish collected		
2876	Upper New Channel Reach	Open-1	2022-06-24	10	No fish collected		
2877	Upper New Channel Reach	Open-2	2022-06-24	1	No fish collected		
2877	Upper New Channel Reach	Open-2	2022-06-24	2	No fish collected		
2877	Upper New Channel Reach	Open-2	2022-06-24	3	No fish collected		
2877	Upper New Channel Reach	Open-2	2022-06-24	4	No fish collected		
2877	Upper New Channel Reach	Open-2	2022-06-24	5	No fish collected		
2877	Upper New Channel Reach	Open-2	2022-06-24	6	No fish collected		
2877	Upper New Channel Reach	Open-2	2022-06-24	7	No fish collected		
2877	Upper New Channel Reach	Open-2	2022-06-24	8	No fish collected		
2877	Upper New Channel Reach	Open-2	2022-06-24	9	No fish collected		
2877	Upper New Channel Reach	Open-2	2022-06-24	10	No fish collected		
2878	Upper New Channel Reach	Hyg-1	2022-06-24	1	Etheostoma fonticola	30	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	1	Etheostoma fonticola	27	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	1	Etheostoma fonticola	24	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	1	Etheostoma fonticola	28	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	1	Etheostoma fonticola	30	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	1	Etheostoma fonticola	26	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	1	Palaemonetes sp.		12
2878	Upper New Channel Reach	Hyg-1	2022-06-24	1	Procambarus sp.		1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	2	Etheostoma fonticola	25	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	2	Palaemonetes sp.		1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	2	Procambarus sp.		1

2878	Upper New Channel Reach	Hyg-1	2022-06-24	3	Etheostoma fonticola	28	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	3	Etheostoma fonticola	31	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	3	Etheostoma fonticola	26	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	3	Etheostoma fonticola	28	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	3	Etheostoma fonticola	28	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	3	Etheostoma fonticola	33	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	3	Herichthys cyanoguttatus	20	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	3	Procambarus sp.		5
2878	Upper New Channel Reach	Hyg-1	2022-06-24	3	Palaemonetes sp.		6
2878	Upper New Channel Reach	Hyg-1	2022-06-24	4	No fish collected		
2878	Upper New Channel Reach	Hyg-1	2022-06-24	5	Procambarus sp.		2
2878	Upper New Channel Reach	Hyg-1	2022-06-24	5	Herichthys cyanoguttatus	20	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	5	Etheostoma fonticola	27	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	6	Etheostoma fonticola	26	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	6	Procambarus sp.		3
2878	Upper New Channel Reach	Hyg-1	2022-06-24	6	Palaemonetes sp.		2
2878	Upper New Channel Reach	Hyg-1	2022-06-24	7	Etheostoma fonticola	30	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	7	Palaemonetes sp.		1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	7	Procambarus sp.		2
2878	Upper New Channel Reach	Hyg-1	2022-06-24	8	No fish collected		
2878	Upper New Channel Reach	Hyg-1	2022-06-24	9	No fish collected		
2878	Upper New Channel Reach	Hyg-1	2022-06-24	10	Etheostoma fonticola	26	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	11	No fish collected		
2878	Upper New Channel Reach	Hyg-1	2022-06-24	12	No fish collected		
2878	Upper New Channel Reach	Hyg-1	2022-06-24	13	Etheostoma fonticola	26	1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	13	Procambarus sp.		1
2878	Upper New Channel Reach	Hyg-1	2022-06-24	14	No fish collected		
2878	Upper New Channel Reach	Hyg-1	2022-06-24	15	Etheostoma fonticola	32	1

2878	Upper New Channel Reach	Hyg-1	2022-06-24	16	No fish collected		
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Lepomis miniatus	45	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Lepomis miniatus	50	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Lepomis miniatus	36	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Lepomis miniatus	70	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Lepomis miniatus	35	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Lepomis miniatus	65	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Lepomis miniatus	45	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Lepomis miniatus	35	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Lepomis miniatus	35	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	31	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	31	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	22	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	18	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	15	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	21	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	18	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	24	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	18	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	15	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Gambusia sp.	16	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Oreochromis aureus	65	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Etheostoma fonticola	28	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Herichthys cyanoguttatus	20	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	1	Palaemonetes sp.		4
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Lepomis miniatus	42	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Lepomis miniatus	135	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Lepomis miniatus	38	1

2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Lepomis miniatus	55	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Lepomis miniatus	31	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Lepomis miniatus	24	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Oreochromis aureus	70	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Gambusia sp.	28	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Gambusia sp.	12	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Gambusia sp.	21	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Gambusia sp.	12	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Gambusia sp.	17	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Gambusia sp.	15	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Gambusia sp.	10	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	2	Palaemonetes sp.		4
2879	Upper New Channel Reach	Cab-1	2022-06-24	3	Lepomis miniatus	105	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	3	Lepomis miniatus	35	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	3	Lepomis miniatus	19	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	3	Lepomis gulosus	125	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	3	Herichthys cyanoguttatus	18	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	3	Palaemonetes sp.		1
2879	Upper New Channel Reach	Cab-1	2022-06-24	4	Micropterus salmoides	55	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	4	Lepomis miniatus	86	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	4	Lepomis sp.	6	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	5	Oreochromis aureus	70	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	5	Lepomis sp.	26	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	5	Palaemonetes sp.		2
2879	Upper New Channel Reach	Cab-1	2022-06-24	6	Palaemonetes sp.		1
2879	Upper New Channel Reach	Cab-1	2022-06-24	6	No fish collected		
2879	Upper New Channel Reach	Cab-1	2022-06-24	7	Procambarus sp.		1
2879	Upper New Channel Reach	Cab-1	2022-06-24	7	No fish collected		

2879	Upper New Channel Reach	Cab-1	2022-06-24	8	Palaemonetes sp.		1
2879	Upper New Channel Reach	Cab-1	2022-06-24	8	No fish collected		
2879	Upper New Channel Reach	Cab-1	2022-06-24	9	Palaemonetes sp.		1
2879	Upper New Channel Reach	Cab-1	2022-06-24	9	No fish collected		
2879	Upper New Channel Reach	Cab-1	2022-06-24	10	Palaemonetes sp.		1
2879	Upper New Channel Reach	Cab-1	2022-06-24	10	No fish collected		
2879	Upper New Channel Reach	Cab-1	2022-06-24	11	Procambarus sp.		2
2879	Upper New Channel Reach	Cab-1	2022-06-24	11	Palaemonetes sp.		1
2879	Upper New Channel Reach	Cab-1	2022-06-24	11	Lepomis miniatus	35	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	11	Lepomis miniatus	40	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	12	Lepomis sp.	5	1
2879	Upper New Channel Reach	Cab-1	2022-06-24	13	No fish collected		
2879	Upper New Channel Reach	Cab-1	2022-06-24	14	No fish collected		
2879	Upper New Channel Reach	Cab-1	2022-06-24	15	No fish collected		
2880	Upper New Channel Reach	Cab-2	2022-06-24	1	Lepomis miniatus	80	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	1	Lepomis miniatus	40	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	1	Lepomis miniatus	25	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	1	Herichthys cyanoguttatus	20	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	1	Herichthys cyanoguttatus	18	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	1	Herichthys cyanoguttatus	22	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	1	Herichthys cyanoguttatus	21	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	1	Herichthys cyanoguttatus	20	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	1	Herichthys cyanoguttatus	20	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	1	Palaemonetes sp.		3
2880	Upper New Channel Reach	Cab-2	2022-06-24	2	Procambarus sp.		2
2880	Upper New Channel Reach	Cab-2	2022-06-24	2	Palaemonetes sp.		5
2880	Upper New Channel Reach	Cab-2	2022-06-24	2	Lepomis miniatus	75	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	2	Herichthys cyanoguttatus	18	1

2880	Upper New Channel Reach	Cab-2	2022-06-24	2	Herichthys cyanoguttatus	18	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	2	Herichthys cyanoguttatus	16	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	2	Herichthys cyanoguttatus	21	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	2	Herichthys cyanoguttatus	18	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	2	Herichthys cyanoguttatus	18	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	2	Gambusia sp.	12	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	3	Procambarus sp.		1
2880	Upper New Channel Reach	Cab-2	2022-06-24	3	Palaemonetes sp.		5
2880	Upper New Channel Reach	Cab-2	2022-06-24	3	Lepomis miniatus	30	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	3	Herichthys cyanoguttatus	100	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	3	Herichthys cyanoguttatus	19	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	3	Herichthys cyanoguttatus	23	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	3	Herichthys cyanoguttatus	15	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	3	Herichthys cyanoguttatus	20	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	4	Procambarus sp.		1
2880	Upper New Channel Reach	Cab-2	2022-06-24	4	Palaemonetes sp.		3
2880	Upper New Channel Reach	Cab-2	2022-06-24	4	No fish collected		
2880	Upper New Channel Reach	Cab-2	2022-06-24	5	Lepomis miniatus	45	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	5	Lepomis miniatus	28	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	5	Herichthys cyanoguttatus	18	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	6	Herichthys cyanoguttatus	36	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	6	Herichthys cyanoguttatus	18	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	6	Palaemonetes sp.		1
2880	Upper New Channel Reach	Cab-2	2022-06-24	7	Lepomis miniatus	85	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	7	Lepomis miniatus	51	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	8	Herichthys cyanoguttatus	18	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	8	Herichthys cyanoguttatus	18	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	8	Palaemonetes sp.		3

2880	Upper New Channel Reach	Cab-2	2022-06-24	9	No fish collected		
2880	Upper New Channel Reach	Cab-2	2022-06-24	10	Herichthys cyanoguttatus	20	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	10	Palaemonetes sp.		2
2880	Upper New Channel Reach	Cab-2	2022-06-24	11	Procambarus sp.		2
2880	Upper New Channel Reach	Cab-2	2022-06-24	11	Palaemonetes sp.		1
2880	Upper New Channel Reach	Cab-2	2022-06-24	11	Herichthys cyanoguttatus	20	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	11	Herichthys cyanoguttatus	22	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	12	Palaemonetes sp.		1
2880	Upper New Channel Reach	Cab-2	2022-06-24	12	Herichthys cyanoguttatus	15	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	13	No fish collected		
2880	Upper New Channel Reach	Cab-2	2022-06-24	14	Procambarus sp.		1
2880	Upper New Channel Reach	Cab-2	2022-06-24	14	No fish collected		
2880	Upper New Channel Reach	Cab-2	2022-06-24	15	Lepomis miniatus	45	1
2880	Upper New Channel Reach	Cab-2	2022-06-24	15	Herichthys cyanoguttatus	20	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	1	Procambarus sp.		2
2881	Upper New Channel Reach	Hyg-2	2022-06-24	1	Palaemonetes sp.		2
2881	Upper New Channel Reach	Hyg-2	2022-06-24	1	Etheostoma fonticola	26	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	1	Etheostoma fonticola	35	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	1	Etheostoma fonticola	30	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	2	Procambarus sp.		3
2881	Upper New Channel Reach	Hyg-2	2022-06-24	2	No fish collected		
2881	Upper New Channel Reach	Hyg-2	2022-06-24	3	Lepomis miniatus	38	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	3	Etheostoma fonticola	28	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	3	Herichthys cyanoguttatus	18	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	3	Palaemonetes sp.		2
2881	Upper New Channel Reach	Hyg-2	2022-06-24	3	Procambarus sp.		4
2881	Upper New Channel Reach	Hyg-2	2022-06-24	4	Procambarus sp.		5
2881	Upper New Channel Reach	Hyg-2	2022-06-24	4	Palaemonetes sp.		1

2881	Upper New Channel Reach	Hyg-2	2022-06-24	4	No fish collected		
2881	Upper New Channel Reach	Hyg-2	2022-06-24	5	Procambarus sp.		6
2881	Upper New Channel Reach	Hyg-2	2022-06-24	5	Etheostoma fonticola	28	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	6	Procambarus sp.		1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	6	No fish collected		
2881	Upper New Channel Reach	Hyg-2	2022-06-24	7	Herichthys cyanoguttatus	37	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	7	Procambarus sp.		2
2881	Upper New Channel Reach	Hyg-2	2022-06-24	7	Palaemonetes sp.		1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	8	Etheostoma fonticola	34	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	9	Palaemonetes sp.		1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	9	Dionda nigrotaeniata	55	1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	10	Procambarus sp.		1
2881	Upper New Channel Reach	Hyg-2	2022-06-24	10	No fish collected		
2881	Upper New Channel Reach	Hyg-2	2022-06-24	11	Procambarus sp.		2
2881	Upper New Channel Reach	Hyg-2	2022-06-24	11	No fish collected		
2881	Upper New Channel Reach	Hyg-2	2022-06-24	12	No fish collected		
2881	Upper New Channel Reach	Hyg-2	2022-06-24	13	Procambarus sp.		3
2881	Upper New Channel Reach	Hyg-2	2022-06-24	13	No fish collected		
2881	Upper New Channel Reach	Hyg-2	2022-06-24	14	No fish collected		
2881	Upper New Channel Reach	Hyg-2	2022-06-24	15	Herichthys cyanoguttatus	20	1
2882	Upper New Channel Reach	Lud-1	2022-06-24	1	Gambusia sp.	25	1
2882	Upper New Channel Reach	Lud-1	2022-06-24	1	Lepomis sp.	12	1
2882	Upper New Channel Reach	Lud-1	2022-06-24	1	Procambarus sp.		4
2882	Upper New Channel Reach	Lud-1	2022-06-24	2	Palaemonetes sp.		1
2882	Upper New Channel Reach	Lud-1	2022-06-24	2	Procambarus sp.		2
2882	Upper New Channel Reach	Lud-1	2022-06-24	3	Herichthys cyanoguttatus	30	1
2882	Upper New Channel Reach	Lud-1	2022-06-24	3	Procambarus sp.		3
2882	Upper New Channel Reach	Lud-1	2022-06-24	3	Palaemonetes sp.		2

2882	Upper New Channel Reach	Lud-1	2022-06-24	4	Procambarus sp.		3
2882	Upper New Channel Reach	Lud-1	2022-06-24	4	Herichthys cyanoguttatus	18	1
2882	Upper New Channel Reach	Lud-1	2022-06-24	4	Herichthys cyanoguttatus	30	1
2882	Upper New Channel Reach	Lud-1	2022-06-24	5	Procambarus sp.		2
2882	Upper New Channel Reach	Lud-1	2022-06-24	5	No fish collected		
2882	Upper New Channel Reach	Lud-1	2022-06-24	6	Etheostoma lepidum	44	1
2882	Upper New Channel Reach	Lud-1	2022-06-24	6	Procambarus sp.		1
2882	Upper New Channel Reach	Lud-1	2022-06-24	7	Procambarus sp.		1
2882	Upper New Channel Reach	Lud-1	2022-06-24	7	No fish collected		
2882	Upper New Channel Reach	Lud-1	2022-06-24	8	Etheostoma fonticola	26	1
2882	Upper New Channel Reach	Lud-1	2022-06-24	8	Etheostoma lepidum	40	1
2882	Upper New Channel Reach	Lud-1	2022-06-24	8	Procambarus sp.		3
2882	Upper New Channel Reach	Lud-1	2022-06-24	9	No fish collected		
2882	Upper New Channel Reach	Lud-1	2022-06-24	10	No fish collected		
2882	Upper New Channel Reach	Lud-1	2022-06-24	11	Palaemonetes sp.		1
2882	Upper New Channel Reach	Lud-1	2022-06-24	11	No fish collected		
2882	Upper New Channel Reach	Lud-1	2022-06-24	12	Procambarus sp.		1
2882	Upper New Channel Reach	Lud-1	2022-06-24	12	No fish collected		
2882	Upper New Channel Reach	Lud-1	2022-06-24	13	No fish collected		
2882	Upper New Channel Reach	Lud-1	2022-06-24	14	No fish collected		
2882	Upper New Channel Reach	Lud-1	2022-06-24	15	No fish collected		
2883	Upper New Channel Reach	Lud-2	2022-06-24	1	Herichthys cyanoguttatus	20	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	1	Herichthys cyanoguttatus	22	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	1	Micropterus salmoides	62	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	1	Etheostoma fonticola	31	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	1	Etheostoma fonticola	32	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	1	Palaemonetes sp.		7
2883	Upper New Channel Reach	Lud-2	2022-06-24	1	Procambarus sp.		2

2883	Upper New Channel Reach	Lud-2	2022-06-24	2	Etheostoma fonticola	34	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	2	Palaemonetes sp.		2
2883	Upper New Channel Reach	Lud-2	2022-06-24	2	Procambarus sp.		1
2883	Upper New Channel Reach	Lud-2	2022-06-24	3	Procambarus sp.		1
2883	Upper New Channel Reach	Lud-2	2022-06-24	3	Etheostoma fonticola	32	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	3	Herichthys cyanoguttatus	24	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	3	Palaemonetes sp.		8
2883	Upper New Channel Reach	Lud-2	2022-06-24	4	Palaemonetes sp.		1
2883	Upper New Channel Reach	Lud-2	2022-06-24	4	Etheostoma fonticola	30	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	5	Etheostoma fonticola	31	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	5	Procambarus sp.		7
2883	Upper New Channel Reach	Lud-2	2022-06-24	5	Palaemonetes sp.		3
2883	Upper New Channel Reach	Lud-2	2022-06-24	6	Palaemonetes sp.		2
2883	Upper New Channel Reach	Lud-2	2022-06-24	6	No fish collected		
2883	Upper New Channel Reach	Lud-2	2022-06-24	7	Lepomis miniatus	28	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	7	Gambusia sp.	20	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	7	Etheostoma fonticola	34	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	8	Palaemonetes sp.		1
2883	Upper New Channel Reach	Lud-2	2022-06-24	8	No fish collected		
2883	Upper New Channel Reach	Lud-2	2022-06-24	9	Procambarus sp.		2
2883	Upper New Channel Reach	Lud-2	2022-06-24	9	Etheostoma fonticola	26	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	9	Lepomis miniatus	25	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	10	Procambarus sp.		1
2883	Upper New Channel Reach	Lud-2	2022-06-24	10	No fish collected		
2883	Upper New Channel Reach	Lud-2	2022-06-24	11	Ameiurus natalis	36	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	12	Etheostoma fonticola	29	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	12	Procambarus sp.		1
2883	Upper New Channel Reach	Lud-2	2022-06-24	13	Palaemonetes sp.		1

2883	Upper New Channel Reach	Lud-2	2022-06-24	13	Etheostoma fonticola	30	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	13	Lepomis miniatus	25	1
2883	Upper New Channel Reach	Lud-2	2022-06-24	14	No fish collected		
2883	Upper New Channel Reach	Lud-2	2022-06-24	15	Palaemonetes sp.		1
2883	Upper New Channel Reach	Lud-2	2022-06-24	15	No fish collected		
2909	Upper New Channel Reach	Open-1	2022-08-26	1	No fish collected		
2909	Upper New Channel Reach	Open-1	2022-08-26	2	No fish collected		
2909	Upper New Channel Reach	Open-1	2022-08-26	3	No fish collected		
2909	Upper New Channel Reach	Open-1	2022-08-26	4	No fish collected		
2909	Upper New Channel Reach	Open-1	2022-08-26	5	No fish collected		
2909	Upper New Channel Reach	Open-1	2022-08-26	6	No fish collected		
2909	Upper New Channel Reach	Open-1	2022-08-26	7	No fish collected		
2909	Upper New Channel Reach	Open-1	2022-08-26	8	No fish collected		
2909	Upper New Channel Reach	Open-1	2022-08-26	9	No fish collected		
2909	Upper New Channel Reach	Open-1	2022-08-26	10	No fish collected		
2910	Upper New Channel Reach	Cab-1	2022-08-26	1	Procambarus sp.		2
2910	Upper New Channel Reach	Cab-1	2022-08-26	1	Palaemonetes sp.		2
2910	Upper New Channel Reach	Cab-1	2022-08-26	1	Herichthys cyanoguttatus	39	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	1	Herichthys cyanoguttatus	37	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	1	Herichthys cyanoguttatus	25	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	1	Lepomis miniatus	39	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	1	Lepomis miniatus	85	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	1	Lepomis miniatus	45	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	1	Lepomis sp.	11	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	1	Lepomis cyanellus	58	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	2	Lepomis sp.	9	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	2	Lepomis miniatus	40	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	2	Lepomis miniatus	42	1

2910	Upper New Channel Reach	Cab-1	2022-08-26	2	Palaemonetes sp.		1
2910	Upper New Channel Reach	Cab-1	2022-08-26	3	Lepomis cyanellus	54	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	3	Lepomis cyanellus	52	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	3	Herichthys cyanoguttatus	20	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	3	Palaemonetes sp.		1
2910	Upper New Channel Reach	Cab-1	2022-08-26	4	Procambarus sp.		2
2910	Upper New Channel Reach	Cab-1	2022-08-26	4	Palaemonetes sp.		3
2910	Upper New Channel Reach	Cab-1	2022-08-26	4	Lepomis miniatus	39	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	4	Etheostoma fonticola	33	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	5	Palaemonetes sp.		1
2910	Upper New Channel Reach	Cab-1	2022-08-26	5	Herichthys cyanoguttatus	34	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	5	Herichthys cyanoguttatus	42	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	5	Lepomis miniatus	35	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	6	Lepomis cyanellus	94	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	6	Lepomis miniatus	45	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	6	Lepomis sp.	11	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	6	Palaemonetes sp.		2
2910	Upper New Channel Reach	Cab-1	2022-08-26	7	Lepomis cyanellus	51	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	7	Lepomis cyanellus	49	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	8	Procambarus sp.		1
2910	Upper New Channel Reach	Cab-1	2022-08-26	8	Palaemonetes sp.		1
2910	Upper New Channel Reach	Cab-1	2022-08-26	8	Lepomis miniatus		1
2910	Upper New Channel Reach	Cab-1	2022-08-26	9	Herichthys cyanoguttatus	24	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	9	Lepomis miniatus	43	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	9	Lepomis sp.	9	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	10	Lepomis miniatus	40	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	11	Lepomis miniatus	78	1
2910	Upper New Channel Reach	Cab-1	2022-08-26	12	No fish collected		

2910	Upper New Channel Reach	Cab-1	2022-08-26	13	Lepomis miniatus		1
2910	Upper New Channel Reach	Cab-1	2022-08-26	14	Procambarus sp.		1
2910	Upper New Channel Reach	Cab-1	2022-08-26	14	No fish collected		
2910	Upper New Channel Reach	Cab-1	2022-08-26	15	Procambarus sp.		1
2910	Upper New Channel Reach	Cab-1	2022-08-26	15	No fish collected		
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Procambarus sp.		3
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Palaemonetes sp.		4
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Lepomis miniatus	82	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Lepomis miniatus	47	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Lepomis miniatus	50	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Lepomis miniatus	91	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Lepomis miniatus	45	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Lepomis miniatus	50	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Herichthys cyanoguttatus	21	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Herichthys cyanoguttatus	22	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Etheostoma fonticola	33	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Etheostoma fonticola	26	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Micropterus salmoides	52	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	1	Lepomis sp.	14	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	2	Palaemonetes sp.		3
2911	Upper New Channel Reach	Cab-2	2022-08-26	2	Lepomis miniatus	57	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	2	Lepomis miniatus	47	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	2	Lepomis miniatus	79	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	2	Lepomis miniatus	58	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	3	Palaemonetes sp.		9
2911	Upper New Channel Reach	Cab-2	2022-08-26	3	Procambarus sp.		1
2911	Upper New Channel Reach	Cab-2	2022-08-26	3	Lepomis gulosus	108	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	3	Lepomis miniatus	31	1

2911	Upper New Channel Reach	Cab-2	2022-08-26	3	Lepomis miniatus	44	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	3	Lepomis miniatus	41	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	3	Lepomis miniatus	40	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	4	Lepomis miniatus	31	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	4	Lepomis miniatus	75	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	4	Lepomis miniatus	38	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	4	Lepomis miniatus	44	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	4	Lepomis cyanellus	52	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	4	Lepomis cyanellus	49	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	4	Lepomis sp.	11	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	4	Palaemonetes sp.		2
2911	Upper New Channel Reach	Cab-2	2022-08-26	5	Lepomis miniatus	38	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	5	Lepomis cyanellus	50	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	5	Palaemonetes sp.		6
2911	Upper New Channel Reach	Cab-2	2022-08-26	5	Procambarus sp.		1
2911	Upper New Channel Reach	Cab-2	2022-08-26	6	Palaemonetes sp.		1
2911	Upper New Channel Reach	Cab-2	2022-08-26	6	Procambarus sp.		1
2911	Upper New Channel Reach	Cab-2	2022-08-26	6	Lepomis miniatus	58	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	7	Gambusia sp.	35	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	7	Lepomis miniatus	52	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	8	Palaemonetes sp.		1
2911	Upper New Channel Reach	Cab-2	2022-08-26	8	No fish collected		
2911	Upper New Channel Reach	Cab-2	2022-08-26	9	Lepomis miniatus	51	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	9	Etheostoma fonticola	32	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	10	No fish collected		
2911	Upper New Channel Reach	Cab-2	2022-08-26	11	Procambarus sp.		1
2911	Upper New Channel Reach	Cab-2	2022-08-26	11	Lepomis miniatus	47	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	12	No fish collected		

2911	Upper New Channel Reach	Cab-2	2022-08-26	13	Lepomis cyanellus	101	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	13	Lepomis miniatus	43	1
2911	Upper New Channel Reach	Cab-2	2022-08-26	14	No fish collected		
2911	Upper New Channel Reach	Cab-2	2022-08-26	15	No fish collected		
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Procambarus sp.		1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Micropterus salmoides		1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Herichthys cyanoguttatus	41	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	43	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	98	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	54	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	42	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	33	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	120	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	104	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	48	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	98	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	64	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	28	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	1	Lepomis miniatus	25	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	2	Lepomis miniatus	67	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	2	Lepomis miniatus	29	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	2	Lepomis miniatus	70	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	3	Lepomis miniatus	42	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	3	Lepomis miniatus	47	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	3	Lepomis miniatus	39	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	3	Lepomis sp.	10	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	4	Lepomis miniatus	48	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	4	Lepomis miniatus	59	1

2912	Upper New Channel Reach	Hyg-1	2022-08-26	5	Lepomis cyanellus	98	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	5	Lepomis miniatus	30	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	6	No fish collected		
2912	Upper New Channel Reach	Hyg-1	2022-08-26	7	Micropterus salmoides	47	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	8	No fish collected		
2912	Upper New Channel Reach	Hyg-1	2022-08-26	9	No fish collected		
2912	Upper New Channel Reach	Hyg-1	2022-08-26	10	Lepomis miniatus	85	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	10	Lepomis miniatus	77	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	11	Lepomis miniatus	40	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	12	No fish collected		
2912	Upper New Channel Reach	Hyg-1	2022-08-26	13	Lepomis miniatus	56	1
2912	Upper New Channel Reach	Hyg-1	2022-08-26	14	No fish collected		
2912	Upper New Channel Reach	Hyg-1	2022-08-26	15	No fish collected		
2913	Upper New Channel Reach	Lud-1	2022-08-26	1	Procambarus sp.		1
2913	Upper New Channel Reach	Lud-1	2022-08-26	2	No fish collected		
2913	Upper New Channel Reach	Lud-1	2022-08-26	3	Etheostoma lepidum	35	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	3	Etheostoma lepidum	35	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	3	Etheostoma lepidum	46	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	3	Etheostoma lepidum	41	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	3	Etheostoma lepidum	35	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	3	Etheostoma fonticola	27	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	4	Etheostoma fonticola	32	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	4	Etheostoma fonticola	35	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	4	Etheostoma fonticola	21	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	5	Etheostoma lepidum	45	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	6	Procambarus sp.		1
2913	Upper New Channel Reach	Lud-1	2022-08-26	6	Etheostoma fonticola	25	1
2913	Upper New Channel Reach	Lud-1	2022-08-26	7	Procambarus sp.		1

2913	Upper New Channel Reach	Lud-1	2022-08-26	7	No fish collected		
2913	Upper New Channel Reach	Lud-1	2022-08-26	8	Procambarus sp.		2
2913	Upper New Channel Reach	Lud-1	2022-08-26	8	No fish collected		
2913	Upper New Channel Reach	Lud-1	2022-08-26	9	Procambarus sp.		2
2913	Upper New Channel Reach	Lud-1	2022-08-26	9	No fish collected		
2913	Upper New Channel Reach	Lud-1	2022-08-26	10	No fish collected		
2913	Upper New Channel Reach	Lud-1	2022-08-26	11	No fish collected		
2913	Upper New Channel Reach	Lud-1	2022-08-26	12	No fish collected		
2913	Upper New Channel Reach	Lud-1	2022-08-26	13	No fish collected		
2913	Upper New Channel Reach	Lud-1	2022-08-26	14	No fish collected		
2913	Upper New Channel Reach	Lud-1	2022-08-26	15	No fish collected		
2914	Upper New Channel Reach	Open-2	2022-08-26	1	No fish collected		
2914	Upper New Channel Reach	Open-2	2022-08-26	2	No fish collected		
2914	Upper New Channel Reach	Open-2	2022-08-26	3	No fish collected		
2914	Upper New Channel Reach	Open-2	2022-08-26	4	No fish collected		
2914	Upper New Channel Reach	Open-2	2022-08-26	5	No fish collected		
2914	Upper New Channel Reach	Open-2	2022-08-26	6	No fish collected		
2914	Upper New Channel Reach	Open-2	2022-08-26	7	No fish collected		
2914	Upper New Channel Reach	Open-2	2022-08-26	8	No fish collected		
2914	Upper New Channel Reach	Open-2	2022-08-26	9	No fish collected		
2914	Upper New Channel Reach	Open-2	2022-08-26	10	No fish collected		
2915	Upper New Channel Reach	Hyg-2	2022-08-26	1	Palaemonetes sp.		17
2915	Upper New Channel Reach	Hyg-2	2022-08-26	1	Lepomis miniatus	25	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	2	Lepomis miniatus	80	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	2	Lepomis miniatus	21	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	2	Micropterus salmoides	52	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	2	Micropterus salmoides	34	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	2	Gambusia sp.	15	1

2915	Upper New Channel Reach	Hyg-2	2022-08-26	2	Gambusia sp.	10	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	2	Palaemonetes sp.		14
2915	Upper New Channel Reach	Hyg-2	2022-08-26	2	Procambarus sp.		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	3	Palaemonetes sp.		5
2915	Upper New Channel Reach	Hyg-2	2022-08-26	3	Procambarus sp.		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	3	Lepomis miniatus	28	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	3	Etheostoma lepidum	41	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	3	Gambusia sp.	17	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	4	Palaemonetes sp.		12
2915	Upper New Channel Reach	Hyg-2	2022-08-26	4	Herichthys cyanoguttatus	26	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	5	Palaemonetes sp.		27
2915	Upper New Channel Reach	Hyg-2	2022-08-26	5	Procambarus sp.		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	5	Lepomis miniatus	130	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	5	Herichthys cyanoguttatus	30	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	5	Herichthys cyanoguttatus	32	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	5	Gambusia sp.	10	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	5	Etheostoma fonticola	15	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	6	Palaemonetes sp.		9
2915	Upper New Channel Reach	Hyg-2	2022-08-26	6	Procambarus sp.		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	6	No fish collected		
2915	Upper New Channel Reach	Hyg-2	2022-08-26	7	Palaemonetes sp.		3
2915	Upper New Channel Reach	Hyg-2	2022-08-26	7	Procambarus sp.		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	7	Lepomis cyanellus	81	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	7	Lepomis cyanellus		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	7	Lepomis miniatus	50	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	8	Lepomis miniatus	85	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	8	Lepomis cyanellus	45	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	8	Palaemonetes sp.		13

2915	Upper New Channel Reach	Hyg-2	2022-08-26	9	Palaemonetes sp.		3
2915	Upper New Channel Reach	Hyg-2	2022-08-26	9	Procambarus sp.		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	9	Lepomis miniatus	75	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	10	Lepomis miniatus	95	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	10	Lepomis miniatus	57	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	10	Palaemonetes sp.		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	11	Palaemonetes sp.		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	11	No fish collected		
2915	Upper New Channel Reach	Hyg-2	2022-08-26	12	Lepomis miniatus	132	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	12	Lepomis miniatus	98	1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	12	Palaemonetes sp.		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	13	No fish collected		
2915	Upper New Channel Reach	Hyg-2	2022-08-26	14	Palaemonetes sp.		1
2915	Upper New Channel Reach	Hyg-2	2022-08-26	14	No fish collected		
2915	Upper New Channel Reach	Hyg-2	2022-08-26	15	No fish collected		
2916	Upper New Channel Reach	Lud-2	2022-08-26	1	Palaemonetes sp.		5
2916	Upper New Channel Reach	Lud-2	2022-08-26	1	Procambarus sp.		2
2916	Upper New Channel Reach	Lud-2	2022-08-26	1	No fish collected		
2916	Upper New Channel Reach	Lud-2	2022-08-26	2	Procambarus sp.		3
2916	Upper New Channel Reach	Lud-2	2022-08-26	2	Palaemonetes sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	2	No fish collected		
2916	Upper New Channel Reach	Lud-2	2022-08-26	3	Palaemonetes sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	3	Procambarus sp.		3
2916	Upper New Channel Reach	Lud-2	2022-08-26	3	No fish collected		
2916	Upper New Channel Reach	Lud-2	2022-08-26	4	Lepomis miniatus	40	1
2916	Upper New Channel Reach	Lud-2	2022-08-26	4	Lepomis miniatus	30	1
2916	Upper New Channel Reach	Lud-2	2022-08-26	4	Lepomis miniatus	33	1
2916	Upper New Channel Reach	Lud-2	2022-08-26	4	Ambloplites rupestris	57	1

2916	Upper New Channel Reach	Lud-2	2022-08-26	4	Etheostoma fonticola	26	1
2916	Upper New Channel Reach	Lud-2	2022-08-26	4	Etheostoma fonticola	31	1
2916	Upper New Channel Reach	Lud-2	2022-08-26	4	Herichthys cyanoguttatus	25	1
2916	Upper New Channel Reach	Lud-2	2022-08-26	4	Procambarus sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	4	Palaemonetes sp.		2
2916	Upper New Channel Reach	Lud-2	2022-08-26	5	Procambarus sp.		5
2916	Upper New Channel Reach	Lud-2	2022-08-26	5	Palaemonetes sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	5	No fish collected		
2916	Upper New Channel Reach	Lud-2	2022-08-26	6	No fish collected		
2916	Upper New Channel Reach	Lud-2	2022-08-26	7	Palaemonetes sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	7	Procambarus sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	7	Etheostoma fonticola	32	1
2916	Upper New Channel Reach	Lud-2	2022-08-26	7	Gambusia sp.	14	1
2916	Upper New Channel Reach	Lud-2	2022-08-26	8	Procambarus sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	8	No fish collected		
2916	Upper New Channel Reach	Lud-2	2022-08-26	9	Procambarus sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	9	No fish collected		
2916	Upper New Channel Reach	Lud-2	2022-08-26	10	Procambarus sp.		3
2916	Upper New Channel Reach	Lud-2	2022-08-26	10	Palaemonetes sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	10	No fish collected		
2916	Upper New Channel Reach	Lud-2	2022-08-26	11	Procambarus sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	11	Lepomis miniatus	32	1
2916	Upper New Channel Reach	Lud-2	2022-08-26	12	Lepomis miniatus	36	1
2916	Upper New Channel Reach	Lud-2	2022-08-26	12	Procambarus sp.		2
2916	Upper New Channel Reach	Lud-2	2022-08-26	13	Procambarus sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	13	No fish collected		
2916	Upper New Channel Reach	Lud-2	2022-08-26	14	Procambarus sp.		1
2916	Upper New Channel Reach	Lud-2	2022-08-26	14	No fish collected		

2916	Upper New Channel Reach	Lud-2	2022-08-26	15	No fish collected		
2943	Upper New Channel Reach	Hyg-1	2022-10-26	1	Palaemonetes sp.		12
2943	Upper New Channel Reach	Hyg-1	2022-10-26	1	Procambarus sp.		1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	1	Herichthys cyanoguttatus	31	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	1	Gambusia sp.	24	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	1	Etheostoma fonticola	34	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	1	Etheostoma fonticola	21	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	1	Etheostoma fonticola	15	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	1	Etheostoma fonticola	14	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	1	Etheostoma fonticola	12	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	1	Etheostoma fonticola	16	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	2	Palaemonetes sp.		4
2943	Upper New Channel Reach	Hyg-1	2022-10-26	2	Herichthys cyanoguttatus	27	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	2	Lepomis miniatus	55	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	2	Gambusia sp.	25	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	2	Gambusia sp.	18	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	2	Etheostoma fonticola	33	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	2	Etheostoma fonticola	30	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	3	Procambarus sp.		1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	3	Etheostoma fonticola	17	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	4	No fish collected		
2943	Upper New Channel Reach	Hyg-1	2022-10-26	5	Palaemonetes sp.		2
2943	Upper New Channel Reach	Hyg-1	2022-10-26	5	Procambarus sp.		2
2943	Upper New Channel Reach	Hyg-1	2022-10-26	5	Etheostoma fonticola	26	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	6	Palaemonetes sp.		1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	6	No fish collected		
2943	Upper New Channel Reach	Hyg-1	2022-10-26	7	Procambarus sp.		2
2943	Upper New Channel Reach	Hyg-1	2022-10-26	7	Etheostoma fonticola	30	1

2943	Upper New Channel Reach	Hyg-1	2022-10-26	7	Etheostoma fonticola	13	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	7	Etheostoma fonticola	31	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	8	Procambarus sp.		2
2943	Upper New Channel Reach	Hyg-1	2022-10-26	8	No fish collected		
2943	Upper New Channel Reach	Hyg-1	2022-10-26	9	Palaemonetes sp.		1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	9	Procambarus sp.		2
2943	Upper New Channel Reach	Hyg-1	2022-10-26	9	No fish collected		
2943	Upper New Channel Reach	Hyg-1	2022-10-26	10	Procambarus sp.		2
2943	Upper New Channel Reach	Hyg-1	2022-10-26	10	No fish collected		
2943	Upper New Channel Reach	Hyg-1	2022-10-26	11	Palaemonetes sp.		1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	11	Etheostoma fonticola	18	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	12	Procambarus sp.		1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	12	No fish collected		
2943	Upper New Channel Reach	Hyg-1	2022-10-26	13	Gambusia sp.	26	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	13	Etheostoma fonticola	34	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	13	Etheostoma fonticola	15	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	14	Etheostoma fonticola	24	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	14	Lepomis miniatus	50	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	14	Procambarus sp.		2
2943	Upper New Channel Reach	Hyg-1	2022-10-26	15	Etheostoma fonticola	29	1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	15	Palaemonetes sp.		1
2943	Upper New Channel Reach	Hyg-1	2022-10-26	16	No fish collected		
2944	Upper New Channel Reach	Open-1	2022-10-26	1	No fish collected		
2944	Upper New Channel Reach	Open-1	2022-10-26	2	No fish collected		
2944	Upper New Channel Reach	Open-1	2022-10-26	3	No fish collected		
2944	Upper New Channel Reach	Open-1	2022-10-26	4	No fish collected		
2944	Upper New Channel Reach	Open-1	2022-10-26	5	No fish collected		
2944	Upper New Channel Reach	Open-1	2022-10-26	6	No fish collected		

2944	Upper New Channel Reach	Open-1	2022-10-26	7	No fish collected		
2944	Upper New Channel Reach	Open-1	2022-10-26	8	No fish collected		
2944	Upper New Channel Reach	Open-1	2022-10-26	9	No fish collected		
2944	Upper New Channel Reach	Open-1	2022-10-26	10	No fish collected		
2945	Upper New Channel Reach	Open-2	2022-10-26	1	No fish collected		
2945	Upper New Channel Reach	Open-2	2022-10-26	2	No fish collected		
2945	Upper New Channel Reach	Open-2	2022-10-26	3	No fish collected		
2945	Upper New Channel Reach	Open-2	2022-10-26	4	No fish collected		
2945	Upper New Channel Reach	Open-2	2022-10-26	5	No fish collected		
2945	Upper New Channel Reach	Open-2	2022-10-26	6	No fish collected		
2945	Upper New Channel Reach	Open-2	2022-10-26	7	No fish collected		
2945	Upper New Channel Reach	Open-2	2022-10-26	8	No fish collected		
2945	Upper New Channel Reach	Open-2	2022-10-26	9	No fish collected		
2945	Upper New Channel Reach	Open-2	2022-10-26	10	No fish collected		
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Procambarus sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Palaemonetes sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Lepomis miniatus	38	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Lepomis miniatus	40	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Micropterus salmoides	103	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Lepomis sp.	15	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	30	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	28	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	30	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	24	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	20	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	30	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	35	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	25	1

2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	24	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	35	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	24	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	20	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	40	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	25	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	18	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	18	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	25	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	20	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	22	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	30	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	18	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	17	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	27	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	27	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	1	Gambusia sp.	30	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	2	Lepomis miniatus	131	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	2	Lepomis miniatus	75	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	2	Lepomis miniatus	54	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	2	Lepomis miniatus	55	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	2	Lepomis sp.	15	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	3	Lepomis miniatus	55	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	3	Lepomis sp.	12	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	3	Gambusia sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	3	Gambusia sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	3	Gambusia sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	3	Gambusia sp.		1

2946	Upper New Channel Reach	Cab-1	2022-10-26	3	Gambusia sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	3	Gambusia sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	4	No fish collected		
2946	Upper New Channel Reach	Cab-1	2022-10-26	5	Lepomis miniatus	55	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	6	Lepomis sp.	20	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	6	Gambusia sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	7	Lepomis sp.	14	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	7	Lepomis sp.	15	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	8	No fish collected		
2946	Upper New Channel Reach	Cab-1	2022-10-26	9	Gambusia sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	9	Palaemonetes sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	10	Lepomis miniatus	95	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	11	No fish collected		
2946	Upper New Channel Reach	Cab-1	2022-10-26	12	Etheostoma fonticola	21	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	12	Lepomis sp.	16	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	13	Gambusia sp.		1
2946	Upper New Channel Reach	Cab-1	2022-10-26	13	Etheostoma fonticola	15	1
2946	Upper New Channel Reach	Cab-1	2022-10-26	14	No fish collected		
2946	Upper New Channel Reach	Cab-1	2022-10-26	15	No fish collected		
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Palaemonetes sp.		16
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis miniatus	62	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis miniatus	55	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Astyanax mexicanus	28	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Gambusia sp.	11	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Etheostoma fonticola	15	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	17	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	16	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	16	1

2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	10	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	11	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	12	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	14	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	15	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	11	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	11	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	1	Lepomis sp.	10	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Palaemonetes sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis cyanellus	11	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis cyanellus	15	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis miniatus	45	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis sp.	15	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis sp.	15	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis sp.	15	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis sp.	15	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis sp.	11	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis sp.	10	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis sp.	12	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	2	Lepomis sp.	14	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	3	Palaemonetes sp.		3
2947	Upper New Channel Reach	Cab-2	2022-10-26	3	Lepomis cyanellus	61	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	3	Herichthys cyanoguttatus	70	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	3	Lepomis sp.	12	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	3	Lepomis sp.	14	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	3	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	3	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	4	Palaemonetes sp.		2

2947	Upper New Channel Reach	Cab-2	2022-10-26	4	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	4	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	4	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Palaemonetes sp.		3
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	5	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	6	Lepomis miniatus	61	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	6	Lepomis miniatus	67	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	6	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	6	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	6	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	6	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	6	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	6	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	7	Lepomis miniatus	113	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	8	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	8	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	9	Procambarus sp.		1

2947	Upper New Channel Reach	Cab-2	2022-10-26	9	No fish collected		
2947	Upper New Channel Reach	Cab-2	2022-10-26	10	Lepomis cyanellus	75	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	10	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	10	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	10	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	10	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	11	Lepomis miniatus	60	1
2947	Upper New Channel Reach	Cab-2	2022-10-26	11	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	11	Palaemonetes sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	12	Procambarus sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	12	No fish collected		
2947	Upper New Channel Reach	Cab-2	2022-10-26	13	Procambarus sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	13	Lepomis sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	14	Palaemonetes sp.		1
2947	Upper New Channel Reach	Cab-2	2022-10-26	14	No fish collected		
2947	Upper New Channel Reach	Cab-2	2022-10-26	15	No fish collected		
2947	Upper New Channel Reach	Cab-2	2022-10-26	6	Lepomis sp.		1
2948	Upper New Channel Reach	Lud-1	2022-10-26	1	Palaemonetes sp.		11
2948	Upper New Channel Reach	Lud-1	2022-10-26	1	Lepomis sp.	19	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	2	Palaemonetes sp.		6
2948	Upper New Channel Reach	Lud-1	2022-10-26	2	Procambarus sp.		1
2948	Upper New Channel Reach	Lud-1	2022-10-26	2	No fish collected		
2948	Upper New Channel Reach	Lud-1	2022-10-26	3	Palaemonetes sp.		4
2948	Upper New Channel Reach	Lud-1	2022-10-26	3	Procambarus sp.		1
2948	Upper New Channel Reach	Lud-1	2022-10-26	3	Lepomis miniatus	28	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	3	Herichthys cyanoguttatus	27	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	3	Lepomis sp.	9	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	4	Palaemonetes sp.		1

2948	Upper New Channel Reach	Lud-1	2022-10-26	4	Procambarus sp.		1
2948	Upper New Channel Reach	Lud-1	2022-10-26	4	No fish collected		
2948	Upper New Channel Reach	Lud-1	2022-10-26	5	Palaemonetes sp.		3
2948	Upper New Channel Reach	Lud-1	2022-10-26	5	Procambarus sp.		1
2948	Upper New Channel Reach	Lud-1	2022-10-26	5	No fish collected		
2948	Upper New Channel Reach	Lud-1	2022-10-26	6	Procambarus sp.		1
2948	Upper New Channel Reach	Lud-1	2022-10-26	6	No fish collected		
2948	Upper New Channel Reach	Lud-1	2022-10-26	7	Procambarus sp.		3
2948	Upper New Channel Reach	Lud-1	2022-10-26	7	Lepomis miniatus	30	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	8	Etheostoma fonticola	30	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	8	Etheostoma fonticola	28	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	8	Etheostoma lepidum	40	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	8	Procambarus sp.		4
2948	Upper New Channel Reach	Lud-1	2022-10-26	9	Procambarus sp.		1
2948	Upper New Channel Reach	Lud-1	2022-10-26	9	No fish collected		
2948	Upper New Channel Reach	Lud-1	2022-10-26	10	Palaemonetes sp.		1
2948	Upper New Channel Reach	Lud-1	2022-10-26	10	Etheostoma fonticola	30	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	10	Lepomis sp.	10	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	11	Procambarus sp.		2
2948	Upper New Channel Reach	Lud-1	2022-10-26	11	No fish collected		
2948	Upper New Channel Reach	Lud-1	2022-10-26	12	Etheostoma fonticola	31	1
2948	Upper New Channel Reach	Lud-1	2022-10-26	13	Procambarus sp.		1
2948	Upper New Channel Reach	Lud-1	2022-10-26	13	No fish collected		
2948	Upper New Channel Reach	Lud-1	2022-10-26	14	No fish collected		
2948	Upper New Channel Reach	Lud-1	2022-10-26	15	Procambarus sp.		2
2948	Upper New Channel Reach	Lud-1	2022-10-26	15	No fish collected		
2949	Upper New Channel Reach	Lud-2	2022-10-26	1	Etheostoma fonticola	30	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	1	Etheostoma fonticola	11	1

2949	Upper New Channel Reach	Lud-2	2022-10-26	1	Procambarus sp.		5
2949	Upper New Channel Reach	Lud-2	2022-10-26	1	Ameiurus natalis	41	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	1	Procambarus sp.		5
2949	Upper New Channel Reach	Lud-2	2022-10-26	2	Palaemonetes sp.		6
2949	Upper New Channel Reach	Lud-2	2022-10-26	2	Procambarus sp.		2
2949	Upper New Channel Reach	Lud-2	2022-10-26	3	Ambloplites rupestris	48	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	3	Gambusia sp.	20	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	3	Herichthys cyanoguttatus	31	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	4	Palaemonetes sp.		2
2949	Upper New Channel Reach	Lud-2	2022-10-26	4	Etheostoma fonticola	11	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	5	Procambarus sp.		1
2949	Upper New Channel Reach	Lud-2	2022-10-26	5	No fish collected		
2949	Upper New Channel Reach	Lud-2	2022-10-26	6	Procambarus sp.		1
2949	Upper New Channel Reach	Lud-2	2022-10-26	6	Etheostoma fonticola	35	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	7	Procambarus sp.		1
2949	Upper New Channel Reach	Lud-2	2022-10-26	7	No fish collected		
2949	Upper New Channel Reach	Lud-2	2022-10-26	8	Gambusia sp.	21	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	9	Etheostoma lepidum	45	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	10	Etheostoma fonticola	11	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	11	Gambusia sp.	18	1
2949	Upper New Channel Reach	Lud-2	2022-10-26	12	No fish collected		
2949	Upper New Channel Reach	Lud-2	2022-10-26	13	No fish collected		
2949	Upper New Channel Reach	Lud-2	2022-10-26	14	No fish collected		
2949	Upper New Channel Reach	Lud-2	2022-10-26	15	No fish collected		
2949	Upper New Channel Reach	Lud-2	2022-10-26	2	No fish collected		
2950	Upper New Channel Reach	Hyg-2	2022-10-26	1	Procambarus sp.		2
2950	Upper New Channel Reach	Hyg-2	2022-10-26	1	Lepomis miniatus	61	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	1	Lepomis miniatus	28	1

2950	Upper New Channel Reach	Hyg-2	2022-10-26	1	Palaemonetes sp.		3
2950	Upper New Channel Reach	Hyg-2	2022-10-26	1	Astyanax mexicanus	20	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	2	Lepomis miniatus	80	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	2	Lepomis miniatus	55	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	2	Lepomis miniatus	51	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	2	Etheostoma lepidum	60	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	3	Lepomis miniatus	100	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	3	Lepomis miniatus	55	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	3	Palaemonetes sp.		1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	4	Procambarus sp.		3
2950	Upper New Channel Reach	Hyg-2	2022-10-26	4	No fish collected		
2950	Upper New Channel Reach	Hyg-2	2022-10-26	5	Lepomis miniatus	72	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	5	Palaemonetes sp.		1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	6	Lepomis sp.	9	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	7	No fish collected		
2950	Upper New Channel Reach	Hyg-2	2022-10-26	8	Lepomis sp.	9	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	9	No fish collected		
2950	Upper New Channel Reach	Hyg-2	2022-10-26	10	Palaemonetes sp.		1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	10	Lepomis miniatus	36	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	11	Lepomis sp.	10	1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	12	Procambarus sp.		1
2950	Upper New Channel Reach	Hyg-2	2022-10-26	12	No fish collected		
2950	Upper New Channel Reach	Hyg-2	2022-10-26	13	No fish collected		
2950	Upper New Channel Reach	Hyg-2	2022-10-26	14	Procambarus sp.		4
2950	Upper New Channel Reach	Hyg-2	2022-10-26	14	No fish collected		
2950	Upper New Channel Reach	Hyg-2	2022-10-26	15	Lepomis miniatus	89	1
2771	Upper Spring Run	Open-1	2022-05-03	1	Dionda nigrotaeniata	24	1
2771	Upper Spring Run	Open-1	2022-05-03	2	Procambarus sp.		1
2771	Upper Spring Run	Open-1	2022-05-03	2	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	3	No fish collected		

2771	Upper Spring Run	Open-1	2022-05-03	4	Etheostoma lepidum	44	1
2771	Upper Spring Run	Open-1	2022-05-03	5	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	6	Procambarus sp.		1
2771	Upper Spring Run	Open-1	2022-05-03	6	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	7	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	8	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	9	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	10	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	11	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	12	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	13	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	14	No fish collected		
2771	Upper Spring Run	Open-1	2022-05-03	15	No fish collected		
2772	Upper Spring Run	Algae-1	2022-05-03	1	Micropterus salmoides	35	1
2772	Upper Spring Run	Algae-1	2022-05-03	2	Lepomis miniatus	32	1
2772	Upper Spring Run	Algae-1	2022-05-03	2	Lepomis miniatus	23	1
2772	Upper Spring Run	Algae-1	2022-05-03	2	Etheostoma fonticola	21	1
2772	Upper Spring Run	Algae-1	2022-05-03	2	Etheostoma fonticola	15	1
2772	Upper Spring Run	Algae-1	2022-05-03	2	Etheostoma fonticola	14	1
2772	Upper Spring Run	Algae-1	2022-05-03	3	Procambarus sp.		2
2772	Upper Spring Run	Algae-1	2022-05-03	3	Etheostoma lepidum	35	1
2772	Upper Spring Run	Algae-1	2022-05-03	3	Etheostoma fonticola	28	1
2772	Upper Spring Run	Algae-1	2022-05-03	3	Etheostoma fonticola	28	1
2772	Upper Spring Run	Algae-1	2022-05-03	3	Etheostoma fonticola	29	1
2772	Upper Spring Run	Algae-1	2022-05-03	4	Procambarus sp.		2
2772	Upper Spring Run	Algae-1	2022-05-03	4	Astyanax mexicanus	33	1
2772	Upper Spring Run	Algae-1	2022-05-03	4	Etheostoma fonticola	25	1
2772	Upper Spring Run	Algae-1	2022-05-03	5	Dionda nigrotaeniata	32	1
2772	Upper Spring Run	Algae-1	2022-05-03	5	Dionda nigrotaeniata	30	1
2772	Upper Spring Run	Algae-1	2022-05-03	5	Dionda nigrotaeniata	32	1
2772	Upper Spring Run	Algae-1	2022-05-03	5	Dionda nigrotaeniata	35	1
2772	Upper Spring Run	Algae-1	2022-05-03	5	Dionda nigrotaeniata	28	1
2772	Upper Spring Run	Algae-1	2022-05-03	5	Dionda nigrotaeniata	28	1
2772	Upper Spring Run	Algae-1	2022-05-03	5	Dionda nigrotaeniata	32	1
2772	Upper Spring Run	Algae-1	2022-05-03	5	Dionda nigrotaeniata	29	1
2772	Upper Spring Run	Algae-1	2022-05-03	6	Procambarus sp.		1
2772	Upper Spring Run	Algae-1	2022-05-03	6	No fish collected		
2772	Upper Spring Run	Algae-1	2022-05-03	7	Procambarus sp.		1
2772	Upper Spring Run	Algae-1	2022-05-03	7	No fish collected		
2772	Upper Spring Run	Algae-1	2022-05-03	8	Dionda nigrotaeniata	30	1
2772	Upper Spring Run	Algae-1	2022-05-03	8	Dionda nigrotaeniata	25	1

2772	Upper Spring Run	Algae-1	2022-05-03	8	Dionda nigrotaeniata	23	1
2772	Upper Spring Run	Algae-1	2022-05-03	8	Dionda nigrotaeniata	27	1
2772	Upper Spring Run	Algae-1	2022-05-03	8	Dionda nigrotaeniata	29	1
2772	Upper Spring Run	Algae-1	2022-05-03	9	No fish collected		
2772	Upper Spring Run	Algae-1	2022-05-03	10	Dionda nigrotaeniata	38	1
2772	Upper Spring Run	Algae-1	2022-05-03	10	Etheostoma fonticola	32	1
2772	Upper Spring Run	Algae-1	2022-05-03	10	Etheostoma fonticola	30	1
2772	Upper Spring Run	Algae-1	2022-05-03	11	Micropterus salmoides	60	1
2772	Upper Spring Run	Algae-1	2022-05-03	11	Dionda nigrotaeniata	33	1
2772	Upper Spring Run	Algae-1	2022-05-03	11	Etheostoma fonticola	30	1
2772	Upper Spring Run	Algae-1	2022-05-03	12	Etheostoma fonticola	29	1
2772	Upper Spring Run	Algae-1	2022-05-03	12	Etheostoma lepidum	25	1
2772	Upper Spring Run	Algae-1	2022-05-03	12	Etheostoma lepidum	24	1
2772	Upper Spring Run	Algae-1	2022-05-03	13	Dionda nigrotaeniata	27	1
2772	Upper Spring Run	Algae-1	2022-05-03	13	Procambarus sp.		1
2772	Upper Spring Run	Algae-1	2022-05-03	14	No fish collected		
2772	Upper Spring Run	Algae-1	2022-05-03	15	Procambarus sp.		1
2772	Upper Spring Run	Algae-1	2022-05-03	15	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	1	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	2	Etheostoma fonticola	22	1
2773	Upper Spring Run	Open-2	2022-05-03	2	Astyanax mexicanus	14	1
2773	Upper Spring Run	Open-2	2022-05-03	3	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	4	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	5	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	6	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	7	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	8	Dionda nigrotaeniata	18	1
2773	Upper Spring Run	Open-2	2022-05-03	9	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	10	Etheostoma fonticola	31	1
2773	Upper Spring Run	Open-2	2022-05-03	10	Etheostoma fonticola	29	1
2773	Upper Spring Run	Open-2	2022-05-03	11	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	12	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	13	Etheostoma fonticola	29	1
2773	Upper Spring Run	Open-2	2022-05-03	14	No fish collected		
2773	Upper Spring Run	Open-2	2022-05-03	15	No fish collected		
2774	Upper Spring Run	Algae-2	2022-05-03	4	Etheostoma fonticola	19	1
2774	Upper Spring Run	Algae-2	2022-05-03	4	Etheostoma fonticola	27	1
2774	Upper Spring Run	Algae-2	2022-05-03	5	Procambarus sp.		1
2774	Upper Spring Run	Algae-2	2022-05-03	5	Etheostoma fonticola	40	1
2774	Upper Spring Run	Algae-2	2022-05-03	6	Etheostoma fonticola	26	1
2774	Upper Spring Run	Algae-2	2022-05-03	6	Etheostoma fonticola	29	1

2774	Upper Spring Run	Algae-2	2022-05-03	6	Etheostoma fonticola	18	1
2774	Upper Spring Run	Algae-2	2022-05-03	6	Etheostoma fonticola	22	1
2774	Upper Spring Run	Algae-2	2022-05-03	6	Procambarus sp.		1
2774	Upper Spring Run	Algae-2	2022-05-03	7	Procambarus sp.		1
2774	Upper Spring Run	Algae-2	2022-05-03	7	Etheostoma fonticola	29	1
2774	Upper Spring Run	Algae-2	2022-05-03	7	Dionda nigrotaeniata	12	1
2774	Upper Spring Run	Algae-2	2022-05-03	8	Etheostoma fonticola	24	1
2774	Upper Spring Run	Algae-2	2022-05-03	8	Procambarus sp.		1
2774	Upper Spring Run	Algae-2	2022-05-03	9	Etheostoma fonticola	26	1
2774	Upper Spring Run	Algae-2	2022-05-03	9	Etheostoma fonticola	28	1
2774	Upper Spring Run	Algae-2	2022-05-03	10	No fish collected		
2774	Upper Spring Run	Algae-2	2022-05-03	11	Etheostoma lepidum	42	1
2774	Upper Spring Run	Algae-2	2022-05-03	12	No fish collected		
2774	Upper Spring Run	Algae-2	2022-05-03	13	No fish collected		
2774	Upper Spring Run	Algae-2	2022-05-03	14	Etheostoma fonticola	26	1
2774	Upper Spring Run	Algae-2	2022-05-03	14	Etheostoma fonticola	25	1
2774	Upper Spring Run	Algae-2	2022-05-03	15	Etheostoma fonticola	28	1
2774	Upper Spring Run	Algae-2	2022-05-03	16	Etheostoma fonticola	22	1
2774	Upper Spring Run	Algae-2	2022-05-03	17	No fish collected		
2774	Upper Spring Run	Algae-2	2022-05-03	1	Procambarus sp.		3
2774	Upper Spring Run	Algae-2	2022-05-03	1	Etheostoma fonticola	16	1
2774	Upper Spring Run	Algae-2	2022-05-03	1	Etheostoma fonticola	16	1
2774	Upper Spring Run	Algae-2	2022-05-03	1	Etheostoma fonticola	18	1
2774	Upper Spring Run	Algae-2	2022-05-03	1	Etheostoma fonticola	18	1
2774	Upper Spring Run	Algae-2	2022-05-03	1	Etheostoma fonticola	22	1
2774	Upper Spring Run	Algae-2	2022-05-03	1	Etheostoma fonticola	18	1
2774	Upper Spring Run	Algae-2	2022-05-03	1	Dionda nigrotaeniata	20	1
2774	Upper Spring Run	Algae-2	2022-05-03	1	Palaemonetes sp.		1
2774	Upper Spring Run	Algae-2	2022-05-03	2	Procambarus sp.		2
2774	Upper Spring Run	Algae-2	2022-05-03	2	Etheostoma fonticola	28	1
2774	Upper Spring Run	Algae-2	2022-05-03	2	Etheostoma fonticola	16	1
2774	Upper Spring Run	Algae-2	2022-05-03	2	Etheostoma fonticola	20	1
2774	Upper Spring Run	Algae-2	2022-05-03	3	Etheostoma fonticola	27	1
2774	Upper Spring Run	Algae-2	2022-05-03	3	Etheostoma fonticola	24	1
2774	Upper Spring Run	Algae-2	2022-05-03	3	Etheostoma fonticola	40	1
2775	Upper Spring Run	Sag-1	2022-05-03	1	Procambarus sp.		1
2775	Upper Spring Run	Sag-1	2022-05-03	1	No fish collected		
2775	Upper Spring Run	Sag-1	2022-05-03	2	Procambarus sp.		2
2775	Upper Spring Run	Sag-1	2022-05-03	2	Lepomis miniatus	85	1
2775	Upper Spring Run	Sag-1	2022-05-03	3	Dionda nigrotaeniata	26	1
2775	Upper Spring Run	Sag-1	2022-05-03	3	Dionda nigrotaeniata	25	1

2775	Upper Spring Run	Sag-1	2022-05-03	3	Dionda nigrotaeniata	26	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Procambarus sp.		2
2775	Upper Spring Run	Sag-1	2022-05-03	4	Micropterus salmoides	45	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Micropterus salmoides	65	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	33	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	28	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	31	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	30	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	27	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	28	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	27	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	36	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	28	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	35	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	31	1
2775	Upper Spring Run	Sag-1	2022-05-03	4	Dionda nigrotaeniata	27	1
2775	Upper Spring Run	Sag-1	2022-05-03	5	Procambarus sp.		1
2775	Upper Spring Run	Sag-1	2022-05-03	5	Dionda nigrotaeniata	32	1
2775	Upper Spring Run	Sag-1	2022-05-03	5	Dionda nigrotaeniata	28	1
2775	Upper Spring Run	Sag-1	2022-05-03	6	Dionda nigrotaeniata	26	1
2775	Upper Spring Run	Sag-1	2022-05-03	7	Procambarus sp.		1
2775	Upper Spring Run	Sag-1	2022-05-03	7	No fish collected		
2775	Upper Spring Run	Sag-1	2022-05-03	8	No fish collected		
2775	Upper Spring Run	Sag-1	2022-05-03	9	Dionda nigrotaeniata	32	1
2775	Upper Spring Run	Sag-1	2022-05-03	10	No fish collected		
2775	Upper Spring Run	Sag-1	2022-05-03	11	No fish collected		
2775	Upper Spring Run	Sag-1	2022-05-03	12	Dionda nigrotaeniata	34	1
2775	Upper Spring Run	Sag-1	2022-05-03	13	Procambarus sp.		1
2775	Upper Spring Run	Sag-1	2022-05-03	13	No fish collected		
2775	Upper Spring Run	Sag-1	2022-05-03	14	Dionda nigrotaeniata	34	1
2775	Upper Spring Run	Sag-1	2022-05-03	15	Dionda nigrotaeniata	28	1
2775	Upper Spring Run	Sag-1	2022-05-03	3	Procambarus sp.		1
2776	Upper Spring Run	Sag-2	2022-05-03	1	Procambarus sp.		1
2776	Upper Spring Run	Sag-2	2022-05-03	1	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	2	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	2	Procambarus sp.		1
2776	Upper Spring Run	Sag-2	2022-05-03	3	Procambarus sp.		2
2776	Upper Spring Run	Sag-2	2022-05-03	3	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	4	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	5	Procambarus sp.		1
2776	Upper Spring Run	Sag-2	2022-05-03	5	No fish collected		

2776	Upper Spring Run	Sag-2	2022-05-03	6	Procambarus sp.		1
2776	Upper Spring Run	Sag-2	2022-05-03	6	Dionda nigrotaeniata	32	1
2776	Upper Spring Run	Sag-2	2022-05-03	7	Dionda nigrotaeniata	33	1
2776	Upper Spring Run	Sag-2	2022-05-03	8	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	9	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	10	Procambarus sp.		1
2776	Upper Spring Run	Sag-2	2022-05-03	10	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	11	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	12	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	13	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	14	No fish collected		
2776	Upper Spring Run	Sag-2	2022-05-03	15	No fish collected		
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Procambarus sp.		15
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Palaemonetes sp.		23
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Lepomis miniatus	35	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Lepomis miniatus	22	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Dionda nigrotaeniata	22	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Dionda nigrotaeniata	18	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Dionda nigrotaeniata	15	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Dionda nigrotaeniata	14	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Etheostoma fonticola	32	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Etheostoma fonticola	30	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Etheostoma fonticola	32	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Etheostoma fonticola	34	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Etheostoma fonticola	28	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Etheostoma fonticola	18	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Etheostoma fonticola	20	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Etheostoma fonticola	28	1
2777	Upper Spring Run	Bryo-1	2022-05-03	1	Etheostoma fonticola	24	1
2777	Upper Spring Run	Bryo-1	2022-05-03	2	Procambarus sp.		22
2777	Upper Spring Run	Bryo-1	2022-05-03	2	Palaemonetes sp.		8
2777	Upper Spring Run	Bryo-1	2022-05-03	2	Astyanax mexicanus	25	1
2777	Upper Spring Run	Bryo-1	2022-05-03	2	Astyanax mexicanus	15	1
2777	Upper Spring Run	Bryo-1	2022-05-03	2	Astyanax mexicanus	27	1
2777	Upper Spring Run	Bryo-1	2022-05-03	2	Astyanax mexicanus	15	1
2777	Upper Spring Run	Bryo-1	2022-05-03	2	Dionda nigrotaeniata	18	1
2777	Upper Spring Run	Bryo-1	2022-05-03	2	Dionda nigrotaeniata	16	1
2777	Upper Spring Run	Bryo-1	2022-05-03	2	Dionda nigrotaeniata	12	1
2777	Upper Spring Run	Bryo-1	2022-05-03	3	Procambarus sp.		20
2777	Upper Spring Run	Bryo-1	2022-05-03	3	Palaemonetes sp.		8
2777	Upper Spring Run	Bryo-1	2022-05-03	3	Etheostoma fonticola	27	1

2777	Upper Spring Run	Bryo-1	2022-05-03	3	Etheostoma fonticola	26	1
2777	Upper Spring Run	Bryo-1	2022-05-03	4	Procambarus sp.		8
2777	Upper Spring Run	Bryo-1	2022-05-03	4	Palaemonetes sp.		6
2777	Upper Spring Run	Bryo-1	2022-05-03	4	Dionda nigrotaeniata	24	1
2777	Upper Spring Run	Bryo-1	2022-05-03	4	Dionda nigrotaeniata	14	1
2777	Upper Spring Run	Bryo-1	2022-05-03	4	Dionda nigrotaeniata	24	1
2777	Upper Spring Run	Bryo-1	2022-05-03	4	Lepomis miniatus	20	1
2777	Upper Spring Run	Bryo-1	2022-05-03	4	Lepomis miniatus	20	1
2777	Upper Spring Run	Bryo-1	2022-05-03	4	Etheostoma fonticola	26	1
2777	Upper Spring Run	Bryo-1	2022-05-03	5	Procambarus sp.		4
2777	Upper Spring Run	Bryo-1	2022-05-03	5	Palaemonetes sp.		1
2777	Upper Spring Run	Bryo-1	2022-05-03	5	Astyanax mexicanus	25	1
2777	Upper Spring Run	Bryo-1	2022-05-03	5	Dionda nigrotaeniata	13	1
2777	Upper Spring Run	Bryo-1	2022-05-03	6	Procambarus sp.		5
2777	Upper Spring Run	Bryo-1	2022-05-03	6	Lepomis miniatus	23	1
2777	Upper Spring Run	Bryo-1	2022-05-03	6	Procambarus sp.		1
2777	Upper Spring Run	Bryo-1	2022-05-03	7	Dionda nigrotaeniata	15	1
2777	Upper Spring Run	Bryo-1	2022-05-03	7	Procambarus sp.		1
2777	Upper Spring Run	Bryo-1	2022-05-03	8	Procambarus sp.		2
2777	Upper Spring Run	Bryo-1	2022-05-03	8	Etheostoma fonticola	30	1
2777	Upper Spring Run	Bryo-1	2022-05-03	8	Dionda nigrotaeniata	13	1
2777	Upper Spring Run	Bryo-1	2022-05-03	9	Procambarus sp.		2
2777	Upper Spring Run	Bryo-1	2022-05-03	9	No fish collected		
2777	Upper Spring Run	Bryo-1	2022-05-03	10	Procambarus sp.		1
2777	Upper Spring Run	Bryo-1	2022-05-03	10	No fish collected		
2777	Upper Spring Run	Bryo-1	2022-05-03	11	Procambarus sp.		5
2777	Upper Spring Run	Bryo-1	2022-05-03	11	Dionda nigrotaeniata	20	1
2777	Upper Spring Run	Bryo-1	2022-05-03	12	No fish collected		
2777	Upper Spring Run	Bryo-1	2022-05-03	13	Palaemonetes sp.		1
2777	Upper Spring Run	Bryo-1	2022-05-03	13	Dionda nigrotaeniata	25	1
2777	Upper Spring Run	Bryo-1	2022-05-03	14	Procambarus sp.		1
2777	Upper Spring Run	Bryo-1	2022-05-03	14	No fish collected		
2777	Upper Spring Run	Bryo-1	2022-05-03	15	No fish collected		
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Procambarus sp.		20
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Lepomis miniatus	24	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	25	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	30	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	30	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	30	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	30	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	30	1

2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	27	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	33	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	20	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	29	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	17	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	18	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	16	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Etheostoma fonticola	16	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Dionda nigrotaeniata	22	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Dionda nigrotaeniata	12	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Lepomis sp.	16	1
2778	Upper Spring Run	Bryo-2	2022-05-03	1	Astyanax mexicanus	20	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Palaemonetes sp.		5
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Etheostoma fonticola	21	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Etheostoma fonticola	31	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Etheostoma fonticola	29	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Etheostoma fonticola	24	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Etheostoma fonticola	18	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Etheostoma fonticola	13	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Etheostoma fonticola	29	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Etheostoma fonticola	13	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Dionda nigrotaeniata	23	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Dionda nigrotaeniata	20	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Astyanax mexicanus	11	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Astyanax mexicanus	15	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Astyanax mexicanus	17	1
2778	Upper Spring Run	Bryo-2	2022-05-03	2	Procambarus sp.		16
2778	Upper Spring Run	Bryo-2	2022-05-03	3	Procambarus sp.		10
2778	Upper Spring Run	Bryo-2	2022-05-03	3	Palaemonetes sp.		1
2778	Upper Spring Run	Bryo-2	2022-05-03	3	Etheostoma fonticola	30	1
2778	Upper Spring Run	Bryo-2	2022-05-03	3	Lepomis sp.	13	1
2778	Upper Spring Run	Bryo-2	2022-05-03	3	Dionda nigrotaeniata	11	1
2778	Upper Spring Run	Bryo-2	2022-05-03	4	Procambarus sp.		5
2778	Upper Spring Run	Bryo-2	2022-05-03	4	Lepomis miniatus	22	1
2778	Upper Spring Run	Bryo-2	2022-05-03	4	Etheostoma fonticola	32	1
2778	Upper Spring Run	Bryo-2	2022-05-03	4	Etheostoma fonticola	30	1
2778	Upper Spring Run	Bryo-2	2022-05-03	4	Etheostoma fonticola	30	1
2778	Upper Spring Run	Bryo-2	2022-05-03	5	Procambarus sp.		3
2778	Upper Spring Run	Bryo-2	2022-05-03	5	Etheostoma fonticola	32	1
2778	Upper Spring Run	Bryo-2	2022-05-03	6	Etheostoma fonticola	22	1
2778	Upper Spring Run	Bryo-2	2022-05-03	6	Etheostoma fonticola	25	1

2778	Upper Spring Run	Bryo-2	2022-05-03	6	Procambarus sp.		2
2778	Upper Spring Run	Bryo-2	2022-05-03	6	Palaemonetes sp.		1
2778	Upper Spring Run	Bryo-2	2022-05-03	6	Dionda nigrotaeniata	27	1
2778	Upper Spring Run	Bryo-2	2022-05-03	7	Procambarus sp.		3
2778	Upper Spring Run	Bryo-2	2022-05-03	7	Palaemonetes sp.		1
2778	Upper Spring Run	Bryo-2	2022-05-03	7	No fish collected		
2778	Upper Spring Run	Bryo-2	2022-05-03	8	Procambarus sp.		2
2778	Upper Spring Run	Bryo-2	2022-05-03	8	Palaemonetes sp.		1
2778	Upper Spring Run	Bryo-2	2022-05-03	8	No fish collected		
2778	Upper Spring Run	Bryo-2	2022-05-03	9	No fish collected		
2778	Upper Spring Run	Bryo-2	2022-05-03	10	No fish collected		
2778	Upper Spring Run	Bryo-2	2022-05-03	11	Etheostoma fonticola	27	1
2778	Upper Spring Run	Bryo-2	2022-05-03	11	Etheostoma fonticola	28	1
2778	Upper Spring Run	Bryo-2	2022-05-03	11	Etheostoma fonticola	29	1
2778	Upper Spring Run	Bryo-2	2022-05-03	11	Lepomis miniatus	25	1
2778	Upper Spring Run	Bryo-2	2022-05-03	12	Procambarus sp.		2
2778	Upper Spring Run	Bryo-2	2022-05-03	12	No fish collected		
2778	Upper Spring Run	Bryo-2	2022-05-03	13	No fish collected		
2778	Upper Spring Run	Bryo-2	2022-05-03	14	No fish collected		
2778	Upper Spring Run	Bryo-2	2022-05-03	15	Dionda nigrotaeniata	24	1
2848	Upper Spring Run	Algae-1	2022-06-22	1	Palaemonetes sp.		1
2848	Upper Spring Run	Algae-1	2022-06-22	1	Procambarus sp.		3
2848	Upper Spring Run	Algae-1	2022-06-22	1	No fish collected		
2848	Upper Spring Run	Algae-1	2022-06-22	2	Procambarus sp.		2
2848	Upper Spring Run	Algae-1	2022-06-22	2	No fish collected		
2848	Upper Spring Run	Algae-1	2022-06-22	3	Procambarus sp.		1
2848	Upper Spring Run	Algae-1	2022-06-22	3	Etheostoma fonticola	13	1
2848	Upper Spring Run	Algae-1	2022-06-22	4	Procambarus sp.		3
2848	Upper Spring Run	Algae-1	2022-06-22	4	No fish collected		
2848	Upper Spring Run	Algae-1	2022-06-22	5	No fish collected		
2848	Upper Spring Run	Algae-1	2022-06-22	6	Etheostoma fonticola	31	1
2848	Upper Spring Run	Algae-1	2022-06-22	6	Procambarus sp.		2
2848	Upper Spring Run	Algae-1	2022-06-22	7	Etheostoma lepidum	31	1
2848	Upper Spring Run	Algae-1	2022-06-22	8	Procambarus sp.		1
2848	Upper Spring Run	Algae-1	2022-06-22	8	No fish collected		
2848	Upper Spring Run	Algae-1	2022-06-22	9	Procambarus sp.		1
2848	Upper Spring Run	Algae-1	2022-06-22	9	No fish collected		
2848	Upper Spring Run	Algae-1	2022-06-22	10	No fish collected		
2848	Upper Spring Run	Algae-1	2022-06-22	11	Procambarus sp.		1
2848	Upper Spring Run	Algae-1	2022-06-22	11	No fish collected		
2848	Upper Spring Run	Algae-1	2022-06-22	12	No fish collected		

2848	Upper Spring Run	Algae-1	2022-06-22	13	Etheostoma fonticola	11	1
2848	Upper Spring Run	Algae-1	2022-06-22	14	No fish collected		
2848	Upper Spring Run	Algae-1	2022-06-22	15	Etheostoma lepidum	31	1
2849	Upper Spring Run	Algae-2	2022-06-22	1	Procambarus sp.		4
2849	Upper Spring Run	Algae-2	2022-06-22	1	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	2	Procambarus sp.		6
2849	Upper Spring Run	Algae-2	2022-06-22	2	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	3	Etheostoma fonticola	35	1
2849	Upper Spring Run	Algae-2	2022-06-22	3	Procambarus sp.		1
2849	Upper Spring Run	Algae-2	2022-06-22	4	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	5	Procambarus sp.		1
2849	Upper Spring Run	Algae-2	2022-06-22	5	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	6	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	7	Procambarus sp.		3
2849	Upper Spring Run	Algae-2	2022-06-22	7	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	8	Procambarus sp.		3
2849	Upper Spring Run	Algae-2	2022-06-22	8	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	9	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	10	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	11	Procambarus sp.		1
2849	Upper Spring Run	Algae-2	2022-06-22	11	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	12	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	13	No fish collected		
2849	Upper Spring Run	Algae-2	2022-06-22	14	Etheostoma fonticola	30	1
2849	Upper Spring Run	Algae-2	2022-06-22	15	Procambarus sp.		1
2849	Upper Spring Run	Algae-2	2022-06-22	15	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	1	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	2	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	3	Micropterus salmoides	71	1
2850	Upper Spring Run	Sagi-1	2022-06-22	4	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	5	Procambarus sp.		1
2850	Upper Spring Run	Sagi-1	2022-06-22	5	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	6	Procambarus sp.		1
2850	Upper Spring Run	Sagi-1	2022-06-22	6	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	7	Procambarus sp.		2
2850	Upper Spring Run	Sagi-1	2022-06-22	7	Lepomis miniatus	46	1
2850	Upper Spring Run	Sagi-1	2022-06-22	8	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	9	Procambarus sp.		1
2850	Upper Spring Run	Sagi-1	2022-06-22	9	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	10	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	11	No fish collected		

2850	Upper Spring Run	Sagi-1	2022-06-22	12	Procambarus sp.		2
2850	Upper Spring Run	Sagi-1	2022-06-22	12	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	13	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	14	No fish collected		
2850	Upper Spring Run	Sagi-1	2022-06-22	15	No fish collected		
2851	Upper Spring Run	Open-1	2022-06-22	1	Palaemonetes sp.		2
2851	Upper Spring Run	Open-1	2022-06-22	1	No fish collected		
2851	Upper Spring Run	Open-1	2022-06-22	2	Palaemonetes sp.		1
2851	Upper Spring Run	Open-1	2022-06-22	2	No fish collected		
2851	Upper Spring Run	Open-1	2022-06-22	3	No fish collected		
2851	Upper Spring Run	Open-1	2022-06-22	4	Procambarus sp.		3
2851	Upper Spring Run	Open-1	2022-06-22	4	No fish collected		
2851	Upper Spring Run	Open-1	2022-06-22	5	No fish collected		
2851	Upper Spring Run	Open-1	2022-06-22	6	No fish collected		
2851	Upper Spring Run	Open-1	2022-06-22	7	No fish collected		
2851	Upper Spring Run	Open-1	2022-06-22	8	No fish collected		
2851	Upper Spring Run	Open-1	2022-06-22	9	No fish collected		
2851	Upper Spring Run	Open-1	2022-06-22	10	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	1	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	2	Procambarus sp.		1
2852	Upper Spring Run	Sagi-2	2022-06-22	2	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	3	Micropterus salmoides	63	1
2852	Upper Spring Run	Sagi-2	2022-06-22	4	Procambarus sp.		4
2852	Upper Spring Run	Sagi-2	2022-06-22	4	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	5	Lepomis miniatus	91	1
2852	Upper Spring Run	Sagi-2	2022-06-22	6	Procambarus sp.		1
2852	Upper Spring Run	Sagi-2	2022-06-22	6	Lepomis miniatus	41	1
2852	Upper Spring Run	Sagi-2	2022-06-22	7	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	8	Procambarus sp.		1
2852	Upper Spring Run	Sagi-2	2022-06-22	8	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	9	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	10	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	11	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	12	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	13	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	14	No fish collected		
2852	Upper Spring Run	Sagi-2	2022-06-22	15	Micropterus salmoides	61	1
2853	Upper Spring Run	Bryo-1	2022-06-22	1	Etheostoma lepidum	32	1
2853	Upper Spring Run	Bryo-1	2022-06-22	1	Palaemonetes sp.		8
2853	Upper Spring Run	Bryo-1	2022-06-22	1	Procambarus sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	2	Palaemonetes sp.		1

2853	Upper Spring Run	Bryo-1	2022-06-22	2	Etheostoma fonticola	29	1
2853	Upper Spring Run	Bryo-1	2022-06-22	2	Procambarus sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	3	Palaemonetes sp.		2
2853	Upper Spring Run	Bryo-1	2022-06-22	3	Etheostoma fonticola	30	1
2853	Upper Spring Run	Bryo-1	2022-06-22	3	Procambarus sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	4	Palaemonetes sp.		3
2853	Upper Spring Run	Bryo-1	2022-06-22	4	Procambarus sp.		5
2853	Upper Spring Run	Bryo-1	2022-06-22	4	No fish collected		
2853	Upper Spring Run	Bryo-1	2022-06-22	5	Procambarus sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	5	Palaemonetes sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	5	No fish collected		
2853	Upper Spring Run	Bryo-1	2022-06-22	6	Palaemonetes sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	6	No fish collected		
2853	Upper Spring Run	Bryo-1	2022-06-22	7	Palaemonetes sp.		3
2853	Upper Spring Run	Bryo-1	2022-06-22	7	Procambarus sp.		5
2853	Upper Spring Run	Bryo-1	2022-06-22	7	Etheostoma fonticola	34	1
2853	Upper Spring Run	Bryo-1	2022-06-22	8	Procambarus sp.		2
2853	Upper Spring Run	Bryo-1	2022-06-22	8	Etheostoma fonticola	26	1
2853	Upper Spring Run	Bryo-1	2022-06-22	9	Palaemonetes sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	9	Procambarus sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	9	No fish collected		
2853	Upper Spring Run	Bryo-1	2022-06-22	10	Procambarus sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	10	No fish collected		
2853	Upper Spring Run	Bryo-1	2022-06-22	11	Procambarus sp.		2
2853	Upper Spring Run	Bryo-1	2022-06-22	11	No fish collected		
2853	Upper Spring Run	Bryo-1	2022-06-22	12	Procambarus sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	12	Etheostoma fonticola	11	1
2853	Upper Spring Run	Bryo-1	2022-06-22	13	Procambarus sp.		1
2853	Upper Spring Run	Bryo-1	2022-06-22	13	Etheostoma fonticola	22	1
2853	Upper Spring Run	Bryo-1	2022-06-22	14	No fish collected		
2853	Upper Spring Run	Bryo-1	2022-06-22	15	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	1	Micropterus salmoides	76	1
2854	Upper Spring Run	Bryo-2	2022-06-22	1	Procambarus sp.		5
2854	Upper Spring Run	Bryo-2	2022-06-22	2	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	3	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	4	Procambarus sp.		1
2854	Upper Spring Run	Bryo-2	2022-06-22	4	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	5	Etheostoma fonticola	29	1
2854	Upper Spring Run	Bryo-2	2022-06-22	6	Procambarus sp.		1
2854	Upper Spring Run	Bryo-2	2022-06-22	6	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	7	No fish collected		

2854	Upper Spring Run	Bryo-2	2022-06-22	8	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	9	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	10	Procambarus sp.		1
2854	Upper Spring Run	Bryo-2	2022-06-22	10	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	11	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	12	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	13	Procambarus sp.		1
2854	Upper Spring Run	Bryo-2	2022-06-22	13	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	14	No fish collected		
2854	Upper Spring Run	Bryo-2	2022-06-22	15	No fish collected		
2855	Upper Spring Run	Open-2	2022-06-22	1	No fish collected		
2855	Upper Spring Run	Open-2	2022-06-22	2	No fish collected		
2855	Upper Spring Run	Open-2	2022-06-22	3	No fish collected		
2855	Upper Spring Run	Open-2	2022-06-22	4	No fish collected		
2855	Upper Spring Run	Open-2	2022-06-22	5	No fish collected		
2855	Upper Spring Run	Open-2	2022-06-22	6	No fish collected		
2855	Upper Spring Run	Open-2	2022-06-22	7	No fish collected		
2855	Upper Spring Run	Open-2	2022-06-22	8	No fish collected		
2855	Upper Spring Run	Open-2	2022-06-22	9	No fish collected		
2855	Upper Spring Run	Open-2	2022-06-22	10	No fish collected		
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1

2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	14	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	14	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	16	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	18	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	15	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	18	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	16	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	17	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	20	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	18	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	18	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	18	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	15	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	15	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	21	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	20	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	20	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	18	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	20	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	21	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	16	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	20	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	18	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	20	1

2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	16	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	18	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	18	1
2884	Upper Spring Run	Algae-1	2022-08-24	1	Dionda nigrotaeniata	21	1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Etheostoma lepidum	31	1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	3	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	4	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	4	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	4	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	5	Etheostoma fonticola	29	1
2884	Upper Spring Run	Algae-1	2022-08-24	5	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	6	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	6	Dionda nigrotaeniata		1

2884	Upper Spring Run	Algae-1	2022-08-24	6	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	6	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	6	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	6	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	7	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	7	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	7	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	8	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	8	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	8	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	9	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	9	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	10	No fish collected		
2884	Upper Spring Run	Algae-1	2022-08-24	11	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	12	No fish collected		
2884	Upper Spring Run	Algae-1	2022-08-24	13	Procambarus sp.		1
2884	Upper Spring Run	Algae-1	2022-08-24	13	No fish collected		
2884	Upper Spring Run	Algae-1	2022-08-24	14	No fish collected		
2884	Upper Spring Run	Algae-1	2022-08-24	15	No fish collected		
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1

2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2884	Upper Spring Run	Algae-1	2022-08-24	2	Dionda nigrotaeniata		1
2885	Upper Spring Run	Open-1	2022-08-24	1	No fish collected		
2885	Upper Spring Run	Open-1	2022-08-24	2	No fish collected		
2885	Upper Spring Run	Open-1	2022-08-24	3	No fish collected		
2885	Upper Spring Run	Open-1	2022-08-24	4	No fish collected		
2885	Upper Spring Run	Open-1	2022-08-24	5	No fish collected		
2885	Upper Spring Run	Open-1	2022-08-24	6	No fish collected		
2885	Upper Spring Run	Open-1	2022-08-24	7	No fish collected		
2885	Upper Spring Run	Open-1	2022-08-24	8	No fish collected		
2885	Upper Spring Run	Open-1	2022-08-24	9	No fish collected		
2885	Upper Spring Run	Open-1	2022-08-24	10	No fish collected		
2886	Upper Spring Run	Algae-2	2022-08-24	1	Lepomis sp.	11	1
2886	Upper Spring Run	Algae-2	2022-08-24	2	No fish collected		
2886	Upper Spring Run	Algae-2	2022-08-24	3	No fish collected		
2886	Upper Spring Run	Algae-2	2022-08-24	4	No fish collected		
2886	Upper Spring Run	Algae-2	2022-08-24	5	No fish collected		
2886	Upper Spring Run	Algae-2	2022-08-24	6	No fish collected		

2886	Upper Spring Run	Algae-2	2022-08-24	7	No fish collected		
2886	Upper Spring Run	Algae-2	2022-08-24	8	No fish collected		
2886	Upper Spring Run	Algae-2	2022-08-24	9	No fish collected		
2886	Upper Spring Run	Algae-2	2022-08-24	10	No fish collected		
2886	Upper Spring Run	Algae-2	2022-08-24	11	No fish collected		
2887	Upper Spring Run	Sag-1	2022-08-24	1	No fish collected		
2887	Upper Spring Run	Sag-1	2022-08-24	2	No fish collected		
2887	Upper Spring Run	Sag-1	2022-08-24	3	Procambarus sp.		1
2887	Upper Spring Run	Sag-1	2022-08-24	3	No fish collected		
2887	Upper Spring Run	Sag-1	2022-08-24	4	Procambarus sp.		1
2887	Upper Spring Run	Sag-1	2022-08-24	4	No fish collected		
2887	Upper Spring Run	Sag-1	2022-08-24	5	Procambarus sp.		1
2887	Upper Spring Run	Sag-1	2022-08-24	5	No fish collected		
2887	Upper Spring Run	Sag-1	2022-08-24	6	No fish collected		
2887	Upper Spring Run	Sag-1	2022-08-24	7	No fish collected		
2887	Upper Spring Run	Sag-1	2022-08-24	8	Procambarus sp.		1
2887	Upper Spring Run	Sag-1	2022-08-24	8	No fish collected		
2887	Upper Spring Run	Sag-1	2022-08-24	9	No fish collected		
2887	Upper Spring Run	Sag-1	2022-08-24	10	No fish collected		
2888	Upper Spring Run	Sag-2	2022-08-24	1	Procambarus sp.		1
2888	Upper Spring Run	Sag-2	2022-08-24	1	Lepomis miniatus	70	1
2888	Upper Spring Run	Sag-2	2022-08-24	1	Lepomis miniatus	64	1
2888	Upper Spring Run	Sag-2	2022-08-24	1	Palaemonetes sp.		1
2888	Upper Spring Run	Sag-2	2022-08-24	2	Lepomis miniatus	45	1
2888	Upper Spring Run	Sag-2	2022-08-24	2	Lepomis miniatus	71	1
2888	Upper Spring Run	Sag-2	2022-08-24	2	Lepomis miniatus	64	1
2888	Upper Spring Run	Sag-2	2022-08-24	2	Micropterus salmoides	60	1
2888	Upper Spring Run	Sag-2	2022-08-24	3	No fish collected		
2888	Upper Spring Run	Sag-2	2022-08-24	4	Micropterus salmoides	92	1
2888	Upper Spring Run	Sag-2	2022-08-24	4	Procambarus sp.		1
2888	Upper Spring Run	Sag-2	2022-08-24	5	No fish collected		
2888	Upper Spring Run	Sag-2	2022-08-24	6	Procambarus sp.		1
2888	Upper Spring Run	Sag-2	2022-08-24	6	Lepomis miniatus	91	1
2888	Upper Spring Run	Sag-2	2022-08-24	7	No fish collected		
2888	Upper Spring Run	Sag-2	2022-08-24	8	No fish collected		
2888	Upper Spring Run	Sag-2	2022-08-24	9	Procambarus sp.		1
2888	Upper Spring Run	Sag-2	2022-08-24	9	No fish collected		
2888	Upper Spring Run	Sag-2	2022-08-24	10	Procambarus sp.		1
2888	Upper Spring Run	Sag-2	2022-08-24	10	Lepomis miniatus	68	1
2888	Upper Spring Run	Sag-2	2022-08-24	11	Procambarus sp.		1
2888	Upper Spring Run	Sag-2	2022-08-24	11	No fish collected		

2888	Upper Spring Run	Sag-2	2022-08-24	12	No fish collected		
2888	Upper Spring Run	Sag-2	2022-08-24	13	Lepomis miniatus	41	1
2888	Upper Spring Run	Sag-2	2022-08-24	13	Procambarus sp.		1
2888	Upper Spring Run	Sag-2	2022-08-24	14	No fish collected		
2888	Upper Spring Run	Sag-2	2022-08-24	15	Lepomis miniatus	61	1
2889	Upper Spring Run	Open-2	2022-08-24	1	No fish collected		
2889	Upper Spring Run	Open-2	2022-08-24	2	No fish collected		
2889	Upper Spring Run	Open-2	2022-08-24	3	No fish collected		
2889	Upper Spring Run	Open-2	2022-08-24	4	No fish collected		
2889	Upper Spring Run	Open-2	2022-08-24	5	No fish collected		
2889	Upper Spring Run	Open-2	2022-08-24	6	No fish collected		
2889	Upper Spring Run	Open-2	2022-08-24	7	No fish collected		
2889	Upper Spring Run	Open-2	2022-08-24	8	No fish collected		
2889	Upper Spring Run	Open-2	2022-08-24	9	No fish collected		
2889	Upper Spring Run	Open-2	2022-08-24	10	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	1	Procambarus sp.		4
2917	Upper Spring Run	Algae-1	2022-10-24	1	Etheostoma fonticola	17	1
2917	Upper Spring Run	Algae-1	2022-10-24	1	Palaemonetes sp.		2
2917	Upper Spring Run	Algae-1	2022-10-24	2	Procambarus sp.		1
2917	Upper Spring Run	Algae-1	2022-10-24	2	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	3	Etheostoma fonticola	22	1
2917	Upper Spring Run	Algae-1	2022-10-24	4	Etheostoma lepidum	35	1
2917	Upper Spring Run	Algae-1	2022-10-24	5	Dionda nigrotaeniata	12	1
2917	Upper Spring Run	Algae-1	2022-10-24	6	Procambarus sp.		1
2917	Upper Spring Run	Algae-1	2022-10-24	6	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	7	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	8	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	9	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	10	Procambarus sp.		1
2917	Upper Spring Run	Algae-1	2022-10-24	10	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	11	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	12	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	13	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	14	No fish collected		
2917	Upper Spring Run	Algae-1	2022-10-24	15	No fish collected		
2918	Upper Spring Run	Open-1	2022-10-24	1	No fish collected		
2918	Upper Spring Run	Open-1	2022-10-24	2	No fish collected		
2918	Upper Spring Run	Open-1	2022-10-24	3	No fish collected		
2918	Upper Spring Run	Open-1	2022-10-24	4	No fish collected		
2918	Upper Spring Run	Open-1	2022-10-24	5	No fish collected		
2918	Upper Spring Run	Open-1	2022-10-24	6	No fish collected		

2918	Upper Spring Run	Open-1	2022-10-24	7	No fish collected		
2918	Upper Spring Run	Open-1	2022-10-24	8	No fish collected		
2918	Upper Spring Run	Open-1	2022-10-24	9	No fish collected		
2918	Upper Spring Run	Open-1	2022-10-24	10	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	1	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	2	Procambarus sp.		1
2919	Upper Spring Run	Algae-2	2022-10-24	2	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	3	Dionda nigrotaeniata	11	1
2919	Upper Spring Run	Algae-2	2022-10-24	4	Procambarus sp.		1
2919	Upper Spring Run	Algae-2	2022-10-24	4	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	5	Procambarus sp.		2
2919	Upper Spring Run	Algae-2	2022-10-24	5	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	6	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	7	Procambarus sp.		3
2919	Upper Spring Run	Algae-2	2022-10-24	7	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	8	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	9	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	10	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	11	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	12	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	13	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	14	No fish collected		
2919	Upper Spring Run	Algae-2	2022-10-24	15	No fish collected		
2920	Upper Spring Run	Sag-1	2022-10-24	1	Procambarus sp.		2
2920	Upper Spring Run	Sag-1	2022-10-24	1	Astyanax mexicanus	38	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Astyanax mexicanus	46	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Astyanax mexicanus	46	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Herichthys cyanoguttatus	82	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Herichthys cyanoguttatus	28	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Herichthys cyanoguttatus	25	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Herichthys cyanoguttatus	22	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Herichthys cyanoguttatus	39	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Herichthys cyanoguttatus	28	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Lepomis sp.	20	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Lepomis sp.	15	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Lepomis sp.	20	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Lepomis sp.	17	1
2920	Upper Spring Run	Sag-1	2022-10-24	1	Micropterus salmoides	30	1
2920	Upper Spring Run	Sag-1	2022-10-24	2	Herichthys cyanoguttatus	25	1
2920	Upper Spring Run	Sag-1	2022-10-24	2	Herichthys cyanoguttatus	20	1
2920	Upper Spring Run	Sag-1	2022-10-24	2	Lepomis sp.	11	1

2920	Upper Spring Run	Sag-1	2022-10-24	2	Procambarus sp.		2
2920	Upper Spring Run	Sag-1	2022-10-24	3	Lepomis sp.	15	1
2920	Upper Spring Run	Sag-1	2022-10-24	3	Procambarus sp.		2
2920	Upper Spring Run	Sag-1	2022-10-24	3	Palaemonetes sp.		1
2920	Upper Spring Run	Sag-1	2022-10-24	4	Procambarus sp.		2
2920	Upper Spring Run	Sag-1	2022-10-24	4	Lepomis sp.	25	1
2920	Upper Spring Run	Sag-1	2022-10-24	4	Herichthys cyanoguttatus	21	1
2920	Upper Spring Run	Sag-1	2022-10-24	5	No fish collected		
2920	Upper Spring Run	Sag-1	2022-10-24	6	No fish collected		
2920	Upper Spring Run	Sag-1	2022-10-24	7	No fish collected		
2920	Upper Spring Run	Sag-1	2022-10-24	8	No fish collected		
2920	Upper Spring Run	Sag-1	2022-10-24	9	Procambarus sp.		2
2920	Upper Spring Run	Sag-1	2022-10-24	9	No fish collected		
2920	Upper Spring Run	Sag-1	2022-10-24	10	No fish collected		
2920	Upper Spring Run	Sag-1	2022-10-24	11	Dionda nigrotaeniata	62	1
2920	Upper Spring Run	Sag-1	2022-10-24	12	No fish collected		
2920	Upper Spring Run	Sag-1	2022-10-24	13	No fish collected		
2920	Upper Spring Run	Sag-1	2022-10-24	14	No fish collected		
2920	Upper Spring Run	Sag-1	2022-10-24	15	No fish collected		
2921	Upper Spring Run	Sag-2	2022-10-24	5	Procambarus sp.		1
2921	Upper Spring Run	Sag-2	2022-10-24	5	Palaemonetes sp.		1
2921	Upper Spring Run	Sag-2	2022-10-24	6	Astyanax mexicanus	45	1
2921	Upper Spring Run	Sag-2	2022-10-24	6	Procambarus sp.		3
2921	Upper Spring Run	Sag-2	2022-10-24	7	Lepomis miniatus	128	1
2921	Upper Spring Run	Sag-2	2022-10-24	7	Procambarus sp.		1
2921	Upper Spring Run	Sag-2	2022-10-24	7	Dionda nigrotaeniata	60	1
2921	Upper Spring Run	Sag-2	2022-10-24	8	Lepomis miniatus	63	1
2921	Upper Spring Run	Sag-2	2022-10-24	8	Procambarus sp.		2
2921	Upper Spring Run	Sag-2	2022-10-24	9	Lepomis miniatus	121	1
2921	Upper Spring Run	Sag-2	2022-10-24	9	Lepomis miniatus	120	1
2921	Upper Spring Run	Sag-2	2022-10-24	9	Dionda nigrotaeniata	56	1
2921	Upper Spring Run	Sag-2	2022-10-24	10	Procambarus sp.		1
2921	Upper Spring Run	Sag-2	2022-10-24	10	Dionda nigrotaeniata	50	1
2921	Upper Spring Run	Sag-2	2022-10-24	11	No fish collected		
2921	Upper Spring Run	Sag-2	2022-10-24	12	No fish collected		
2921	Upper Spring Run	Sag-2	2022-10-24	13	No fish collected		
2921	Upper Spring Run	Sag-2	2022-10-24	14	No fish collected		
2921	Upper Spring Run	Sag-2	2022-10-24	15	Procambarus sp.		2
2921	Upper Spring Run	Sag-2	2022-10-24	15	No fish collected		
2921	Upper Spring Run	Sag-2	2022-10-24	1	Astyanax mexicanus	60	1
2921	Upper Spring Run	Sag-2	2022-10-24	1	Astyanax mexicanus	72	1

2921	Upper Spring Run	Sag-2	2022-10-24	1	Lepomis miniatus	124	1
2921	Upper Spring Run	Sag-2	2022-10-24	1	Dionda nigrotaeniata	45	1
2921	Upper Spring Run	Sag-2	2022-10-24	1	Gambusia sp.	12	1
2921	Upper Spring Run	Sag-2	2022-10-24	1	Gambusia sp.	18	1
2921	Upper Spring Run	Sag-2	2022-10-24	1	Gambusia sp.	12	1
2921	Upper Spring Run	Sag-2	2022-10-24	1	Gambusia sp.	12	1
2921	Upper Spring Run	Sag-2	2022-10-24	2	Lepomis miniatus	63	1
2921	Upper Spring Run	Sag-2	2022-10-24	2	Dionda nigrotaeniata	48	1
2921	Upper Spring Run	Sag-2	2022-10-24	3	Ameiurus natalis	131	1
2921	Upper Spring Run	Sag-2	2022-10-24	3	Dionda nigrotaeniata	26	1
2921	Upper Spring Run	Sag-2	2022-10-24	3	Lepomis miniatus	90	1
2921	Upper Spring Run	Sag-2	2022-10-24	3	Astyanax mexicanus	59	1
2921	Upper Spring Run	Sag-2	2022-10-24	4	Lepomis miniatus	96	1
2921	Upper Spring Run	Sag-2	2022-10-24	4	Lepomis miniatus	71	1
2921	Upper Spring Run	Sag-2	2022-10-24	4	Lepomis sp.	20	1
2921	Upper Spring Run	Sag-2	2022-10-24	5	Lepomis miniatus	83	1
2921	Upper Spring Run	Sag-2	2022-10-24	5	Lepomis miniatus	86	1
2921	Upper Spring Run	Sag-2	2022-10-24	5	Lepomis miniatus	61	1
2921	Upper Spring Run	Sag-2	2022-10-24	5	Lepomis miniatus	72	1
2921	Upper Spring Run	Sag-2	2022-10-24	5	Dionda nigrotaeniata	43	1
2922	Upper Spring Run	Open-2	2022-10-24	1	No fish collected		
2922	Upper Spring Run	Open-2	2022-10-24	2	No fish collected		
2922	Upper Spring Run	Open-2	2022-10-24	3	No fish collected		
2922	Upper Spring Run	Open-2	2022-10-24	4	No fish collected		
2922	Upper Spring Run	Open-2	2022-10-24	5	No fish collected		
2922	Upper Spring Run	Open-2	2022-10-24	6	No fish collected		
2922	Upper Spring Run	Open-2	2022-10-24	7	No fish collected		
2922	Upper Spring Run	Open-2	2022-10-24	8	No fish collected		
2922	Upper Spring Run	Open-2	2022-10-24	9	No fish collected		
2922	Upper Spring Run	Open-2	2022-10-24	10	No fish collected		

APPENDIX H: FOUNTAIN DARTER HABITAT SUITABILITY ANALYTICAL FRAMEWORK

OBJECTIVES

The goal of this analysis was to develop an index to quantify Fountain Darter habitat suitability within biological monitoring study reaches based on aquatic vegetation composition. Specific objectives included: (1) build Habitat Suitability Criteria (HSC) for each vegetation taxa; (2) use HSC to calculate an Overall Habitat Suitability Index (OHSI) based on vegetation community composition mapped at a given study reach during each monitoring event; (3) evaluate the efficacy of OHSI as a measure of Fountain Darter habitat suitability by testing whether Fountain Darter occurrence can be predicted based on OHSI.

METHODS

Habitat Suitability Criteria

HSC are a form of resource selection function (RSF) defined as any function that is proportional to the probability of use by an organism (Manly et al. 1993). HSC were built separately for the Comal and San Marcos river/springs systems using logistic regression based on random-station dip-net data and drop-net data converted to presence/absence. Logistic regression is a form of classification model that uses presence/absence data to predict probabilities based on a set of covariates (Hastie et al. 2009). The response variable for this analysis, probability of darter occurrence, was used to quantify criteria for each vegetation type, ranging from 0 (i.e., not suitable) to 1 (i.e., most suitable) (Figure H1).

OHSI Calculation

To calculate the OHSI for each monitoring event, HSC values for each vegetation strata were first multiplied by the areal coverage of that vegetation strata, and these values were summed across all vegetation strata within each study reach, to generate a Weighted Usable Area (WUA) of vegetation only as follows:

Eq. 1 $$WUA = \sum_{i=1}^{N}(A_i \ x \ HSC_i)$$

where N is the total number of vegetation types, A_i is the areal coverage of a single vegetation type, and HSC_i is the habitat suitability criteria of that single vegetation type (Yao & Bamal 2014).

This WUA was then divided by the total wetted area within the reach to generate OHSI, as follows:

Eq. 2 $$OHSI = \frac{WUA}{\sum_{i=1}^{N}(A_i)}$$

In this way, OHSI can also be thought of as the proportion of weighted usable area (Yao & Bamal 2014), ranging from 0 (unsuitable overall habitat) to 1 (most suitable overall habitat). Standardizing by reach size allows for a comparison of habitat quality between reaches of different sizes.

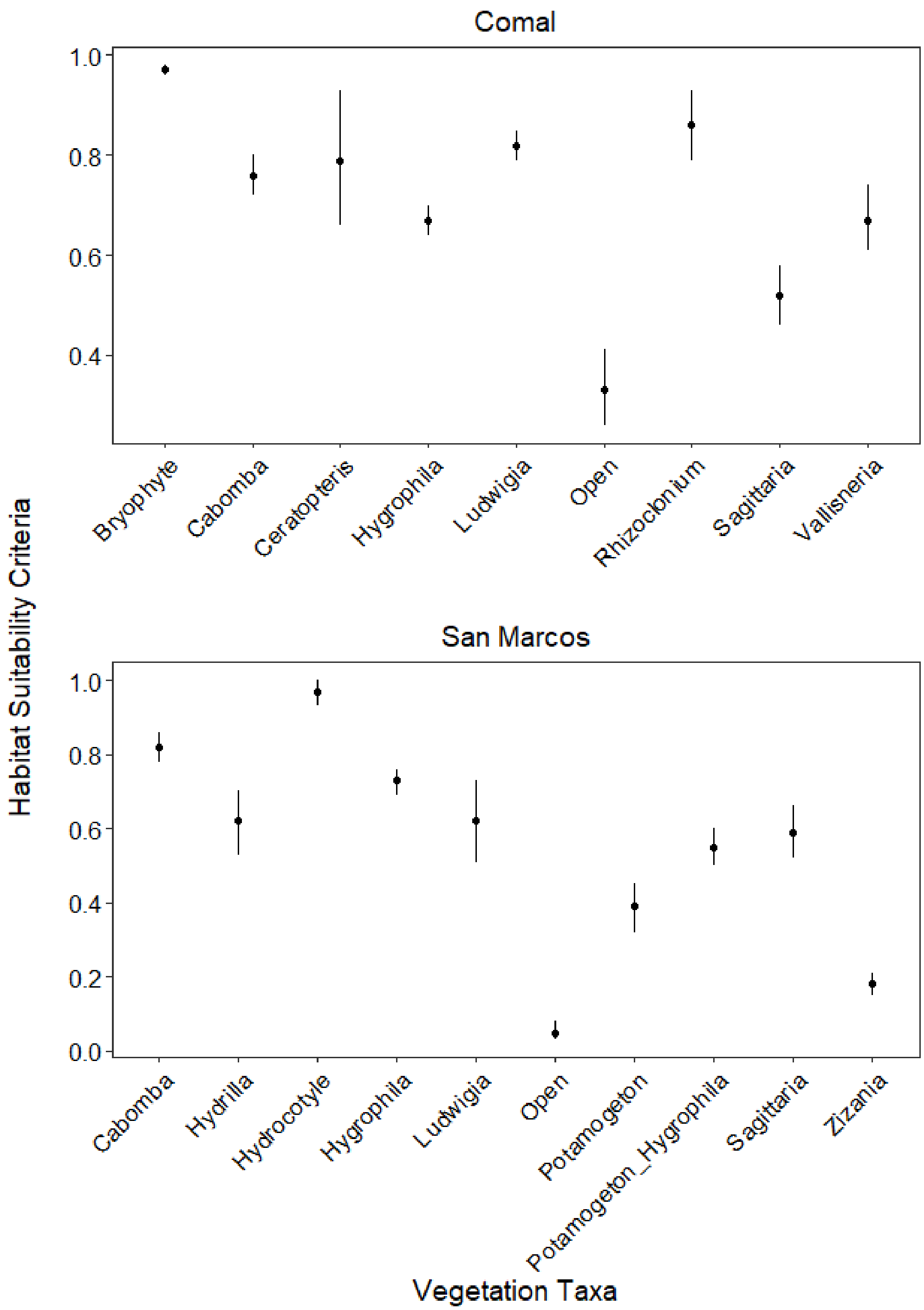

Figure H1. **Aquatic vegetation habitat suitability criteria (±95% CI) built with drop-net and random dip-net datasets using logistic regression.**

OHSI Evaluation

OHSI Evaluation Methods

To examine the relationship between OHSI and Fountain Darter population metrics, random-station dip-net data from 2017-2020 was organized in a way that treats each monitoring event per study reach as independent. This results in the response variable quantified as the proportional occurrence of Fountain Darters per reach at a given monitoring event based on the independent variable OHSI.

To predict Fountain Darter occurrence, two modeling approaches that are able to analyze proportions were used, which included: (1) GLM with a binomial distribution and (2) Random Forest Regression (RF). RF is an ensemble learning technique that builds many decision trees to predict a response variable (Breiman et al. 1984). Each decision tree of the "forest" is built by selecting a random subset of the dataset with replacement and a random set of covariates (Liaw & Wiener 2002). RF are considered more advantageous compared to traditional decision tree models and GLM because they correct for overfitting (Breiman 2001) and can provide more accurate predictions with many covariates (Cutler et al. 2007). For this analysis, we built RF models with 500 trees.

GLMs and RFs were built separately for the Comal and San Marcos systems. First, 50% of each dataset was randomly selected to train each model. Second, 5-fold cross validation (CV) was used to independently test the predictive performance of each model with the remaining 50% of the dataset (i.e., test data). Predictive performance was compared among models based on the correlation (R) and deviance (D) between observed and predicted values. Mean CV R ± standard error (SE) and CV D ± SE were calculated based on predictions from the 5 CV folds. Models with the highest CV R were considered as the best models for making predictions and elaborated on further in the results.

Lastly, figures were built to display fitted predictions across observed OHSI values to examine if there was a positive relationship between Fountain Darter occurrence and OHSI. Fitted predictions were also presented with a LOWESS smoothed function to visualize if trends of OHSI are linear or nonlinear (Milborrow 2020). In sum, if the models displayed strong predictive power and Fountain Darter occurrence showed a positive relationship with OHSI, then OHSI was considered a useful measurement of habitat suitability for Fountain Darters.

OHSI Evaluation Results

Predictive performance for the Comal models showed that RF (0.81 ± 0.18) predictions were more accurate than GLM (0.62 ± 0.20). San Marcos models were similar, showing better predictive accuracy for RF (0.97 ± 0.02) compared to GLM (0.93 ± 0.06) (Table H1). Comparisons between observed vs. predicted occurrence for the RF 5-fold CV demonstrated lowest predictive accuracy at observed proportions about 0.20 or less for the Comal and San Marcos (Figure H2).

Fitted predictions of occurrence as a function of OHSI showed that occurrence increased with increasing OHSI for the Comal and San Marcos. In the Comal, LOWESS smoothed predictions exhibited a non-linear asymptotic trend. Occurrence increased about 0.60 to 0.80 when OHSI increased from about 0.65 to 0.75 and remained around 0.80 at OHSI values >0.75. In the San Marcos, LOWESS smoothed predictions exhibited a more linear trend compared to the Comal and occurrence increased from about 0.25 to 0.55 as OHSI increased from 0.25 to 0.60 (Figure H3).

Table H1. Summary model performance statistics for predicting Fountain Darter occurrence based on OHSI. Summary statistics includes deviance (D) and correlation (R) for training data and 5-fold cross-validation (SE).

	Comal		San Marcos	
	GLM	RF	GLM	RF
Training Data				
Deviance	1.10	1.03	1.23	1.20
Correlation	0.48	0.77	0.70	0.89
Cross-Validation				
Deviance	1.12 (0.05)	1.05 (0.06)	1.24 (0.07)	1.21 (0.05)
Correlation	0.62 (0.20)	0.81 (0.18)	0.93 (0.06)	0.97 (0.02)

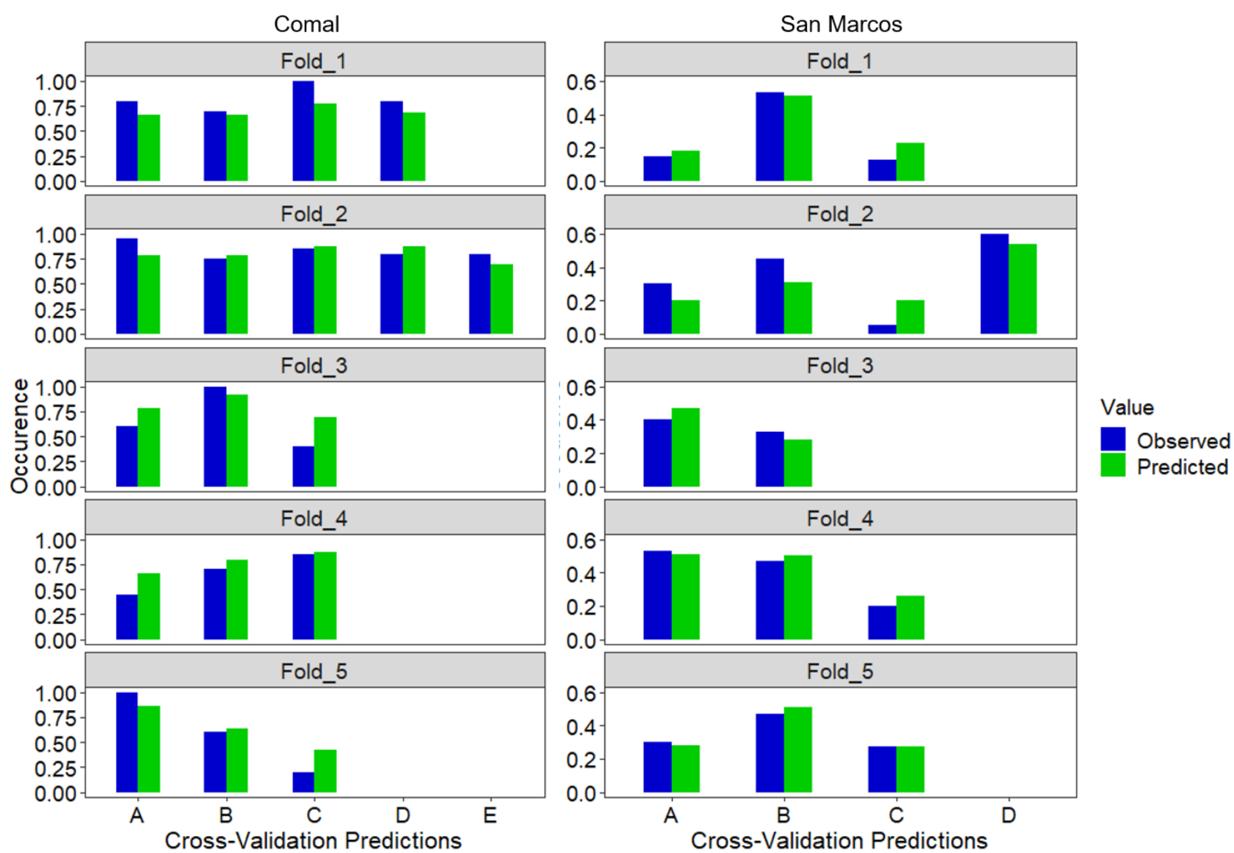

Figure H2. Observed vs. predicted Fountain Darter occurrence in relationship to OHSI from Random Forest 5-fold cross-validation.

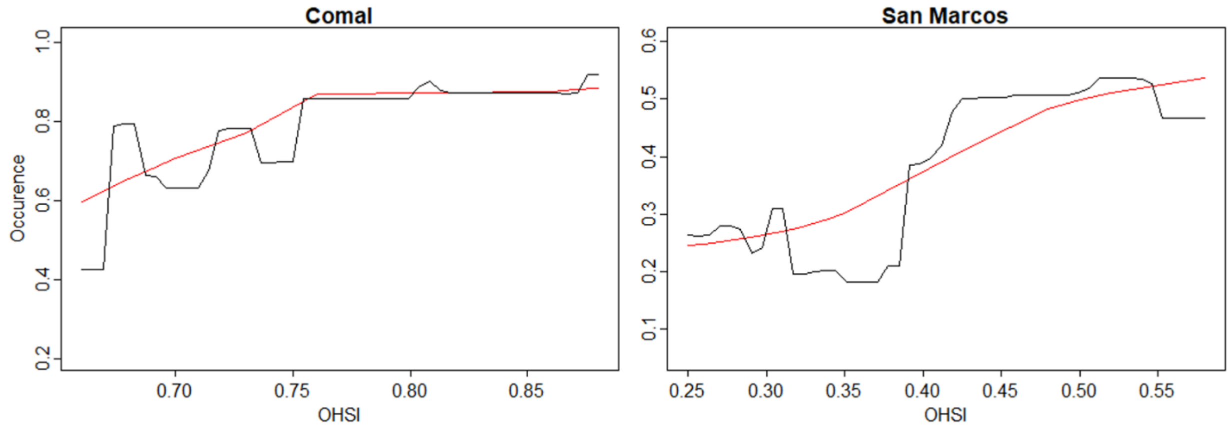

Figure H3. **Fitted occurrence predictions for OHSI in the Comal Springs/River and San Marcos River. The red lines are LOWESS smoothed fitted predictions used to visualize nonlinear trends.**

OHSI EVALUATION DISCUSSION

Model CV R >0.80 for all RFs demonstrate good model performance and that Fountain Darter occurrence can be accurately predicted based on OHSI. Further, similar performance statistics for training data and test data via cross-validation indicated that the training models were not overfit and can reliably predict independent observations in the future. That being said, predictions were least accurate at observed occurrence values about 0.20 or less, which is likely due to smaller sample sizes in this range. As random station dip-net sampling continues during future biomonitoring activities, predictions at these lower occurrence values will likely improve. Fountain Darter occurrence also increased with increasing OHSI. The positive relationship between occurrence and OHSI and good model performance supports that OHSI is an ecologically relevant index for evaluating Fountain Darter habitat suitability based on vegetation community composition.

In sum, this analysis demonstrated that OHSI based on vegetation-specific HSC and reach-level vegetation composition data can accurately predict Fountain Darter occurrence and is a useful measurement for quantifying habitat suitability. However, additional data collection can assist in addressing multiple limitations of this analysis. Firstly, random station dip-net data with simple random sampling is only available from about 2017-2020, which limits the ability to predict occurrence from historical observations. Further, model performance would likely improve at lower occurrence values as additional data are collected and a more robust dataset is generated. Secondly, this analysis assumed that vegetation alone determines Fountain Darter occurrence. For example, decreased predictive accuracy at lower darter occurrence values may be due to other habitat factors (e.g., depth-flow conditions, river discharge) or biotic factors (e.g., competition, predation) rather than due to smaller sample sizes of lower occurrence values; however, a multi-factor ecological model is beyond the scope of this work. In addition, OHSI can only be assessed for vegetation taxa that have been sampled previously and building HSC for rare vegetation taxa not represented may improve predictions. That being said, RF models demonstrated that occurrence can be predicted accurately without including additional habitat variables or vegetation types, supporting that this assumption does not hinder this analysis and does not appear to restrict the inference value of OHSI.

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Appendix F3 | **San Marcos Biological Monitoring Report**

HABITAT CONSERVATION PLAN

BIOLOGICAL MONITORING PROGRAM

San Marcos Springs/River Aquatic Ecosystem

ANNUAL REPORT

December 2022

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EXECUTIVE SUMMARY

The Edwards Aquifer Habitat Conservation Plan (EAHCP) Biological Monitoring Program continued to track biota and habitat conditions of the San Marcos Springs/River ecosystem in 2022 through a series of routine and Critical Period monitoring activities outlined in this report. Monitoring in the San Marcos system consisted of routine surveys specific to HCP Covered Species: Fountain Darter (*Etheostoma fonticola*), Texas Wild-rice (*Zizania texana*), and San Marcos Salamander (*Eurycea nana*). Community-level monitoring data were also collected on aquatic vegetation, fish, and benthic macroinvertebrates. In addition, reduced river discharge triggered Critical Period and species-specific low-flow sampling events starting in late spring. The last extensive drought in the San Marcos system occurred near the start of EAHCP implementation in 2013-2014. Nine years later, EAHCP activities have included extensive efforts to enhance ecological conditions in the system. The results from 2022 biological monitoring provide valuable data to assess ecological responses of aquatic biota in the San Marcos Springs/River ecosystem under some of the lowest total river discharge conditions recorded since the inception of the Edwards Aquifer Authority (EAA) biological monitoring program in 2000.

In 2022, low precipitation and higher ambient temperatures in central Texas resulted in severe drought conditions by spring and transitioned to an exceptional drought classification by mid-summer. River discharge in the San Marcos River was below median historical conditions for most of the year and represents the lowest levels since the inception of biological monitoring in 2000. Median and minimum mean daily discharge were similar in 2022 (119 and 82 cfs, respectively) and 2009 (96 and 83 cfs, respectively). Median mean daily discharge aligned with 2022 during low flows in 2006 (116 cfs) and 2011 (117 cfs). Despite similar medians and minimums in 2022 and 2009, flows returned to normal levels by October in 2009, whereas river discharge remained low in fall 2022. San Marcos River monthly median discharge decreased throughout the year. Median discharge aligned with long-term medians from January to March and descended to values near the long-term 10th percentile by June. Flows dropped below 100 cfs in July, triggering additional Critical Period sampling. River discharge was mostly below 100 cfs for the remainder of the year and fell slightly below the long-term 10th percentile for all of October, reaching the annual minimum (82 cfs) by the end of October.

Three visual habitat evaluations and resulting memorandum updates were conducted this year as discharge decreased below 95 cfs. Despite lower flows and slightly degraded habitat conditions, water quality parameters measured during Critical Period sampling in summer 2022 were within the range of historical data. Expectedly, water temperatures were slightly elevated relative to typical years, but remained consistent with respect to historical longitudinal patterns. Under these extreme low-flow conditions, the maximum optimal water temperature threshold for Fountain Darter larval production was exceeded from Spring Lake Dam to the Wastewater Treatment Plant, occurring less frequently in upstream river segments. Additionally, the threshold for Fountain Darter egg production was exceeded at City Park, Thompson Island Artificial, and Wastewater Treatment Plant, though exceedance was uncommon and for short periods.

Total aquatic vegetation coverage declined from spring to fall across all study reaches this year. Coverages declined at a greater magnitude at Spring Lake Dam compared to other reaches, likely influenced by increased recreational traffic in this reach in 2022. Additionally, total fall cover

was below the long-term average at Spring Lake Dam and City Park but was higher at I-35. Ubiquitous declines were mainly attributed to decreased coverage of Texas Wild-rice due to low flows and recreation. Texas Wild-rice exhibited its lowest system-wide coverage since the peak in spring 2021, although this taxon still remained abundant throughout the system and continued to dominate aquatic vegetation assemblages in the study reaches. Reduced river discharge led to some Texas Wild-rice becoming dewatered and stranded on islands or along bank habitats.

Fountain Darter density among vegetation types sampled demonstrated predictable patterns observed in previous years and continues to support the importance of ornate taxa, whereas patterns in size structure demonstrated that vegetation taxa used at a given life stage can vary depending on localized patch conditions. Population trends within seasons were generally in agreement between the three sampling methods. However, conflicting patterns in CPUE and occurrence during spring sampling were noted, likely due to Fountain Darters being inherently clustered in more suitable vegetation taxa. Each population performance metric generally aligned with seasonal historical data, with some exceptions shown by density and recruitment. Despite some variation in density between events, positive increases were observed across study reaches during the past two years. Density data demonstrate that Fountain Darter are heterogeneously distributed within a reach, with density varying considerably between vegetation taxa.

Overall, and particularly within the most suitable vegetative taxa, Fountain Darter density has increased the past two years. Simultaneously, habitat suitability indices show reductions in suitable habitat at the reach scale, which correspond to reach-scale trends in occurrence. Therefore, increased Fountain Darter density may be a result of aggregation into smaller amounts of available habitat. Alternatively, greater recruitment rates in recent years may provide partial explanation for the increasing density trend. Higher recruitment in 2022 could be attributed to increased patch size of vegetation taxa more suitable for juveniles in certain reaches (e.g., *Cabomba* in City Park), enhanced young-of-year survival (or site fidelity) due to low and/or stable flows, or a combination of all the above. Regardless of the mechanism, results from drop-netting showed that reduced flows in 2022 did not have a negative impact on Fountain Darter populations within suitable habitat patches. Substantially increased abundance of young-of-year darters in the fall, when river discharge was lowest, also suggests that Fountain Darters may be resistant to large reductions in flow by augmentation through recruitment. However, it is unclear at this time whether low flows negatively affected individual fitness. In summary, results from this year provided some interesting insights into Fountain Darter flow-ecology. Additional research is needed to better understand how flow rates influence demographic processes and contribute to population dynamics.

Fish community sampling demonstrated that species richness and diversity generally increased from upstream to downstream, whereas richness and relative density of spring-associated fishes (hereafter ‘spring fishes’) declined in the study segments furthest downstream. Five-year trends in species richness and diversity displayed slight increases at Upper River and Lower River segments. At the Middle River, species richness slightly decreased over time, while diversity increased. Spring fishes’ species richness at Lower River increased the past five years to levels more similar to upstream river segments.

Trends in San Marcos Salamander densities were variable among sites in 2022 and the past five years. However, based on this recent and historical data, low-flow conditions in 2022 did not appear to have had a negative effect on San Marcos Salamander populations.

Macroinvertebrate sampling showed that Spring Lake and City Park scored lower than other sites, likely due to differences in habitats available for sampling. Lower scores were expected at Spring Lake as these communities are naturally different compared to swift flowing “least-disturbed reference streams”. At City Park, lower scores compared to Spring Lake Dam and I-35 were also not surprising. Lotic habitats at City Park mainly consist of deeper runs, while riffles with cobble and gravel substrates more similar to reference streams are present at the other riverine sites. As such, higher scores at Spring Lake Dam and I-35 can be attributed to greater prevalence of fluvial specialist, resulting in greater overall taxa diversity. However, for a spring-fed system, the importance of this metric is not necessarily the ranking, but rather the consistency of scores, or observance of a trend over time. No temporal trends in bioassessment scores were apparent, and overall macroinvertebrate bioassessments revealed a healthy riverine community with a diversity of benthic invertebrates.

Overall, 2022 biological monitoring provided insights into the current condition of the Covered Species and their habitats in the San Marcos Springs/River, and informed flow-ecology relationships following nine years of EAHCP implementation. Total system discharge was the lowest recorded since the inception of the biological monitoring program over two decades ago. The exceptional drought and low-flow conditions resulted in impacted habitat conditions throughout the system with respect to increased siltation in Spring Lake, reductions in aquatic vegetation coverage throughout study reaches, and elevated water temperatures in slower moving segments. Recreational impacts were also magnified this year with the lower water levels and hot summer temperatures. With respect to the Covered Species, Texas Wild-rice coverages declined, although this taxon continued to dominate aquatic vegetation assemblages. Fountain Darter densities and catch rates were high in suitable habitat patches despite lower occurrences and habitat suitability at a reach scale. San Marcos Salamander densities generally aligned with previous low-flow events. In summary, results from 2022 demonstrated varied responses to reduced flows but did not reveal any major degradation to the overall ecological health of the San Marcos system. Subsequent monitoring efforts will provide opportunities to better understand the dynamics of this complex ecological system and further examine responses to varying hydrologic conditions.

INTRODUCTION

The Edwards Aquifer Habitat Conservation Plan (EAHCP) was established in 2012 and supports the issuance of an Incidental Take Permit that allows the "incidental take" of threatened and endangered species (i.e., Covered Species) (Table 1) from otherwise lawful activities in the San Marcos Springs/River. Section 6.3.1 of the HCP established a continuation of biological monitoring in the San Marcos Springs/River. This biological monitoring program was first established in 2000 (formerly known as the Edwards Aquifer Authority [EAA] Variable Flow Study) and its original purpose was to evaluate the effects of variable flow on the biological resources, with an emphasis on threatened and endangered species. However, the utility of the EAHCP biological monitoring program has surpassed its initial purpose (EAHCP 2012), and biological data collected since the implementation of this monitoring program (BIO-WEST 2001–2022) now serves as the foundation for several underlying sections in the HCP, which include: (1) long-term biological goals (LTBGs) and management objectives (Section 4.1); (2) determination of potential impacts to Covered Species, "incidental take" assessment, and Environmental Impact Statement alternatives (Section 4.2); and (3) establishment of core adaptive-management activities for triggered monitoring and adaptive-management response actions (Section 6.4.4). As the EAHCP proceeds, biological monitoring program data, in conjunction with other available information, are essential to adaptive management. Current and future data collection will help assess the effectiveness and efficiency of certain EAHCP mitigation and restoration activities conducted in the San Marcos Springs/River and calculate the EAHCP habitat baseline and net disturbance determination and annual "incidental take" estimate.

Table 1. Covered Species directly sampled for under the Edwards Aquifer Habitat Conservation Plan in the San Marcos Springs/River ecosystem.

SCIENTIFIC NAME	COMMON NAME	ESA STATUS
Plants		
Zizania texana	Texas Wild-rice	Endangered
Amphibians		
Eurycea nana	San Marcos Salamander	Threatened
Fish		
Etheostoma fonticola	Fountain Darter	Endangered

This report provides the methodology and results for biological monitoring activities conducted in 2022 within the San Marcos Springs/River ecosystem. In addition to routine monitoring, Critical Period and species-specific low-flow sampling were triggered. The results include summaries of current physiochemical conditions, as well as current conditions of floral and faunal communities, all of which encompasses both routine and low-flow sampling. For all aquatic organisms, historic observations (BIO-WEST 2001–2022) are also used to provide context to current conditions.

METHODS

Study Location

The upper San Marcos River (San Marcos, Hays County, Texas) is fed by the Edwards Aquifer and originates at a series of spring upwellings in Spring Lake, which was impounded in the mid-1800s (Bousman and Nickels 2003). From the headwaters, the river flows about eight kilometers (km) before its confluence with the Blanco River, traversing two additional impoundments, Rio Vista Dam, and Capes Dam. The upper San Marcos River watershed is dominated by urban landcover and is subjected to recreational use. Spring inputs from the Edwards Aquifer provide stable physiochemical conditions, and springflow conditions are dictated by aquifer recharge and human water use (Sung and Li 2010). The upper San Marcos River maintains diverse assemblages of floral and faunal communities (Bowles and Arsuffi 1993; Owens et al. 2001) that include multiple endemic organisms, such as Texas Wild-rice (*Zizania texana*), Comal Springs Riffle Beetle (*Heterelmis comalensis*), San Marcos Salamander (*Eurycea nana*), and Fountain Darter (*Etheostoma fonticola*) among others.

Sampling Strategy

Based on the long-term biological goals (LTBGs), and management objectives outlined in the EAHCP, study areas were established to conduct long-term monitoring and quantify population trends of the Covered Species (EAHCP 2012). The sampling locations selected are designed to cover the entire extent of Covered Species habitats, but they also allow for holistic ecological interpretation while maximizing resources (Figures 1–3). Comprehensive sampling within the established study area varies temporally and spatially among Covered Species. The current sampling strategy includes five spatial resolutions:

1. System-wide sampling
    a. Texas Wild-rice mapping: 1 event/year (summer)
    b. Aquatic vegetation mapping: 5-year intervals (winter)
2. Select longitudinal locations
    a. Water temperature: assessed year-round at permanent monitoring stations
3. Reach sampling
    a. Aquatic vegetation mapping: 2 events/year (spring, fall)
    b. Fountain Darter drop-net sampling: 2 events/year (spring, fall)
    c. Fountain Darter random-station dip-net surveys: 3 events/year (spring, summer, fall)
4. Springs Sampling
    a. San Marcos Salamander surveys: 2 events/year (spring, fall)
5. River section/segment
    a. Fountain Darter timed dip-net surveys: 3 events/year (spring, summer, fall)
    b. Fish community surveys: 2 events/year (spring, fall)
    c. Macroinvertebrate community sampling: 2 events/year (spring, fall)

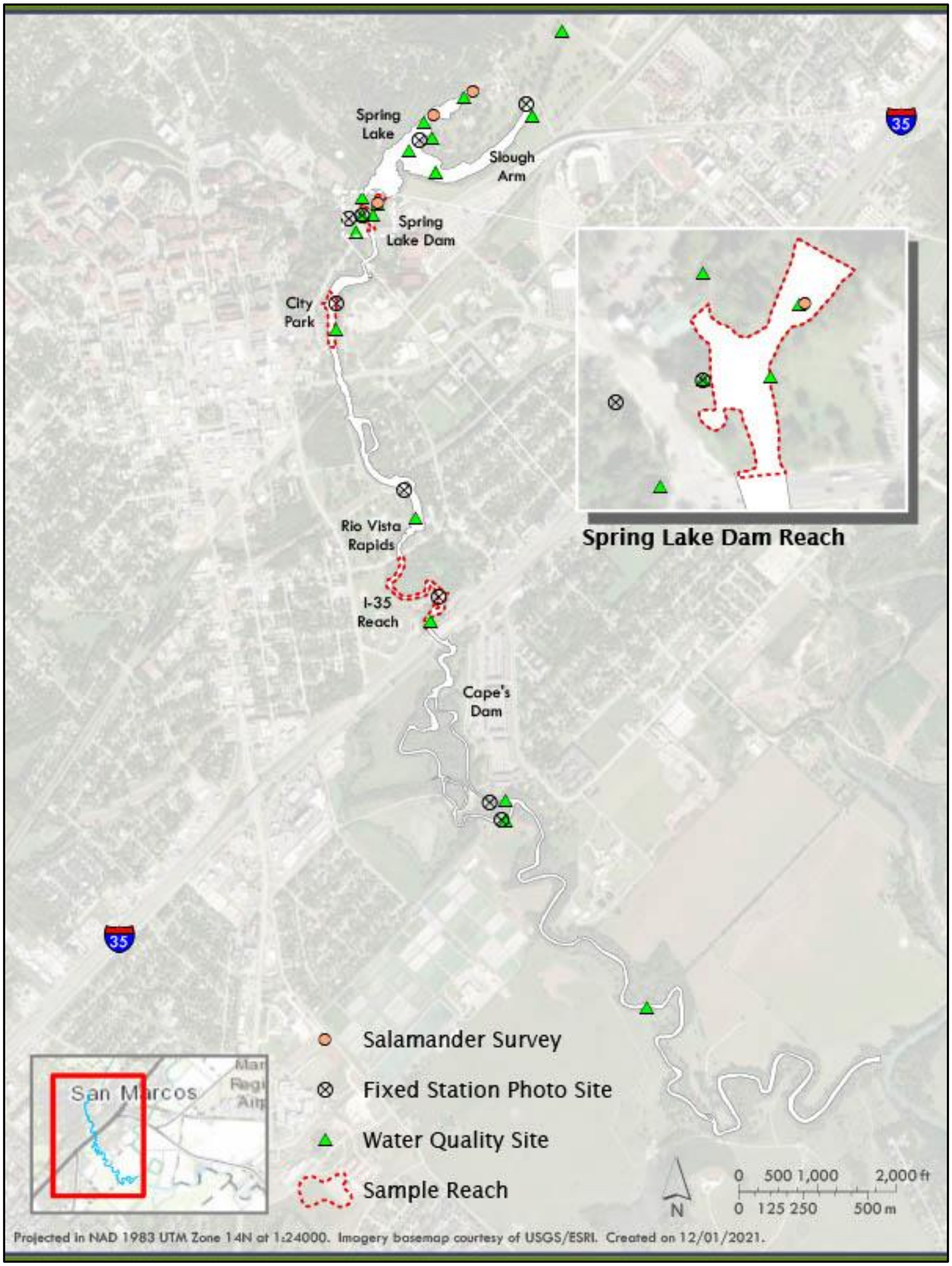

Figure 1. Upper San Marcos River sample reaches, San Marcos Salamander survey sites, water quality sampling sites, and fixed-station photography sites.

Figure 2. Fish community sampling segments and dip-net timed survey sections for the upper San Marcos River.

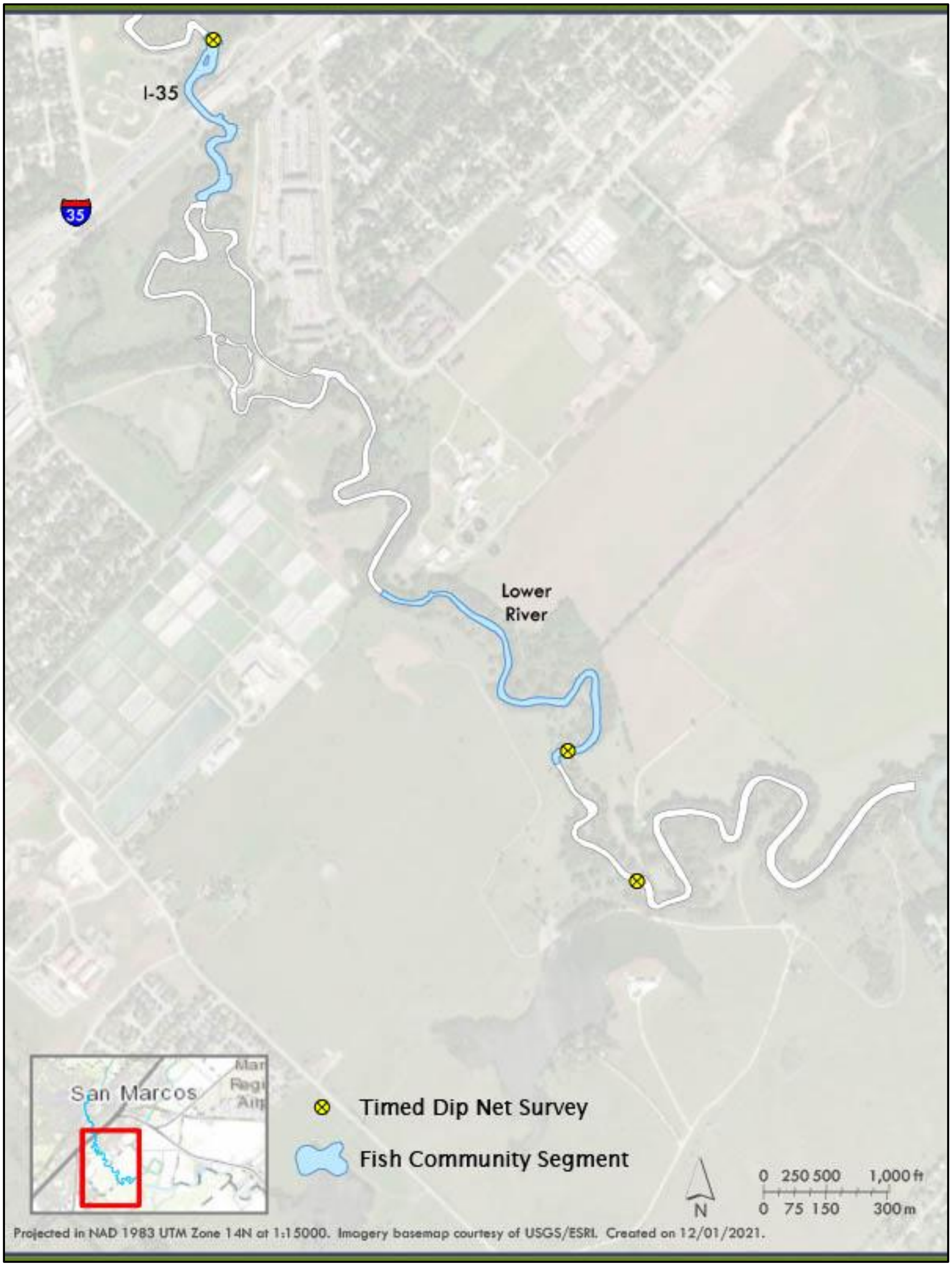

Figure 3. Fish community sampling segments and dip-net survey sections for the lower San Marcos River.

In addition to annual comprehensive sampling outlined above, low-flow sampling may also be conducted, but is dependent on EAHCP flow triggers, which include Critical Period low-flow sampling and species-specific sampling (EAHCP 2012). In July 2022, river discharge dropped below 100 cubic feet per second (cfs), which resulted in a comprehensive Critical Period low-flow full sampling event. Flows in fall remained in Critical Period and biological monitoring was integrated into a routine full, Fall sampling event. In addition, species-specific triggers were met from late spring through the remainder of the year for Texas Wild-rice physical measurements (Appendix A). Critical Period water grab sampling and visual habitat assessment results are presented in Appendix B.

The remaining methods sections provide brief descriptions of the procedures utilized for comprehensive routine, Critical Period, and species-specific sampling efforts. A more-detailed description of the gear types used, methodologies employed, and specific GPS coordinates can be found in the Standard Operating Procedures Manual for the EAHCP biological monitoring program for the San Marcos Springs/River ecosystem (EAA 2017).

San Marcos River Discharge

River hydrology in 2022 was assessed using U.S. Geological Survey (USGS) stream gage data from January 1 through October 31. Mean daily discharge expressed in cubic feet per second (cfs) was acquired from USGS gage #08170500, which represents cumulative river discharge that encompasses springflow and local runoff contributions from the Sink Creek drainage. It should be noted that some of these data are provisional and are subject to revision at a later date (USGS 2022). The annual distribution of mean daily discharge was compared from for the past 5 years using boxplots. The distribution of 2022 mean daily discharge was also summarized by month using boxplots. Monthly discharge levels were compared with long-term (1956–present) 10th, 50th (i.e., median), and 90th percentiles.

Water Temperature

Spatiotemporal trends in water temperature (°C) were assessed using temperature data loggers (HOBO Tidbit v2 Temp Loggers) at the 11 permanent monitoring stations established in 2000. Data loggers recorded water temperature every 10 minutes and were downloaded at regular intervals. Prior to analysis, data processing was conducted to locate potential data logger errors per station by comparing time-series for the current year with previous years. Timeframes displaying temperatures that deviated substantially from historical data and didn’t exhibit ecologically rational trends (e.g., discontinuities, ascending drift) were considered unreliable and omitted from the dataset. For analysis, the distribution of water temperatures for the current year was assessed among stations based on 4-hour intervals and summarized using boxplots. Water temperatures were also compared with maximum optimal temperature requirements for Fountain Darter larval (≥25 °C) and egg (≥26 °C) production (McDonald et al. 2007). Further, 25 °C is also the designated water temperature threshold within the HCP Fountain Darter LTBG study reaches (Spring Lake Dam, City Park, I-35) (EAHCP 2012). In the case of stations that surpassed either water temperature threshold during the year, the general timeframes in which those exceedances occurred are discussed in the text.

Aquatic Vegetation

Mapping

The team used a kayak for visual observations to complete aquatic vegetation mapping in sample reaches during the spring, summer Critical Period, and fall monitoring events. A Trimble GPS unit and external Tempest antenna set on the bow of the kayak was used to collect high accuracy (10–60 centimeter [cm]) geospatial data. A data dictionary with pre-determined attributes was loaded into the GPS unit for data collection in the field. Discrete patch dimensions and the type and density of vegetation were recorded from the kayak. In some instances, an accompanying free diver was used to provide additional detail and to verify surface observations. The discreteness of an individual vegetation patch was determined by the dominant species located within the patch compared to surrounding vegetation. Once a patch of vegetation was visually delineated, the kayak was maneuvered around the perimeter of the vegetation patch to collect geospatial data with the GPS unit, thus creating a vegetation polygon. Attributes assigned to each polygon included species type and percent cover of each of the four most-dominant species. The type of substrate (silt, sand, gravel, cobble, organic) was identified if substrate was a dominant feature within the patch. Rooted aquatic vegetation, floating aquatic vegetation, bryophytes, and algae were mapped as separate features. Only aquatic vegetation patches 1 meter (m) in diameter or larger were mapped as polygons. However, all Texas Wild-rice was recorded, with individual Texas Wild-rice plants too small to delineate as polygons mapped as points instead.

Data Processing and Analysis

During data processing, Microsoft Pathfinder was used to correct spatial data and create shapefiles. Spatial data were projected using the Projected Coordinate System NAD 1983 Zone 14N. Post processing was conducted to clean polygon intersections, check for and correct errors, and calculate cover for individual discrete polygons as well as totals for all encountered aquatic plant species.

Vegetation types are described in the Results and Discussion sections by genus, except for Texas Wild-rice for which the common name is used. Vegetation community composition among taxa and grouped by native vs. invasive taxa are compared for the last five years using stacked bar graphs. Total surface area of aquatic vegetation, measured in square meters (m^2), is presented for each season using bar graphs and is compared with long-term averages (2001–present) from spring, fall, high-flow events, and low-flow events. High-flow and low-flow averages were calculated from Critical Period events. These events are based on predetermined river discharge triggers (Appendix A), which result in additional mapping events to assess flow-related impacts to the vegetation community. All total coverages were calculated solely based on rooted plant taxa.

Texas Wild-rice Annual Observations

Mapping and Physical Observations

In addition to aquatic vegetation mapping in the LTBG study reaches, Texas Wild-rice was mapped within Spring Lake and eight river segments using the same methods described above during routine summer mapping in July, which also represented the Critical Period (Figure 4). Moreover, physical measurements were quantified during routine monitoring in spring and fall. Six additional sampling events occurred during Critical Period and species-specific events triggered in July (n = 2), August (n = 1), September (n = 2), and November (n = 1).

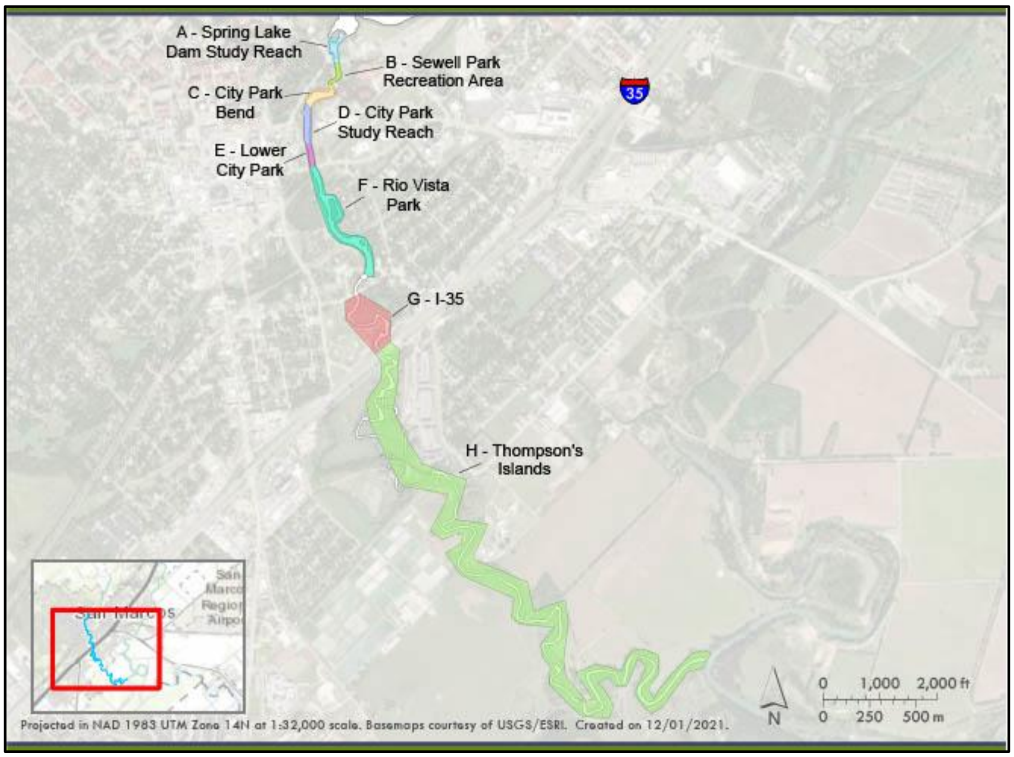

Figure 4. Designated river segments for monitoring Texas Wild-rice coverage.

At the beginning of the initial sampling activities in 2000, Texas Wild-rice stands throughout the San Marcos River were assessed and documented as being in "vulnerable" areas if they possessed one or more of the following characteristics: (1) occurred in shallow water (<0.5 feet); (2) revealed extreme root exposure because of substrate scouring; or (3) generally appeared to be in poor condition. The areal coverage of Texas Wild-rice stands in vulnerable locations were determined in 2022 by GPS mapping (see Aquatic Vegetation Mapping for details) in most instances. However, areal coverage of some smaller stands was measured using a method originally developed by the Texas Parks and Wildlife Department (J. Poole, pers. comm.). To do this, maximum length and maximum width were measured. The length measurement was taken at the water surface parallel to streamflow and included the distance between the bases of the roots to the tip of the longest leaf. The width was measured at the widest point perpendicular to the stream current. Percent cover was then estimated within the rectangle formed from the maximum length and maximum width measurements. The total area of the rectangle was then multiplied by the percent cover to estimate the areal coverage for each small stand.

Data Processing and Analysis

Annual trends in total Texas Wild-rice coverage (m^2) within Spring Lake and all river segments are presented from 2001–present. Changes in Texas Wild-rice coverage (m^2, %) from April to August this year are also compared between the eight river segments. Results for changes in Texas Wild-rice coverage in Spring Lake can be found in Appendix E.

The conditions of vulnerable Texas Wild-rice stands were assessed by combining quantitative and qualitative observational measurements from the following metrics: (1) percent of stand that was emergent, (2) percent of emergent portions that were seeding, (3) percent of stand covered with vegetation mats or algae buildup, and (4) categorical estimation of root exposure. Water depth was measured in feet (ft) at the shallowest point in the Texas Wild-rice stand and velocity in feet per second (ft/s) was measured at the upstream edge of each stand. All results from the physical observations and vulnerable stands monitoring can be found in Appendix D.

Fountain Darter

Drop-Net Sampling

Drop-net sampling was utilized to quantify Fountain Darter densities and habitat utilization during the spring, summer Critical Period, and fall monitoring events at established sample reaches (Figure 1). Drop-net sites were selected using a random-stratified design. In each study reach, two sample sites per vegetation strata were randomly selected based on dominant aquatic vegetation (including open areas) mapped prior to sampling (see Aquatic Vegetation Mapping for details). At each sample site, all organisms were first trapped using a 2 m^2 drop-net. Organisms were then collected by sweeping a 1 m^2 dip-net along the river bottom within the drop-net. If no fish were collected after the first ten dip-net sweeps, the site was considered complete, and if fish were collected, an additional five sweeps were conducted. If any Fountain Darters were collected on sweep 15, additional sweeps were conducted until no Fountain Darters were collected.

Most fishes collected were identified to species and enumerated. Two morphologically similar species, Western Mosquitofish (*Gambusia affinis*) and Largespring Gambusia (*Gambusia geiseri*), which are known to hybridize, were classified by genus (*Gambusia* sp.). Larval and juvenile fishes too small to confidently identify to species in the field were also classified by genus. All Fountain Darters and the first 25 individuals of other fish taxa were measured (total length expressed in millimeters [mm]).

Physiochemical habitat data were collected at each drop-net location. Water depth (ft) and velocity (ft/s) data were collected at the upstream end of drop-net samples using a HACH FH90 flowmeter and adjustable wading rod. Water-velocity measurements were collected at 15 cm above the river bottom to characterize flows that directly influence Fountain Darters. Mean-column velocity was measured at 60% of water depth when depths were less than three feet. At depths of three feet or greater, water velocities were measured at 20% and 80% of depth and averaged to estimate mean column velocity. Water quality was measured within each drop-net using a HydroTech multiprobe, which included water temperature (degrees Celsius [°C]), pH, dissolved oxygen (milligrams per liter [mg/L], percent saturation), and specific conductance (microsiemens per centimeter [µs/cm]). Mid-column water quality was measured at water depths less than three feet, whereas bottom and surface values were measured and averaged at depths of three feet or greater. Lastly, vegetation composition (%) was visually estimated and dominate substrate type was recorded within each drop-net sample.

Dip-Net Sampling

Dip-net sampling was used to provide additional metrics for assessing Fountain Darter population trends and included qualitative timed surveys and random-station presence/absence surveys. All sampling was conducted using a 40x40 cm (1.6-mm-mesh) dip net, and surveys for both methods were conducted in spring, summer, and fall. Summer surveys represented both routine and Critical Period sampling events.

Timed dip-net sampling was conducted to examine patterns in Fountain Darter catch rates and size structure along a more extensive longitudinal gradient compared to drop-net sampling. Surveys were conducted within established survey sections and for a fixed amount of search effort (Spring Lake: 0.5 hour, City Park: 1.0 hour, I-35: 1.0 hour, Cypress Tree: 0.5 hour, Todd Island: 0.5 hour) (Figures 2 and 3). In each study reach, a single surveyor used a dip-net to collect Fountain Darters in a downstream to upstream fashion. Collection efforts mainly focused on suitable Fountain Darter habitat, specifically in areas with dense aquatic vegetation. Non-wadeable habitats (>1.4 m) were not sampled. All Fountain Darters collected were enumerated, measured (mm), and returned to the river at point of collection.

Random-station presence/absence surveys were implemented to assess Fountain Darter occurrence. During each monitoring event, sample stations were randomly selected within the vegetated area of each reach (Spring Lake: 10 sites, Spring Lake Dam: 25 sites, City Park: 20 sites, I-35: 15 sites) (Figure 1). At each random-station presence/absence was recorded during four independent dips. To avoid recapture, collected Fountain Darters were returned to the river in areas adjacent to the random station being sampled. Habitat variables recorded at each station included dominant aquatic vegetation, and presence/absence of bryophytes and algae.

Data Analysis

Key demographic parameters used to evaluate Fountain Darter observations included population performance, size structure, and recruitment. Population performance was assessed using drop-net, timed dip-net, and random dip-net data. Counts of darters per drop-net sample were standardized as density (darters/m^2). Timed dip-net total darter counts per study reach were standardized as catch-per-unit-effort (CPUE; darters/person-hour [p-h]) for each sampling event. Random dip-net occurrence per station was based on whether or not a Fountain Darter was observed during any of the four dips and percent occurrence was calculated per sampling event at each site as: (sum[darter presence]/sum[random stations])*100. Fountain Darter density, CPUE, and occurrence were compared among seasons using boxplots. In addition, density and CPUE seasonal observations were compared to the past five years and long-term observations (2001–present). Occurrence values were only compared to observations from the past four years due to the fact that Texas Wild-rice was excluded from sampling prior to 2017. Lastly, temporal trends in Fountain Darter density were assessed per sampling event for each study reach for the past five years using boxplots and compared to their respective long-term (2001–present) medians and quartiles (25th and 75th percentile).

Size structure and recruitment were assessed among seasons. Fall and spring were assessed by combining drop-net and timed dip-net data and summer was assessed using timed dip-net data only. Boxplots coupled with violin plots were used to display the distribution of darter lengths per sampling event for each season for the past five years. Boxplots show basic length-distribution statistics (i.e., median, quartiles, range) and violin plots visually display the full distribution of lengths relative to each sampling event using kernel probability density estimation (Hintze and Nelson 1998). Recruitment was quantified as the percent of darters ≤20 mm during each sampling event. Based on a linear model built by Brandt et al. (1993) that looked at age-length relationships of laboratory-reared Fountain Darters, individuals of this size are likely less than 3 months old and not sexually mature (Brandt et al. 1993; Schenck and Whiteside 1977). Percent recruitment ±95% confidence intervals (beta distribution percentiles; McDonald 2014) were shown for the past five years by season and compared to their respective long-term averages.

Habitat use was assessed based on population performance and size structure among vegetation strata using drop-net and random station dip-net observations. Fountain Darter density by vegetation taxa was compared based on current, five-year, and long-term (2001–present) observations using boxplots. Long-term comparisons of Texas Wild-rice were not provided since 2020 was the first year this species was sampled via drop-netting. In addition, Texas Wild-rice was only sampled during spring drop-netting and not included in subsequent events due to river discharge dropping below 120 cfs. Proportion of occurrence was also calculated among vegetation types sampled during random-station dip-netting for the current year. Lastly, boxplots coupled with violin plots were used to display the distribution of darter lengths by vegetation taxa using drop-net data to examine habitat use among size classes for the current year. Open habitats and Texas Wild-rice were omitted from analysis due to limited darter counts (i.e. less than 3 darters total).

Habitat suitability was quantified to examine reach-level changes in habitat quality for Fountain Darters through time. First, Habitat Suitability Criteria (HSC) ranging from 0 (unsuitable habitat) to 1 (most suitable habitat) were built based on occurrence data for all vegetation types (including open habitat) that have been sampled using logistic regression (Manly et al. 1993). Resulting HSC were then multiplied by the areal coverage of each vegetation strata mapped during a biomonitoring event, and results were summed across vegetation strata to calculate a weighted usable area for each reach. To make data comparable between reaches of different sizes, the total weighted usable area of each reach was then divided by the total area of the reach, resulting in an Overall Habitat Suitability Index (OHSI) for each reach during each sampling event. Following this method, temporal trends of Fountain Darter OHSI ±95% CI were calculated per sampling event for each study reach (Spring Lake Dam, City Park, I-35) for the past five years. Long-term (2003–present) OHSI and 95% CI averages were also calculated to provide historical context to recent observations. Specific details on the analytical framework used for developing OHSI and evaluating its efficacy as a Fountain Darter habitat index, including methods to build HSC, can be found in Appendix H.

Fish Community

Mesohabitat, Microhabitat, and Seine Sampling

Fish community sampling was conducted in the spring, summer Critical Period, and fall monitoring events to quantify fish assemblage composition/structure and to assess Fountain Darters in river segments and habitats (e.g., deeper areas) not sampled during drop-net and timed dip-net surveys. The following nine monitoring segments were sampled: Spring Lake, Sewell Park, Veterans Plaza, Rio Vista Park, Crooks Park, I-35, Wastewater Treatment Plant, Smith Property, and Thompson Island (Figures 2 and 3). Deeper habitats were sampled using visual transect surveys, and shallow habitats were sampled via seining.

A total of three mesohabitat transects were sampled at each segment during visual surveys. At each transect, four divers swam from bank-to-bank at approximately mid-column depth, enumerating all fishes observed and identifying them to species. After each mesohabitat transect was completed, microhabitat sampling was also conducted along four, five-meter-long PVC pipe segments (micro-transect pipes) placed on the stream bottom, spaced evenly along the original transect. Divers started at the downstream end and swam up the pipe searching through the vegetation, if present, and substrate within approximately 1 m of the pipe. All fishes observed were identified to species and enumerated. For both surveys, any individuals that could not be identified to species were classified by genus. At each micro-transect-pipe, total area surveyed (m^2) aquatic vegetation composition (%), and substrate composition (%) were recorded. Water depth (ft) and velocity (ft/s) data were collected in the middle of each micro-transect pipe using a Marsh McBirney Model 2000 portable flowmeter and adjustable wading rod. At each micro-transect pipe, water-velocity measurements were taken 15 cm from the bottom, mid-column, and at the surface. Standard water-quality parameters were also recorded once at each transect using a handheld water-quality sonde.

In shallow habitats, at least three transects were sampled within each monitoring segment (except Spring Lake) via seining. At each of these, multiple seine hauls were pulled until the entire wadeable area had been covered. After each seine haul, fish were identified, measured (mm), and enumerated. Total area surveyed (m^2) was visually estimated for each seining transect. Habitat data from each seine haul location included substrate and vegetation composition (%); water depth (ft); and mid-column velocity (ft/s).

Data Analysis

To evaluate fish community results, all analyses were conducted using fishes identified to species; fishes identified to genus or family were excluded. Total counts of species from independent samples were first quantified as density (fish/m^2) to standardize abundance among the three gear types used. Results from multiple sites were combined to assess spatial longitudinal differences between Spring Lake, Upper River (Sewell Park, Veterans Plaza), Middle River (Rio Vista Park, Crooks Park, I-35), and Lower River (Thompson Island, Wastewater Treatment Plant, Smith Property) (hereafter ‘study segments’).
Based on microhabitat sampling, temporal trends in Fountain Darter density were assessed per sampling event for each study reach for the past five years using boxplots and compared to their respective long-term (2014–present) medians and quartiles. Overall species richness and

diversity using the Shannon's diversity index (Spellerberg and Fedor 2003) for each study segment was assessed for the past five years and plotted with bar graphs. Richness and relative density (%; [sum(species *x* density)/sum(all species density)]*100) of spring-associated fishes (Table 2) were also quantified and presented in the same manner as species richness and diversity.

Table 2. Spring-associated fishes within the San Marcos Springs system based on Craig et al. (2016).

SCIENTIFIC NAME	COMMON NAME
Dionda nigrotaeniata	Guadalupe Roundnose Minnow
Notropis amabilis	Texas Shiner
Notropis chalybaeus	Ironcolor Shiner
Astyanax mexicanus	Mexican Tetra
Gambusia geiseri	Largespring Gambusia
Etheostoma fonticola	Fountain Darter
Percina apristis	Guadalupe Darter
Percina carbonaria	Texas Logperch

San Marcos Salamander

Visual Surveys

Salamander surveys were conducted during the spring, summer Critical Period, and fall monitoring events at three sites within Spring Lake and the San Marcos River (Figure 1), which were previously described as habitat for San Marcos Salamander (Nelson 1993). Two of the sites are located within Spring Lake: the Hotel Site is adjacent to the old hotel, and the Riverbed Site was located across from the former Aquarena Springs boat dock. The third survey area, called the Spring Lake Dam Site, is located in the main river channel immediately downstream of Spring Lake Dam in the eastern spillway. This site is subdivided into three smaller areas to allow greater coverage of suitable salamander habitat.

SCUBA gear was used to sample habitats in Spring Lake, while a mask and snorkel were used in the site below Spring Lake Dam. For each sample, an area of macrophyte-free rock was outlined using flagging tape, and three timed surveys (five minutes each) were conducted by overturning rocks >5 cm wide and counting the number of San Marcos Salamanders observed underneath. Following each timed search, the total number of rocks surveyed was recorded to estimate the number of San Marcos Salamanders per rock in the area searched. The three surveys were averaged to yield the number of San Marcos Salamanders per rock. Densities of suitably sized rocks at each sampling site were determined using quadrats (0.25 m^2). Three random samples were taken in each area by randomly throwing the quadrat into the sampling area and counting the number of appropriately sized rocks. The three samples were then averaged to yield a density estimate of the number of suitable rocks in the sampling area. The area of each site was determined by measuring each sampling area with a tape measure.

Data Analysis

Salamander densities (salamanders/m^2) are presented for each season using bar graphs and are compared with long-term (2001–present) spring, fall, high-flow event, and low-flow event averages. High-flow and low-flow averages were calculated from Critical Period events. These events are based on predetermined river discharge triggers (Appendix A), which result in additional survey events to assess flow-related impacts to the San Marcos Salamander population. Temporal trends in salamander density were also assessed per sampling event for each study site for the past five years using bar graphs.

Macroinvertebrates

Rapid Bioassessment Sampling

Rapid Bioassessment Protocols (RBPs) are tools for evaluating biotic integrity and overall habitat health, based on the community of organisms present (Barbour et al. 1999). Macroinvertebrates are the most frequently used biological units for RBPs because they are ubiquitous, diverse, and there is an acceptable working knowledge of their taxonomy and life histories (Poff et al. 2006, Merritt et al. 2008).

BIO-WEST performed sampling and processing of freshwater benthic macroinvertebrates, following Texas RBP standards (TCEQ 2014). Macroinvertebrates were sampled with a D-frame kick net (mesh size 500 micrometers [µm]) by disturbing riffle or run habitat (consisting primarily of cobble-gravel substrate) for five minutes while moving in a zig-zag fashion up-stream. Invertebrates were then randomly distributed in a tray and subsamples were taken by scooping out random portions of material and placing them into a separate sorting tray.

All macroinvertebrates were picked from the tray before another subsample was taken. This process was continued until a minimum of 140 individuals were picked to represent a sample. If the entire sample did not contain 140 individuals, the process was repeated again until this minimum count was reached. Macroinvertebrates were collected in this fashion from Spring Lake, Spring Lake Dam, City Park, and I-35 reaches, during spring and fall sampling (Figure 1).

Sample Processing and Data Analysis

Picked samples were preserved in 70% isopropyl, returned to the laboratory, and identified to TCEQ-recommended taxonomic levels (TCEQ 2014). This is usually genus, though members of the family Chironomidae (non-biting midges) and class Oligochaeta (worms) were retained at those taxonomic levels. The 12 ecological measures or metrics of the Texas RBP benthic index of biotic integrity (B-IBI) were calculated for each sample. Each metric represents a functional aspect of the macroinvertebrate community, related to ecosystem health, and sample values are scored from 1 to 4 based on benchmarks set by reference condition streams for the state of Texas. The aggregate of all 12 metric scores for a sample represent the B-IBI score for the reach that sample was taken from. The B-IBI point-scores for each sample are compared to benchmark ranges and are described as having aquatic-life-uses as “Exceptional”, “High”, “Intermediate”, or “Limited”. In this way, point-scores were calculated and the aquatic-life-use for each sample reach was evaluated. Temporal trends in B-IBI scores were assessed per sampling event for each study site for the past five years using bar graphs.

RESULTS and DISCUSSION

In 2022, low precipitation and higher ambient temperatures in central Texas resulted in severe drought conditions by spring and transitioned to an exceptional drought classification by mid-summer. As described in the next section, river discharge in the San Marcos River was below median historical conditions for most of the year. Median and minimum mean daily discharge were similar in 2022 (119 and 82 cfs, respectively) and 2009 (96 and 83 cfs, respectively). Median mean daily discharge aligned with 2022 during low flows in 2006 (116 cfs) and 2011 (117 cfs). Despite similar medians and minimums in 2022 and 2009, flows returned to normal levels by October in 2009, while river discharge remained low in fall 2022. Water quality parameters measured during Critical Period sampling in 2022 were within the range of historical data (Appendix B, Table B1 and B2; Groeger et al. 1997). Lower dissolved oxygen concentrations (1.00 mg/L) were measured at I-35 during fall drop-netting; however, this sample location occurred in a slack water area closer to the channel margins and water quality within the main channel aligned with typical conditions. See Appendix B for a complete summary of water quality conditions during Critical Period low-flow sampling.

San Marcos River discharge decreased throughout the year, reaching 95 cfs at the end of July and 90 cfs by mid-August, and 85 cfs at the end of September, which triggered three full system visual habitat evaluations and memorandum updates (Appendix B). Habitat quality documented for the Covered Species varied spatially during the evaluations at these three flow levels. At 95 cfs in July, Habitat quality for the San Marcos Salamander and Fountain Darter (i.e., aquatic vegetation) remained stable at Spring Lake and Spring Lake Dam despite lower water levels and algae build up. Suitable Fountain Darter habitat also persisted further downstream at City Park and I-35, though total wetted area was reduced at I-35. In addition, system wide coverages of Texas Wild-rice decreased about 10% since mapping in summer 2021, though its footprint was largely intact and lower water levels mostly had a negative impact on the density of top growth.

At 90 cfs in mid-August, habitat conditions for all Covered Species appeared consistent with those observed in July with some exceptions. Specifically, reduced wetted area at I-35 resulted in the formation of slack water habitats along the channel margins, though high quality Fountain Darter habitat remained wetted. By the end of September, habitat conditions were mostly similar to previous evaluations at Spring Lake and Spring Lake Dam. However, lower water levels resulted in slightly degraded habitat quality in some areas that exhibited higher-than-average amounts of algae build up and siltation. Physical habitat conditions also remained consistent with observations in August at areas further downstream. Warmer water temperatures above 25 °C were documented at stations further downstream from Spring Lake, though were infrequent.

In summary, total river discharge in the San Marcos River System in 2022 was the lowest since the inception of biological monitoring in 2000. Noticeably lower water levels most impacted Texas Wild-rice, while other vegetation that are more suitable Fountain Darter habitat were less affected. Based on past low-flow years, it remains important to keep tracking the system-wide habitat conditions for the Covered Species as these lower-than average discharge levels continue to persist. The remaining sections in the Results and Discussion describes current trends in river discharge, water temperature, Covered Species populations, and select floral and faunal communities through the San Marcos system during this low-flow year.

River Discharge

Over the last five years, median mean daily discharge in the San Marcos River increased from 2018 (166 cfs) to 2019 (232 cfs) and then decreased to 2022 (119 cfs), representing the lowest median flow conditions during this timeframe. On an annual basis, maximum mean daily discharge was lowest in 2020 (205 cfs) and 2022 (220 cfs). Highest maximum discharge occurred in 2021 (579 cfs) and was the only year where mean daily discharge exceeded 400 cfs. Minimum mean daily discharge was lowest in 2021 (99 cfs) and 2022 (82 cfs). Variation in discharge (i.e., interquartile range) was generally low, though higher in 2019 (64 cfs), 2021 (57 cfs), and 2022 (64 cfs) relative to 2018 (37 cfs) and 2020 (24 cfs) (Figure 5A).

Monthly discharge trends in 2022 showed median daily discharge was more comparable to long-term trends from January (159 cfs) to March (174 cfs) and was highest in February (220 cfs). Median daily discharge descended below the long-term median by April (148 cfs), decreased to values near the long-term 10th percentile by June (100 cfs), and then decreased further to discharges slightly below the 10th percentile for all of October (median = 87 cfs). Variation in discharge was highest in January (21 cfs) and February (15 cfs) compared to the remaining months of the year which exhibited low variation (3–8 cfs) (Figure 5B).

Routine spring sampling occurred in April, where daily discharge ranged from 142–156 cfs and was slightly below the long-term median (174 cfs). Discharge during summer sampling in July ranged from 97–111 cfs, which aligned more with the long-term 10th percentile (93 cfs). Flows descended below 100 cfs in July, triggering Critical Period sampling, which in addition to usual routine summer sampling, included fixed station photography, water quality grab sampling, Texas Wild-rice physical measurements (n = 2 events), aquatic vegetation mapping, Fountain Darter drop-netting, salamander surveys, fish community sampling, and full-system habitat assessments. Discharge further decreased below 90 cfs in August and September, requiring an additional habitat assessment and Texas Wild-rice physical measurements. As mentioned previously, mean daily discharge was below long-term 10th percentile (98 cfs) in October, ranging from 82–90 cfs. Discharge below 85 cfs resulted in routine fall sampling representing a second critical period event and required the addition of a third habitat assessment (Figure 5B).

Water Temperature

Median water temperature varied about 3 °C among stations and ranged from 20.6 °C at Spring Lake Deep to 23.1 °C at the Wastewater Treatment Plant. Variation in water temperature (i.e., interquartile range) exhibited a longitudinal gradient, generally increasing from upstream to downstream. Stations in Spring Lake had more stable (0.1 °C) temperature regimes. Variation increased above 1 °C from Chute (1.1 °C) to Spring Lake Dam (1.9 °C) and exceeded 2 °C from City Park (2.2 °C) to Wastewater Treatment Plant (2.6 °C) (Figure 6). Longitudinal trends in 2022 match expectations based on previous years and are typical within spring-associated ecosystems, where water temperatures increase in magnitude and variation further downstream from spring inputs (Kollaus and Bonner 2012).

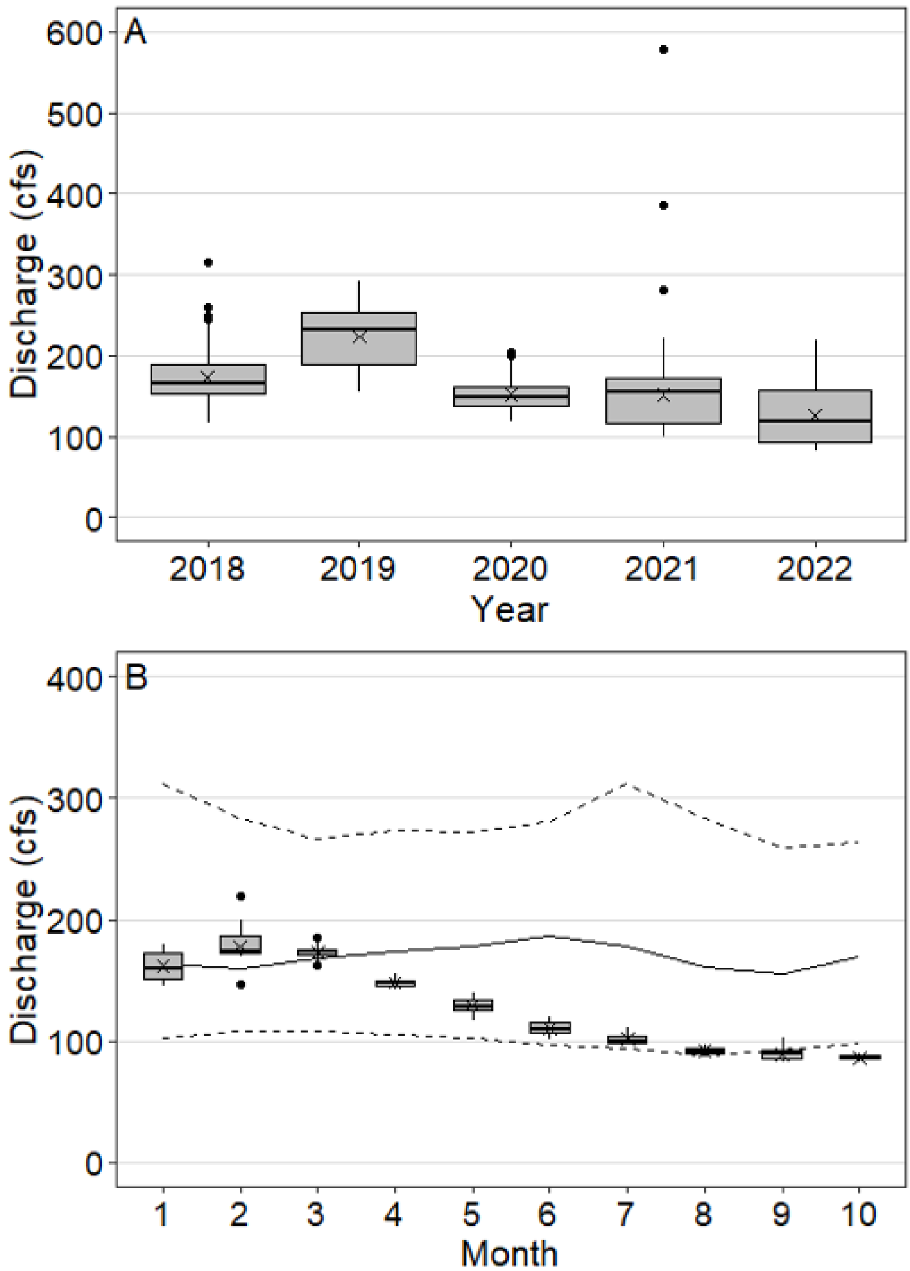

Figure 5. **Boxplots displaying San Marcos River mean daily discharge annually from 2018–2022 (A) and among months (January–October) in 2022 (B). Each month is compared to the 10th percentile (lower dashed line), median (solid line), and 90th percentile (upper dashed line) of their historical (1956–2022) daily means. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

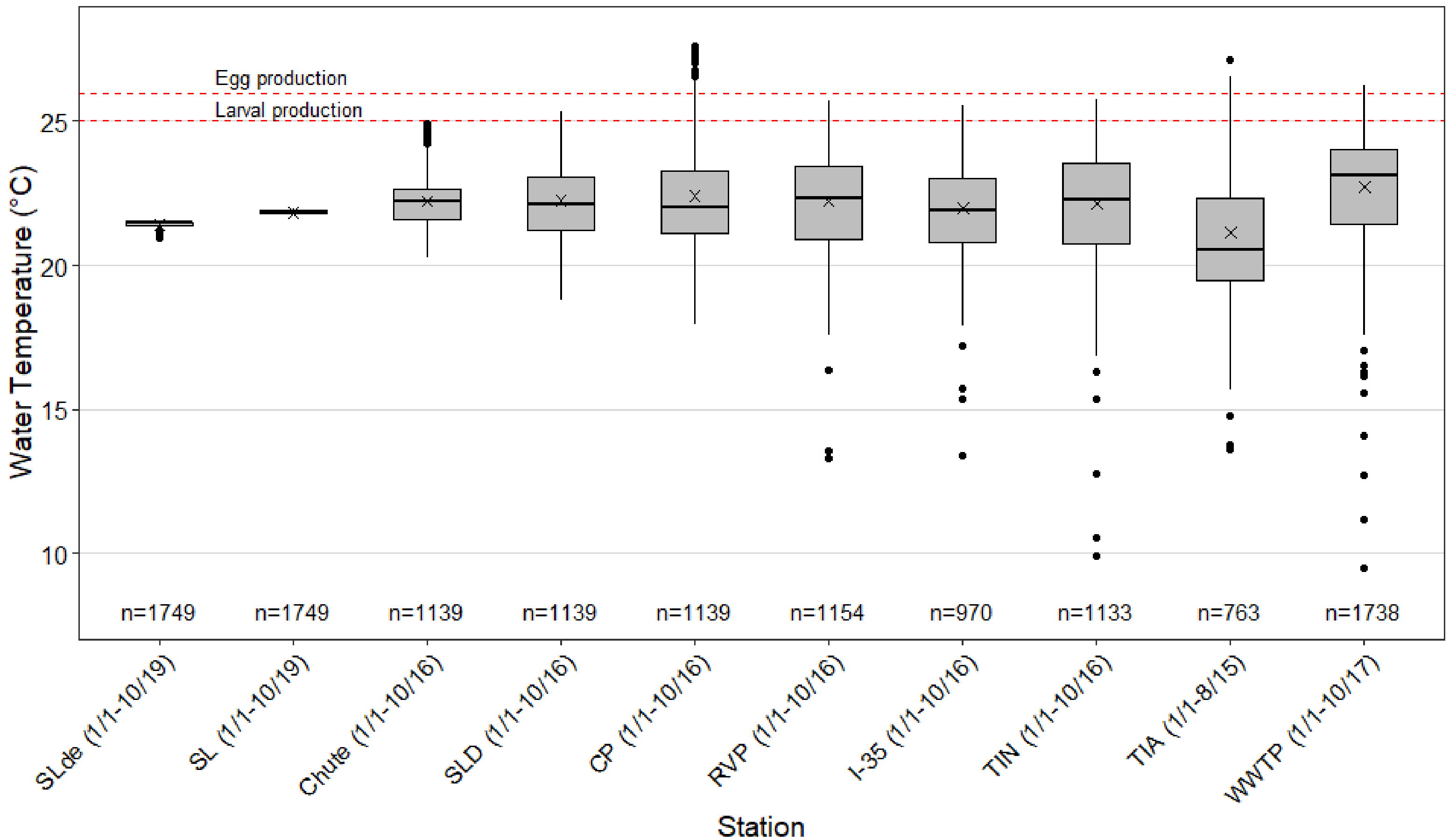

Figure 6. **Boxplots displaying 2022 water temperatures at logger stations (data collection timeframe [Month/Day]). Water temperature data are based on measurements collected at 4-hour increments. Stations include Spring Lake Deep (SLde), Spring Lake (SL), Chute, Spring Lake Dam (SLD), City Park (CP), Rio Vista Park (RVP), I-35, Thompson's Island Natural Channel (TIN), Thompson's Island Artificial Channel (TIA), and Wastewater Treatment Plant (WWTP). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles. The "n" values along the x-axis represent the number of individual temperature measurements in each distribution. The red dashed lines indicate maximum optimal temperatures for Fountain Darter larval (≥25 °C) and egg (≥26 °C) production (McDonald et al. 2007).**

Total number of days water temperatures exceeded the Fountain Darter larval production threshold ranged from 16 to 117 days. Larval exceedance was recorded at 1–2 4-hr measurements per day from June–September at Rio Vista Park (49 days) and July–September at Spring Lake Dam (16 days), City Park (55 days), I-35 (31 days), and Thompson Island Natural (42 days). Additionally, larval exceedance was recorded at 1–3 measurements per day from May–September at Wastewater Treatment Plant (117 days) and 1–4 per day in July and August at Thompson Island Artificial (27 days). Exceedance of the Fountain Darter egg production threshold was recorded at 1–2 4-hr measurements per day at City Park (July–September [31 days]), Thompson Island Artificial (July–August [8 days]), and Wastewater Treatment Plant (July–August [14 days]). In summary, exceedances of larval and egg production thresholds were recorded throughout the summer at some stations. Larval exceedance occurred 4–8 hours per day most frequently, though was recorded 12–16 hours at stations in the lower river. Egg production thresholds were exceeded less frequently, mostly occurring 4 hours per day.

Aquatic Vegetation

Spring Lake Dam Reach

Spring Lake Dam reach has had interesting changes in recent years as Texas Wild-rice has become more dominant. This reach has been a popular recreation spot over the past decade. However, from 2015 to the fall of 2021, the river edge was fenced and closed to the public, limiting access and recreation. This year marks the first full year with restored access and unrestricted recreation. As such, recreation impacts to the vegetation community were noticeable and compounded by the low flow conditions. The spring event showed a total coverage substantially above the long-term average (Figure 7). Total coverage was similar in spring 2021 and 2022 (~2,077 m^2), although Texas Wild-rice cover increased slightly from 1,693 m^2 to 1,806 m^2 (Figure 8). Low-flow event mapping in summer recorded total vegetation coverage of 1,408 m^2 with 1,257 m^2 of Texas-Wild rice. Fall mapping showed a significant decrease in total vegetation coverage reaching 1,125 m^2 with 944 m^2 of Texas Wild-rice (Figures 7 and 8). The vegetation community in Spring Lake Dam Reach is almost entirely dominated by native aquatic plant species. *Potamogeton* and *Hydrocotyle* are generally the two most common species behind Texas Wild-rice. *Potamogeton* was almost completely absent from the reach by fall (Figure 8).

City Park Reach

In 2022, spring total vegetation coverage in City Park Reach remained similar to long term averages, but was much lower in the fall (Figure 7). Vegetation in this reach returned to a more historical distribution compared to the past two years when parks were closed due to Covid-19 restrictions (Figure 7 and 8). City Park Reach is characterized by high recreational activity. Tubing, wading and swimming are very popular activities here. Based on this, large variations in vegetation cover are common, yet long-term seasonal trends tend to remain similar (Figure 7). Total coverage in spring was 4,135 m^2 with Texas Wild-rice accounting for 96% of the coverage. During the low-flow event vegetation dropped to 2,994 m^2. Only 41 m^2 of this was aquatic vegetation other than Texas Wild-rice. By fall, total vegetation coverage had slightly fallen again to 2,872 m^2. However, non-Texas Wild-rice vegetation had risen to 172 m^2, which was highest for 2022 and mainly attributed to changes in *Cabomba* (Figures 7 and 8).

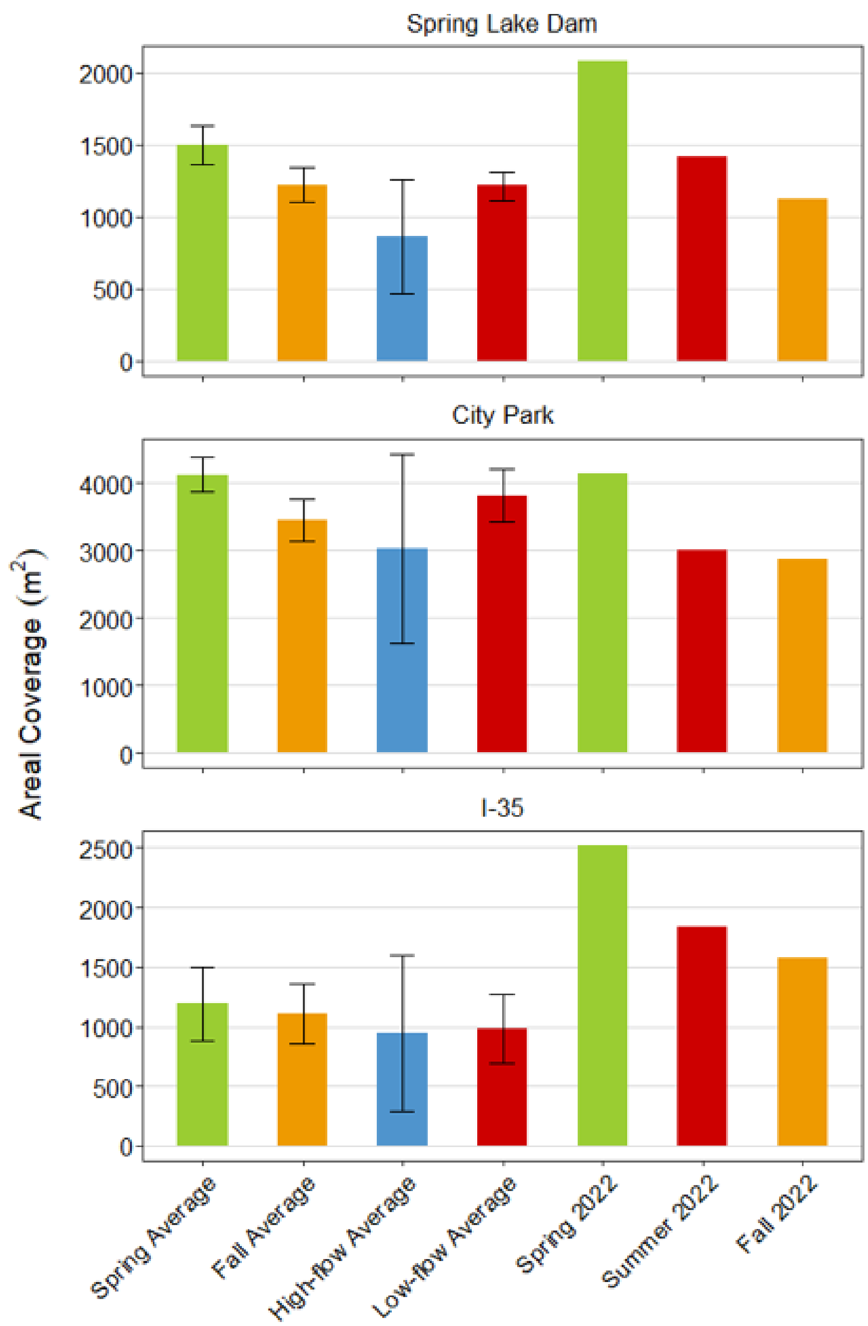

Figure 7. Areal coverage (m^2) of aquatic vegetation among study reaches in the San Marcos River. Long-term (2001–2022) study averages are provided with error bars representing 95% confidence intervals.

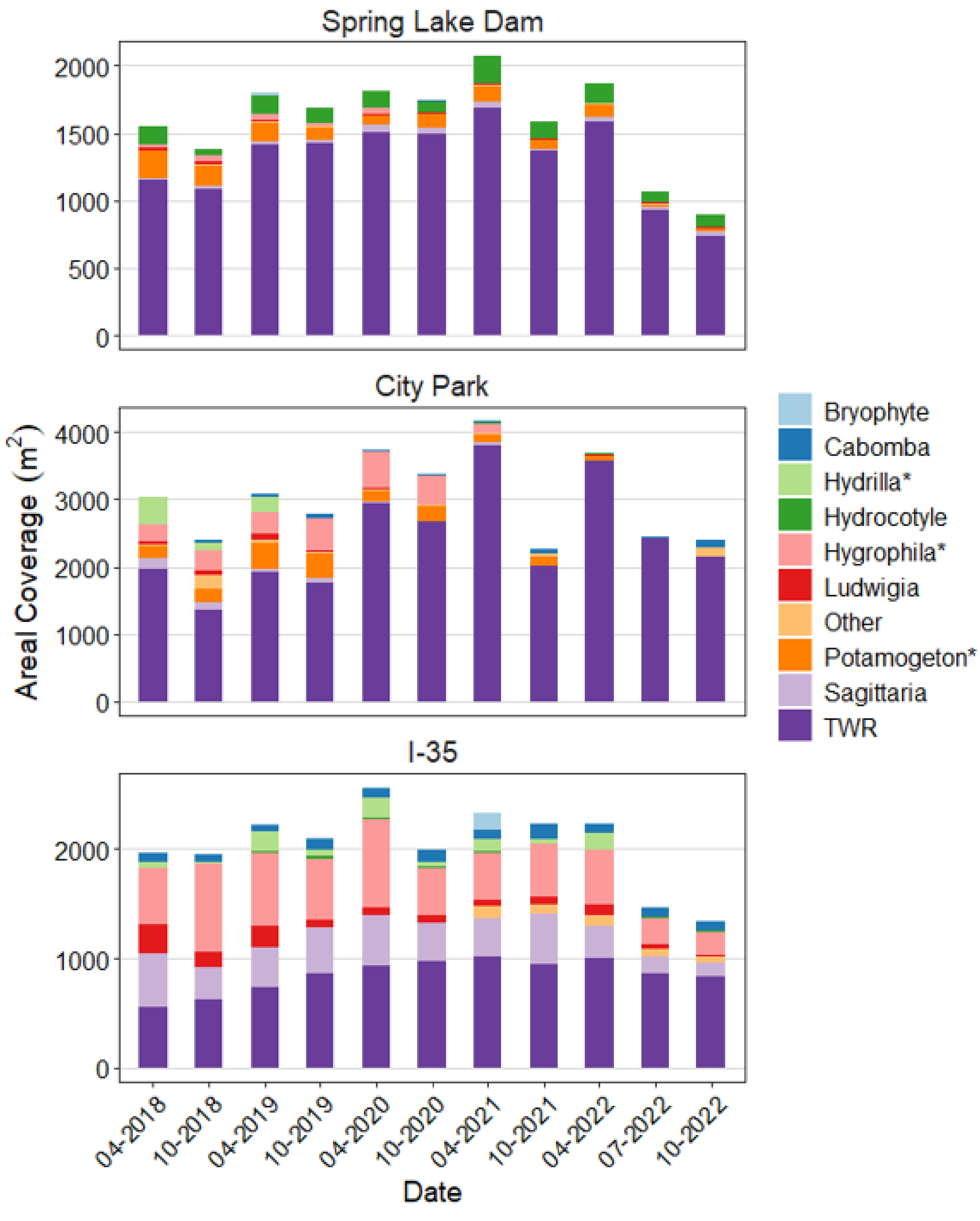

Figure 8. **Aquatic vegetation (m^2) composition among taxa (top row) from 2018–2022 in the San Marcos River. (*) in the legend denote non-native taxa. All taxa represent rooted vegetation except bryophytes.**

I-35 Reach

Total vegetation coverage was substantially higher in spring 2022 compared to long-term averages, driven mainly by a steady increase in Texas Wild-rice which reached 1,164 m^2 in the spring. This is the second highest coverage of Texas Wild-rice mapped in this reach. The total spring vegetation cover was 2,519 m^2. As the drought persisted large portions of the stream bed in the lower section of the reach became exposed above the water surface. This caused a dramatic decrease in aquatic vegetation coverage, mostly impacting *Hygrophila*. Cover of non-Texas Wild-rice species was reduced by 49% by the low flow mapping event in summer when total vegetation coverage was 1,834 m^2. Vegetation coverage fell further by fall to 1,573 m^2 with 612 m^2 of non-Texas Wild-rice vegetation. Despite the decrease fall vegetation coverage still remained higher than the long-term seasonal average (Figures 7 and 8). Other than Texas Wild-rice, *Cabomba* is currently the most dominant native species in the reach. It was less impacted from low flow conditions than many other species since it occurs almost exclusively in deeper areas of this reach (Figures 7 and 8).

Texas Wild-rice

Texas Wild-rice Mapping

In 2022, Texas Wild-rice was mapped during the annual summer mapping event in July/August. By this time, river flows were approaching the Critical Period low-flow trigger for mapping. Therefore, mapping in July/August represented routine annual and Critical Period mapping. Low flows remained below 90 cfs for the remainder of the summer and into the fall. Full system maps are located in Appendix C. Results of the 2022 annual mapping event showed a coverage of 13,273 m^2. This is the lowest coverage of Texas Wild-rice mapped by BIO-WEST since 2019 and continues the trend of decreasing Texas Wild-rice since it reached its peak in April 2021 (Figure 9).

This year’s annual event occurred during substantially reduced discharge (~90–100 cfs) and high levels of recreation in the river. Reduced water levels from low flows led to some Texas Wild-rice becoming dewatered and stranded on islands or along banks. These plants were mapped as terrestrial Texas Wild-rice that totaled 203 m^2. Terrestrial Texas Wild-rice appeared healthy and continued to bloom, as long as roots remained in mud or saturated soil. In some dewatered areas, terrestrial or riparian vegetation was beginning to grow into Texas Wild-rice stands. In instances where the water level dropped so low that the soil dried out, Texas Wild-rice plants perished, although this was an infrequent occurrence and did not heavily impact the total coverage of the species. Recreation in the summer of 2022 also had negative impacts to Texas Wild-rice coverage located adjacent to several public access areas, including the Spring Lake Dam and City Park study reaches.

Between the August 2021 and July/August 2022 annual mapping events, Texas Wild-rice coverage decreased in all but two segments, totaling 709 m^2 (Table 3, Appendix E, Table E-1). Segment A saw the largest percent loss in Texas Wild-rice with cover decreasing by over 368 m^2 since the previous mapping event. A large portion of Texas Wild-rice adjacent to the public access area in this reach was lost since 2021. Texas Wild-rice in Segment B was reduced by 22% (Table 3). Although some loss was due to recreation, loss was also attributed to lower water levels that left several Texas Wild-rice stands desiccated. This impacted the health of these stands and allowed terrestrial vegetation to colonize and compete with Texas Wild-rice. Much of the Texas Wild-rice in Sewell Park was overtaken by emergent or terrestrial plant species as the water level dropped **(**Figure 10).

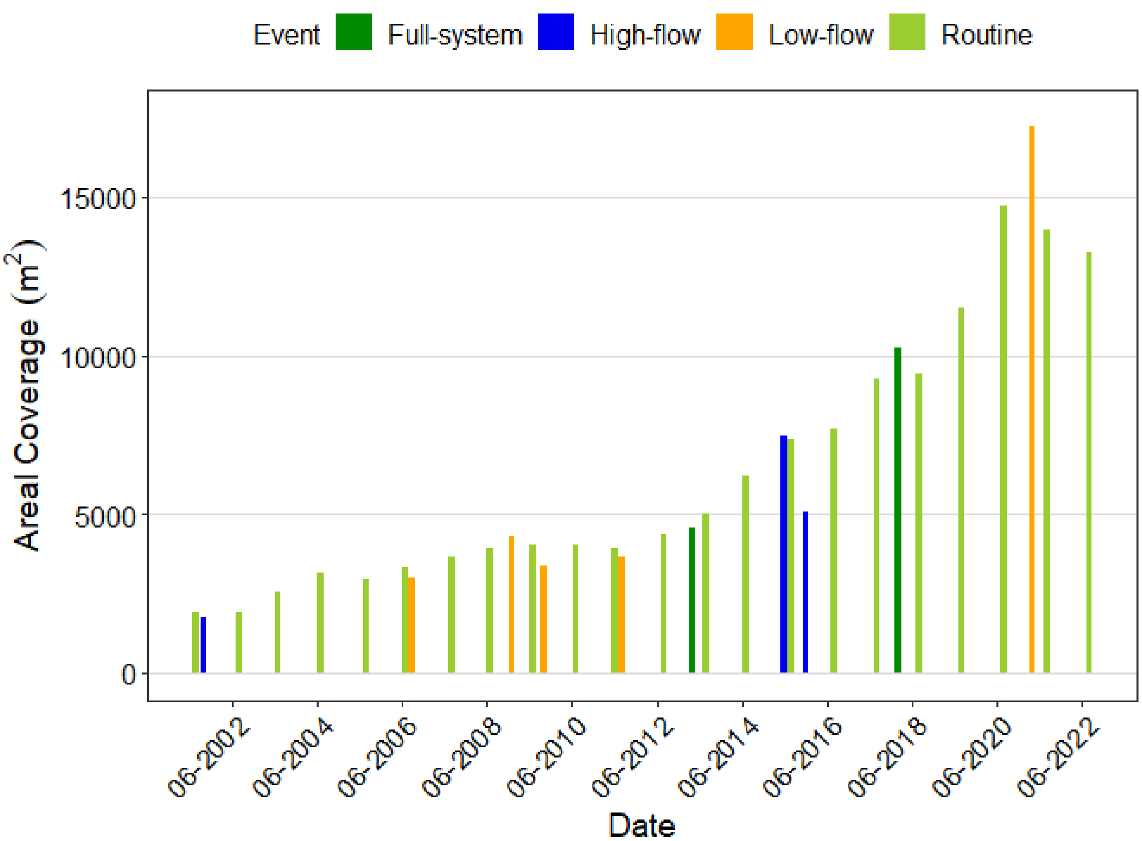

Figure 9. **Texas Wild-rice Areal coverage (m^2) from 2001–2022 in the upper San Marcos River. Routine sampling in 2022 also represents a Critical Period low-flow event.**

Texas Wild-rice declined slightly in several other segments, but although plants were lost in some areas, plants expanded in others. Segment H saw the largest increase in Texas wild-rice of 25% over the previous year (Table 3). In recent years, Texas wild-rice has been steadily increasing in this section mostly as a result of heightened natural expansion, EAHCP restoration plantings and lack of pulse flow scouring events. Texas Wild-rice plants in the mill race below Cheatham Street and in the Thompson's Island mill race were observed again for the fourth consecutive year.

In summary, Texas Wild-rice remained abundant throughout the system. Plants were only locally extirpated in areas where the substrate had been desiccated or eroded away by foot traffic or shear velocity flows. Even though top growth has been impacted in many places, the root footprints remained intact, potentially allowing plants to re-sprout when growing conditions improve (Figure 10).

Table 3. Change in cover amount (m^2) of Texas Wild-rice between August 2021 and July/August 2022 annual mapping.

RIVER SEGMENT	AUGUST 2021 COVERAGE	JULY/AUGUST 2022 COVERAGE	COVERAGE CHANGE	PERCENT CHANGE
A. Spring Lake Dam Study Reach	1,372	1,004	-368	-26.8%
B. Sewell Park	1,308	1,017	-291	-22.2%
C. City Park bend	3,988	3,802	-186	-4.6%
D. City Park Study Reach	2,452	2,424	-28	-1.1%
E. Lower City Park	1,335	1,516	+181	+13.6%
F. Veramendi Park to Rio Vista Park	2,124	2,126	+2	-0.1%
G. I-35 Study Reach	954	866	-88	-9.2%
H. Below I-35	317	419	+102	+32.1%
Spring Lake	132	99	-33	-25.0%

Figure 10. Texas Wild-rice at Sewell Park overtaken by terrestrial and riparian sedges and grasses at low water levels (top); Texas Wild-rice root masses in the heavily recreated Spring Lake Dam Reach, which were still viable despite poor root condition (bottom).

Fountain Darter

A total of 734 Fountain Darters were observed at 76 drop-net samples in 2022. Drop-net densities ranged from 0.00–53.00 fish/m^2. Community summaries and raw drop-net data are included in Appendix D and Appendix E, respectively. Habitat conditions observed during drop-netting can be found in Table 4. Texas Wild-rice was only sampled during spring drop-netting and not included in subsequent events due to river discharge dropping below 120 cfs. Timed dip-netting resulted in a total of 557 Fountain Darters during 10.5 person-hours (p-h) of effort. Site CPUE ranged from 4–116 fish/p-h. Lastly, Fountain Darters were present at 60 out of 180 random-stations and reach-level percent occurrence among monitoring events ranged from 10–87%. A summary of occurrences per reach and vegetation taxa can be found in Table 5.

Table 4. Habitat conditions observed during 2022 drop-net sampling. Physical habitat parameters include counts of dominant vegetation (median % composition) and dominant substrate type sampled. Depth-velocity and water quality parameters include medians (min-max) of each variable among all drop-net samples.

HABITAT PARAMETERS	SLD	CP	I-35
Vegetation			
Cabomba[1]	0	6 (95%)	6 (100%)
Hydrocotyle[1]	6 (100%)	2 (85%)	0
Hygrophila[1]	0	0	5 (100%)
Ludwigia[1]	0	0	3 (90%)
Open	6 (100%)	6 (100%)	6 (100%)
Potamogeton[2]	6 (90%)	4 (85%)	0
Sagittaria[2]	6 (93%)	2 (100%)	6 (95%)
Texas Wild-rice[2]	2 (100%)	2 (93%)	2 (100%)
Substrate			
Cobble	11	1	0
Gravel	9	8	2
Sand	1	2	10
Silt	5	11	16
Depth-velocity			
Water depth (ft)	1.2 (0.3–2.7)	2.3 (0.6–3.7)	1.0 (0.2–3.8)
Mean column velocity (ft/s)	0.4 (0.0–2.3)	0.2 (0.0–0.9)	0.1 (0.0–0.9)
15-cm column velocity (ft/s)	0.3 (0.0–2.3)	0.1 (0.0–0.6)	0.0 (0.0–0.9)
Water quality			
Water temperature (°C)	22.0 (21.5–22.8)	22.6 (21.7–24.2)	22.6 (20.2–24.1)
DO (ppm)	8.5 (7.1–9.3)	9.3 (5.2–10.6)	8.7 (1.0[3]–10.3)
DO % saturation	97.4 (82.7–106.9)	107.6 (6.7–122.1)	99.1 (9.7–120.0)
pH	7.5 (7.4–7.9)	7.5 (7.3–7.8)	7.7 (7.3–7.8)
Specific conductance (µs/cm)	635 (623–640)	627 (617–639)	630 (624–693)

[1]Denotes ornate vegetation taxa with physical characteristics that create complex structure
[2]Denotes long broad or ribbon-like, austere-leaved vegetation taxa
[3]Minimum DO concentration was observed at a slack water area adjacent to the main channel, which maintained suitable water quality conditions

Table 5. Summary of vegetation types sampled among reaches during 2022 random-station surveys in the San Marcos Springs/River and the percent occurrence of Fountain Darters in each reach and vegetation type. Raw numbers represent the sum of detections per reach-vegetation type combination.

VEGETATION TYPE	SL	SLD	CP	I-35	Total	Occurrence
Cabomba[1]	3	0	3	2	**8**	**57.1**
Ceratophyllum[1]	3	0	0	0	**3**	**100.0**
Filamentous algae[1]	1	0	0	0	**1**	**100.0**
Hydrocotyle[1]	0	6	0	1	**7**	**70.0**
Hygrophila[1]	0	0	0	17	**17**	**77.3**
Ludwigia[1]	0	0	0	1	**1**	**100.0**
Potamogeton[2]	0	2	0	0	**2**	**66.7**
Sagittaria[2]	9	1	0	1	**11**	**52.4**
Texas Wild-Rice[2]	0	4	6	0	**10**	**9.5**
Total	**16**	**13**	**9**	**22**	**60**	**33.3**
Occurrence	**53.3**	**28.9**	**15.0**	**48.9**	**-**	**-**

[1]Denotes ornate vegetation taxa with physical characteristics that create complex structure
[2]Denotes long broad or ribbon-like, austere-leaved vegetation taxa

Population Demography

Seasonal population trends

Median Fountain Darter density in 2022 was higher in the summer (3.75 darters/m^2) than spring (0.75 darters/m^2) and fall (1.25 darters/m^2). Compared to historical data, spring 2022 aligned with 5-year trends, whereas both spring 2022 and spring 5-year had lower medians and variability (i.e., interquartile range) compared to the long-term. In contrast, median density and variation were slightly above long-term trends in summer (Figure 11A). Mean density was ubiquitously higher than the median across seasons and temporal extents, demonstrating positively skewed distributions (i.e., clustered). Median CPUE in 2022 was highest in spring (69 darters/p-h), followed by summer (54 darter/p-h) and fall (36 darters/p-h). Compared to historical data, median CPUE was higher in spring 2022 and variation was lower across seasons, which can be attributed to lower sample sizes associated with this sampling method (Figure 11B). Lastly, median percent occurrence was greatest in summer (42%), followed by spring (33%) and fall (29%). Median percent occurrence in spring 2022 was lower than the 5-year dataset and variation was slightly lower in fall 2022 when compared to 5-year data (Figure 11C).

In summary, population performance metrics generally aligned with historical data. Some exceptions included less frequent high-density samples for 5-year versus long-term trends in spring and a greater frequency of high-density samples in summer 2022 compared to the long-term. Despite decreases in high-density samples shown by 5-year trends, density increased across reaches in recent years (see next section). Conflicting patterns in spring CPUE and occurrence further support Fountain Darter's inherently clustered distributions, as shown by drop-net data. Based on the methods used for generating sample sites to examine occurrence (i.e., simple random sampling), it is reasonable to suggest that the sampling sites selected were not located in areas with high aggregations of darters. For example, all City Park random dip-net stations in spring occurred in Texas Wild-rice, resulting in low percent occurrence, whereas CPUE during timed dip-netting was high, with efforts focused more in suitable habitat types (e.g., *Cabomba*).

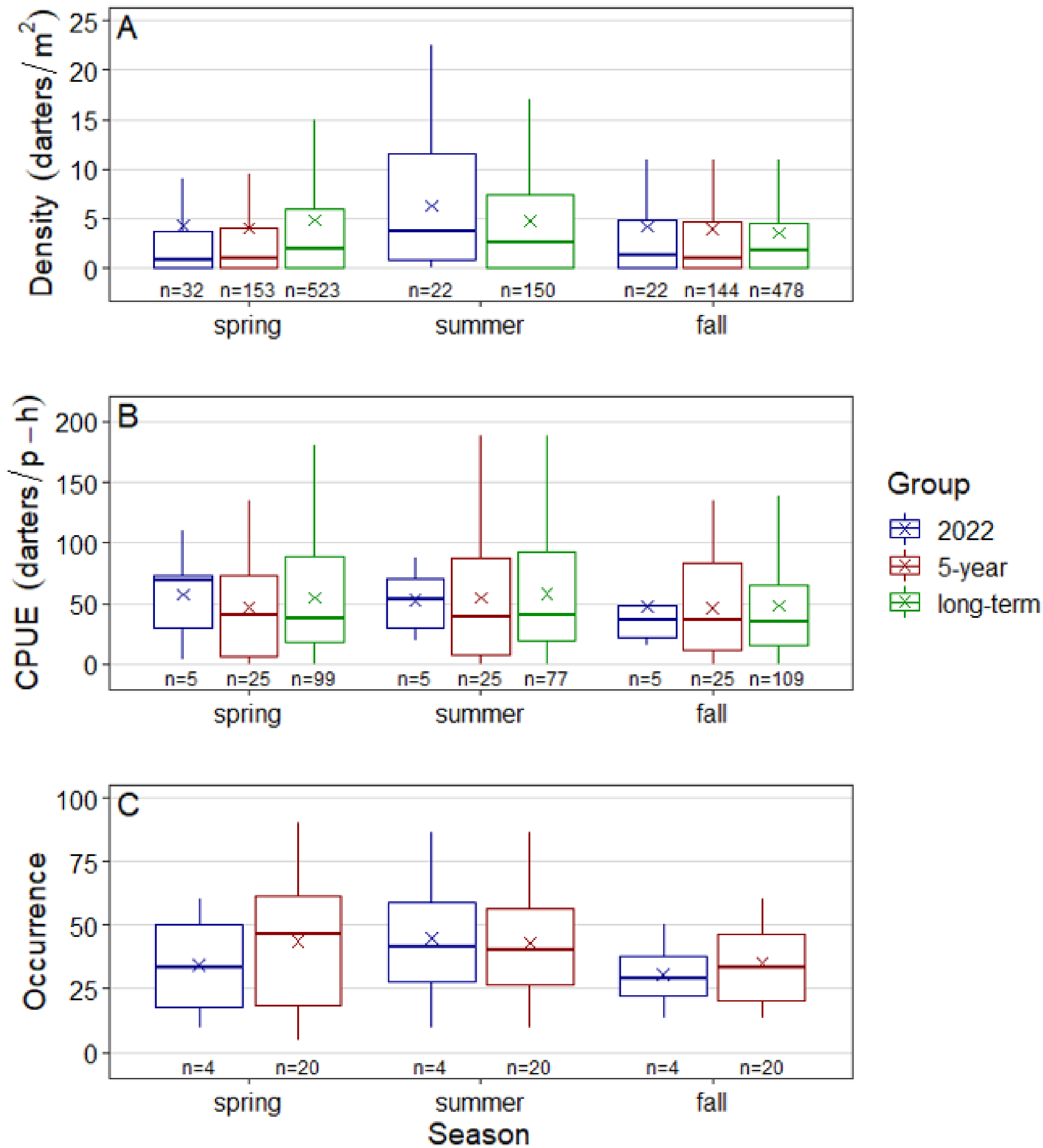

Figure 11. Boxplots comparing Fountain Darter density from drop-net sampling (A), catch-per-unit-effort (CPUE) from timed dip-netting (B), and proportional occurrence from random station dip-netting (C) among seasons in the San Marcos Springs/River. Temporal groups include 2022, 5-year (2018–2022), and long-term (2001–2022) observations. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axes represent the number of discrete samples per category.

Drop-net sampling density trends

Patterns in Fountain Darter density varied among and within reaches in 2022. Median density at Spring Lake Dam was similar to the long-term median (1.50 darters/m^2) in the spring (1.00 darters/m^2) and fall (2.00 darters/m^2). Median density was higher in the summer (4.00 darters/m^2) and closer to the long-term 75th percentile (4.50 darters/m^2), representing the highest densities documented since 2018. Median density at City Park and I-35 was less than or equal to their long-term median (2.00 darters/m^2) in spring (0.75 and 1.25 darters/m^2, respectively) and fall (1.25 and 2.00 darters/m^2, respectively). Summer medians were also higher than the long-term at City Park (4.00 darters/m^2) and I-35 (3.75 darters/m^2). Drop-net samples with high Fountain Darter densities often resulted in greater medians and upper quartiles the past two years. As such, directional trends in density were generally positive across reaches since 2018, though varied in magnitude depending on the descriptive statistic assessed (Figure 12).

Positive increases in median density were minimal, though slightly higher at I-35.
The direction of temporal trends was more apparent based on upper quartile quantities, which exhibited positive directional change at greater magnitudes. Increased upper quartiles were highest in City Park, followed by I-35 and Spring Lake (Figure 12). Positive increases in density the past five years may be due to several extrinsic and intrinsic factors. Increased patch size of more suitable vegetation taxa (e.g., *Cabomba* in City Park) could explain some recent increases observed (Angermeier et al. 2002). In addition, flow stability likely facilitated higher recruitment rates the last two years and contributed to the positive trends observed (Katz and Freeman 2015; see 'Size structure and recruitment trends'). This suggests suitable environmental conditions were sustained during low flows across all Fountain Darter life stages. The degree that recruitment positively affected patterns in density may also be attributed to reach-level differences in the availability of suitable vegetation for juveniles (e.g., *Cabomba*), which would explain why higher increases occurred at City Park and I-35 compared to Spring Lake Dam. However, results should be interpreted with a degree of uncertainty due to potential influences of imperfect detection (Davis et al. 2011; Kéry and Royle 2021).

In summary, results from drop-netting suggest that reduced flows in 2022 did not have a negative impact on Fountain Darter density. On the contrary, densities were generally higher compared to long-term trends, which previous low-flow sampling also supports (Figure E5 and E6). As such, stable flows in 2022 could have enhanced young-of-year survival (or prevented displacement) that led to the increased density from spring to summer. This suggests demographic processes vary in response to flow conditions and that population growth can occur during periods of environmental stability (Freeman et al. 2001; Falke et al. 2012; Katz and Freeman 2015). Results also indicate that population resistance to reduced flows may be a function of recruitment (McCargo and Peterson 2010; Katz and Freeman 2015). However, explicit effects of vital rates on population density are currently unknown. Although long-term data shows densities were higher at lower flows, it's unlikely that this pattern would continue if flows decreased to levels that degrade habitat quality or impact darter fitness (McDonald et al. 2007; Mora et al. 2013). Additional research is needed to understand how different demographic processes (e.g., recruitment, survival, immigration/emigration) contribute to population dynamics during periods of reduced flows and how the duration and/or magnitude of such events influences population state transitions (Wheeler et al. 2017; Freeman et al. 2022).

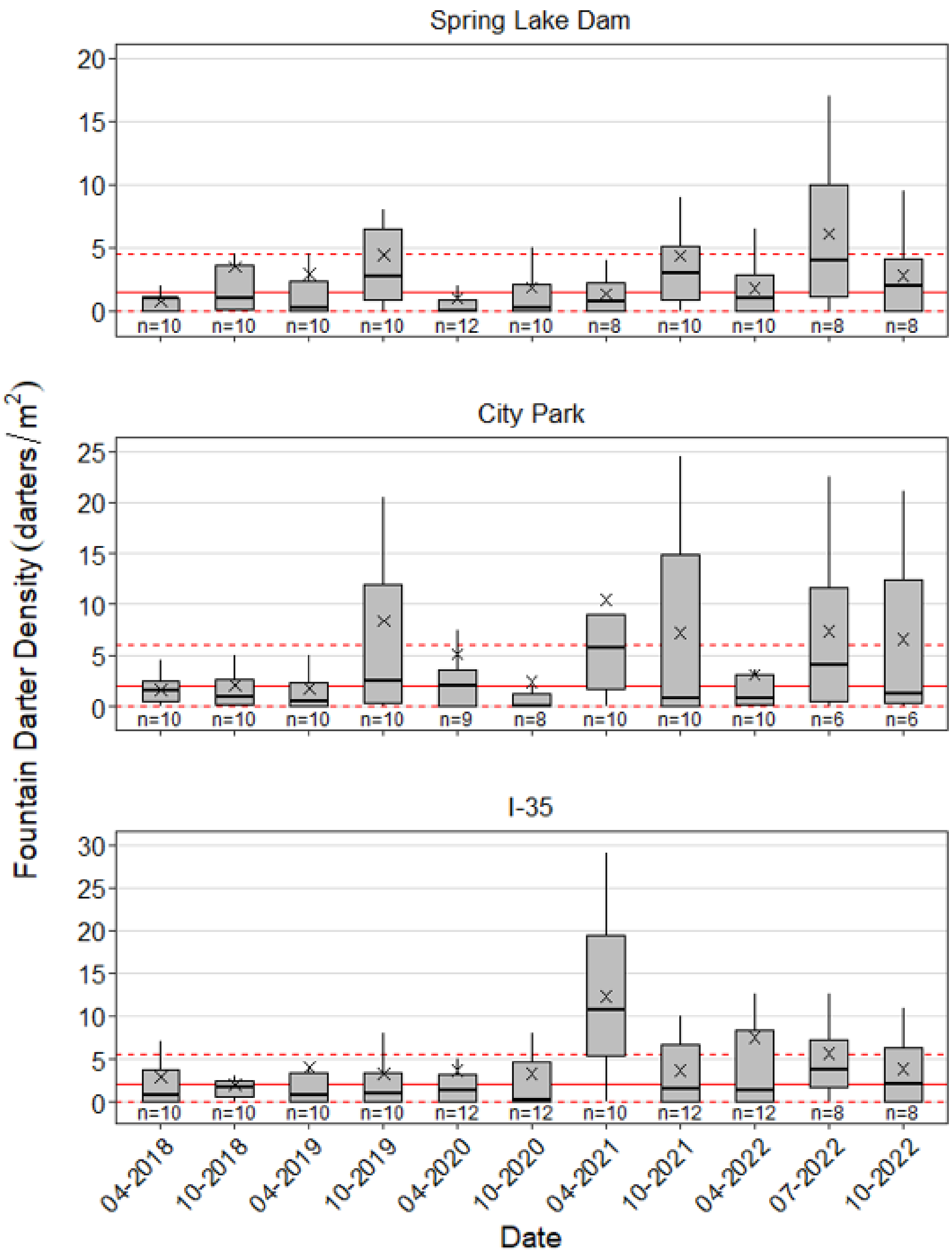

Figure 12. **Boxplots displaying temporal trends in Fountain Darter density (darters/m²) among study reaches from 2018–2022 during drop-net sampling in the San Marcos River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axes represent the number of drop-net samples in each category. Solid and dashed red lines denote long-term (2001–2022) medians and interquartile ranges, respectively.**

Size structure and recruitment trends

Five-year trends in Fountain Darter size structure and recruitment displayed consistent patterns among seasons, though event-specific discrepancies were observed. In general, smaller darters were more frequently observed in spring during the peak reproductive period, as seen by lower median lengths (19–22 mm). Violin plots with distributions that are negatively skewed and greater levels of recruitment in spring (42.55–61.09%) further support this trend. Patterns in size structure aligned with long-term trends in the spring. Recruitment was noticeable higher in spring 2019 (60.09%), 2021 (59.47%), and 2022 (57.26%) than other years and the lack of confidence interval overlap with long-term trends suggest these were meaningful increases. Summer median lengths (25–28 mm) were high with distributions more frequently skewed positively towards larger darters. As such, summer recruitment rates (14.89–25.95%) were lower, but aligned with historical summer data. In fall from 2018–2021, median lengths (26–29 mm) and recruitment (16.04–31.25%) were comparable to summer trends. However, recruitment in fall 2022 (39.24%) represented the highest relative abundance of young-of-year darters in recent falls and confidence intervals lacking overlap with long-term data support a meaningful response (Figure 13).

Higher recruitment rates in 2021 and 2022 likely provide partial explanation for the positive trend in Fountain Darter density observed the past two years. Events with the highest drop-net densities are consistently represented by a greater proportion of young-of-year darters (i.e., ≤20 mm). Spring and fall recruitment rates did not align with expectations of long-term trends in these events. In particular, fall 2022 exhibited the highest fall recruitment rate on record. Higher rates of recruitment were also documented during past periods of similar hydrologic conditions in the San Marcos River, supporting that low and/or stable flows can increase recruitment and enhance young-of-year survival (or site fidelity) (Freeman et al. 2001; Poff and Zimmerman 2010; Craven et al. 2010; Katz and Freeman 2015). A previous study that assessed population dynamics of the Turquoise Darter (*Etheostoma inscriptum*) also observed greater young-of-year abundances during years of lower and more stable flows, suggesting that Fountain Darters may be resistant to large reductions in flow by augmentation through recruitment (Katz and Freeman 2015).

While data from this program and past research indicate recruitment as a mechanism for population resistance, studies have also observed attenuated growth of darters during extreme low flows (Marsh-Matthews and Matthews 2010; Katz and Freeman 2015). It is currently unknown whether the current drought negatively influenced individual growth and fitness; however, even if a negative impact was observed, recovery of body condition would be expected when flow conditions return to normal (Marsh-Matthews and Matthews 2010). In summary, patterns in size structure and recruitment provided some interesting insight into Fountain Darter flow-ecology, including recruitment as a potential mechanism for population resistance. Additional research using more robust analyses would be needed to provide a more mechanistic understanding of population resistance and resilience. Nonetheless, these results suggest management strategies that aim to establish or maintain suitable spawning and young-of-year habitats could augment Fountain Darter population persistence (Katz and Freeman 2015; Duncan et al. 2016; Dunn and Angermeier 2019).

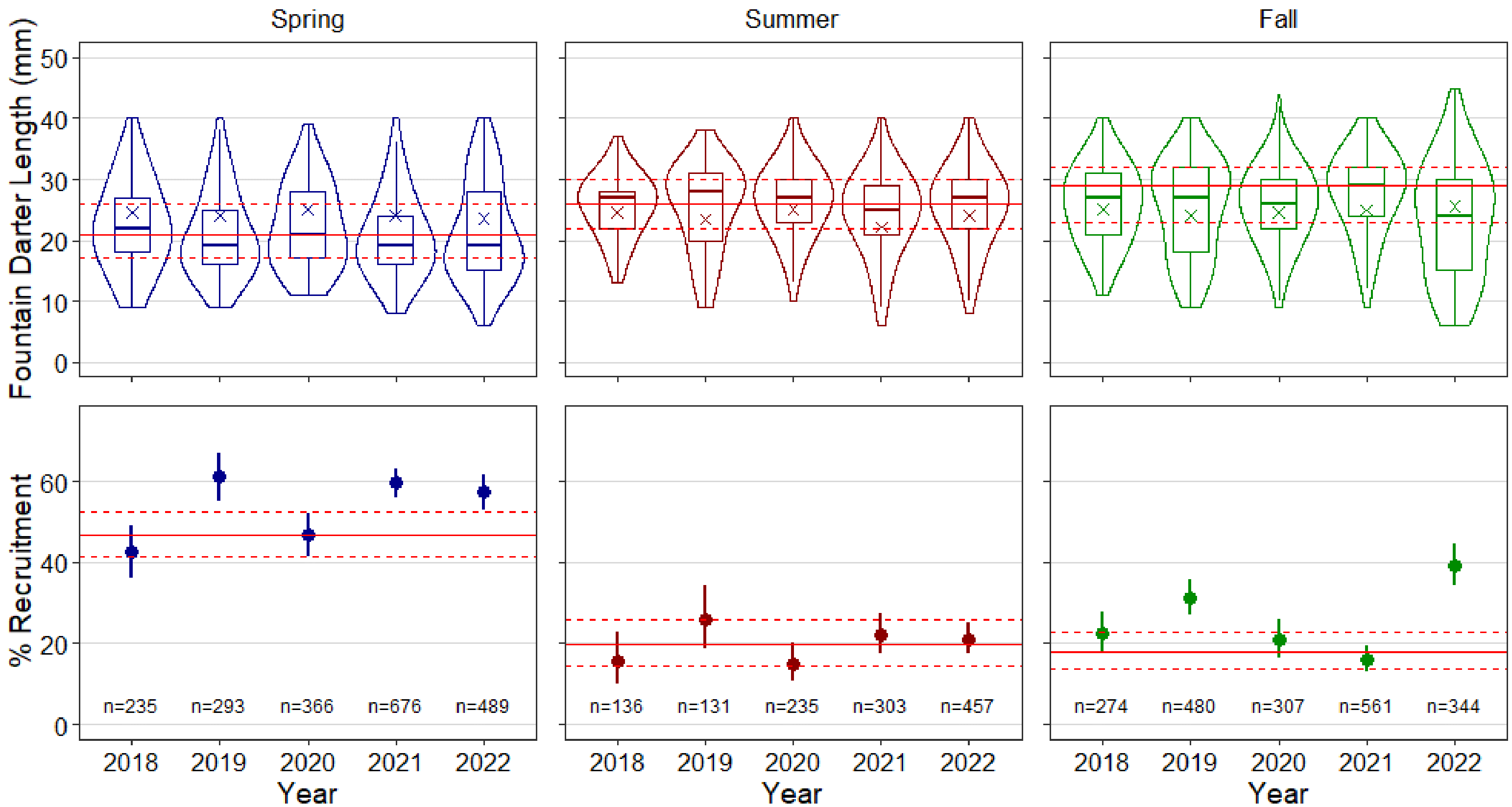

Figure 13. **Seasonal trends of Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the San Marcos River from 2018–2022. Spring and fall trends are based on drop-net and timed dip-net data in aggregate, whereas summer trends are based on timed dip-net data only. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability density; polygons outlining boxplots). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axis of the top row represent the number of Fountain Darter length measurements in each distribution. Recruitment is the percent relative abundance (± 95% CI) of darters ≤20 mm. Long-term (2001–2022) trends in size structure are represented by median (solid red line) and interquartile range (dashed red lines). Recruitment is compared to the long-term mean percentage (solid red line) and 95% CI (dashed red lines).**

Habitat Use and Suitability

Density trends among vegetation taxa

Median densities in 2022 were highest in *Cabomba* (11.25 darters/m^2), *Hygrophila* (11.00 darters/m^2), and *Ludwigia* (9.50 darters/m^2). Maximum density in 2022 also occurred in *Cabomba* (53.00 darters/m^2). Densities in *Hygrophila* and *Ludwigia* were substantially higher during 2022 sampling compared to 5-year and long-term trends. Density trends for *Cabomba* in 2022 were slightly lower than 5-year trends, though had similar levels of dispersion and were both greater than long-term trends. Higher variation (i.e., interquartile range) in *Cabomba* (11.88 darters/m^2) demonstrates that while this taxon often harbors greater densities of darters, there is high variability among sites within a given year. The remaining taxa had lower medians, which included *Hydrocotyle* (3.25 darters/m^2), *Sagittaria* (2.00 darters/m^2), Texas Wild-rice (0.00 darters/m^2), and open habitats (0.00 darters/m^2). These taxa also displayed similar trends to historical observations, except for *Potamogeton*, which in 2022 was higher than 5-year and long-term trends (Figure 14).

Current patterns of vegetation use continue to generally support previous research, showing higher Fountain Darter densities occur within ornate vegetation (Schenck and Whiteside 1976; Linam et al. 1993; Alexander and Phillips 2012; Edwards and Bonner 2022). Densities were higher than historical data for several taxa. Higher densities in 2022 could simply be a product of temporal variation in drop-net locations within the river channel. For example, most individuals in high density samples were recent recruits located in slack water habitats along the banks (e.g., *Ludwigia*), making spatial variation an important consideration when interpretating results (see 'Size structure among vegetation taxa' for further discussion). Alternately, habitat associations may be density-dependent at greater population sizes. Preferred habitats may not support all individuals at high population densities, which would result in use of a wider breadth of habitats, including less-favored ones (i.e., *Potamogeton*) (Angermeier et al. 2002). However, it remains unclear whether density-dependence is in fact a regulating mechanism on Fountain Darter habitat use. Trends observed may instead be a result of higher levels of aggregation due to reduced habitat suitability (reaches dominated by less-suitable Texas Wild-rice with limited amounts of high-quality habitat) and/or low-flow conditions, rather than increased population size.

Size structure among vegetation taxa

Distribution summary statistics and violin plots showed that Fountain Darter size structure varied among vegetation taxa in 2022. Open and Texas Wild-rice were not included in analysis due to limited observations. The lowest median lengths occurred in *Ludwigia* (19 mm), *Cabomba* (21 mm), and *Potamogeton* (22 mm). Size structure distributions were negatively skewed for *Ludwigia*, while *Cabomba* was more uniform, which both conflict with past results (Figure 15). In 2021, *Ludwigia* and *Cabomba* were positively and negatively skewed, respectively, indicating both taxa can be important habitat for young-of-year and adults (BIO-WEST 2022). Taxa with the highest median lengths included *Sagittaria* (29 mm) and *Hydrocotyle* (29 mm), which aligned with previous observations and was due to greater representation of larger adults (Figure 15; BIO-WEST 2022).

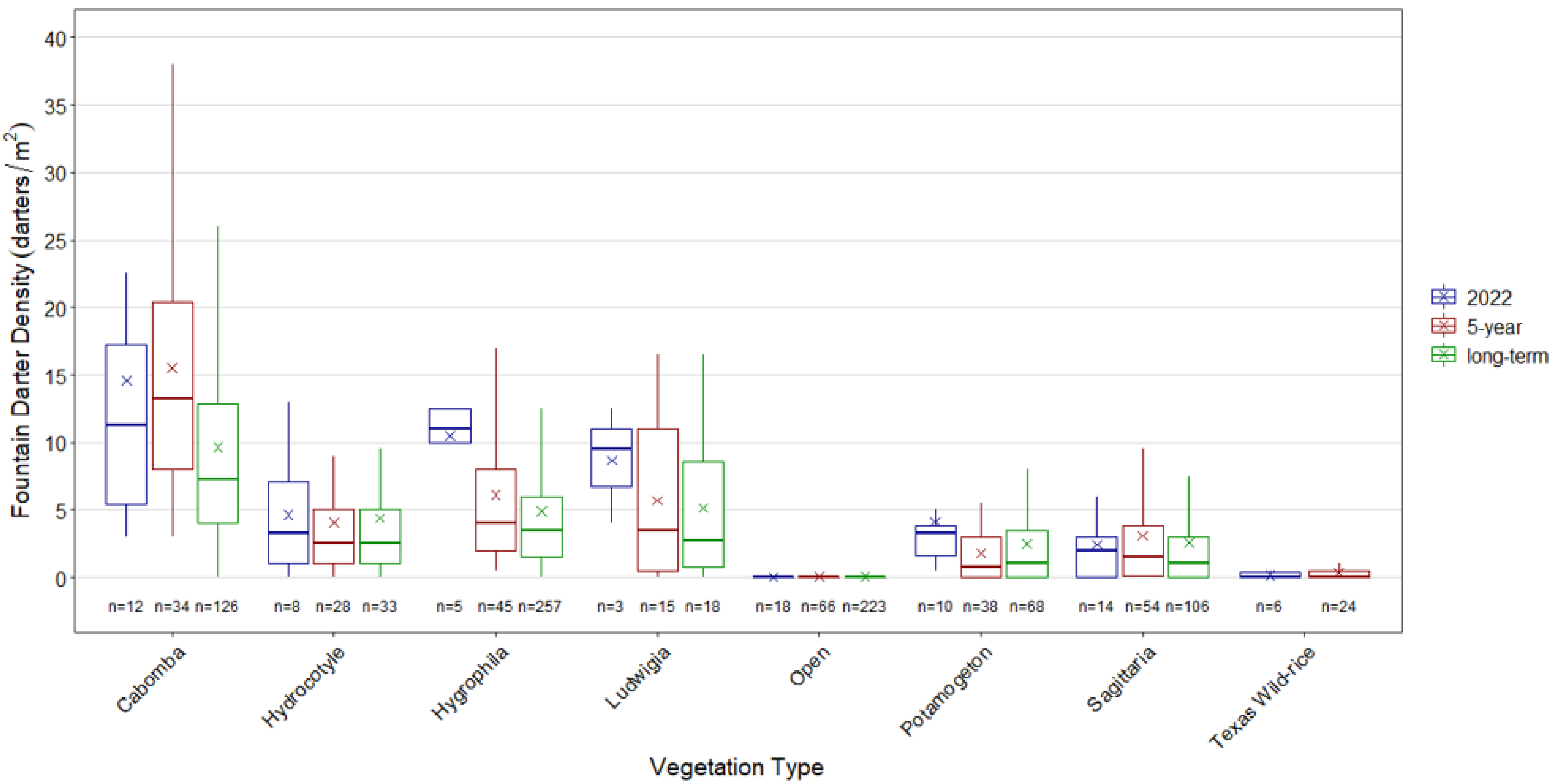

Figure 14. **Boxplots displaying 2022, 5-year (2018–2022), and long-term (2001–2022) drop-net Fountain Darter density (darters/m^2) among vegetation types in the San Marcos River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axes represent drop-net sample sizes per group.**

When evaluating Fountain Darter size structure among vegetation taxa it is important to recognize the influence of other confounding factors (e.g., water quality, hydraulics) that impact the distribution of aquatic vegetation and darter size structure. For example, *Cabomba* tends to grow in low-velocity backwater areas with silty substrates that provide important habitat for early life stages of darters, which likely have difficulty persisting and feeding in swift flowing water. In contrast, *Hydrocotyle* is most abundant in shallow high-velocity areas with course gravel and cobble substrates where large adults typically prevail. Lastly, most *Ludwigia* drop-net samples at I-35 in 2021 and 2022 were within shallow moderate- to high-velocity areas and contained larger adult darters (BIO-WEST 2022). In summer 2022, about 50% of the darters collected from one slack water *Ludwigia* habitat sampled were recent recruits, which aligned more with data collected in the Comal system this year. In summary, results from 2022 show that habitat use can vary annually among size classes, while consistent ontogenetic differences in habitat use appear to be related to the physical structure of vegetation taxa and local flow conditions. This in total indicates that habitat use across life stages should be put into context with channel position and associated hydraulic characteristics.

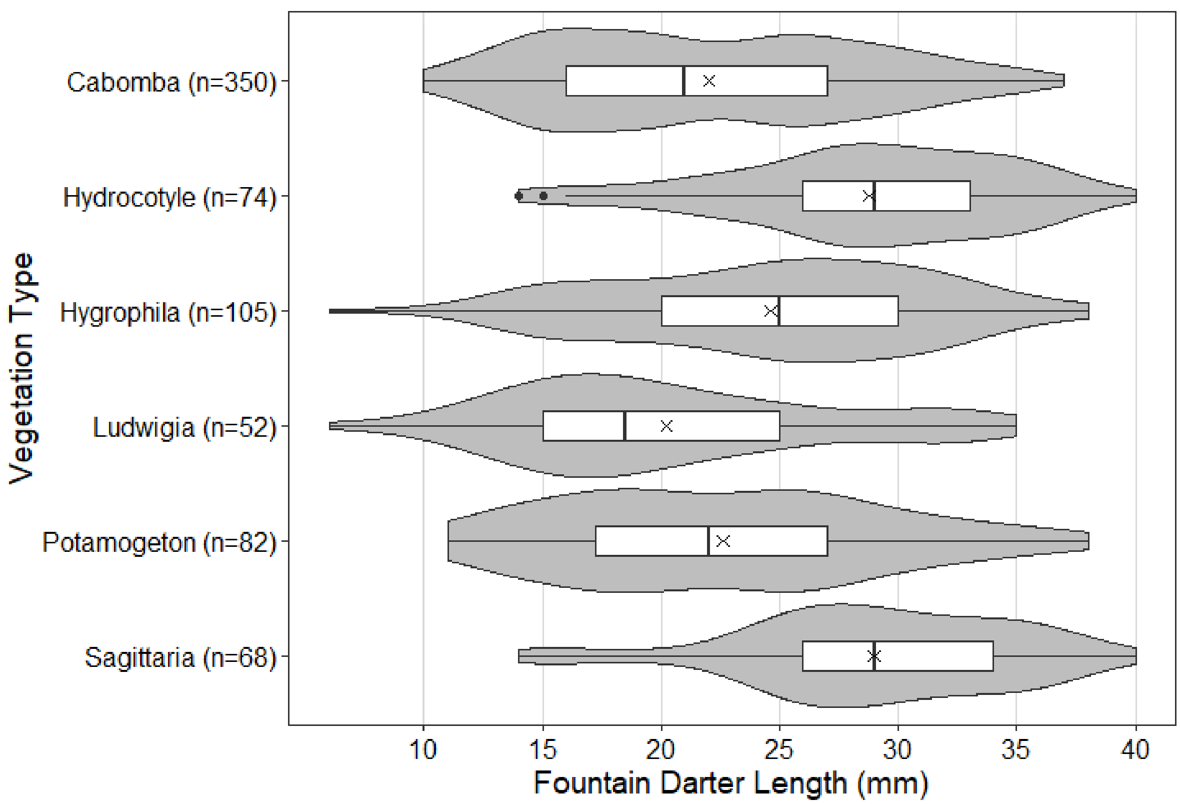

Figure 15. Boxplots and violin plots (grey polygons) displaying Fountain Darter lengths among dominant vegetation types during 2022 drop-net sampling in the San Marcos River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles. The "n" values represent the number of Fountain Darter length measurements per vegetation type.

Habitat suitability

Temporal trends in Fountain Darter habitat suitability at Spring Lake Dam showed OHSI was similar or above the long-term mean (0.12) from 2018 to spring 2022 (~0.12–0.16) and showed a slight increase during this period. Habitat suitability from spring (0.14) to fall (0.10) in 2022 denotes the largest decrease at Spring Lake Dam in recent years. At City Park, OHSI was stable from 2018 to spring 2021 (0.16-0.18), followed by a decline that remained stable from fall 2021 to fall 2022 (0.10-0.12). City Park OHSI has remained below the long-term 95% confidence intervals since 2018. Habitat suitability at I-35 showed a pattern similar to Spring Lake Dam, being generally stable from 2018 to spring 2022 (0.13–0.16), then declining in summer and fall (0.09). Although coverages of more suitable vegetation taxa declined (e.g., *Cabomba*, *Hydrocotyle*), the impact of reduced flows on OHSI was mainly driven by increased open habitats associated with decreased Texas Wild-rice coverage. Despite Texas Wild-rice having low suitability criteria, it has a strong impact on changes in OHSI due to its dominance within each study reach.

Fountain Darter habitat suitability in 2022 declined at each reach, which can be contributed to combined effects of recreation and low flows. Decreased vegetation coverage from spring to fall has been consistent through time due to summer recreation that was likely exacerbated by reduced flows and lead to OHSIs dropping below 0.10 at Spring Lake Dam and I-35 (Figure 16 and E10). Habitat conditions were noticeably impacted by low-flows at I-35, where fluvial habitats closer to the banks transitioned to backwaters or were desiccated. Habitat suitability at City Park has been lower than the long-term mean since 2014 due to increased dominance of Texas Wild-rice, which has the lowest suitability criteria among taxa (Figure E10 and H1).

The utility of OHSI for providing potential explanations on Fountain Darter population trends are apparent when put into context with random dip-net results. Sites for random dip-netting are selected via simple random sampling, which provides unbiased estimates of prevalence at the reach-level. Analyses conducted when developing OHSI showed a strong relationship between OHSI and occurrence (Table H1 and Figure H3). For example, Texas wild-rice represented 92% of random dip-net stations sampled at City Park in 2022 resulting in overall occurrence of 15%, whereas occurrence was 65% during all sampling events in 2014, which had higher OHSI values (>0.30) and mostly included samples in the previously dominant non-natives (but highly suitable) *Hydrilla* and *Hygrophila* (Table 5; BIO-WEST 2015). These differences support that Fountain Darters in the San Marcos River currently exhibit spatially structured distributions at the reach-level.

While lower Fountain Darter prevalence points to degraded population condition at the reach-level, estimates of population performance by drop-net and timed dip-net data do not support this. Drop-net results showed that densities have increased recently, demonstrating spatial structured distributions and restricted patches of suitable habitat does not appear to negatively affect population performance (Davis and Cooke 2010; Davis et al. 2011). In addition, for species that are patchily distributed, estimated occurrence via simple random sampling may not be a reliable measure of population performance, since important taxa (e.g., spawning habitat) with limited coverage have a low probability of being selected for sampling (Pacifici et al. 2016). Nonetheless, occurrence data still provides useful information on patterns of species distribution that are still relevant to population performance. At the Old Channel in the Comal system for example, overall occurrence, OHSI, and density are consistently higher compared to reaches in the San Marcos River. This suggests that higher habitat suitability can increase overall occurrence and result in higher densities. Based on this, establishing diverse vegetation assemblages could enhance Fountain Darter population persistence potential in the San Marcos River (Duncan et al. 2016; Dunn and Angermeier 2018).

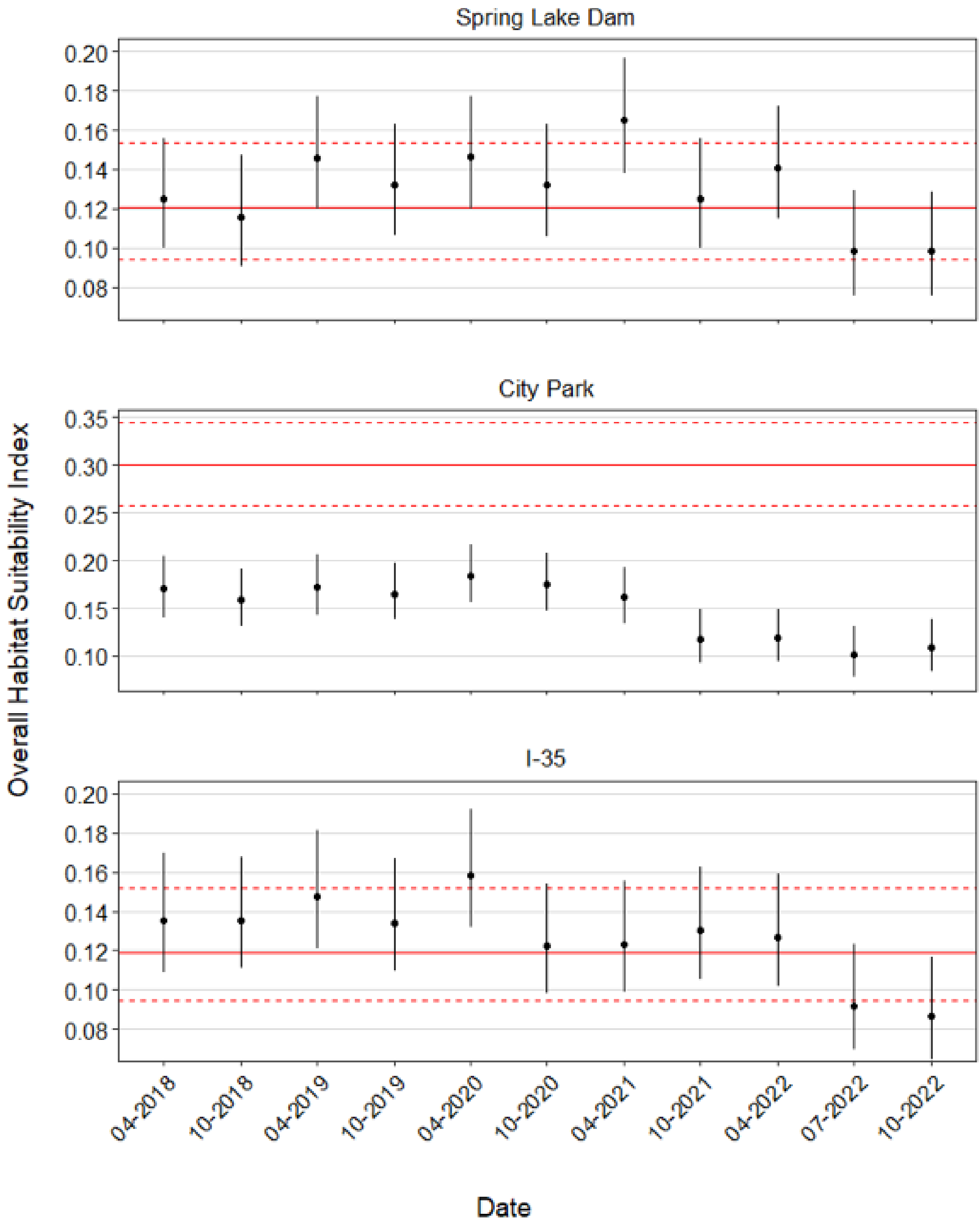

Figure 16. Overall Habitat Suitability Index (OHSI) (±95% CI) from 2018–2022 among study reaches in the San Marcos River. Solid and dashed red lines denote means of long-term (2003–2022) OHSI and 95% CI, respectively.

Fish Community

A total of 9,758 fishes represented by 10 families and 29 unique species were observed in the San Marcos Springs system during 2022 sampling. Fish assemblage showed somewhat discrete shifts in structure (percent relative density), particularly between the lower river and upstream segments. At the three most upstream segments, assemblages were dominated by Guadalupe Roundnose Minnow (*Dionda nigrotaeniata*; 30.7–31.9%) or Largespring Gambusia (*Gambusia geiseri*; 54.1%), while the Lower River was dominated by Texas Shiner (*Notropis amabilis*; 35.2%). Fountain Darter ranked 5th in abundance at Spring Lake (6.9%) and Upper River (4.8%), 9th at Middle River (3.3%), and 8th at Lower River (2.7%) (Table E2).

Evidence of detectable temporal trends in fish communities varied among the selected metrics and between and within study segments. Species richness and diversity was typically highest in Lower River. Species richness was also high at the Upper River, though diversity was low and more like Spring Lake. Middle River displayed intermediate species richness levels and diversity quantities akin to Lower River. Five-year trends in species richness and diversity displayed slight increases at Upper River and Lower River. At the Middle River, species richness slightly decreased over time, while diversity increased at a greater magnitude in comparison. Community-based metrics at Spring Lake contrasted other segments and were stable (Figure 17).

Temporal trends in spring fishes' species richness and relative density were incongruent with community-level observations. Spring fishes' species richness was high and stable at the Upper River and Middle River. Total number of spring fish species were also stable at Spring Lake, though didn't exceed 4 species. Spring fishes' species richness at Lower River increased the past five years to levels more similar to upstream river segments. Relative density of spring fishes was high and stable at Spring Lake and Upper River. At the Middle River, relative density was also high, but less stable. Relative density was lower at Lower River, but accounted for >60% of the assemblage in fall 2021 and summer 2022 (Figure 18). Decreases in the total species and relative density of spring fishes with increasing distance from springflow influence is well documented (Hubbs 1995; Kollaus and Bonner 2012; Craig et al. 2016). That being said, relative density was about 80% in the lower river this summer, which does not align with expectation, especially under low-flow conditions. However, it's possible that other spring-associated fishes have experienced increased recruitment due to low stable flows, as documented for Fountain Darters above.

Temporal trends in Fountain Darter density from 2018–2022 were based on microhabitat sampling data. In 2022, median density was above or slightly below the long-term at Spring Lake and Middle River. Variation in density (i.e., interquartile range) was generally similar to the long-term at Spring Lake, except for spring 2022, where the upper quartile was substantially higher. At the Middle River, variability aligned with the long-term in fall and was lower the other two events. Lastly, median Fountain Darter density in 2022 was at or close to zero at the Upper River and Lower River, which are typical trends (Figure 19).

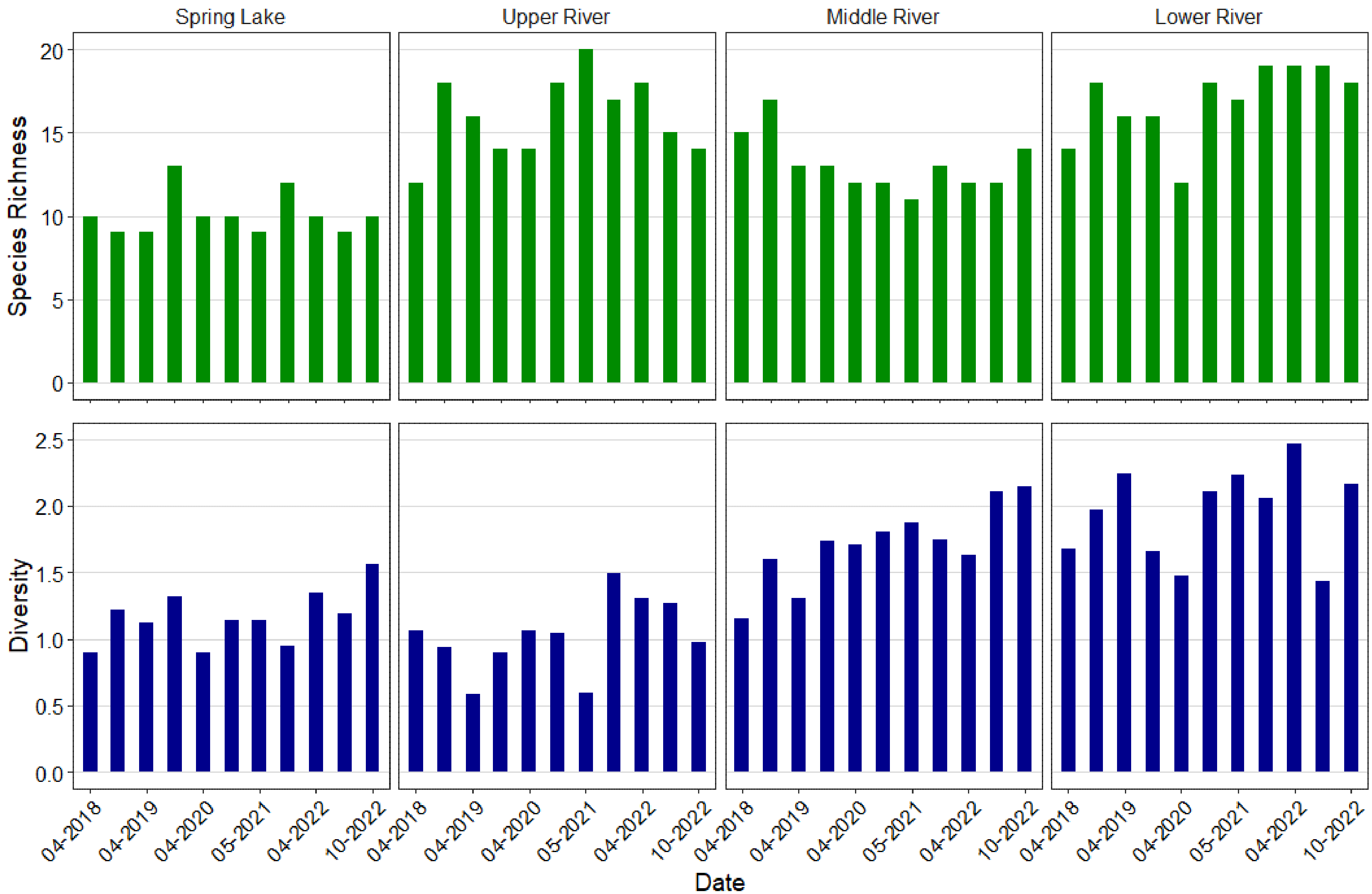

Figure 17. **Bar graphs displaying species richness (top row) and diversity (bottom row) from 2018–2022 based on all three fish community sampling methods in the San Marcos Springs/River.**

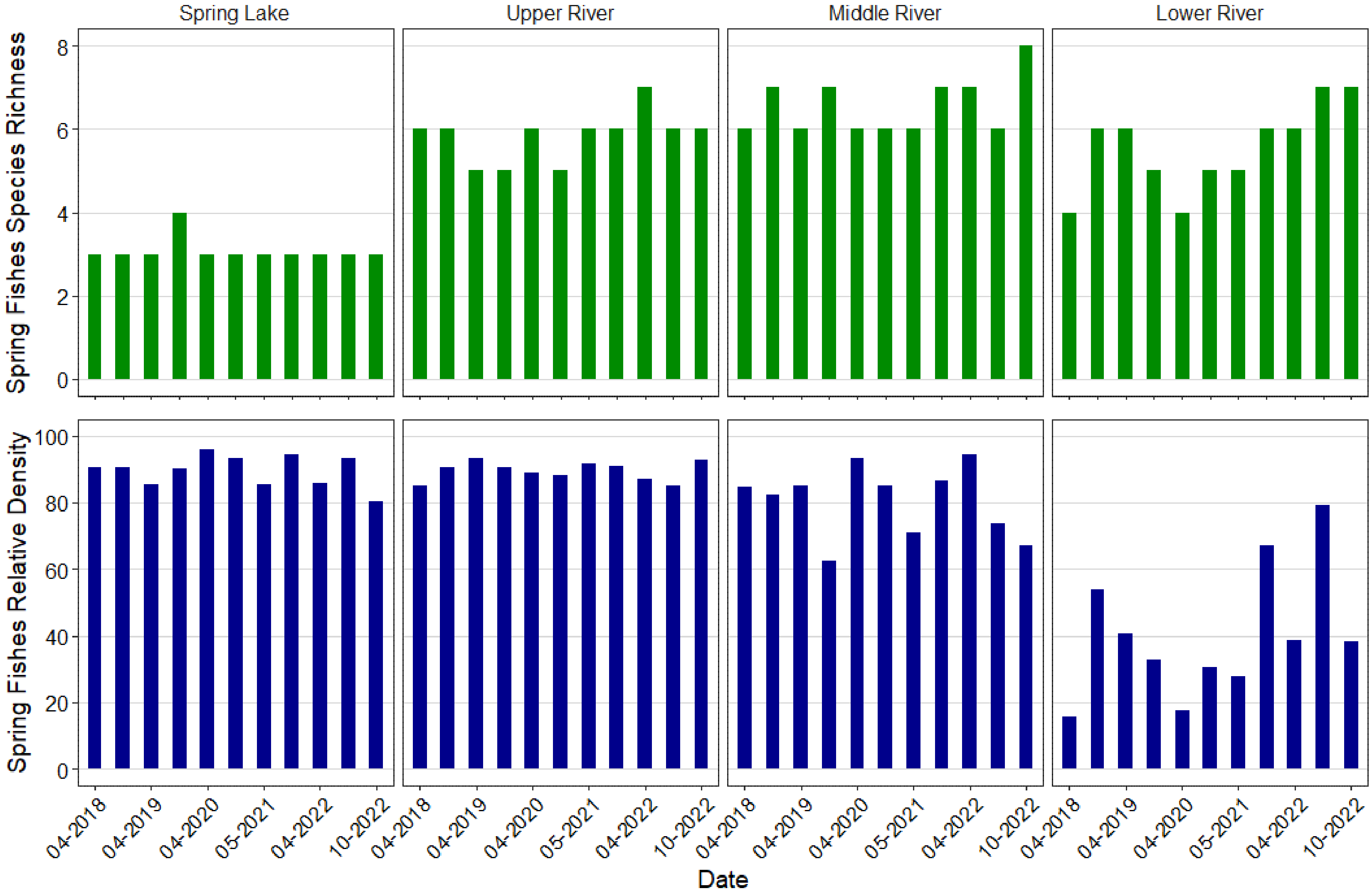

Figure 18. **Bar graphs displaying spring fish richness (top row) and relative density (RD; %) (bottom row) from 2018–2022 based on all three fish community sampling methods in the upper San Marcos Springs/River.**

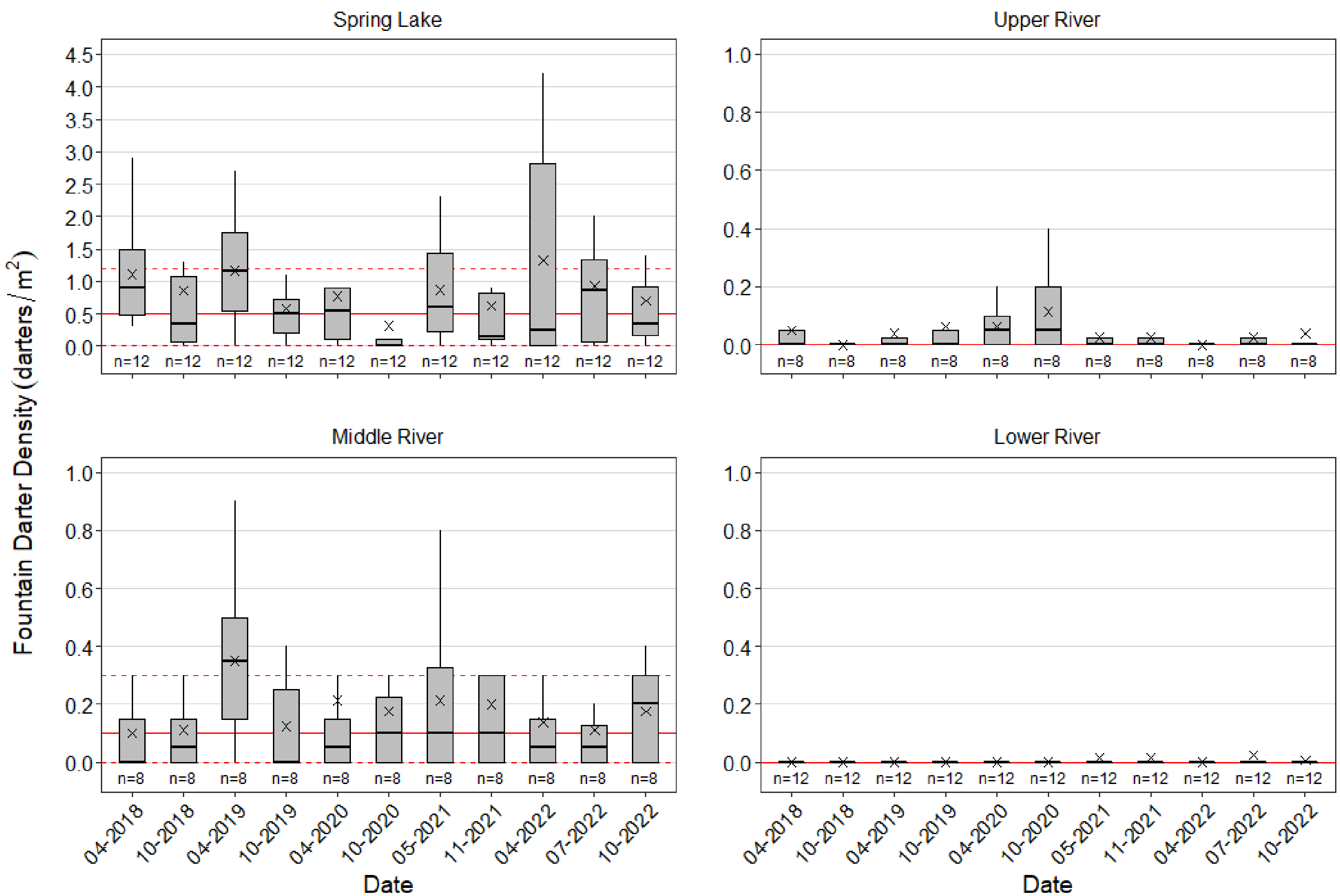

Figure 19. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) among study reaches from 2018–2022 during fish community microhabitat sampling in the San Marcos Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. The "n" values along the x-axes represent the number of microhabitat samples per category. Solid and dashed red lines denote long-term (2014–2022) medians and interquartile ranges, respectively.**

San Marcos Salamander

In 2022, a total of 679 San Marcos salamanders were observed in spring (195 salamanders), summer (240 salamanders), and fall (244 salamanders) and densities ranged from 2.88–30.86 salamanders/m^2 (Figure 20). At the Hotel Site, salamander densities in 2022 were lower than the long-term average for the spring and were considerably higher in summer and fall. San Marcos salamander densities at Riverbed were higher than long-term averages in spring and fall but were lower in summer. In contrast, densities at Spring Lake Dam in 2022 were higher in summer and lower for other seasons. Almost all density observations in the current year fell outside the confidence interval boundaries (except Spring Lake Dam, summer 2022), suggesting meaningful differences (Figure 20).

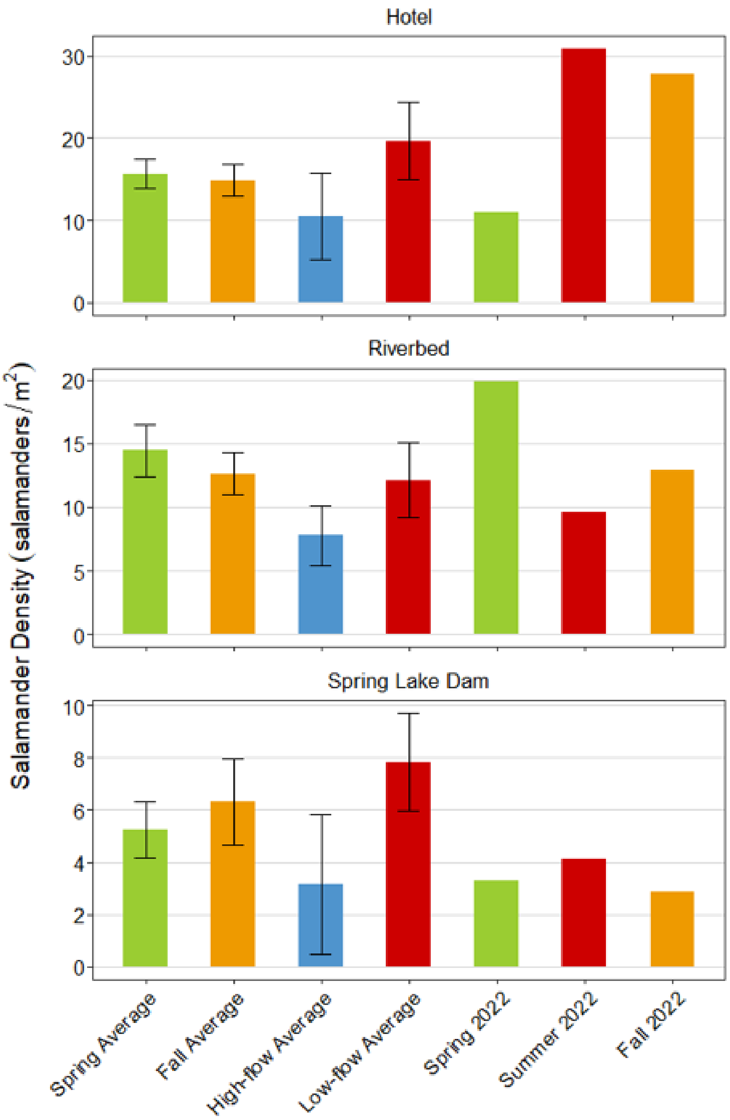

Figure 20. San Marcos Salamander density (salamanders/m^2) among sites in 2022, with the long-term (2001–2022) average for each sampling event. Error bars for long-term averages represent 95% confidence intervals.

Five-year trends at the Hotel Site did not display any distinct patterns in density from 2018 to spring 2022 but a noticeable increase occurred the last two events in 2022. At the Riverbed Site, density generally decreased from 2018–2022, though was similar to values from 2018–2020 in spring 2022. Density at Spring Lake Dam generally declined from 2018–2021, which was followed by an increase in 2022 (Figure 21). Subsequent monitoring will help provide insights on how salamander densities change following this low-flow year.

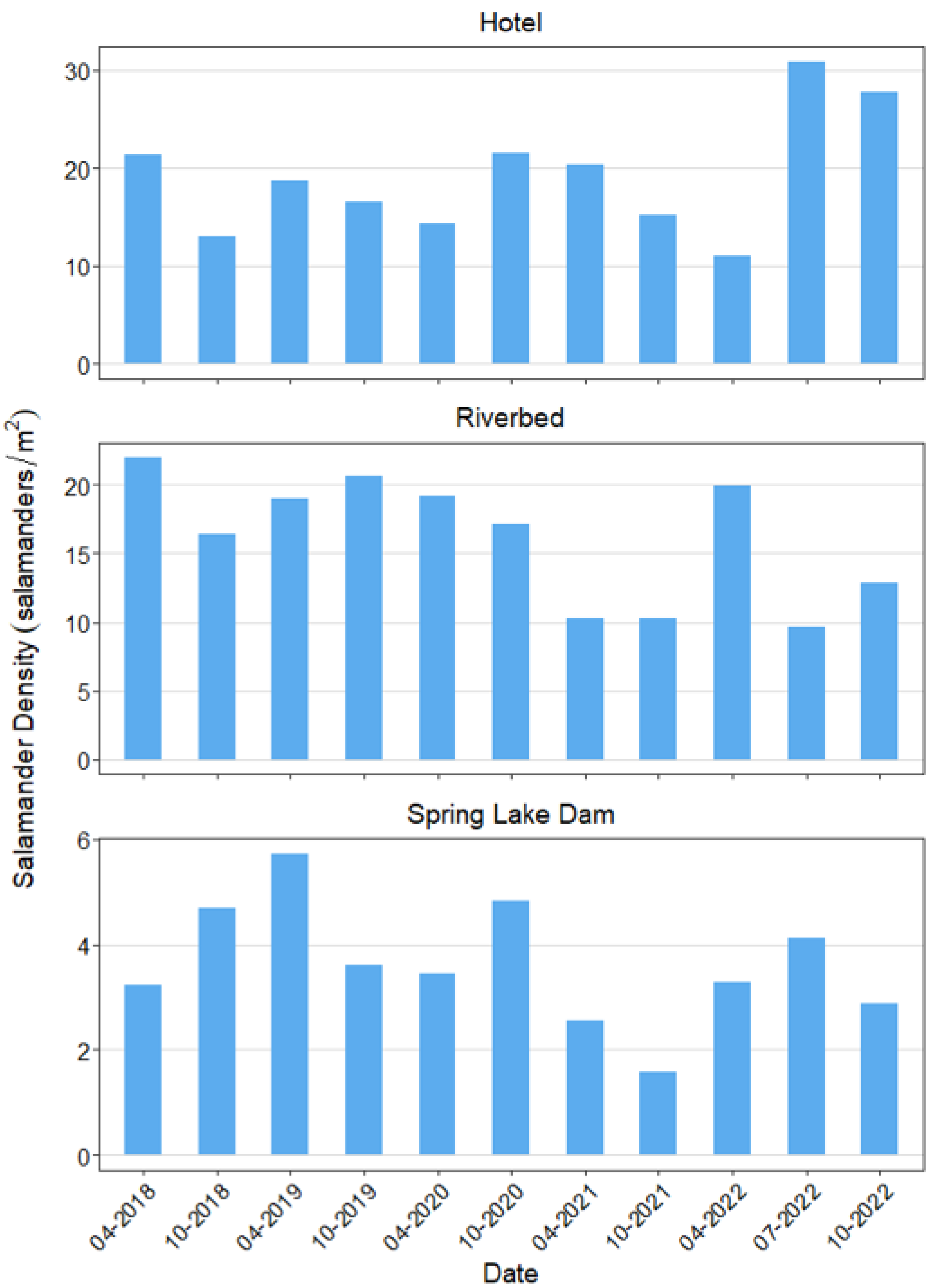

Figure 21. **San Marcos Salamander density (salamanders/m^2) among sites from 2018–2022 in the San Marcos Springs/River.**

Macroinvertebrates

Benthic Macroinvertebrate Rapid Bioassessment

Benthic macroinvertebrate rapid bioassessment data was collected during both the spring and fall sampling events in 2022 (raw data presented in Appendix F). A total of 687 and 821 individual macroinvertebrates, representing 47 and 40 unique taxa were sampled in spring and fall, respectively. Altogether, 66 unique taxa were represented among all samples from 2022. Values for each metric are reported, while metric scores for calculating the B-IBI can be found in Table 6. At Spring Lake, habitats sampled this year included emergent vegetation, root wads, and sand. Similar habitats were sampled at City Park, with the addition of debris jams. Cobble/gravel habitats were sampled at Spring Lake Dam and I-35 in addition to what was sampled at City Park. No supplemental snag samples were taken. Aquatic-life-use in 2022 generally aligned with four years prior and indicates stable trends. Spring Lake and City Park were described as "Intermediate" for both seasons, whereas Spring Lake Dam was described as "High". Aquatic-life-use during both sampling events were ranked "Exceptional" at I-35 (Figure 22).

In summary, Spring Lake and City Park scored lower than the other sites, likely due to differences in habitats available for sampling. Lower scores were expected at Spring Lake as these communities are naturally different compared to swift flowing "least-disturbed reference streams". At City Park, lower scores compared to Spring Lake Dam and I-35 were also not surprising. Lotic habitats at City Park consists of runs, while riffles with cobble and gravel substrates more similar to reference streams are present at the other riverine sites. As such, higher scores at Spring Lake Dam and I-35 are best explained by greater prevalence of fluvial specialist, resulting in greater taxa diversity overall. It should also be noted that most reference streams do not exhibit the stenothermal conditions present within the upper San Marcos River and this may result in differing community composition. Based on this, the level of score is less important in the spring-fed San Marcos River sample reaches than the consistency or trends in results per reach over time. Additional monitoring will generate a robust reference dataset and allow for the development of scoring criteria specific to this unique ecosystem, providing a more accurate realization of ecological health through time.

Table 6. Metric value scoring ranges for calculating the Texas RBP B-IBI (TCEQ 2014).

METRIC	SCORING CRITERIA			
	4	3	2	1
Taxa richness	>21	15–21	8–14	<8
EPT taxa abundance	>9	7–9	4–6	<4
Biotic index (HBI)	<3.77	3.77–4.52	4.56–5.27	>5.27
% Chironomidae	0.79–4.10	4.11–9.48	9.49–16.19	<0.79 or >16.19
% Dominant taxon	<22.15	22.15–31.01	31.02–39.88	>39.88
% Dominant FFG	<36.50	36.50–45.30	45.31–54.12	>54.12
% Predators	4.73–15.20	15.21–25.67	25.68–36.14	<4.73 or >36.14
Ratio of intolerant: tolerant taxa	>4.79	3.21–4.79	1.63–3.20	<1.63
% of total Trichoptera as Hydropsychidae	<25.50	25.51–50.50	50.51–75.50	>75.50 or no Trichoptera
# of non–insect taxa	>5	4–5	2–3	<2
% Collector–gatherers	8.00–19.23	19.24–30.46	30.47–41.68	<8.00 or >41.68
% of total number as Elmidae	0.88–10.04	10.05–20.08	20.09–30.12	<0.88 or >30.12

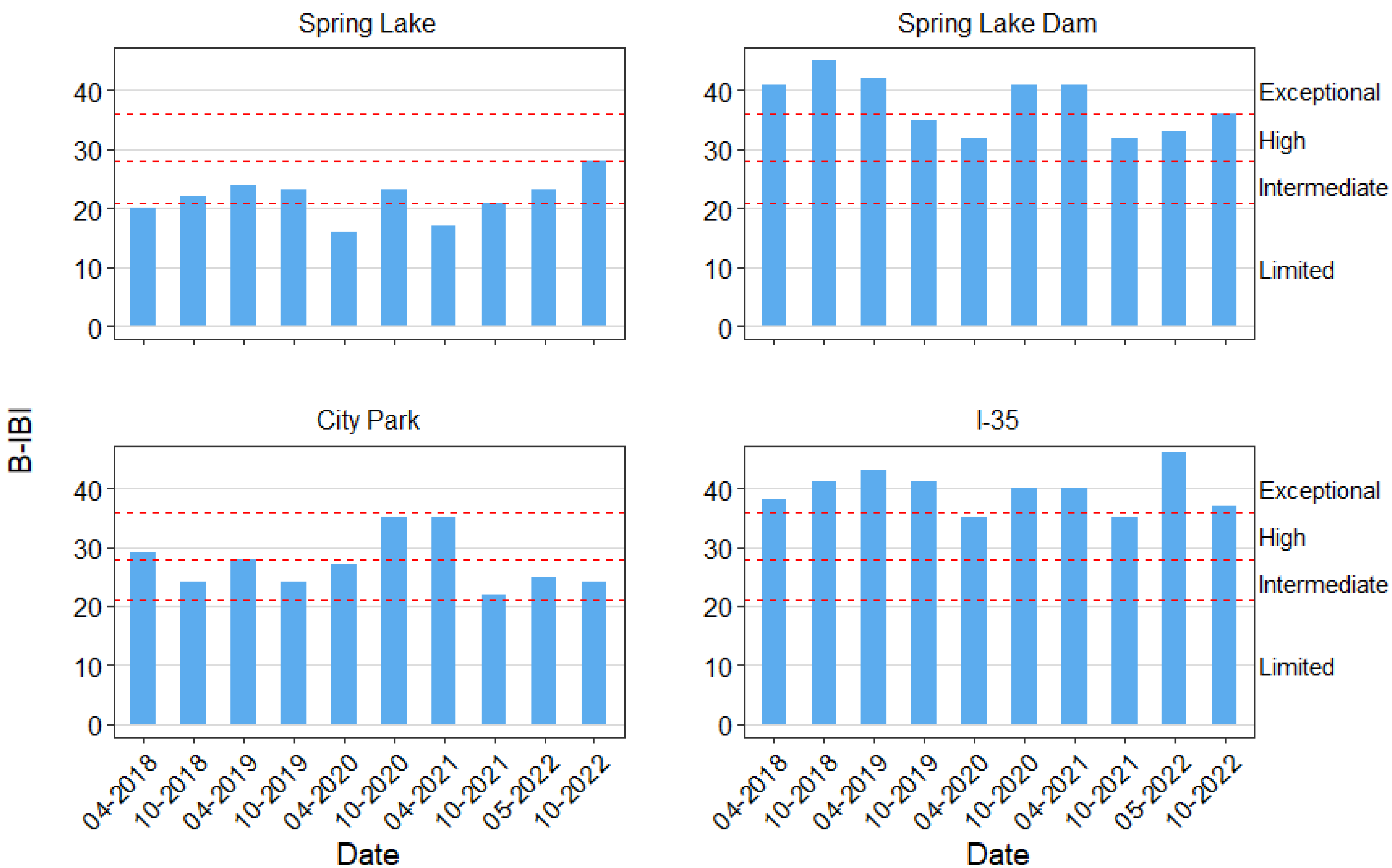

Figure 22. **Benthic macroinvertebrate Index of Biotic Integrity (B-IBI) scores and aquatic-life-use point-score ranges from 2018–2022 in the San Marcos Springs/River. "Exceptional" indicates highest quality habitats**

CONCLUSION

In 2022, low precipitation and higher ambient temperatures in central Texas resulted in severe drought conditions by spring and transitioned to an exceptional drought classification by mid-summer. San Marcos River discharge decreased throughout the year, reaching 95 cfs at the end of July, 90 cfs by mid-August, and 85 cfs at the end of September, which triggered three full system visual habitat evaluations and memorandum updates. Habitat quality documented for the Covered Species varied spatially during the evaluations at these three flow levels. By the third evaluation (September), lower water levels resulted in slightly degraded habitat quality in Spring Lake which exhibited higher-than-average amounts of algae build up and siltation. At this time, conditions in the river continued to experience aquatic vegetation coverage declines and warmer than typical water temperatures.

In summary, total river discharge in the San Marcos River System in 2022 was the lowest since the inception of biological monitoring in 2000. Total aquatic vegetation coverage declined from spring to fall across all study reaches. Coverages declined at a greater magnitude at Spring Lake Dam compared to other reaches. Additionally, total fall cover was below the long-term average at Spring Lake Dam and City Park, but was higher at I-35. Ubiquitous declines in vegetation were mainly attributed to decreased coverage of Texas Wild-rice due to both low-flows and recreation. Full system mapping represented the lowest Texas Wild-rice coverage since spring 2021, although this taxon still remained abundant throughout the system and continued to dominate aquatic vegetation assemblages. Reduced river discharge in 2022 led to some Texas Wild-rice becoming dewatered and stranded on islands or along bank habitats.

Fountain Darter population performance metrics generally aligned with historical data among seasons, with several exceptions shown by density. Despite some seasonal discrepancies, positive increases in density were observed across reaches the past two years. The strong relationship between overall habitat suitability and occurrence supports that Fountain Darters in the San Marcos River exhibit spatially structured distributions at the reach-level, driven by the composition and configuration of vegetation assemblages. Yet, recent increases in density show increased population performance within patches of suitable habitat. Positive increases in Fountain Darter density may be due to several extrinsic and/or intrinsic factors. Greater recruitment rates in recent years likely provide partial explanation for this increasing trend, potentially due to increased coverage of suitable vegetation in some reaches (e.g., *Cabomba* at City Park), or low/stable flows minimizing displacement of young-of-year darters. Regardless of the mechanism, results from drop-netting showed that reduced flows in 2022 did not negatively impact Fountain Darter populations within suitable habitat patches. Concurrently, reach-level occurrence and habitat suitability indices show that highly suitable habitat patches have become restricted in recent years due to dominance of Texas Wild-rice. Substantially higher young-of-year darters in the fall, when river discharge was lowest, also suggests that Fountain Darters may be resistant to large reductions in flow by augmentation through recruitment. This increased recruitment could come through increased reproduction rates (i.e., compensatory reproduction) or through higher survival of young-of-year. It is also unclear whether flows negatively affect individual fitness and growth of juvenile and adult darters. Additional research is needed to understand how different demographic processes under low flow conditions contribute to population dynamics.

Fish community sampling demonstrated that species richness and diversity generally increased from upstream to downstream, whereas richness and relative density of spring-associated fishes declined in the study segments furthest downstream. Five-year trends in species richness and diversity displayed slight increases at Upper River and Lower River segments. At the Middle River, species richness slightly decreased over time, while diversity increased. Spring fishes' species richness at Lower River increased the past five years to levels more similar to upstream river segments.

Trends in San Marcos Salamander densities were variable among sites in 2022 and the past five years. Five-year trends at the Hotel Site did not display any distinct patterns in density from 2018 to spring 2022 and a noticeable increase occurred the last two events in 2022. At the Riverbed Site, density generally decreased from 2018–2022, though was similar to values from 2018–2020 in spring 2022. Density at Spring Lake Dam generally declined from 2018–2021, which was followed by an increase in 2022. Given the methodology employed, the magnitude of variation between events, and the differences in patterns among sites, no clear patterns in San Marcos Salamander populations are evident.

Macroinvertebrate bioassessment results showed areas lacking riffle habitats (i.e. Spring Lake, City Park) scored lower, as these communities are naturally different compared to swift flowing least-disturbed reference streams. As such, higher scores at Spring Lake Dam and I-35 are best explained by greater prevalence of fluvial specialist, resulting in greater taxa diversity overall. However, for a spring-fed system, the importance of this metric is not necessarily the ranking, but rather the evaluation of a trend over time. No temporal trends in bioassessment scores were apparent, suggesting that reduced flows in 2022 did not degrade the ecological health of the San Marcos system.

In summary, 2022 biological monitoring provided insights into the current condition of the EAHCP Covered Species in the San Marcos Springs/River, and informed flow-ecology relationships. Patterns in river discharge and water temperatures aligned with previous low-flow years, and although impacts to available Fountain Darter habitat and Texas Wild-rice coverage were observed, conditions in 2022 did not appear to result in detrimental impacts to covered species populations. Subsequent monitoring efforts will provide opportunities to better understand the dynamics of this complex ecological system and how it responds to future hydrologic conditions.

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APPENDIX A: CRITICAL PERIOD MONITORING SCHEDULE

SAN MARCOS RIVER/SPRINGS
Critical Period Low-Flow Sampling – Schedule and Parameters

FLOW TRIGGER (+ or - 5 cfs)	**PARAMETERS**
120 cfs	Wild-Rice vulnerable stands - Every 5 cfs decline (maximum weekly)
100 cfs	Full Sampling Event
100 - 85 cfs	Habitat Evaluations - Every 5 cfs decline (maximum weekly)
85 cfs	Full Sampling Event
85 - 60 cfs	Habitat Evaluations - Every 5 cfs decline (maximum weekly)
60 cfs	Full Sampling Event
60 - 25 cfs	Habitat Evaluations - Every 5 cfs decline (maximum weekly)
25 cfs	Full Sampling Event
25 - 0 cfs	Habitat Evaluations - Every 5 cfs decline (maximum weekly)
10 - 0 cfs	Full Sampling Event
RECOVERY	
25 - 85 cfs	Full Sampling Event (dependent on flow stabilization)
85 - 125 cfs	Full Sampling Event (dependent on flow stabilization)

PARAMETER DESCRIPTION

Wild-Rice Monitoring	Physical changes vulnerable stands
Fall Sampling Event	Aquatic Vegetation Mapping - including Texas Wild-Rice Fountain Darter Sampling Drop Net, Dip net (Presence/Absence), and Visual Parasite evaluations Fish Community Sampling Salamander Sampling - Visual Fish Sampling - Exotics/Predation (85 cfs and below) Water Quality - Suite I and Suite II
Habitat Evaluations	Photographs

SAN MARCOS RIVER/SPRINGS
Species-Specific Triggered Sampling

FLOW RATE (+ or – 10 cfs)	SPECIES	FREQUENCY	PARAMETERS
≤80 cfs or ≥ 50 cfs continuing until flow rate restores to ≥100 cfs	Fountain Darter	Every other month	Aquatic vegetation mapping at Spring Lake Dam reach, City Park reach, and IH-35 reach
≤80 cfs or ≥ 50 cfs continuing until flow rate restores to ≥100 cfs	Fountain Darter	Every other month	Conduct dip net sampling/visual parasite evaluations at 50 sites in high quality habitat to include fifteen (15) sites in Spring Lake Dam reach; twenty (20) sites in City Park reach, and fifteen (15) sites in IH-35 reach.
≤50 cfs	Fountain Darter	Monthly	Aquatic vegetation mapping at Spring Lake Dam reach, City Park reach, and IH-35 reach
≤50 cfs	Fountain Darter	Weekly	Conduct dip net sampling/visual parasite evaluations at 50 sites in high quality habitat to include fifteen (15) sites in Spring Lake Dam reach; twenty (20) sites in City Park reach, and fifteen (15) sites in IH-35 reach.
≤80 cfs or ≥ 50 cfs	San Marcos Salamander	Every other week	Salamander surveys (SCUBA and snorkel) will be conducted at the Hotel Area, Riverbed area, and eastern spillway of Spring Lake Dam
<50 cfs	San Marcos Salamander	Weekly	Salamander surveys (SCUBA and snorkel) will be conducted at the Hotel Area, Riverbed area, and eastern spillway of Spring Lake Dam
100 cfs	Texas Wild-Rice	Once	Mapping of Texas Wild-Rice coverage for the entire San Marcos River will be conducted
≤100 cfs or ≥60 cfs	Texas Wild-Rice	Every other week	Physical parameters of Texas Wild-Rice will be monitored in designated "vulnerable" areas
<80 cfs	Texas Wild-Rice	Monthly	Mapping of Texas Wild-Rice coverage for the entire San Marcos River will be conducted
<80 cfs	Texas Wild-Rice	Weekly	Physical visual observations of Texas Wild-Rice will occur

APPENDIX B: LOW-FLOW CRITICAL PERIOD WATER QUALITY SAMPING AND HABITAT EVALUATION

Water Quality Sampling Results

Table B1. **Water quality sampling at select stations during Low-flow Critical Period Monitoring in July 2022. Measurements were taken at the middle of the water-column.**

Site	Date	Time	Temp (°C)	spCond (µs/cm)	pH	D.O. (mg/L)	Depth (ft)	Velocity (ft/s)	Weather Conditions
Sink Creek	2022-07-21	15:00	26.2	601.0	7.4	5.9	0.9	0.0	partly cloudy, 98 F, 45% RH
Hotel	2022-07-21	14:40	22.6	611.0	7.5	5.9	7.0	0.0	partly cloudy, 98 F, 45% RH
Submarine	2022-07-21	14:32	23.1	612.0	7.6	7.1	1.8	0.0	partly cloudy, 98 F, 45% RH
DS Boatdock	2022-07-21	14:22	22.8	605.0	7.4	6.6	5.0	0.0	partly cloudy, 97 F, 46% RH
Landing Dock	2022-07-21	14:00	24.0	629.0	7.6	8.9	1.5	0.0	partly cloudy, 97 F, 46% RH
Boardwalk	2022-07-21	13:52	26.7	628.0	7.6	6.2	2.0	0.0	partly cloudy, 97 F, 46% RH
Downstream of Road	2022-07-21	13:30	26.7	606.0	7.5	4.5	2.4	0.0	partly cloudy, 95 F, 47% RH
Above Dam	2022-07-21	13:08	24.1	633.0	7.4	8.2	1.5	0.4	partly cloudy, 92 F, 50% RH
Below Dam	2022-07-21	13:00	24.1	631.0	7.7	8.6	0.8	0.6	partly cloudy, 92 F, 50% RH
Below Chute	2022-07-21	12:52	23.3	634.0	7.7	8.7	1.5	0.0	partly cloudy, 92 F, 51% RH
Above Chute	2022-07-21	12:43	23.5	636.0	7.7	8.4	1.6	0.3	partly cloudy, 92 F, 51% RH
Sessom Creek	2022-07-21	12:30	24.3	667.0	7.6	7.1	0.2	1.2	partly cloudy, 92 F, 51% RH
City Park	2022-07-21	12:05	23.5	633.0	7.8	9.3	2.9	0.4	partly cloudy, 92 F, 53% RH
Rio Vista	2022-07-21	11:47	23.6	633.0	7.9	9.0	1.0	0.0	partly cloudy, 90 F, 57% RH
IH 35 Crossing	2022-07-21	11:27	23.5	633.0	7.9	8.8	4.0	0.1	partly cloudy, 90 F, 57% RH
Thompson's Island - Natural	2022-07-21	10:57	23.5	632.0	7.9	8.6	0.8	0.6	partly cloudy, 86 F, 68% RH
Thompson's Island - Artificial	2022-07-21	10:47	23.7	627.0	7.9	8.5	1.6	0.0	partly cloudy, 86 F, 68% RH
Water Treatment Plant	2022-07-21	10:15	23.5	625.0	7.8	8.0	1.7	0.8	partly cloudy, 86 F, 68% RH

Table B2. **Lab results from water quality grab samples collected at select stations during Low-flow Critical Period Monitoring on July 21, 2022. The unit for each parameter is milligrams per liter (mg/L). ND for each parameters denotes that it was not detectable.**

Site	Nitrate as N	Total N	Ammonium	Soluble Reactive P	Total P	Alkalinity	Total Suspended Solids
Sink Creek	0.49	3.71	0.15	0.08	0.24	243	185
Hotel	1.23	0.81	0.06	0.09	ND	252	8.40
Submarine	1.29	1.04	ND	ND	ND	253	3.10
DS Boatdock	1.29	0.88	ND	ND	ND	256	ND
Landing Dock	1.42	1.30	0.05	ND	ND	266	7.40
Boardwalk	0.96	0.85	0.09	0.05	ND	252	38.90
Downstream of Road	0.52	0.38	0.11	ND	ND	245	2.70
Above Dam	1.03	1.11	ND	ND	ND	267	ND
Below Dam	1.05	1.13	ND	ND	ND	268	ND
Below Chute	1.16	1.26	ND	ND	ND	267	ND
Above Chute	1.15	1.26	ND	ND	ND	266	ND
Sessom Creek	1.31	1.40	ND	ND	ND	265	ND
City Park	1.08	1.23	ND	ND	ND	260	ND
Rio Vista	1.13	1.22	ND	0.24	ND	269	22.90
IH 35 Crossing	1.14	1.22	ND	ND	ND	269	6.50
Thompson's Island - Natural	1.12	1.23	ND	ND	ND	255	4.70
Thompson's Island - Artificial	1.04	1.18	ND	ND	ND	262	8.30
Water Treatment Plant	1.09	1.46	0.06	ND	ND	255	12.50

Habitat Evaluation

MEMORANDUM

TO:	Chad Furl, Jamie Childers
FROM:	Ed Oborny (BIO-WEST)
DATE:	**August 5, 2022**
SUBJECT:	EA HCP Critical Period Habitat Evaluation – 95 cfs – San Marcos System

95 cfs Habitat Evaluation

SAN MARCOS SYSTEM:

The Spring 2022 Comprehensive Biological Monitoring effort for the San Marcos System was completed in April / May 2022. As total system discharge continued to decline over the summer, the 100 cfs full Critical Period monitoring was triggered and completed in July. That monitoring effort incorporated the 100 cfs Habitat Evaluation. As of this memorandum, all activities associated with San Marcos Critical Period Biological Monitoring (**Task 2**) < 100 cfs event have been completed and are currently being processed:

- Aquatic vegetation mapping of the three (Spring Lake Dam, City Park, and I35) study reaches.
- San Marcos Salamander surveys (Spring Lake and Spring Lake Dam).
- Thermister downloads and zebra mussel lure assessment.
- Fixed-station photography.
- Fountain Darter presence/absence and timed dip netting.
- Fountain Darter drop netting in the three study reaches.
- Fish Community sampling via SCUBA and seine.
- Texas Wild-rice vulnerable stands measurements.
- Texas Wild-rice full system mapping.
- Suite I and II water quality sampling.

Habitat evaluations are required for every 5 cfs decline (not to exceed weekly) in the San Marcos system when conditions are below 100 cfs. The 95 cfs Habitat Evaluation was completed on July 27th. Per requirement, the next scheduled evaluation should occur at 90 cfs. Preliminary observations and photo documentation associated with the full system Critical Period event and 95 cfs Habitat Evaluation are presented below. As of this memorandum, the total system discharge in the San Marcos River ≈ 94 cfs (see Figure to the right).

EDWARDS AQUIFER AUTHORITY — AQUIFER CONDITIONS

Area Index	Today	Yesterday	Ten Day
Bexar (J-17)	630.4	630.6	631.6
Uvalde (J-27)	843.3	843.4	843.8
Comal Springs	100	101	105
San Marcos	94	96	98

Provisional Daily water readings as of 9:00 AM
Last Updated on August 5 2022

Key ecological information relative to the Spring 2022 routine and July Critical Period sampling are included herein to describe current conditions. Water temperature is a key component system-wide as it is an underlying driver of spring-related aquatic assemblages.

Recent 7-day trends in water temperature (°C) for July Critical Period sampling were assessed using temperature data loggers (HOBO Tidbit v2 Temp Loggers) at 10 permanent monitoring stations in Spring Lake and the upper San Marcos River. A location map is purposely not included in this memorandum to help prevent tampering with sensitive and expensive equipment. Data for each monitoring station are based on 10-minute intervals and dates for recent trends extended from the last day that each data logger was downloaded to 7 days prior. All 7-day trends were examined from 7/23 – 7/29, except for Spring Lake Deep (7/21 – 7/27), Spring Lake (7/21 – 7/27), and Rio Vista Park (7/13 – 7/20). Recent 7-day trends were compared to long-term water temperature data measured at 4-hour intervals in July from 2001 – 2021 or to the greatest temporal extent available. For analysis, 7-day trends were compared to long-term trends using boxplots to visualize differences in central tendency (i.e., median) and variation (e.g., range, interquartile range). Results are provided in Table 1 and graphically depicted in Figures 1 and 2. Overall, it is clear the San Marcos system is in a lower flow, summer time condition but no water temperatures are noted as a concern at stations in Spring Lake or longitudinally down the system at this time.

Table 1. Summary of boxplot descriptive statistics comparing recent 7-day and long-term trends in water temperature (°C) at 10 monitoring stations in the upper San Marcos Springs/River.

Station	Period	Min	Lower Box	Median	Upper Box	Max	Interquartile Range	Range
Spring Lake Deep	7-day	21.39	21.46	21.49	21.51	21.53	0.05	0.14
Spring Lake Deep	Long-term	21.56	21.97	22.14	22.37	22.50	0.40	0.94
Spring Lake	7-day	21.84	21.84	21.87	21.87	21.87	0.02	0.02
Spring Lake	Long-term	21.51	21.58	21.62	21.68	21.82	0.09	0.31
Chute	7-day	22.39	22.59	22.85	23.42	24.68	0.84	2.28
Chute	Long-term	21.33	22.13	22.32	22.67	23.46	0.54	2.13
Spring Lake Dam	7-day	22.71	22.97	23.40	24.36	25.26	1.40	2.55
Spring Lake Dam	Long-term	21.52	22.24	22.49	22.94	23.99	0.71	2.47
City Park	7-day	22.61	23.02	23.74	25.21	26.82	2.19	4.21
City Park	Long-term	21.61	22.37	22.81	23.23	24.52	0.86	2.91
Rio Vista Park	7-day	22.71	23.09	23.62	24.56	25.60	1.47	2.89
Rio Vista Park	Long-term	21.33	22.36	22.84	23.61	25.48	1.25	4.15
I-35	7-day	22.66	23.02	23.67	24.68	25.72	1.66	3.06
I-35	Long-term	21.82	22.46	22.87	23.52	25.12	1.06	3.30
Thompson Island - Natural	7-day	22.87	23.23	23.98	25.09	25.91	1.86	3.04
Thompson Island - Natural	Long-term	20.52	22.61	23.20	24.06	26.23	1.45	5.71
Thompson Island - Artificial	7-day	23.47	24.20	24.87	25.45	26.21	1.26	2.74
Thompson Island - Artificial	Long-term	21.93	22.77	23.44	24.22	26.34	1.45	4.40
Waste Water Treatment Plant	7-day	23.16	23.59	24.36	25.36	25.99	1.76	2.83
Waste Water Treatment Plant	Long-term	21.87	22.80	23.42	24.19	26.24	1.39	4.38

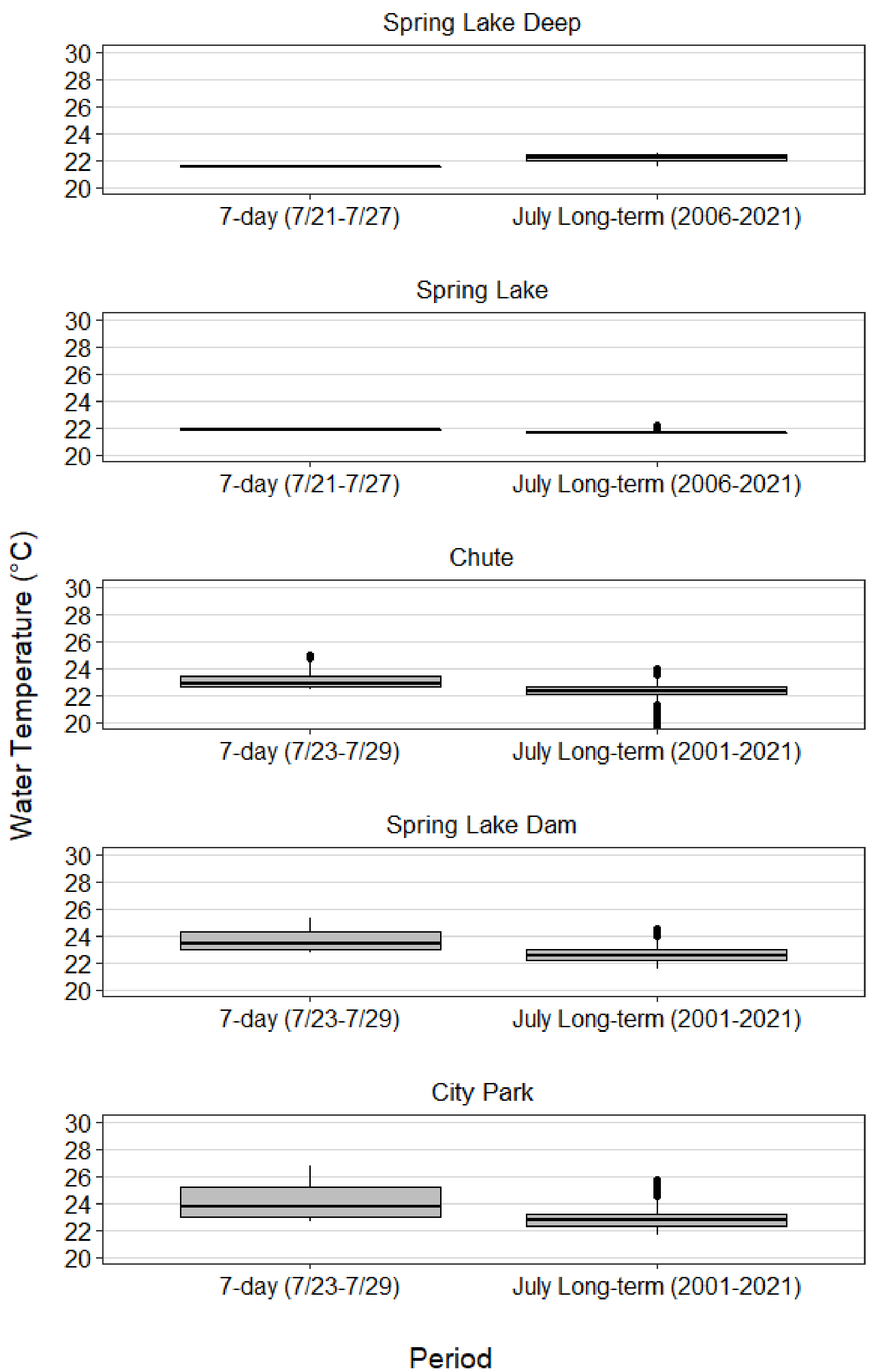

Figure 1. **Boxplots comparing recent 7-day and long-term water temperature trends at five monitoring stations from Spring Lake to City Park. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

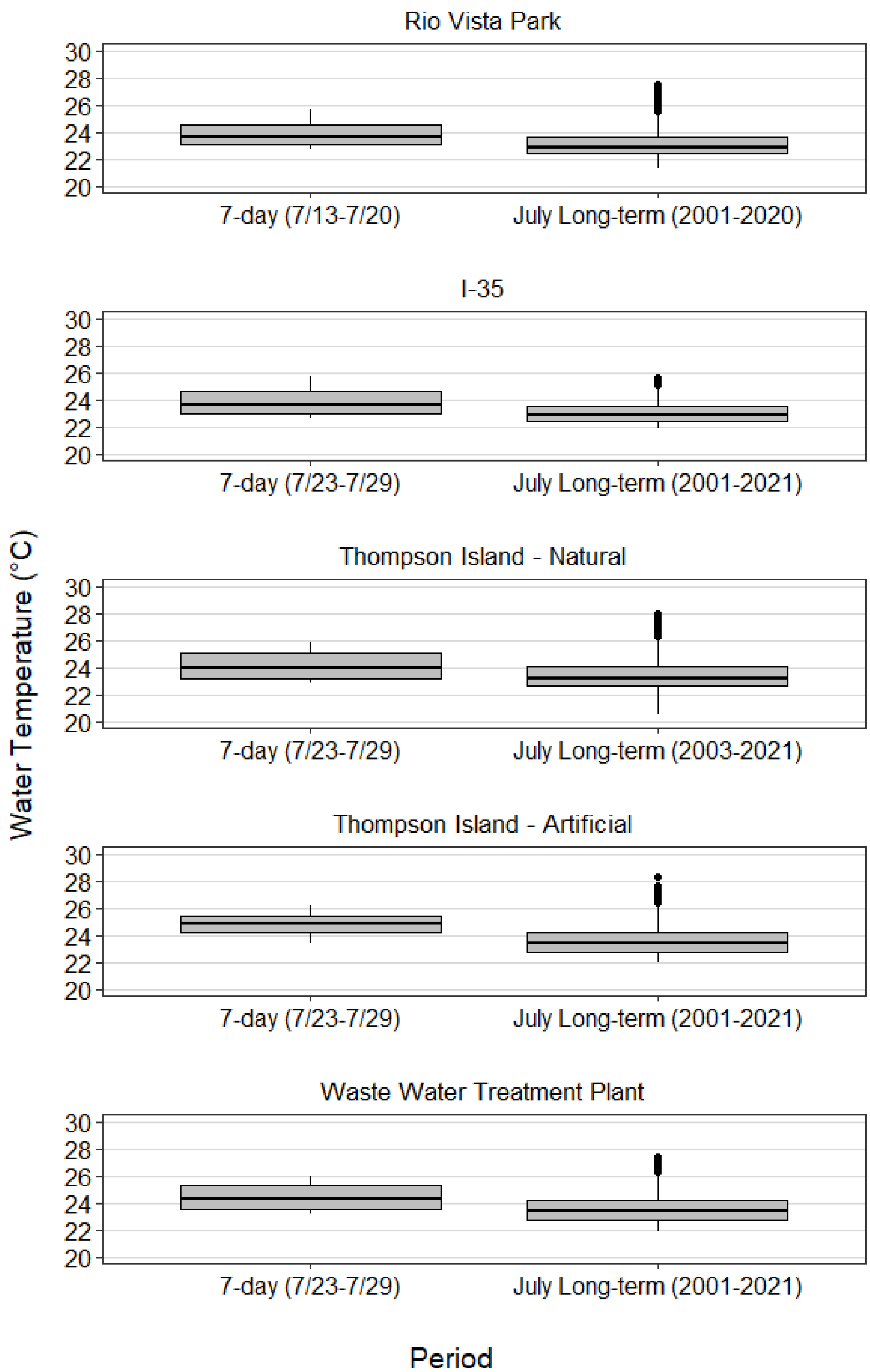

Figure 2. **Boxplots comparing recent 7-day and long-term water temperature trends at five monitoring stations from Rio Vista Park to Waste Water Treatment Plant. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

Aquatic vegetation mapping and Fountain Darter dip netting are key monitoring components as they comprise the equation / criteria for Fountain Darter refugia salvage activities described in Section 6.4.4 (**San Marcos Springs and River Ecosystem Adaptive Management Activities**) of the EAHCP. The trigger conditions for the Fountain Darter in the San Marcos system are as follows:

- *Less than 50 percent mean aquatic vegetation (Variable Flow Study monitoring reaches including Spring Lake) AND less than 20 percent darter presence,*

OR

- *Less than 25 percent mean aquatic vegetation (Variable Flow Study monitoring reaches including Spring Lake) AND less than 30 percent darter presence.*

At present, neither of the above scenarios are close to being triggered. However, the San Marcos study reaches are experiencing summer time aquatic vegetation declines greater than average, which is typical for lower-than-average flow conditions. From April to July 2022, all three San Marcos River study reaches (Spring Lake Dam, City Park, and I35) have seen a reduction of aquatic vegetation greater than 25%. Fountain Darter dip netting results are also below average conditions as would be expected. In Spring 2022, 24% of the sites had darters present, while on July 29th 40% of the sites had darters present. With respect to Fountain Darters in both drop net and dip net sampling, the two reaches most impacted are Spring Lake Dam and City Park. Over the past several years, these reaches have become dominated by Texas Wild-rice leaving limited other aquatic vegetation of higher darter preference available. At present, the remaining native aquatic vegetation in these two reaches is unfortunately on the fringes which has started to become exposed due to declining water levels.

Throughout the system, Texas Wild-rice total coverage has experienced an approximate 10 percent decline from August 2021 to July 2022. There is approximately 13,000 m^2 of Texas Wild-rice in wetted areas. Currently, last summer's Texas Wild-rice footprint is still largely intact but what has been negatively impacted the most from lower water levels is the density of the top growth. The overall system-wide reduction versus reach reductions of all aquatic vegetation noted above is less, partly because of the amount of Texas Wild-rice that has been planted below Capes Dam. With no scouring pulse events the past few years in this area, these patches are currently doing exceedingly well.

Another key factor is the condition of Spring Lake as it and the Spring Lake Dam spillway are the only two locations that support the presence all three listed species (Fountain Darter, San Marcos Salamander, and Texas Wild-rice. The following pictorial habitat evaluation highlights the current condition of Spring Lake, Spring Lake Dam and longitudinally down the San Marcos River with respect to threatened and endangered species habitat conditions.

SPRING LAKE AND SPRING LAKE DAM

As evident in Figures 3, 4, and 5, water levels throughout Spring Lake are declining. Additionally, habitat conditions for San Marcos Salamanders and Fountain Darters in the lake are holding steady at this time (Figures 6, 7, and 8). The reduced water flow throughout Spring Lake with lower discharge has resulted in higher levels of algal build up and siltation within the San Marcos Salamander Spring Lake study sites. Although there is more silt depositing in these areas with less flow through the lake as is expected, that silt is not yet filtering into the under-rock crevices that support clean substrate habitat. Overall, salamander counts were consistent with years past and adult and juvenile San Marcos Salamanders and Fountain Darters were observed at all sites.

Figure 3: Headwaters of Spring Lake looking downstream on July 27, 2022.

Figure 4: View of slough arm in Spring Lake on July 27, 2022.

Figure 5: View of Spring Lake toward Spring Lake Dam spillway on July 27, 2022.

Figure 6: Hotel Study Reach habitat surveyed on July 27, 2022.

Figure 7: Riverbed Study Reach habitat survey on July 27, 2022.

Figure 8: San Marcos Salamanders and Fountain Darters at the Hotel Reach on July 27, 2022.

Figure 9: Spring Lake Dam Spillway on July 27, 2022.

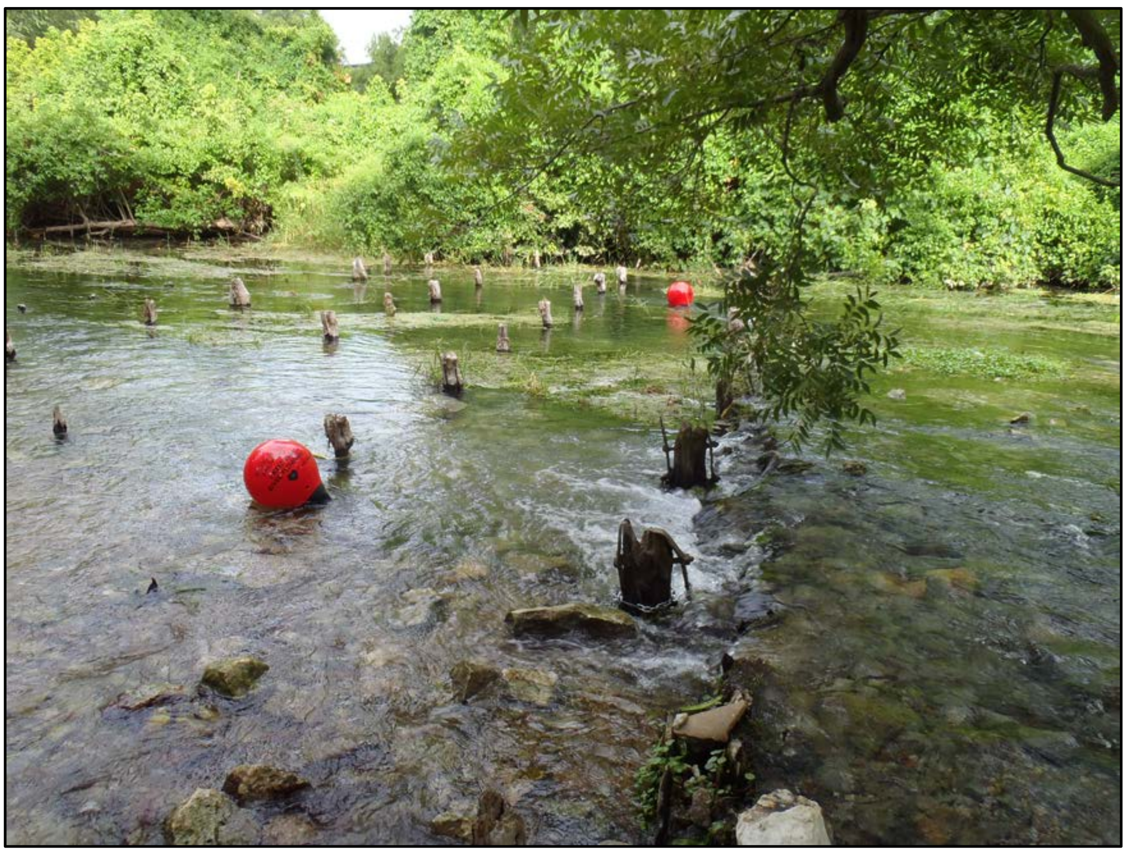

Figure 10: Spring Lake Dam water level on July 27, 2022.

Figure 11: Spring Lake Dam Site U1 Habitat surveyed on July 27, 2022.

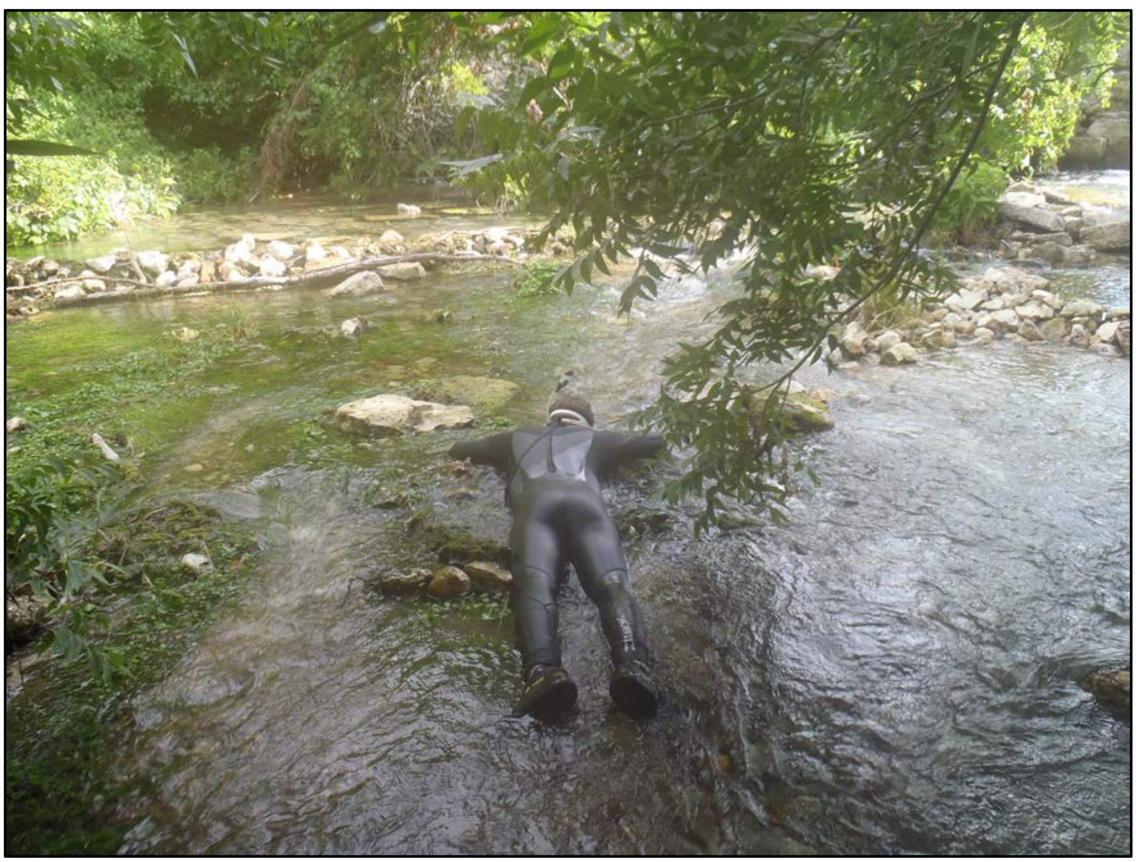

Figure 12: Spring Lake Dam Site U2 Habitat surveyed on July 27, 2022.

Figure 13: Texas Wild-rice exclusion zone below Spring Lake Dam looking downstream on July 27, 2022.

As evident in Figures 9 through 12 above, there is considerable San Marcos Salamander and Fountain Darter habitat in the spillway area. However, there has been considerable rock moving and relocating to build structures by the public which disturbs habitat in this very important area. As previously mentioned, aquatic vegetation within the Spring Lake Dam (Figure 13) and City Park (Figure 14) study reaches continue to be dominated by Texas Wild-Rice, while the I35 study reach (Figure 17) supports a more diverse aquatic vegetation community. The following photographs highlight the declining water levels and Fountain Darter habitat conditions moving downstream in the San Marcos River.

Figure 14: City Park habitat conditions on July 27, 2022.

Figure 15: City Park habitat conditions on July 27, 2022.

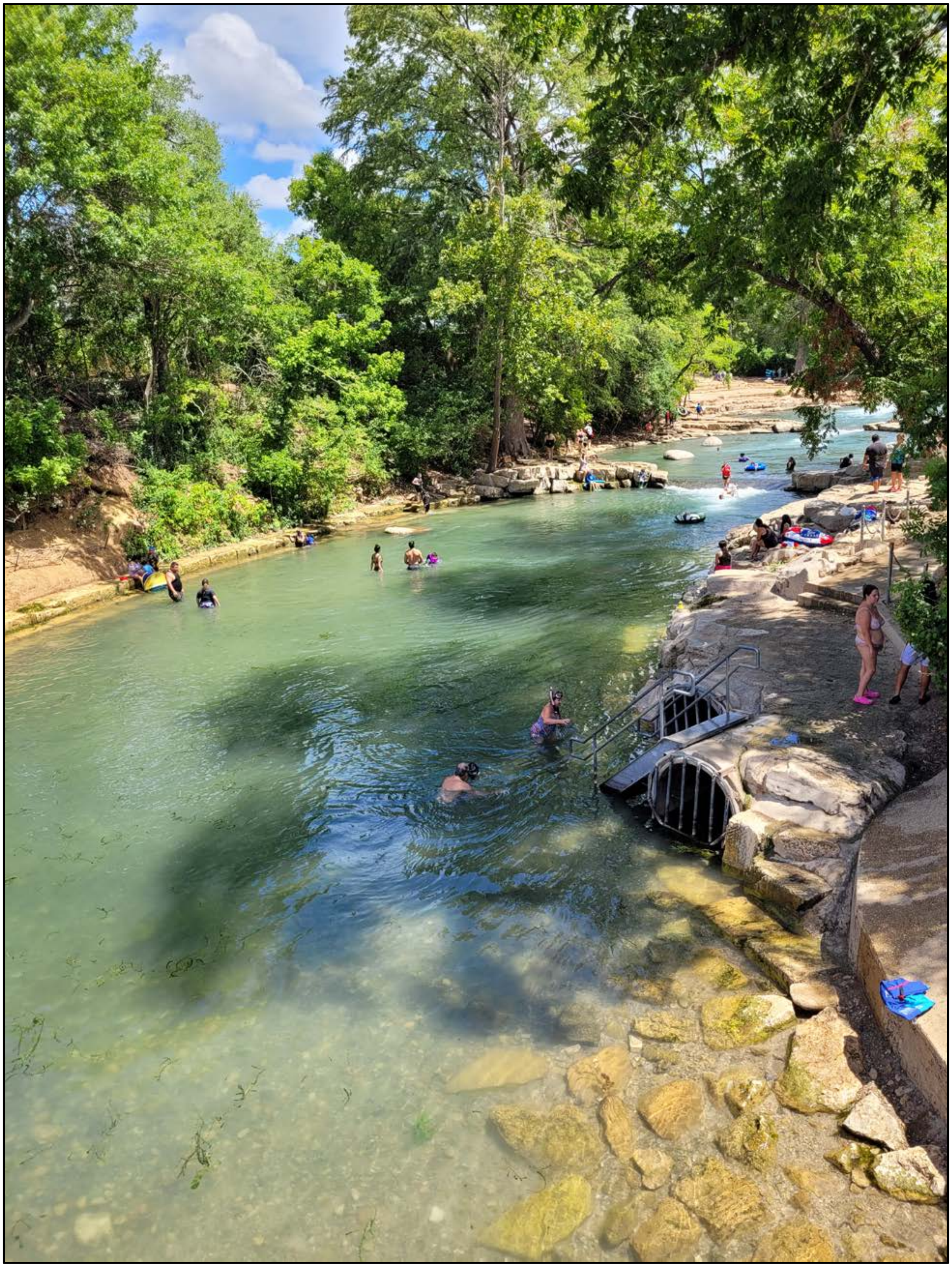

Figure 16: Rio Vista habitat conditions looking upstream on July 27, 2022.

Figure 17: I35 habitat conditions on July 27, 2022.

Figure 18: I35 habitat conditions on July 27, 2022.

Figure 17: Thompson Island mill race on July 27, 2022.

Figure 18: Thompson Island natural channel on July 27, 2022.

The majority of fish community study sites reported similar conditions from April to July. As expected, the water levels at the most downstream location were considerably lower than average. Presumably related to decreased depths (increased light penetration; but also decreased flow/current velocities) increased coverages of epiphytic algae and some aquatic vegetation was observed in areas typically void of vegetation. As evident in Figure 2, water temperatures are holding at the downstream locations, hence a fish community shift (spring fish community shifting to more riverine fish community) is not being observed. Instead, preliminary review of the data shows an increase in spring fish community (i.e. a greater abundance/densities of Texas Shiners and Texas Logperch). The numbers of Fountain Darters are about the same as previous collections, but it is important to note that they are still present.

Overall, water levels are noticeably down at 95 cfs, but BIO-WEST and Texas State University biologists noted no biological indicators of alarm at this time relative to historically observed conditions. As previously noted, flow through Spring Lake is presently reduced causing increased algal growth and siltation at certain locations in the lake. It should also be noted that although a diverse aquatic vegetation community is present in the I35 study reach, and scattered non-rice aquatic vegetation is present in the City Park study reach, much of this habitat is located in edge or shallow areas which will be impacted by declining water levels. Finally, declining water levels are also exposing more wetted areas to wadable conditions. As water levels continue to decline, it will be imperative to continue to track habitat conditions for HCP Covered Species during this heavy recreation season for the San Marcos River.

As always, please don’t hesitate to contact me if you have any questions or concerns.

Ed

MEMORANDUM

TO:	Chad Furl, Jamie Childers
FROM:	Ed Oborny (BIO-WEST)
DATE:	**August 23, 2022**
SUBJECT:	EAHCP Critical Period Habitat Evaluation – 90 cfs – San Marcos System

SAN MARCOS SYSTEM: 90 cfs Habitat Evaluation

As total system discharge continued to decline in August coupled with the USGS gage adjustment on August 11th, the 90 cfs Habitat Evaluation was triggered. The 95 cfs Habitat Evaluation was completed on July 27th and the 90 cfs evaluation was conducted on August 19th. Per requirement, the next habitat evaluation is scheduled for 85 cfs which would also trigger a full-system Critical Period Event. As of this memorandum, the total system discharge in the San Marcos River is approximately 91 cfs (Figure 1).

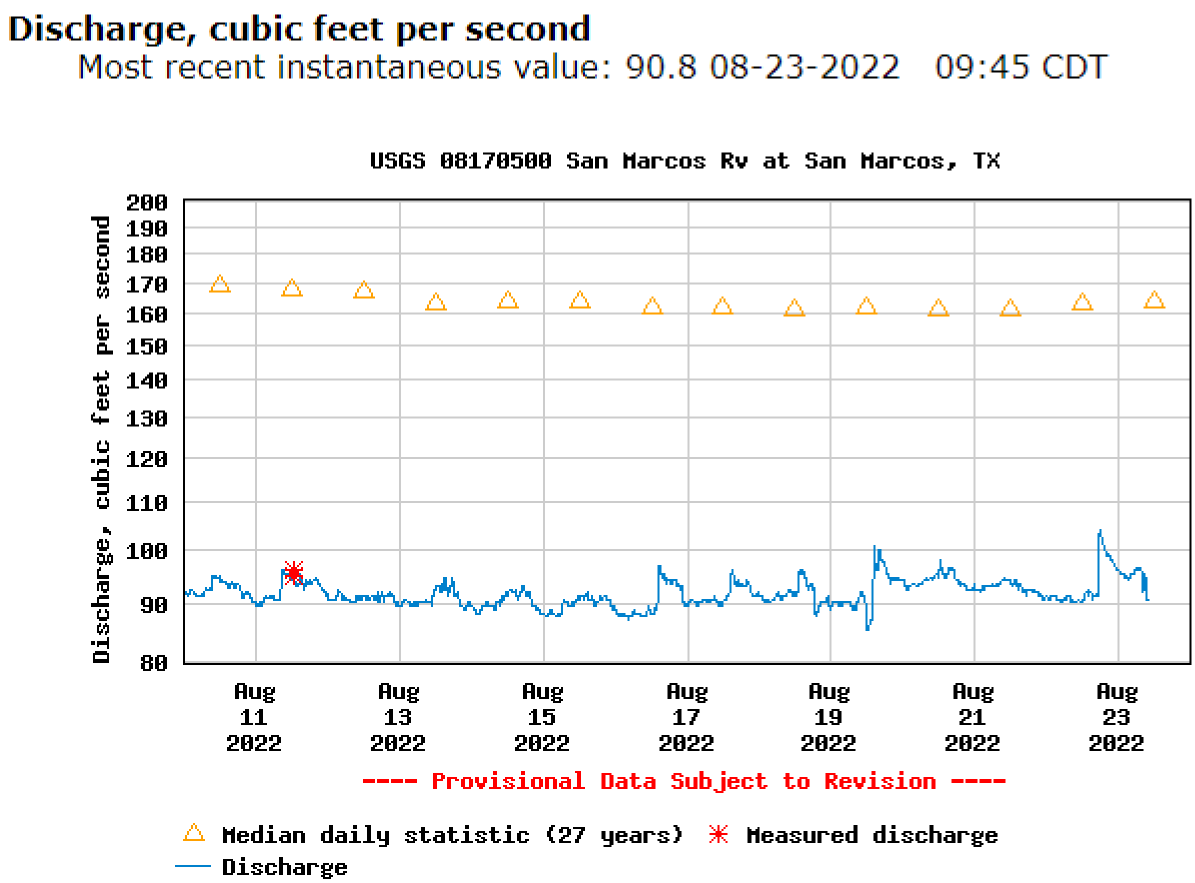

Figure 1. Total San Marcos River discharge over the past two weeks (USGS 08170500 at San Marcos, Texas.

Water temperature is a key component system-wide as it is an underlying driver of spring-related aquatic assemblages. Recent 7-day trends in water temperature (°C) for August Critical Period sampling were assessed using temperature data loggers (HOBO Tidbit v2 Temp Loggers) at 8 permanent monitoring stations in the upper San Marcos River (Table 1, Figures 2 and 3). Data for each monitoring station are based on 10-minute intervals and dates for recent trends extended from the last day that each data logger was downloaded to 7 days prior. For all stations, 7-day trends were examined from 8/13 – 8/19. Recent 7-day trends were compared to long-term water temperature data measured at 4-hour intervals in August from 2001 – 2021 or to the greatest temporal extent available. For analysis, 7-day trends were compared to long-term trends using boxplots to visualize differences in central tendency (i.e., median) and variation (e.g., interquartile range). Boxplots from July Critical Period sampling were also included for comparison. Overall, it remains evident that the San Marcos system is in a lower-than-average discharge, summer time condition. However, no water temperatures are noted as a concern at stations in the San Marcos River at this time (Figures 2 and 3).

Table 1. Summary of boxplot descriptive statistics comparing recent 7-day and long-term trends in water temperature (°C) at 8 monitoring stations in the upper San Marcos Springs River for the month of August.

Station	Period	Lower Whisker	Lower Box	Median	Upper Box	Upper Whisker	Interquartile Range
Chute	7-day	22.35	22.49	22.73	23.21	24.24	0.72
Chute	Long-term	21.28	22.17	22.40	22.76	23.65	0.59
Spring Lake Dam	7-day	22.71	23.02	23.45	24.27	25.19	1.25
Spring Lake Dam	Long-term	21.03	22.11	22.47	23.00	24.33	0.89
City Park	7-day	22.71	23.04	23.79	25.19	27.63	2.15
City Park	Long-term	21.67	22.37	22.76	23.27	24.61	0.90
Rio Vista Park	7-day	22.68	22.99	23.45	24.34	25.53	1.35
Rio Vista Park	Long-term	21.01	22.42	22.87	23.68	25.56	1.26
I-35	7-day	22.63	22.99	23.57	24.36	25.38	1.37
I-35	Long-term	21.70	22.51	22.97	23.68	25.44	1.18
Thompson Island - Natural	7-day	22.78	23.16	23.79	24.65	25.65	1.49
Thompson Island - Natural	Long-term	21.29	22.66	23.27	24.19	26.50	1.54
Thompson Island - Artificial	7-day	23.91	24.51	25.02	25.72	27.53	1.21
Thompson Island - Artificial	Long-term	21.61	22.86	23.52	24.43	26.78	1.57
Waste Water Treatment Plant	7-day	23.06	23.55	24.24	25.02	25.87	1.47
Waste Water Treatment Plant	Long-term	21.70	22.85	23.53	24.41	26.74	1.56

There was no Aquatic vegetation mapping or Fountain Darter dip netting triggered since the July Habitat Evaluation and full Critical Period sampling effort. There was a Texas Wild-rice vulnerable stand sampling triggered, and subsequently conducted on August 16th. Figures 4 and 5 highlight impacts that are presently occurring to Texas Wild-rice in these vulnerable areas. Another key factor is the condition of Spring Lake as it and the Spring Lake Dam spillway are the only two locations that support the presence all three listed species (Fountain Darter, San Marcos Salamander, and Texas Wild-rice). The following pictorial habitat evaluation highlights the current condition of Spring Lake, Spring Lake Dam and longitudinally down the San Marcos River with respect to threatened and endangered species habitat conditions.

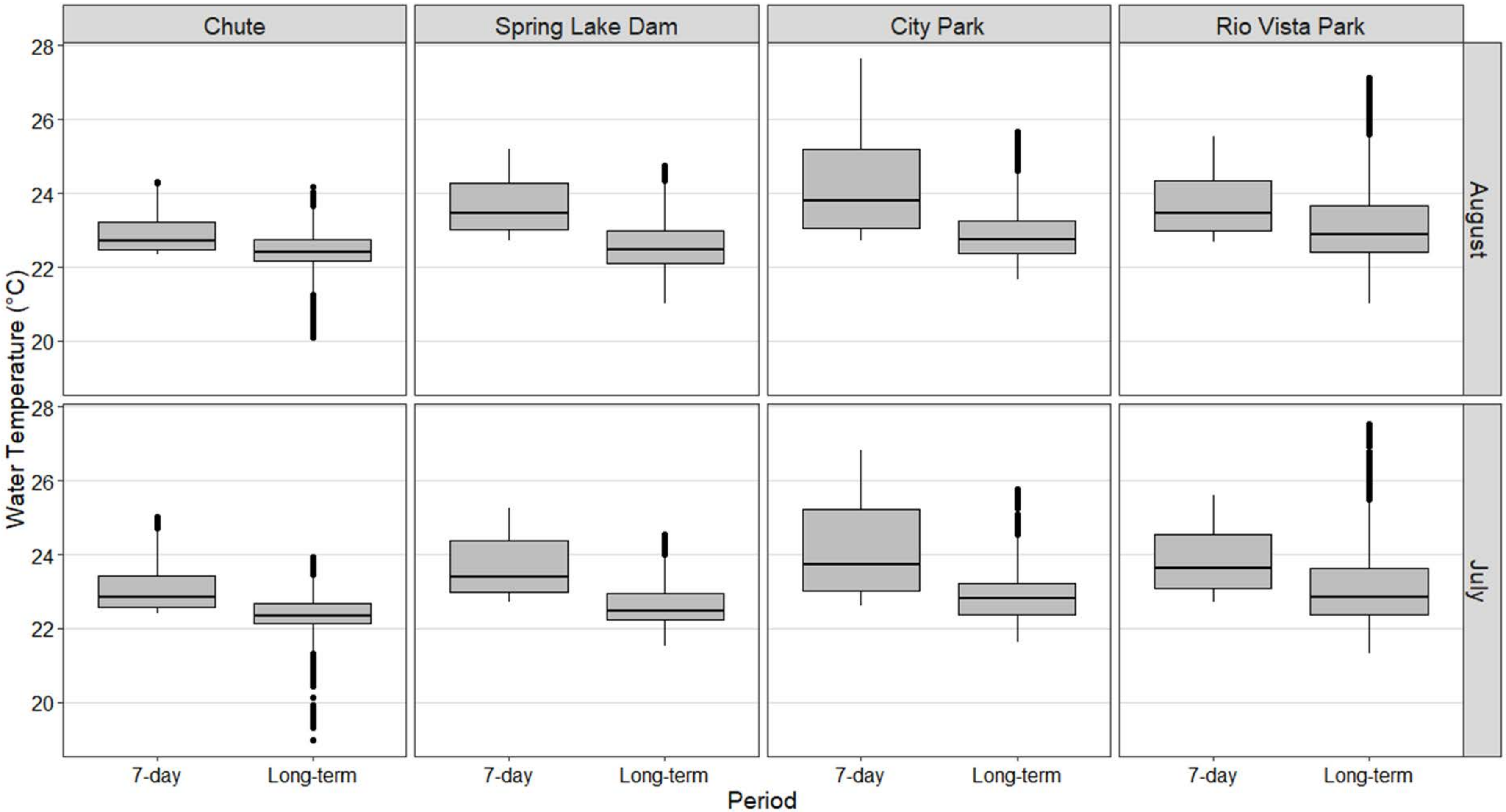

Figure 2. **Boxplots comparing recent 7-day and long-term water temperature trends at four monitoring stations from Chute to Rio Vista Park for the month of August (top). July results are also included for comparison (bottom). The thick horizontal line in each box is the median, x represents the mean, and the upper / lower bounds of each box represents the interquartile range. Whiskers represent minimum / maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

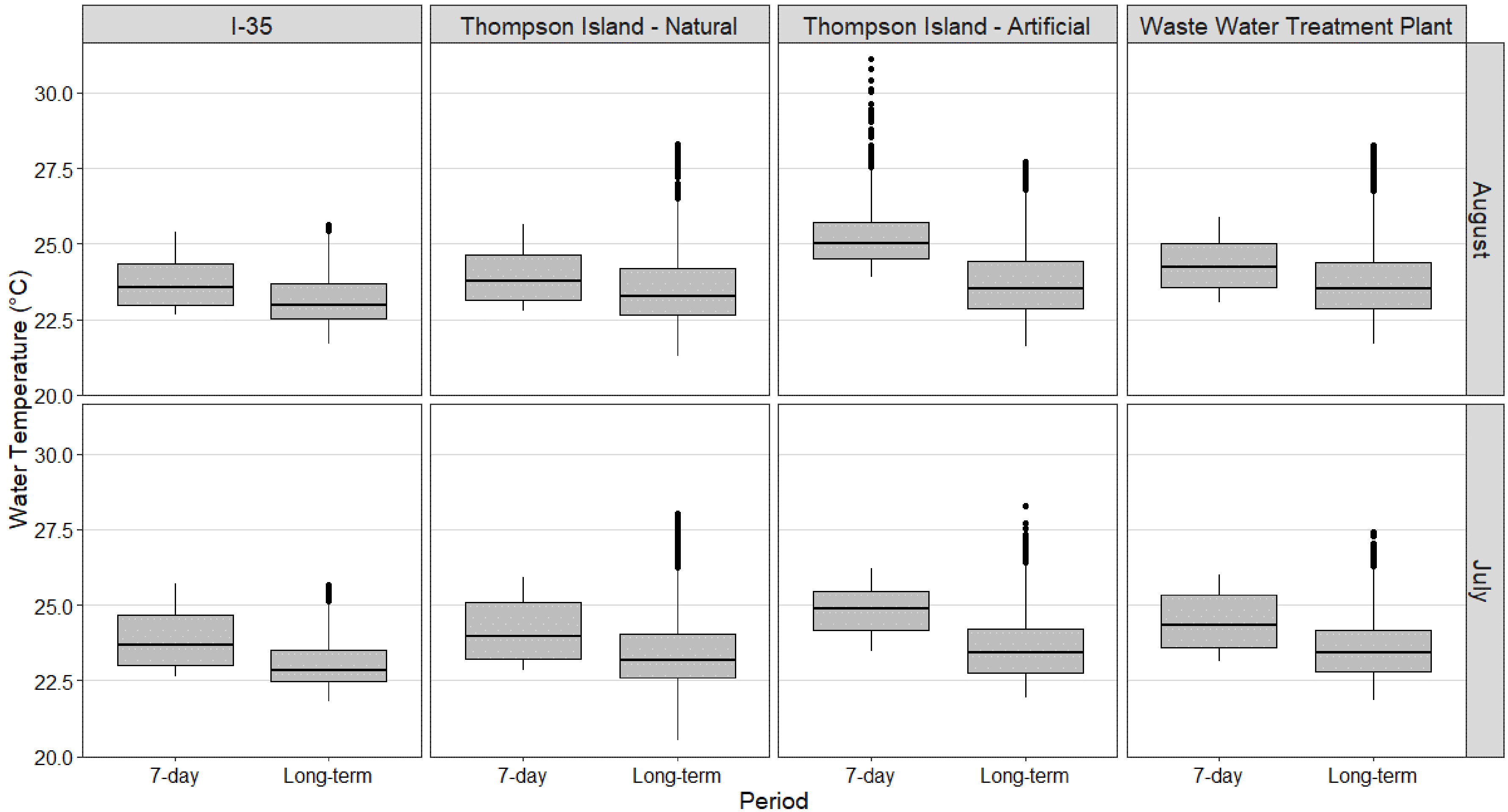

Figure 3. **Boxplots comparing recent 7-day and long-term water temperature trends at four monitoring stations from I-35 to Waste Water Treatment Plant in August 2022 (top). July results are also included for comparison (bottom). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

Figure 4: Texas Wild-rice root ball exposure on August 16, 2022.

Figure 5: Texas Wild-rice impacted underwater stands (left) and on dry land (right) on August 16, 2022.

SPRING LAKE AND SPRING LAKE DAM

Habitat conditions for San Marcos Salamanders and Fountain Darters in Spring Lake appear consistent with those observed in July. As noted last month, the reduced water flow throughout Spring Lake with lower discharge has resulted in higher-than-average levels of algal build up and siltation within San Marcos Salamander habitat. However, as of this evaluation, the Hotel site salamander habitat is maintaining clear, clean substrate (Figure 6).

Figure 6: Headwaters of Spring Lake looking downstream at San Marcos Salamander Hotel study site on August 19, 2022.

As evident in Figure 7, considerable San Marcos Salamander and Fountain Darter habitat are being maintained in the spillway area. There continues to be evidence of recreational activities such as rock relocating which disturbs both species habitat. As previously mentioned, aquatic vegetation within the Spring Lake Dam (Figure 7) and City Park (Figure 8) study reaches continue to be dominated by Texas Wild-rice, while the I35 study reach (Figure 10) supports a more diverse aquatic vegetation community. The following photographs highlight Fountain Darter habitat conditions moving downstream in the San Marcos River.

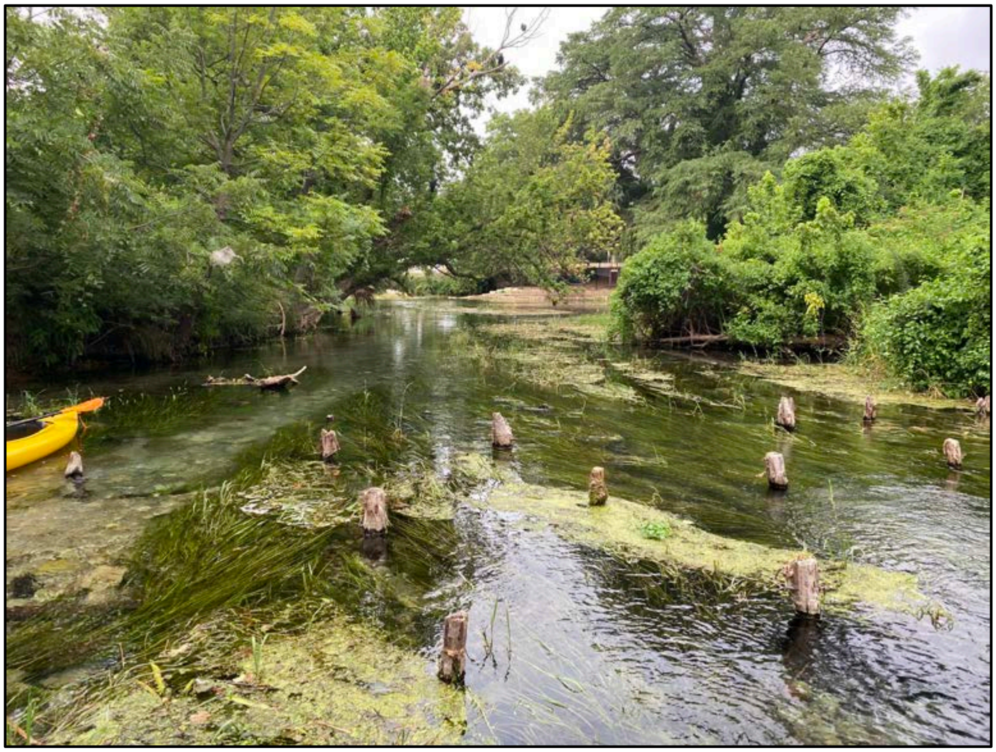

Figure 7: Spring Lake Dam spillway water level on August 16, 2022.

Figure 8: City Park habitat conditions on August 19, 2022.

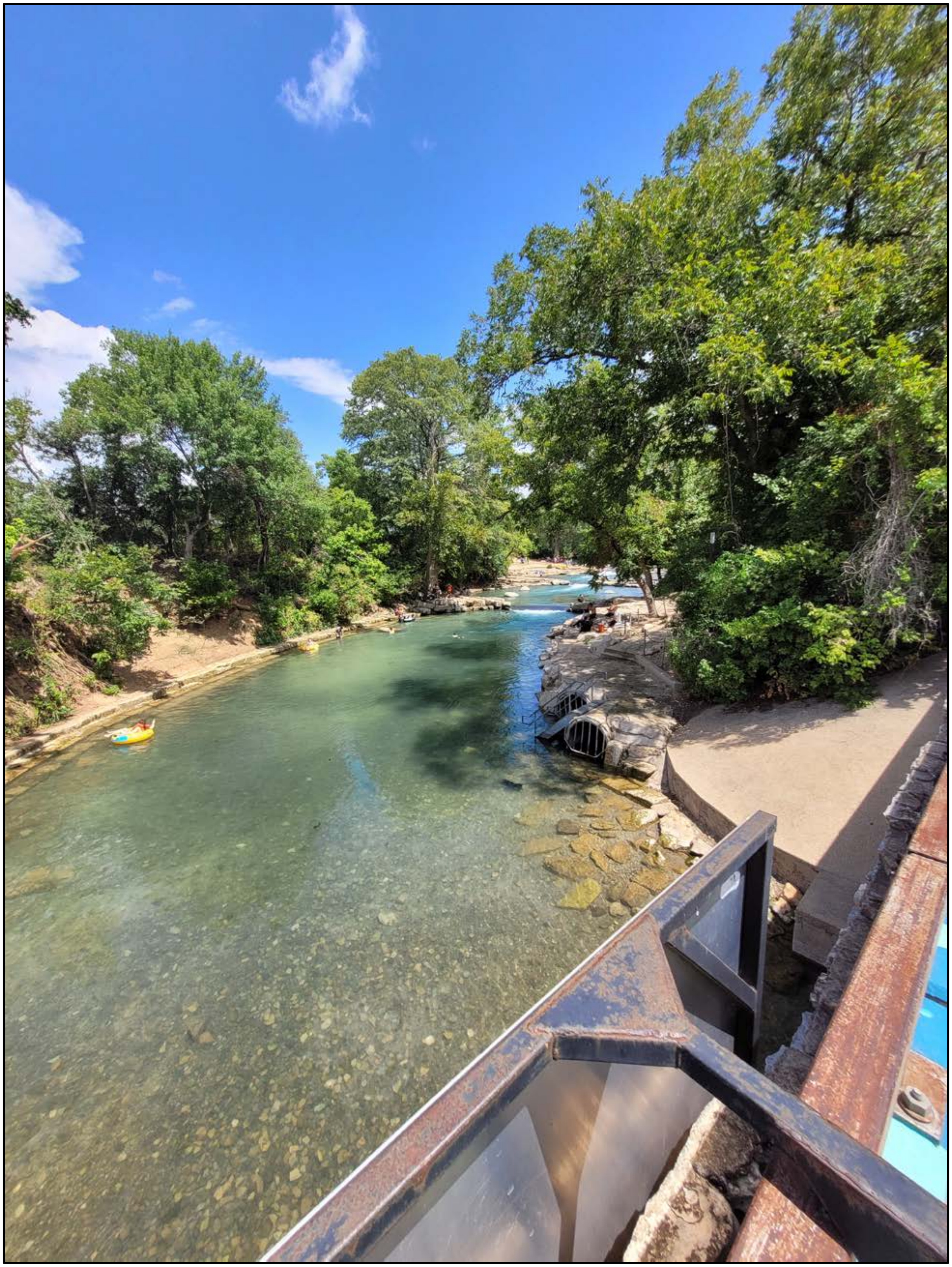

Figure 9: Rio Vista habitat conditions looking upstream on August 19, 2022.

Figure 10: I35 habitat conditions on August 19, 2022.

Overall, water levels and Covered Species habitat conditions remain similar to those observed in July. Lower-than-average water levels continue to expose more wetted area to recreational activities that can impact Covered Species habitat. Texas Wild-rice in vulnerable areas (i.e., low water depth, high recreation) continues to be the Covered Species impacted to the greatest extent under present conditions. As noted last month, the turnover of Spring Lake is presently reduced causing increased algal growth and siltation at certain locations in the lake. However, San Marcos Salamander and Fountain Darter habitat within the lake remains suitable. The higher quality Fountain Darter habitat in the I35 study reach (compared to the Spring Lake Dam and City Park study reaches) remains quite shallow, but still mostly wetted as shown in Figure 10. Should the extreme drought continue, monitoring activities are in place to continue to track habitat conditions for HCP covered species in the San Marcos River.

Please don't hesitate to contact me if you have any questions or concerns.

Ed

MEMORANDUM

TO:	Chad Furl, Jamie Childers
FROM:	Ed Oborny (BIO-WEST)
DATE:	**September 30, 2022**
SUBJECT:	EAHCP Critical Period Habitat Evaluation – 85 cfs – San Marcos System

SAN MARCOS SYSTEM: 85 cfs Habitat Evaluation

As total system discharge continued to decline in September, the 85 cfs Habitat Evaluation was triggered. The 95 cfs Habitat Evaluation was completed on July 27th; the 90 cfs evaluation was completed on August 19th; and the 85 cfs evaluation was conducted on September 28th. Per requirement, the next habitat evaluation is scheduled for 80 cfs. As of this memorandum, the total system discharge in the San Marcos River is approximately 85 cfs (Figure 1).

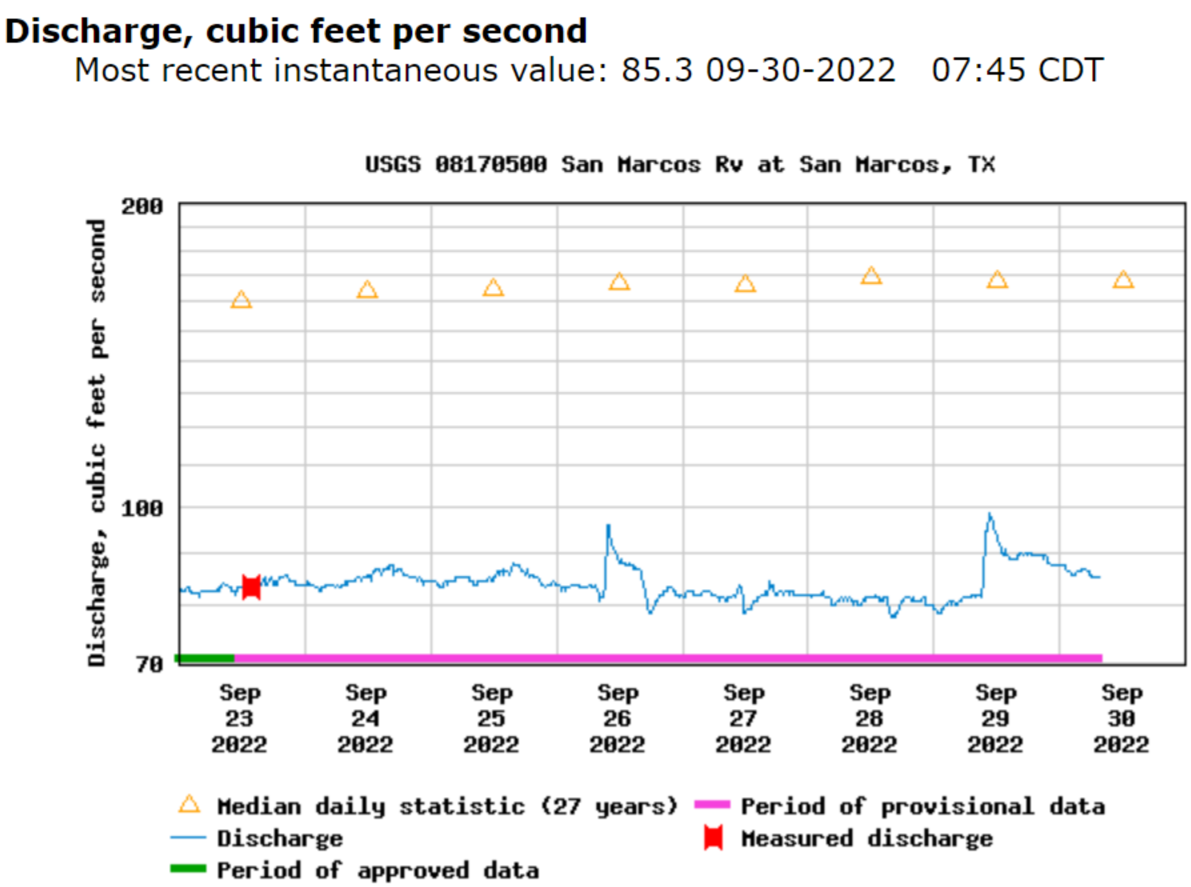

Figure 1. Total San Marcos River discharge over the past two weeks (USGS 08170500 at San Marcos, Texas.

Water temperature is a key component system-wide as it is an underlying driver of spring-related aquatic assemblages. Recent 7-day trends in water temperature (°C) for September Critical Period sampling were assessed using temperature data loggers (HOBO Tidbit v2 Temp Loggers) at 5 permanent monitoring stations in the upper San Marcos River. Data for each monitoring station are based on 10-minute intervals and dates for recent trends extended from the last day that each data logger was downloaded to 7 days prior. For all stations, 7-day trends were examined from September 9 – 15. Recent 7-day trends were compared to long-term water temperature data measured at 4-hour intervals in September from 2001 – 2021 or to the greatest temporal extent available. For analysis, 7-day trends were compared to long-term trends using boxplots to visualize differences in central tendency (i.e., median) and variation (e.g., interquartile range). Boxplots from August and July Critical Period 2022 sampling were also included for comparison. Similar to previous months, no water temperatures are noted as a concern at stations longitudinally down the San Marcos River at this time (Figure 2).

Table 1. **Summary of boxplot descriptive statistics comparing recent 7-day and long-term trends in water temperature (°C) at 5 monitoring stations in the upper San Marcos Springs River for the month of September.**

Station	Period	Lower Whisker	Lower Box	Median	Upper Box	Upper Whisker	Interquartile Range
Chute	7-day	22.11	22.37	22.61	23.11	23.86	0.74
Chute	Long-term	21.37	22.08	22.28	22.56	23.28	0.48
Spring Lake Dam	7-day	22.06	22.56	22.97	23.95	24.97	1.39
Spring Lake Dam	Long-term	20.64	21.81	22.24	22.65	23.89	0.83
City Park	7-day	21.63	22.51	23.21	24.90	25.99	2.39
City Park	Long-term	21.18	22.18	22.50	22.91	23.99	0.73
Thompson Island - Natural	7-day	21.96	22.73	23.38	24.41	25.26	1.68
Thompson Island - Natural	Long-term	20.92	22.34	22.86	23.60	25.45	1.25
Waste Water Treatment Plant	7-day	22.37	23.16	23.81	24.76	25.60	1.60
Waste Water Treatment Plant	Long-term	20.84	22.47	23.08	23.76	25.67	1.29

Aquatic vegetation mapping was conducted in late September as required by Task 3 and to subsequently serve as baseline establishment of the Fall Routine biological monitoring. Each of the three study reaches experienced a continued decline in aquatic vegetation coverage from mid-July to mid-September. This was most notable at the Spring Lake Dam reach (approximately a 16% decline) with lesser declines at the City Park reach (≈2%) and I35 reach (≈8%). Additionally, a Texas Wild-rice vulnerable stand survey was conducted on September 29th. Figure 3 highlights extensive root ball exposure that are presently occurring to Texas Wild-rice in these vulnerable areas. A full Routine Biological Monitoring event (Fall) is scheduled to start next week. To maximize efficiencies while minimizing disturbance during these low-flow conditions, the Fall Routine Event will double as the 85 cfs Critical Period Event.

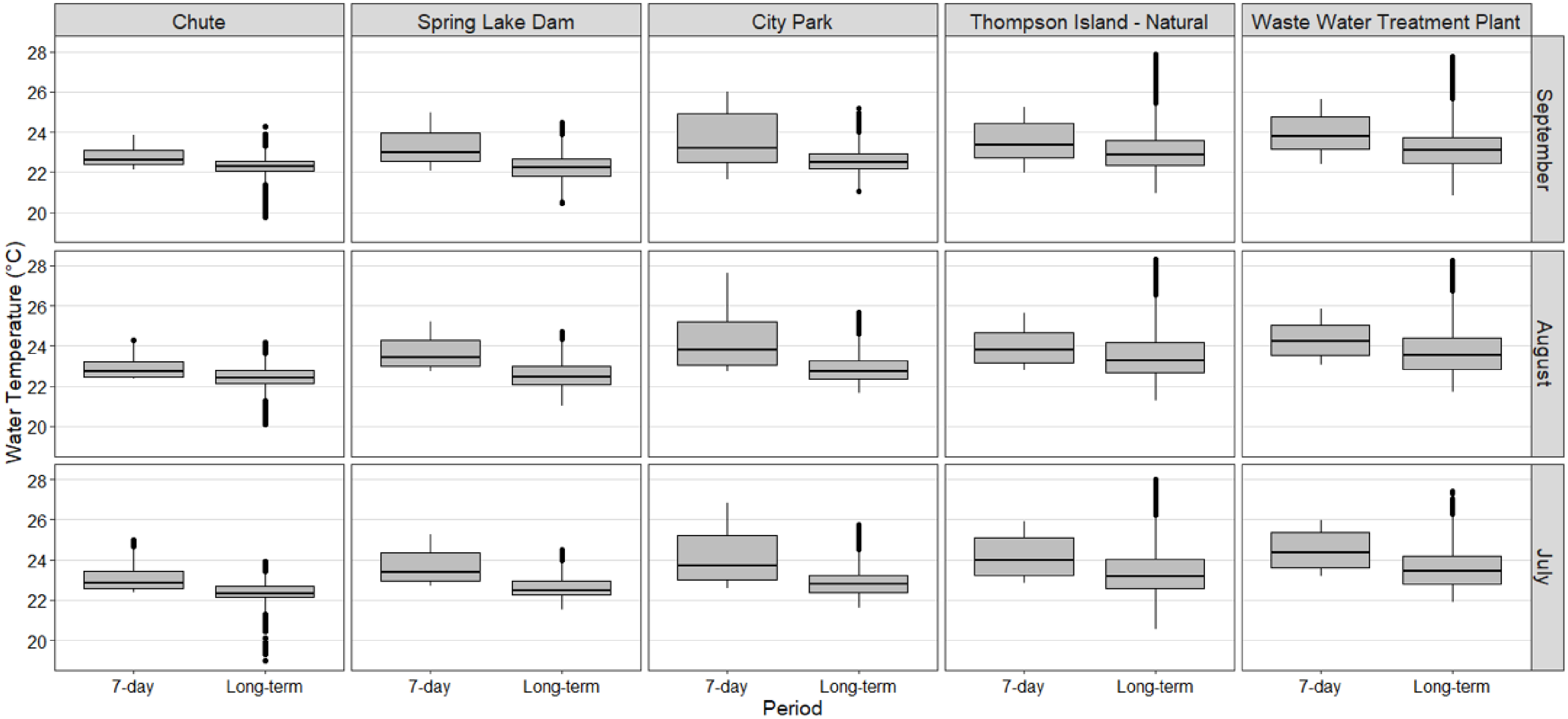

Figure 2. **Boxplots comparing recent 7-day and long-term water temperature trends at five monitoring stations from the Chute (Spring Lake Dam western spillway) to the Waste Water Treatment Plant for the month of September. August and July results are also included for comparison. The thick horizontal line in each box is the median and the upper / lower bounds of each box represents the interquartile range. Whiskers represent minimum / maximum values up to 1.5 times the interquartile range, and outliers beyond this are designated with solid black circles.**

Figure 3: Texas Wild-rice root ball exposure on September 29, 2022.

Another key factor is the condition of Spring Lake as it and the Spring Lake Dam spillway are the only two locations that support the presence all three listed species (Fountain Darter, San Marcos Salamander, and Texas Wild-rice). The following pictorial habitat evaluation highlights the current condition of Spring Lake, Spring Lake Dam and longitudinally down the San Marcos River with respect to threatened and endangered species habitat conditions.

SPRING LAKE AND SPRING LAKE DAM

Habitat conditions for San Marcos Salamanders and Fountain Darters in Spring Lake remain similar but slightly degraded compared to July and August. As noted last month, the reduced water flow throughout Spring Lake with lower discharge has resulted in higher-than-average levels of algal build up and siltation within San Marcos Salamander habitat. This was notably evident in September, but portions of the Hotel site salamander habitat is still supporting clear, clean substrate (Figure 4).

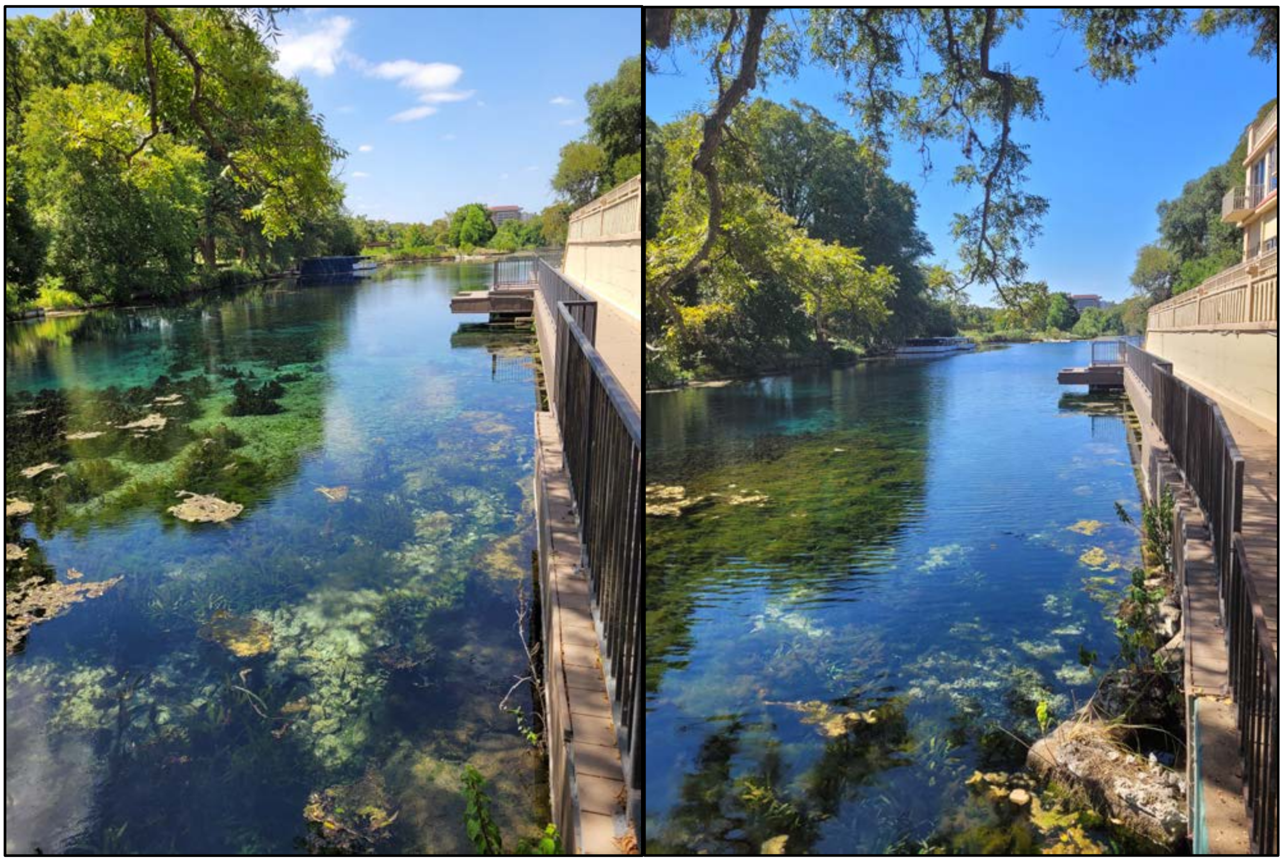

Figure 4: Headwaters of Spring Lake looking downstream at San Marcos Salamander Hotel study site on August 19 (left) and September 28, 2022 (right).

As evident in Figure 5, considerable San Marcos Salamander and Fountain Darter habitat are being maintained in the Spring Lake Dam study site. There continues to be evidence of recreational activities such as rock relocating which disturbs both species habitat. As previously mentioned, aquatic vegetation within the Spring Lake Dam (Figure 5 and 6) and City Park (Figure 7) study reaches continue to be dominated by Texas Wild-rice, while the I35 study reach (Figure 9) supports a more diverse aquatic vegetation community. The following photographs highlight Fountain Darter habitat conditions moving downstream in the San Marcos River.

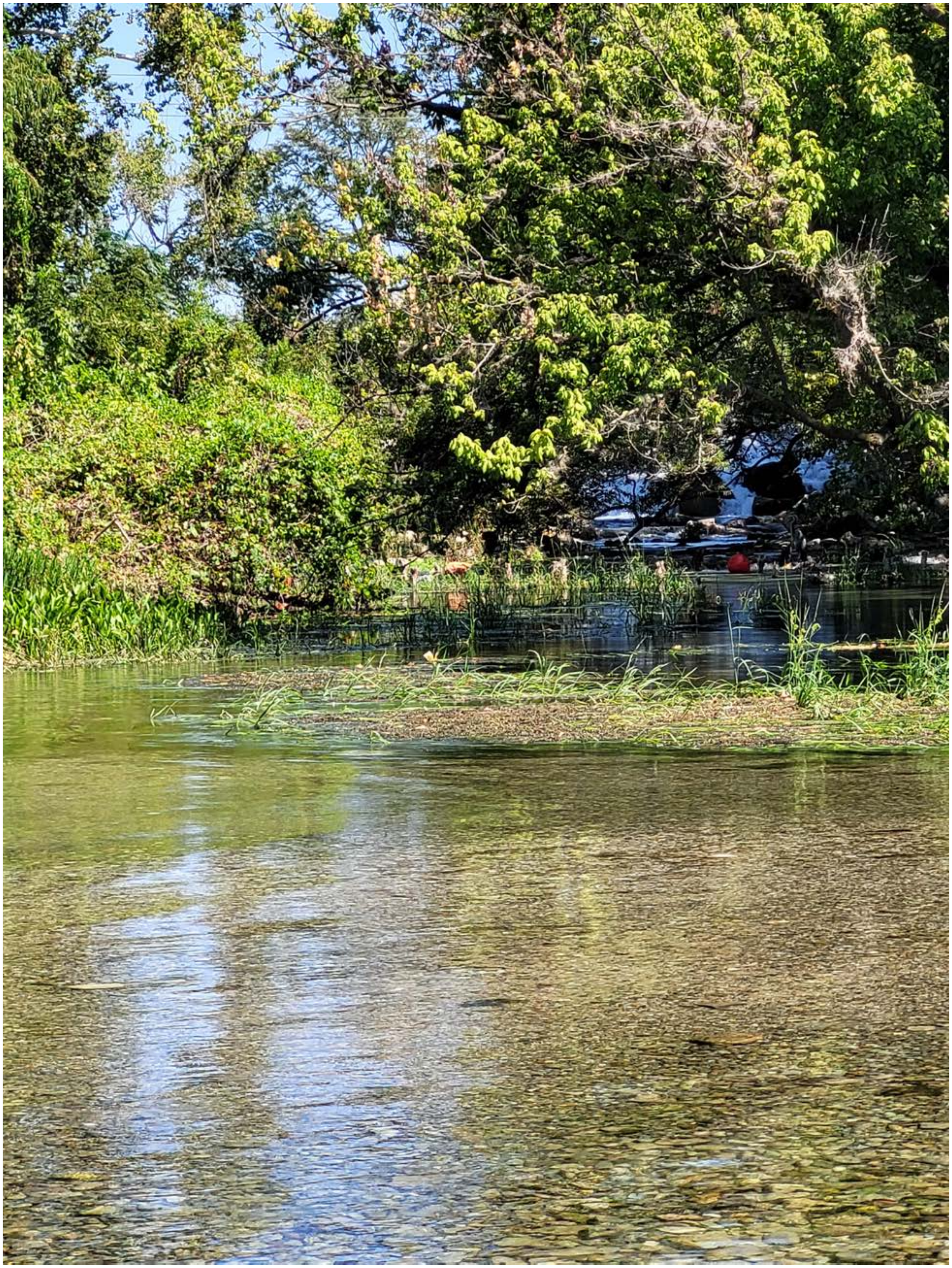

Figure 5: Spring Lake Dam spillway water level on September 28, 2022.

Figure 6: Spring Lake Dam Sessom's Island on September 28, 2022.

Figure 7: City Park habitat conditions looking upstream on September 28, 2022.

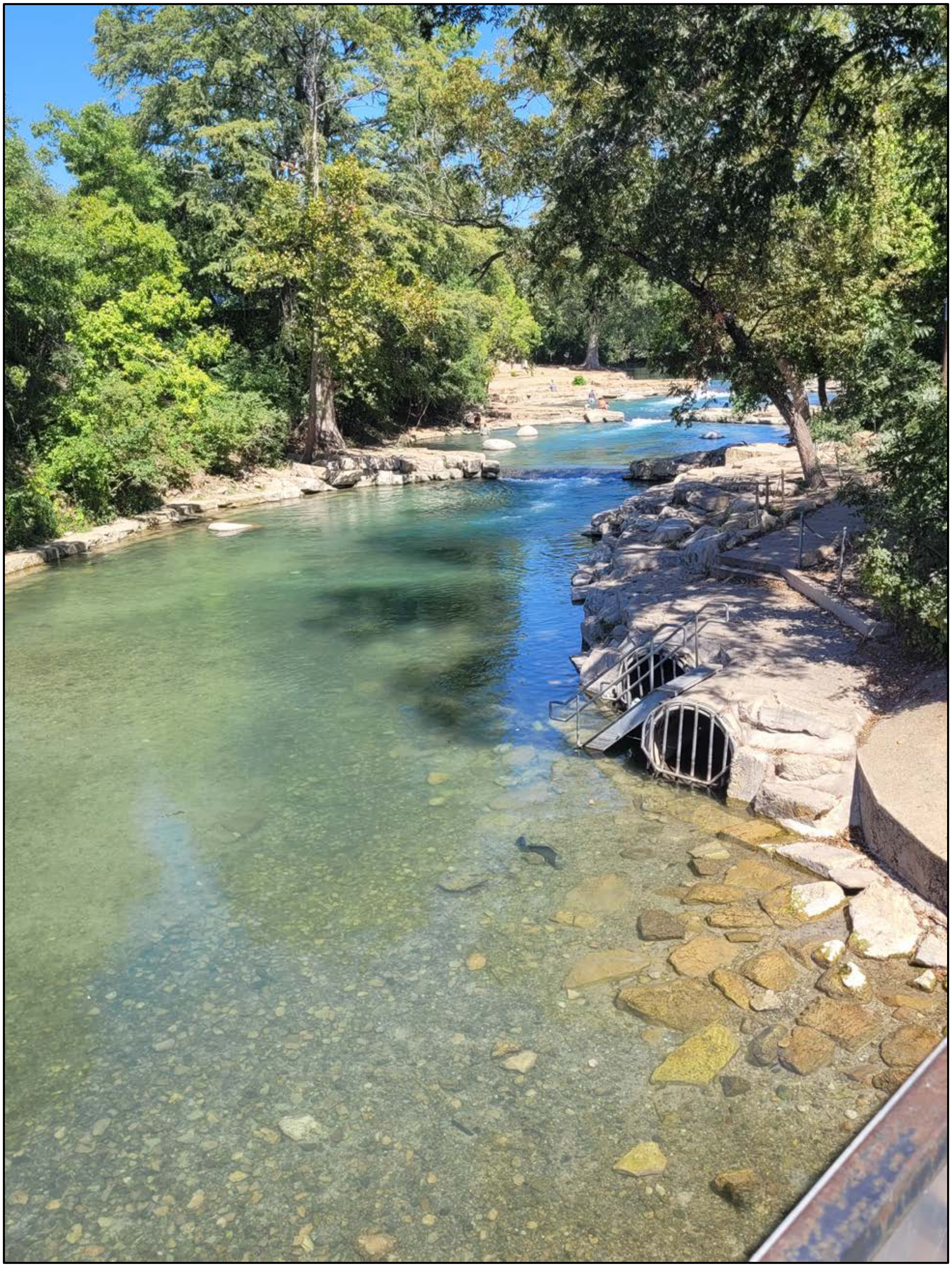

Figure 8: Rio Vista habitat conditions looking upstream on September 28, 2022.

Figure 9: I35 habitat conditions on September 28, 2022.

Overall, water levels and Covered Species habitat conditions remain similar to those observed in July and August. Lower-than-average water levels continue to expose wetted area to recreational activities that impact Covered Species habitat. However, with schools back in session and the start of Autumn, the river is experiencing less recreation than in previous summer-time months. Texas Wild-rice in vulnerable areas (i.e., low water depth) continues to be the Covered Species impacted to the greatest extent under these hydrological conditions. As noted in August, the turnover of Spring Lake is presently reduced causing increased algal growth and siltation at certain locations in the lake. However, San Marcos Salamander and Fountain Darter habitat within the lake and Eastern spillway remains suitable. The higher quality Fountain Darter habitat in the I35 study reach (compared to the Spring Lake Dam and City Park study reaches) remains shallow, but mostly wetted as shown in Figure 9. Should the extreme drought continue, monitoring activities are in place to continue to track habitat conditions for HCP covered species in the San Marcos River.

Please don’t hesitate to contact me if you have any questions or concerns.

Ed

APPENDIX C: AQUATIC VEGETATION MAPS

Long-term Biological Goals Study Reaches

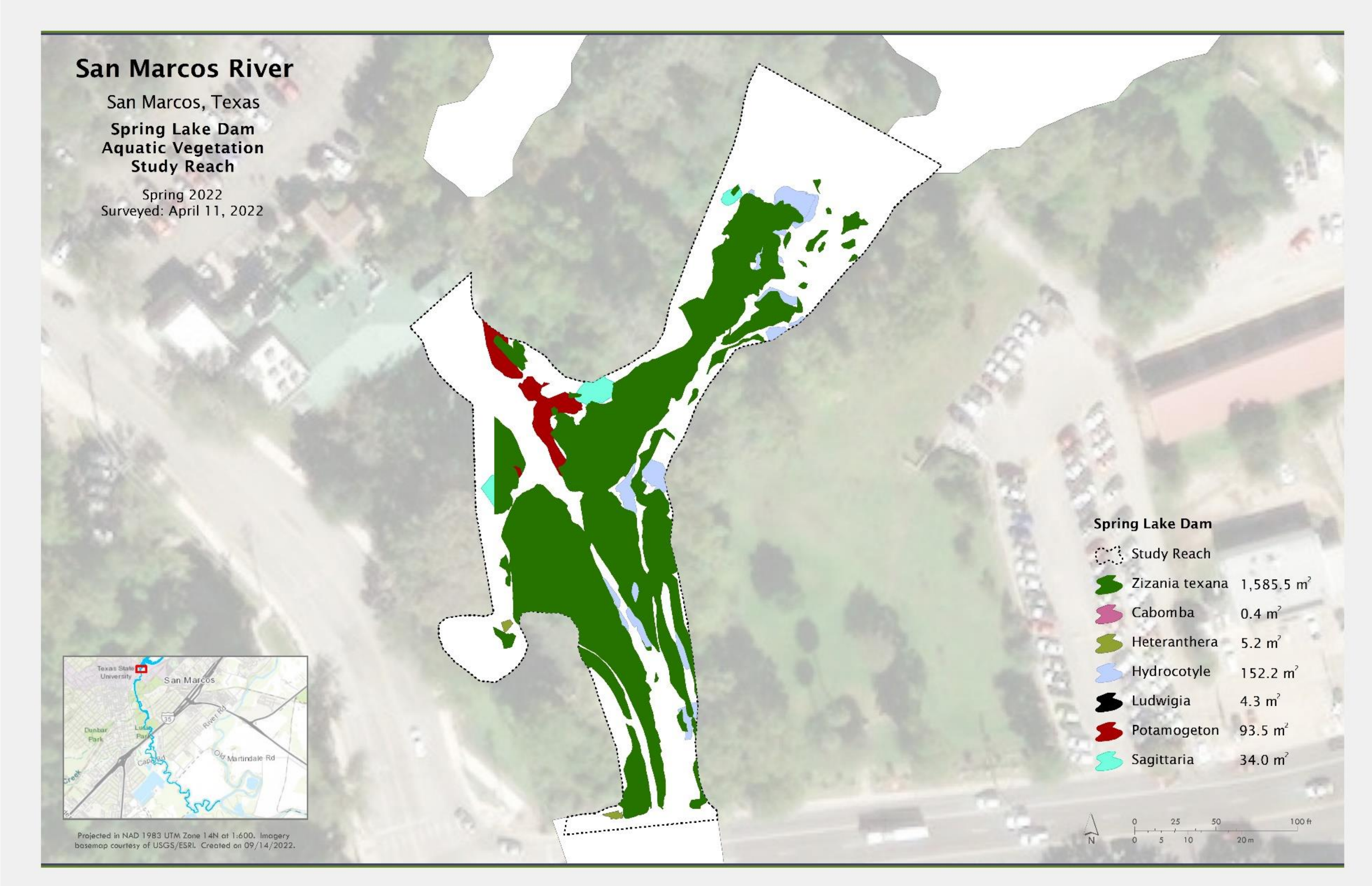

Figure C1. Map of aquatic vegetation coverage at Spring Lake Dam Study Reach in spring 2022.

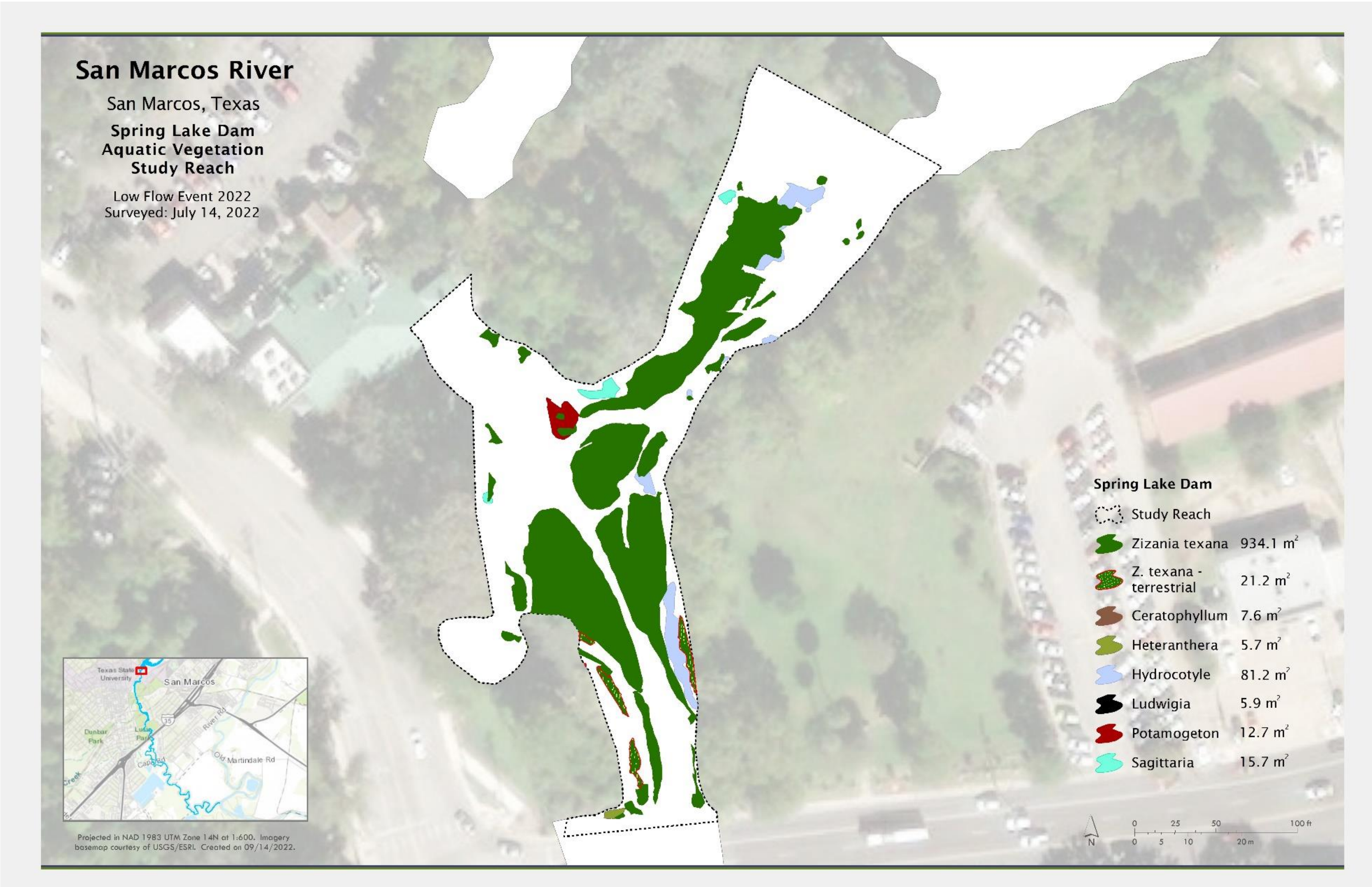

Figure C2. **Map of aquatic vegetation coverage at Spring Lake Dam Study Reach in summer 2022 during Critical Period low-flow sampling event (July).**

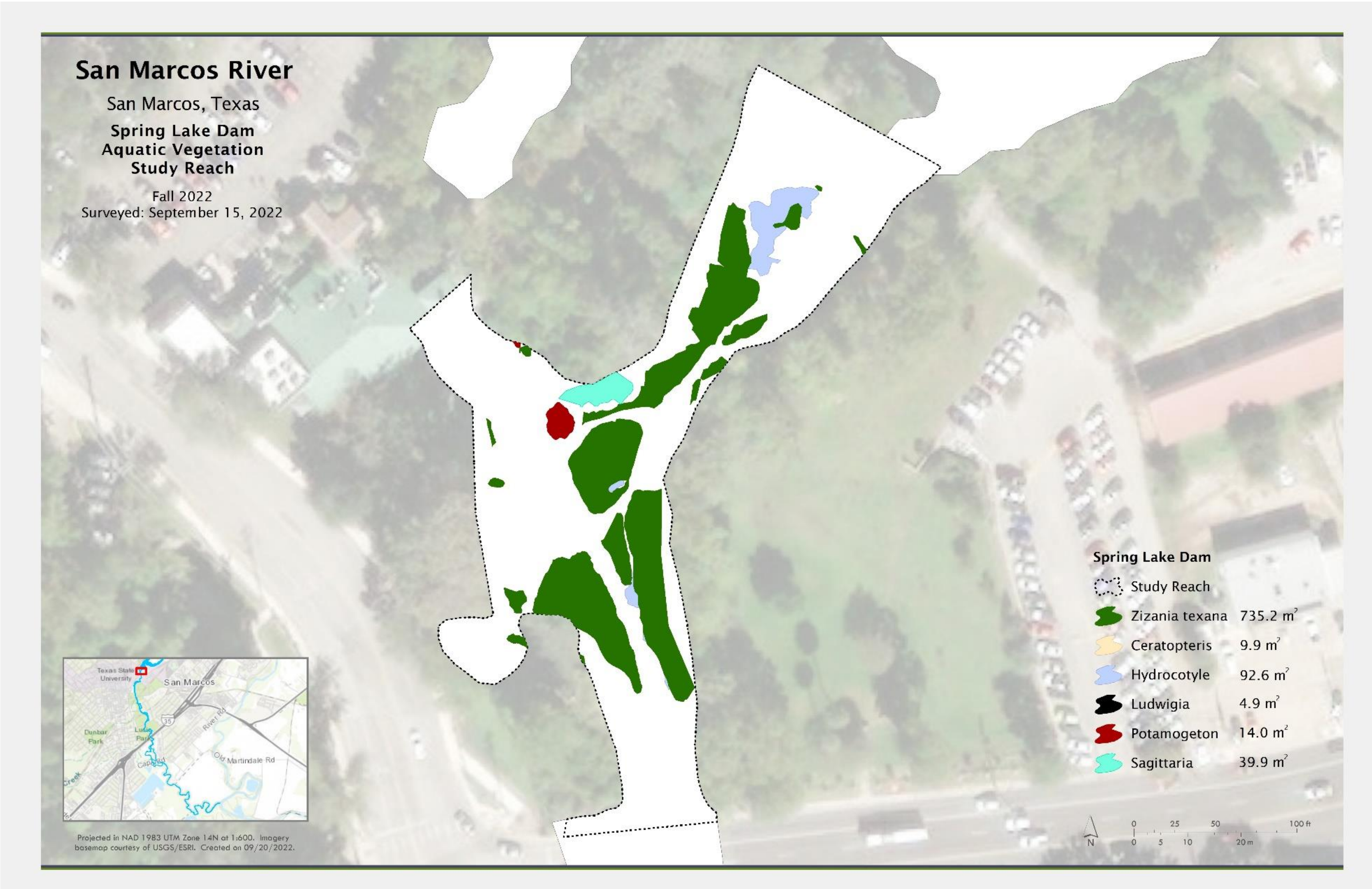

Figure C3. **Map of aquatic vegetation coverage at Spring Lake Dam Study Reach in fall 2022.**

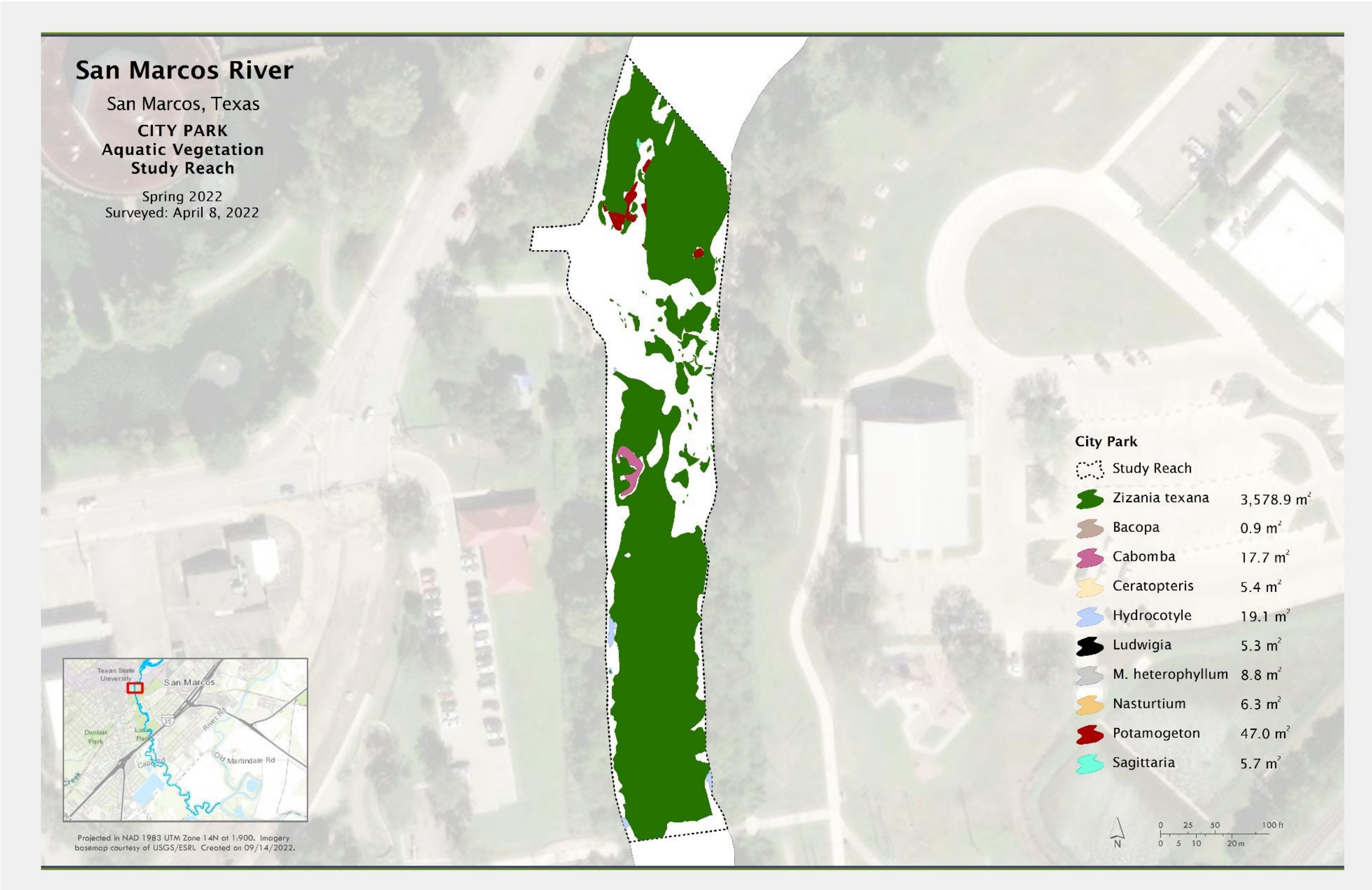

Figure C4. Map of aquatic vegetation coverage at City Park Study Reach in spring 2022.

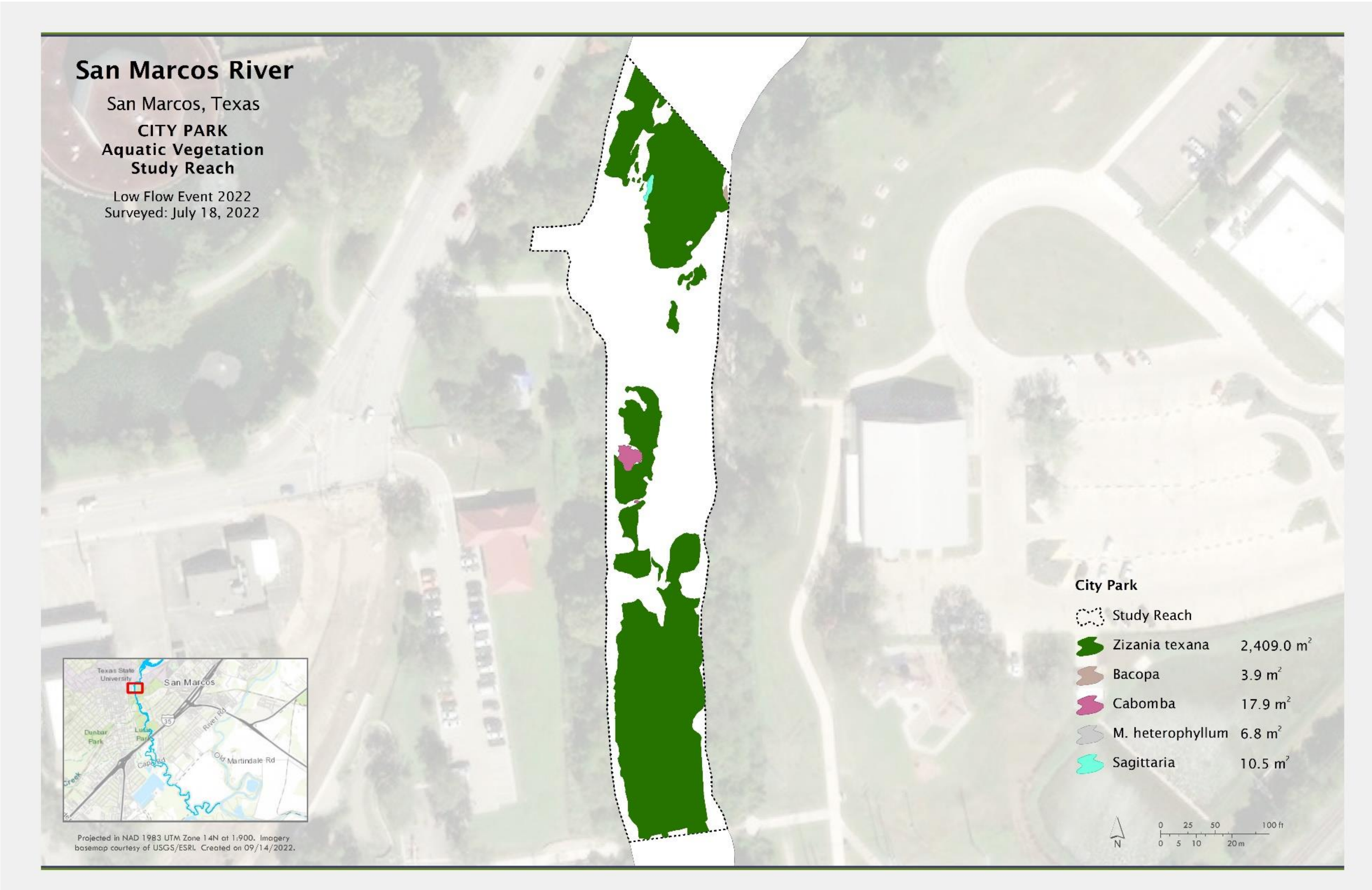

Figure C5. **Map of aquatic vegetation coverage at City Park Study Reach in summer 2022 during Critical Period low-flow sampling event (July).**

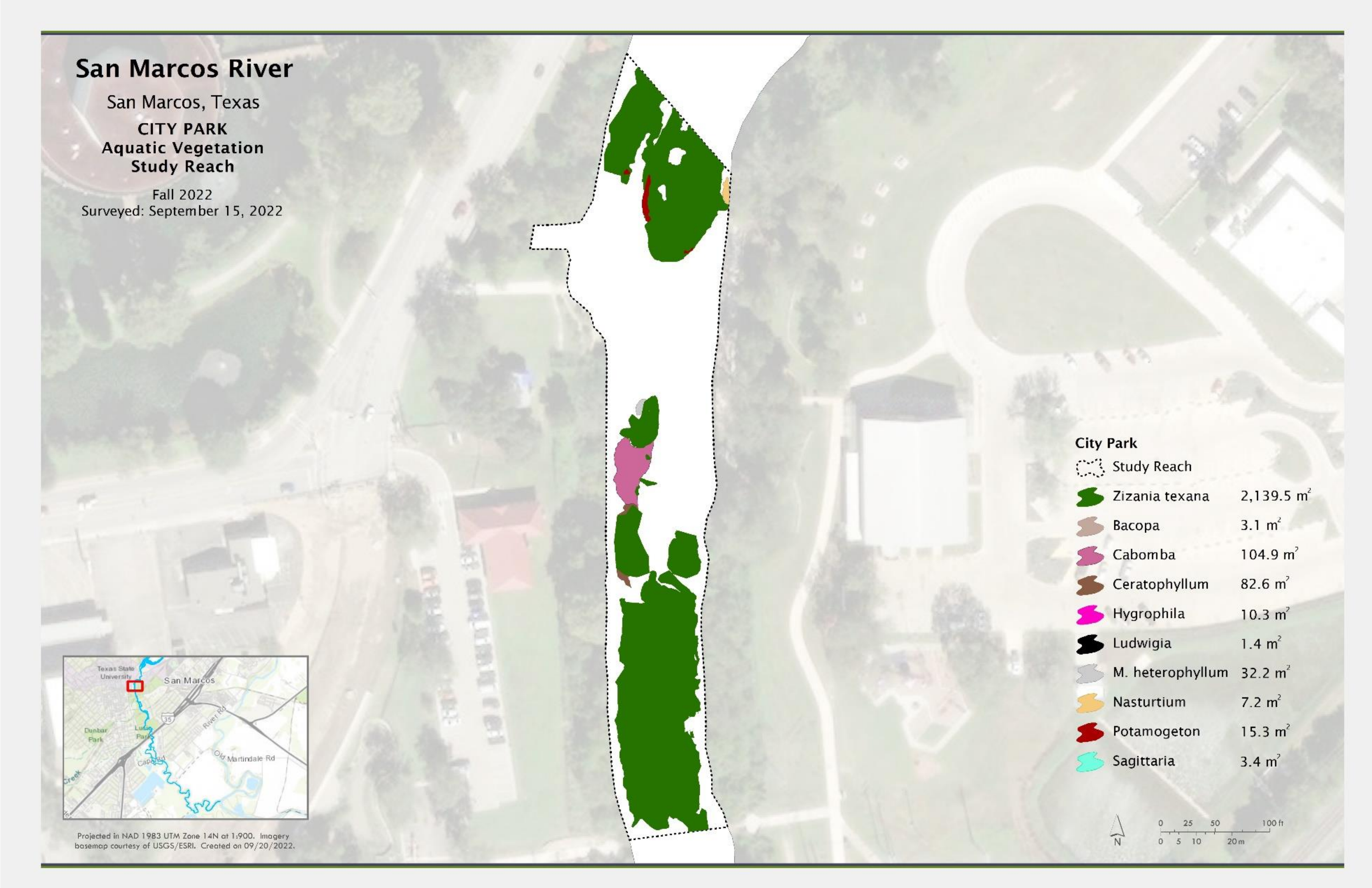

Figure C6. Map of aquatic vegetation coverage at City Park Study Reach in fall 2022.

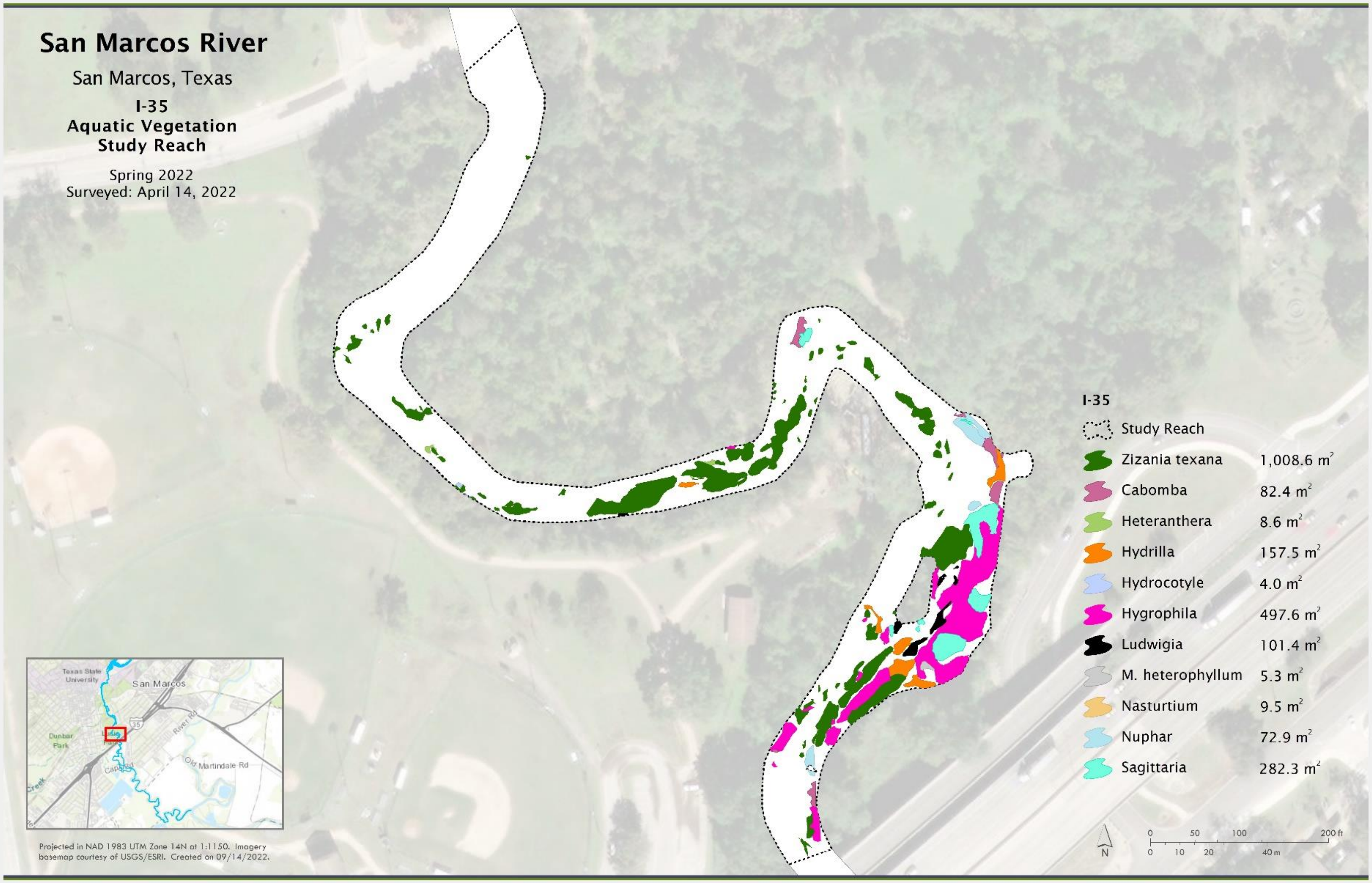

Figure C7. Map of aquatic vegetation coverage at I-35 Study Reach in spring 2022.

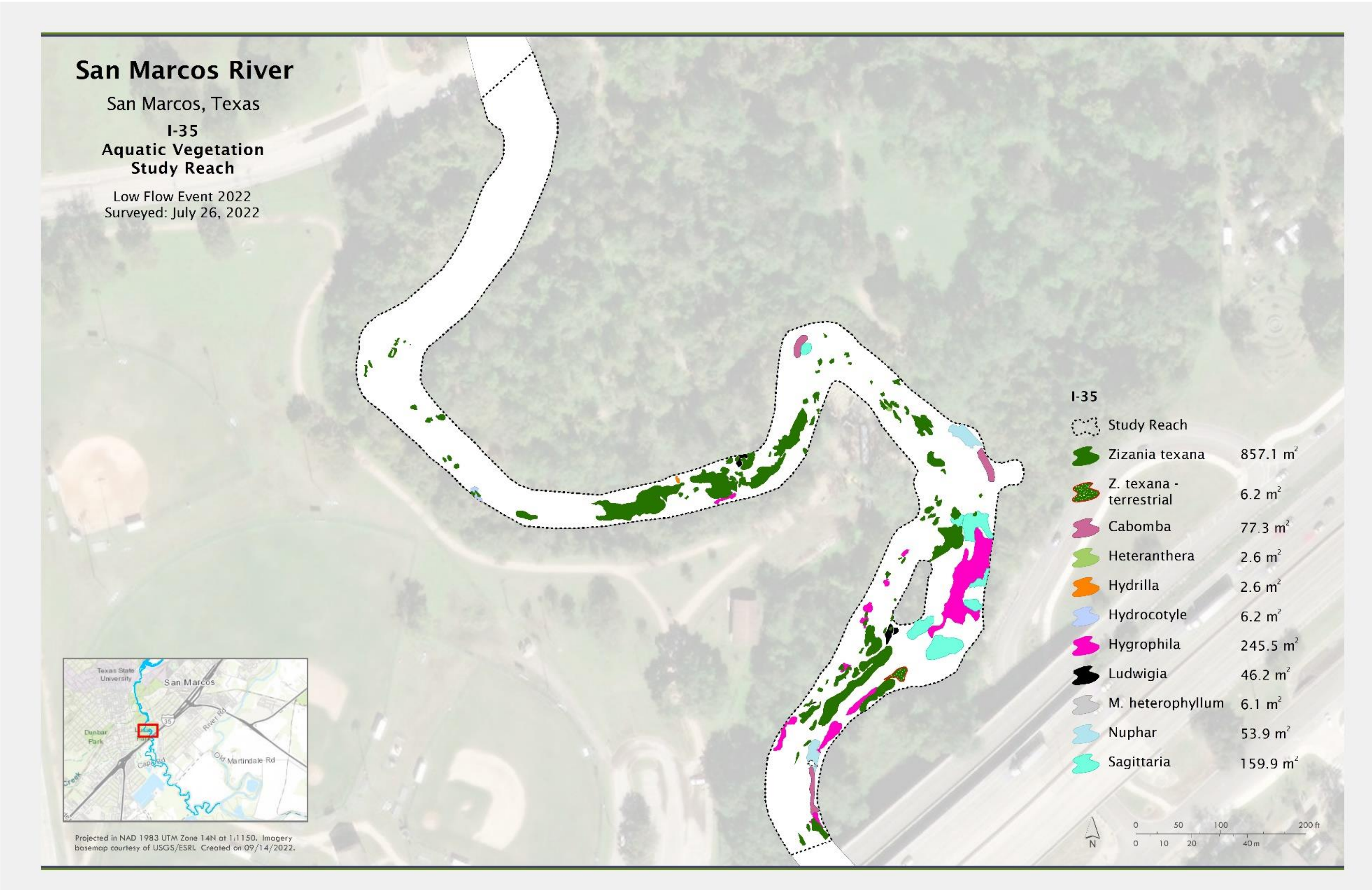

Figure C8. **Map of aquatic vegetation coverage at I-35 Study Reach in summer 2022 during Critical Period low-flow sampling event (July).**

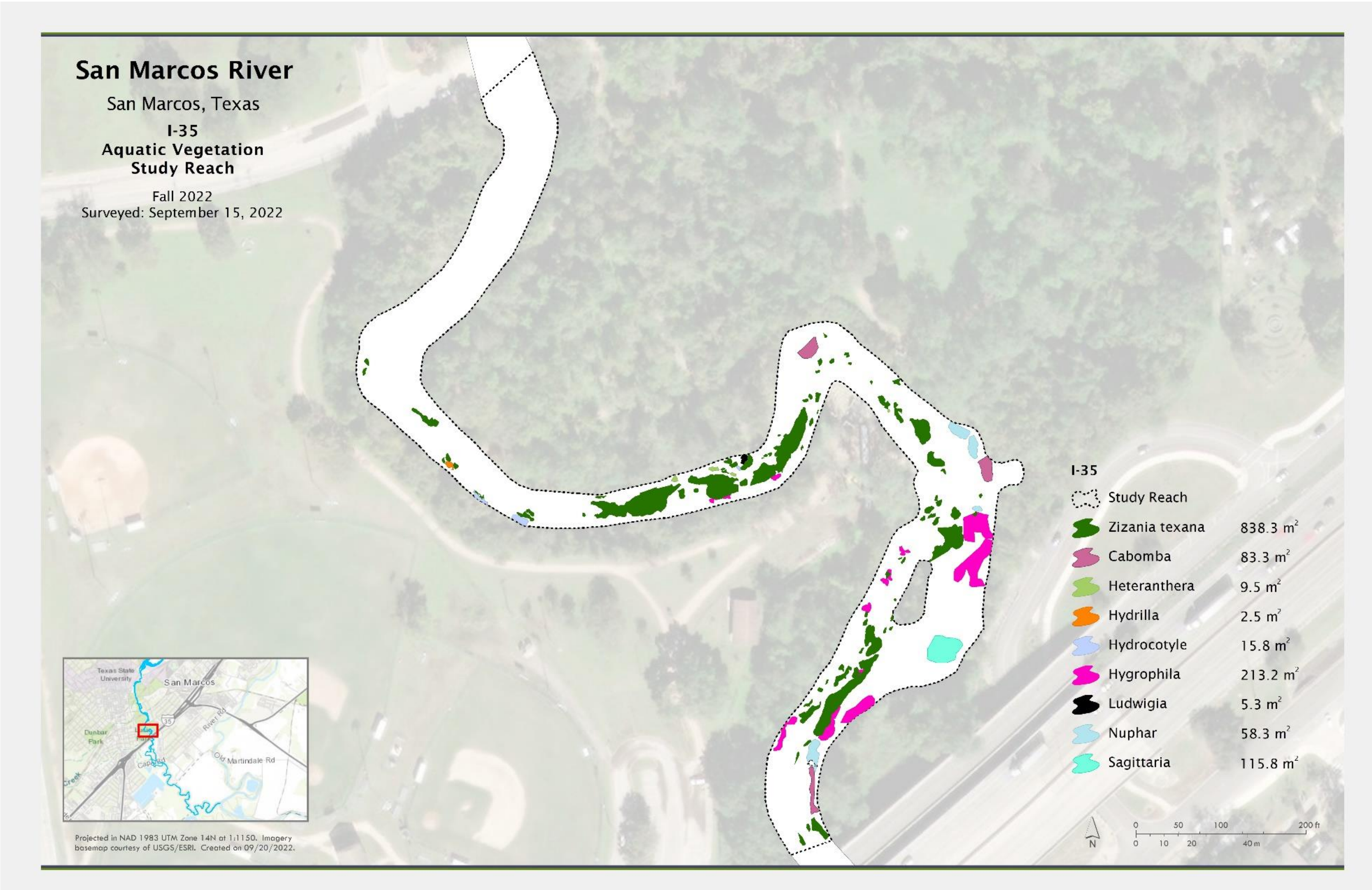

Figure C9. Map of aquatic vegetation coverage at I-35 Study Reach in fall 2022.

Texas Wild-rice Annual Mapping

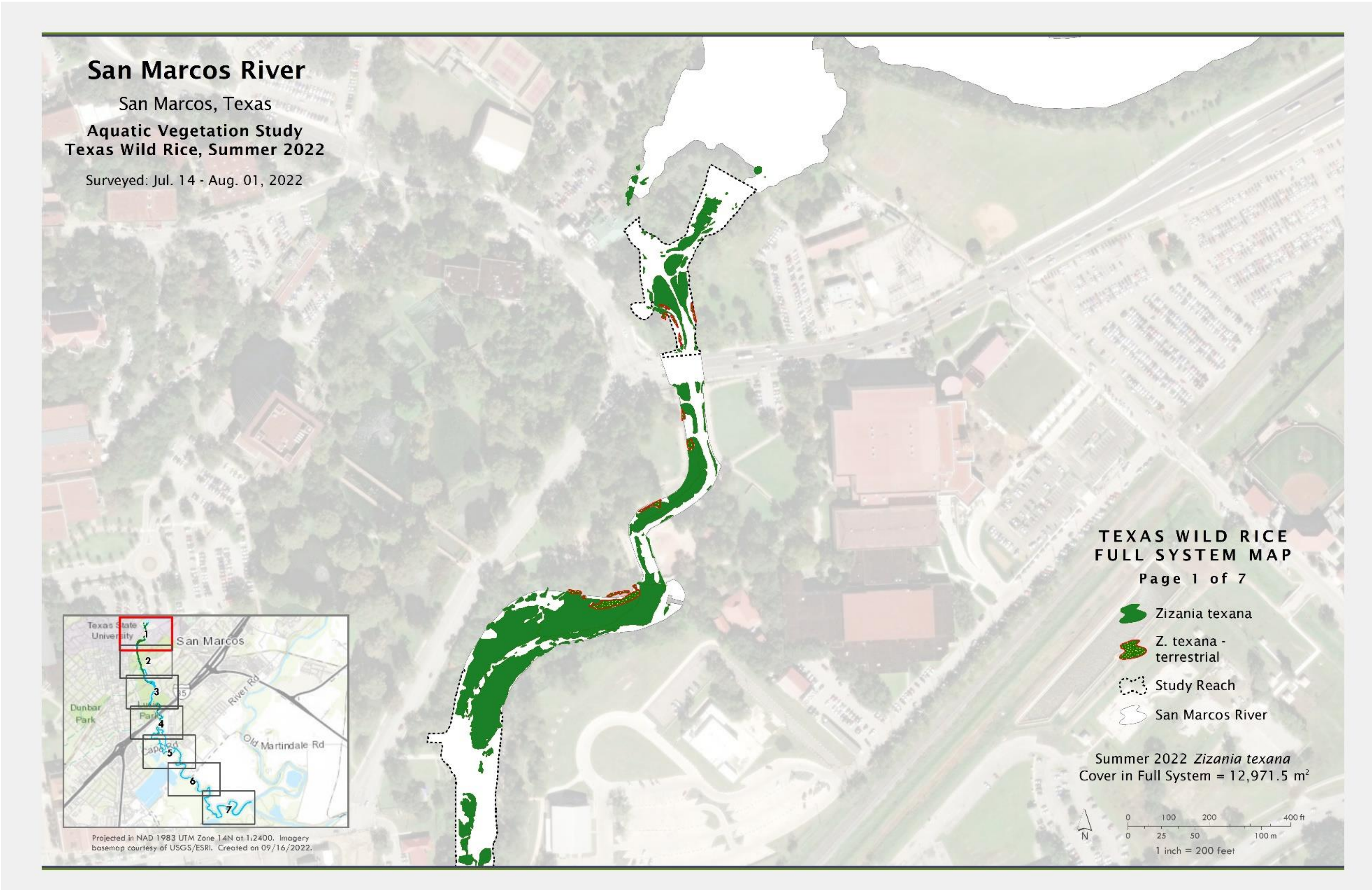

Figure C10. **Map of Texas Wild-rice coverage from Spring Lake to City Park in summer 2022.**

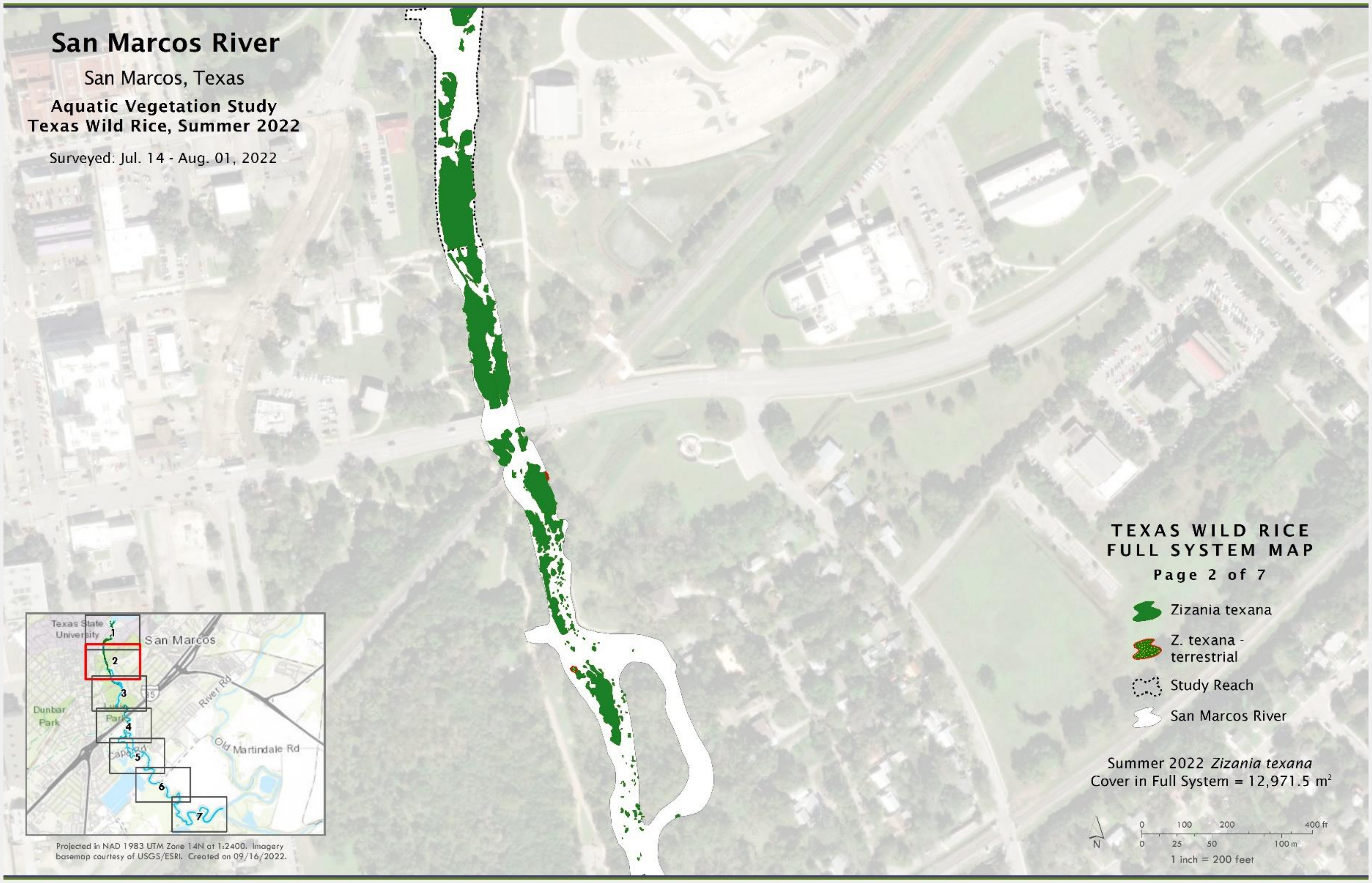

Figure C11. **Map of Texas Wild-rice coverage from City Park Cheatham Street in summer 2022.**

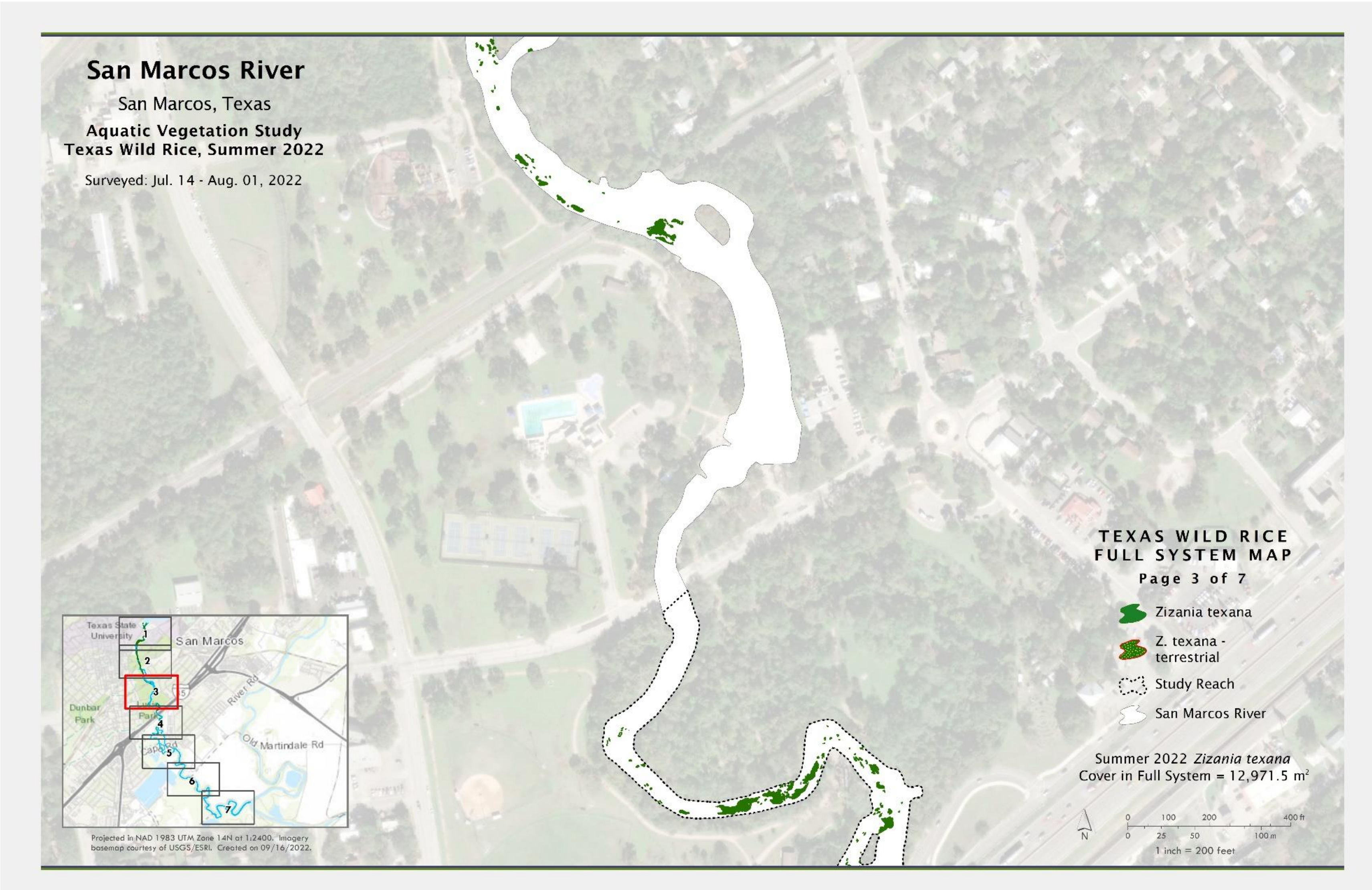

Figure C12. Map of Texas Wild-rice coverage from Cheatham Street to I-35 in summer 2022.

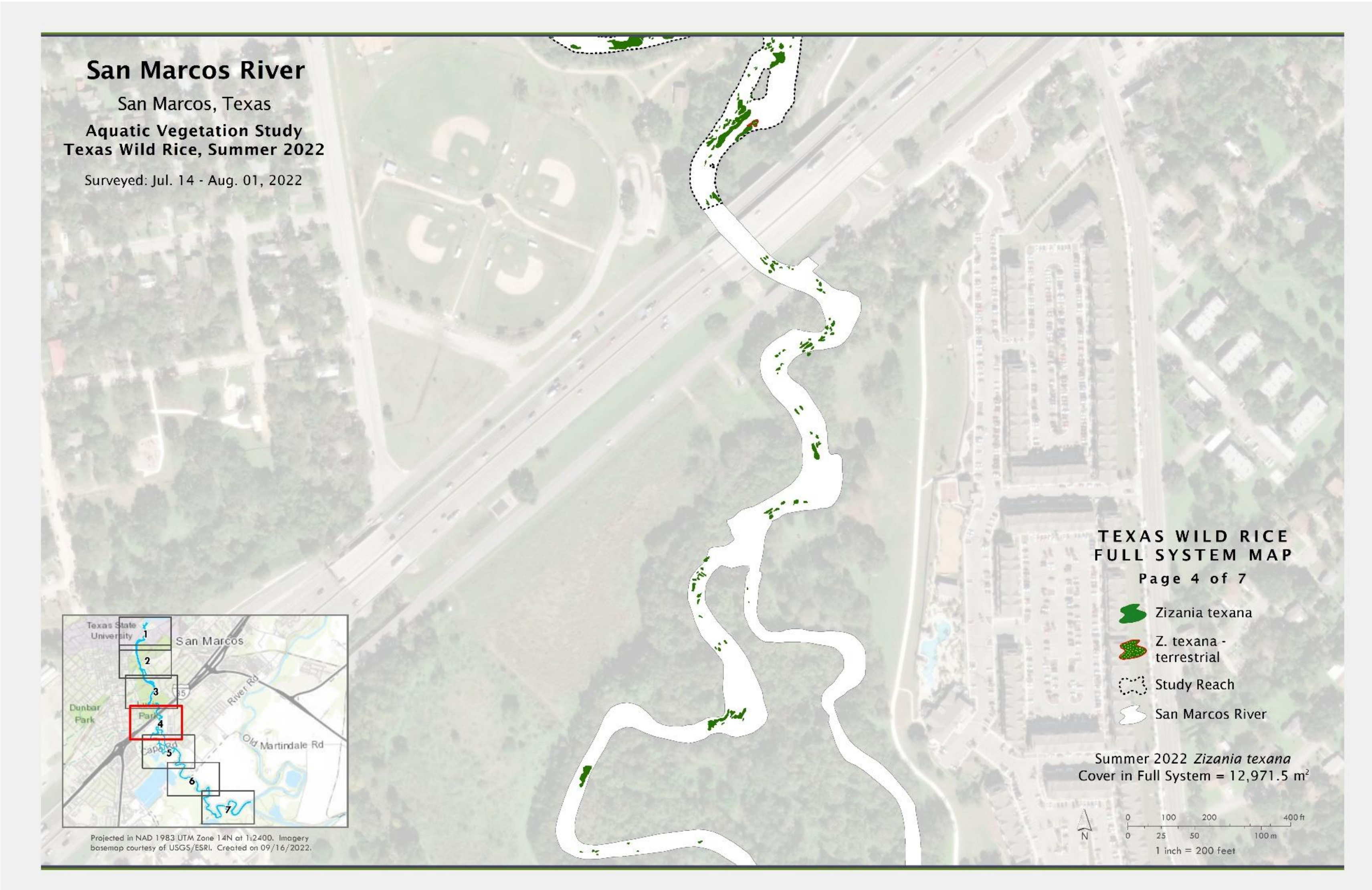

Figure C13. Map of Texas Wild-rice coverage from Cheatham Street to about Stokes Park in summer 2022.

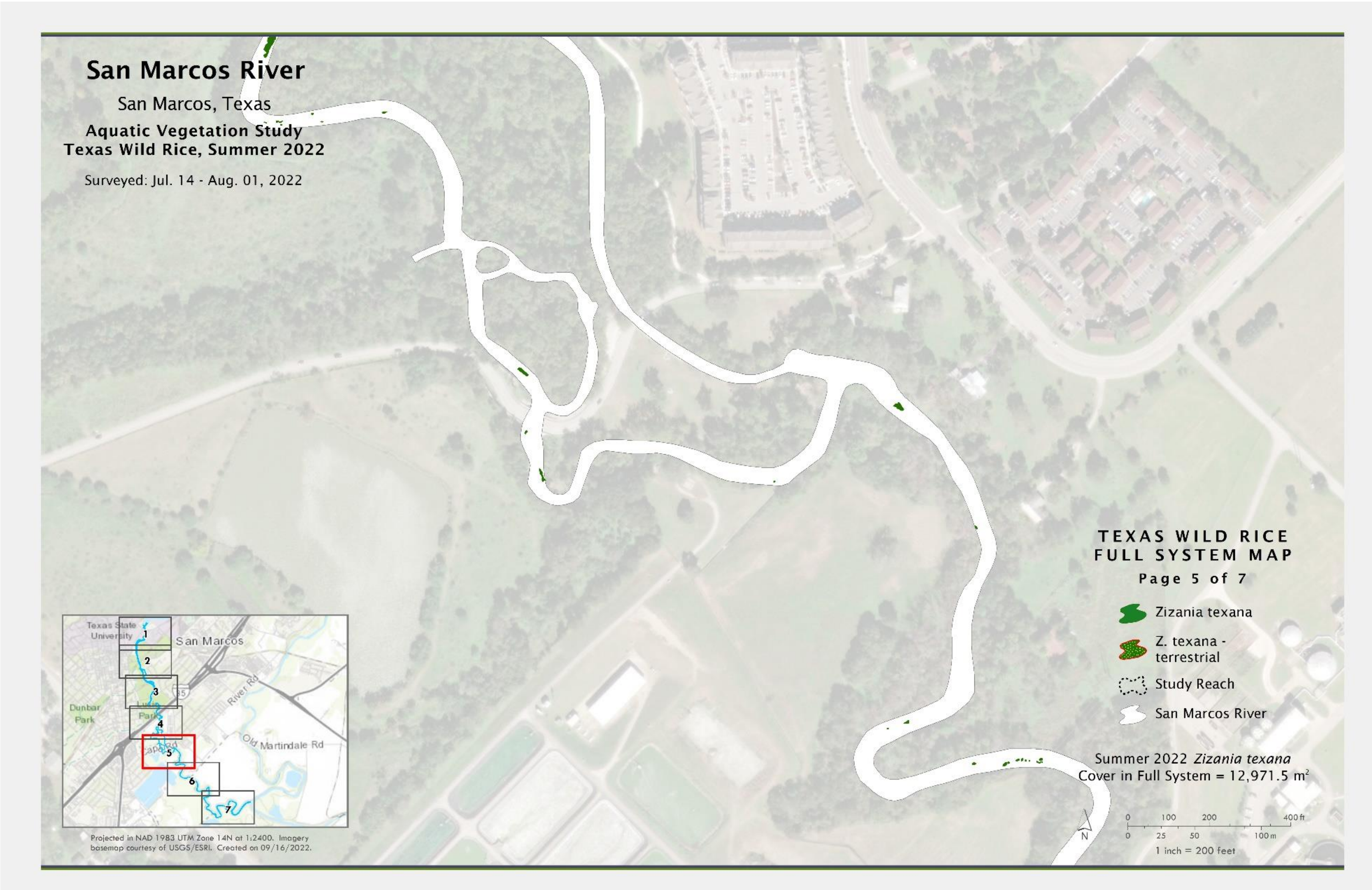

Figure C14. Map of Texas Wild-rice coverage from about Stokes Park to Wastewater Treatment Plant in summer 2022.

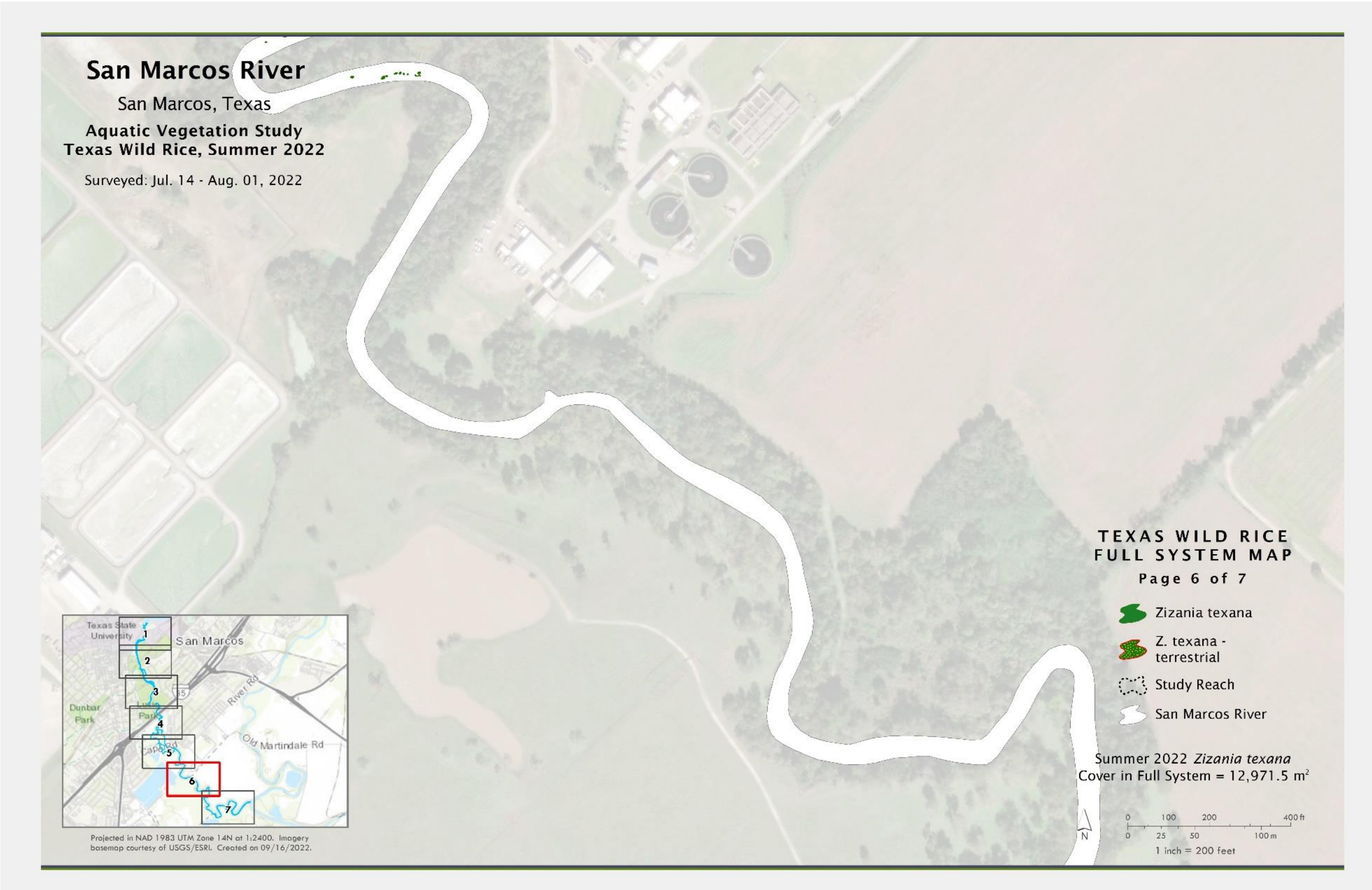

Figure C15. Map of Texas Wild-rice coverage from Wastewater Treatment Plant to about Cypress Tree Island in summer 2022.

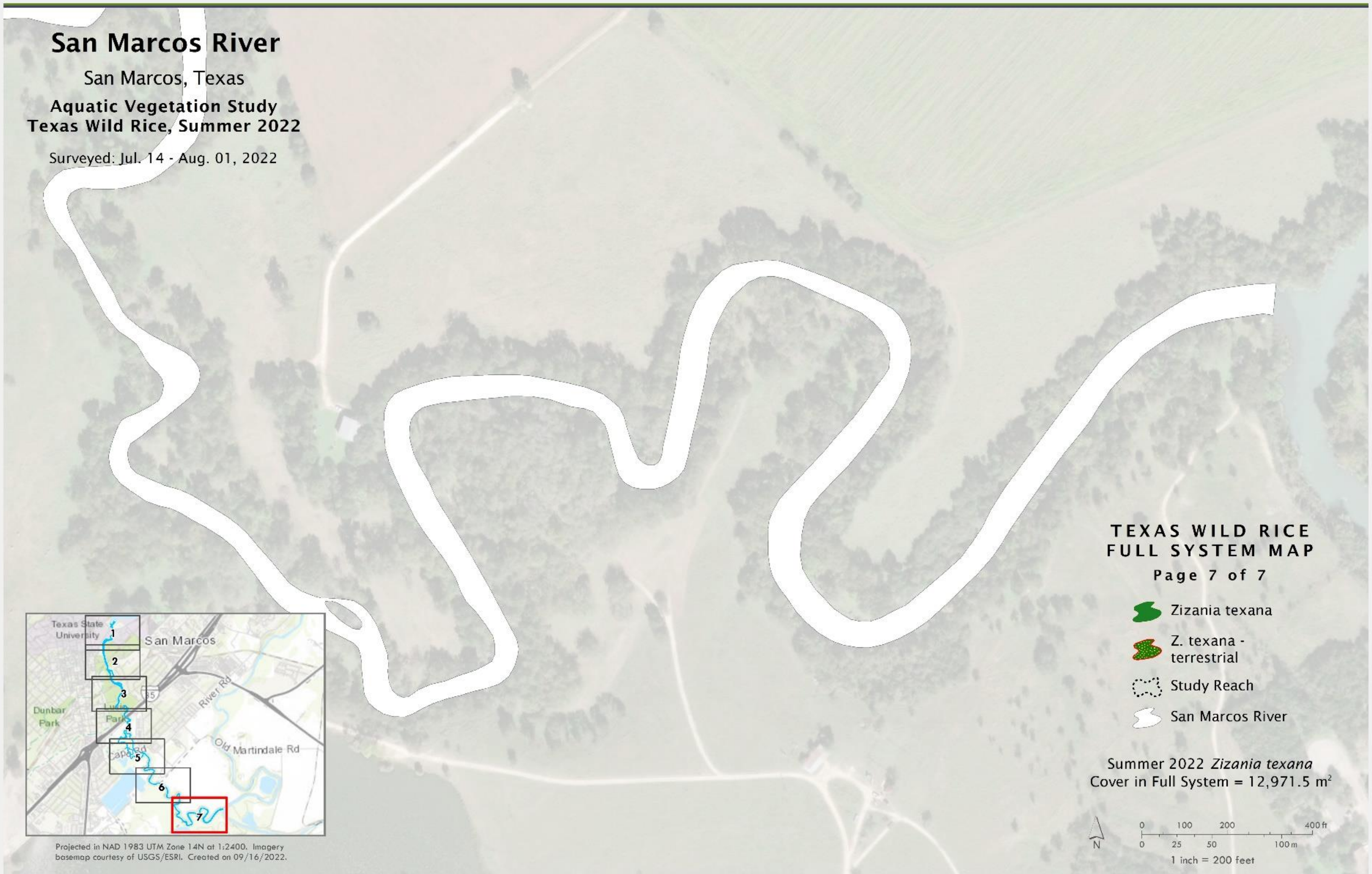

Figure C16. Map of Texas Wild-rice coverage from about Cypress Tree to the Blanco River confluence in summer 2022.

APPENDIX D: TEXAS WILD-RICE PHYSICAL OBSERVATIONS

For the 2022 mapping event, 420 stands and 319 points of Texas Wild-rice were mapped. The extent of Texas Wild-rice was unchanged compared to previous years and the most downstream extent of rice was located at the power line right of way as it crosses the river at A.E. Wood State Fish Hatchery (29.8664456N; -97.9271326W). About 50% of Texas Wild-rice stands were found at water depths ≥ 3 ft. Terrestrial Texas Wild-rice were observed at 4% of stands (n = 16) and were mostly located on islands or newly exposed bank of the river (Table D1). Approximately 20% of Texas Wild-rice stands were found to be associated with another aquatic plant species, which was lower compared to previous years. One non-native aquatic plant species, *Hygrophila polysperma*, and one native aquatic plant species, *Sagittaria platyphylla*, were the most commonly associated aquatic plant species with Texas Wild-rice (Table D2). Plant community associations have changed considerably over the last few years, as native plants have become more widespread along the river. Lastly, there were 41 Texas Wild-rice stands in bloom at the time of mapping and bloom percentage ranged from 10 to 100%.

Table D1. Distribution of Texas Wild-rice stands based on water depth (n=420) during annual mapping in July/August 2022.

WATER DEPTH (ft)	# OF TWR STANDS	FREQUENCY (%)
0 to 0.9	73	17
1-1.9	76	18
2-2.9	58	4
3 +	211	50

Table D2. Associated species found with Texas Wild-rice stands (n=83) during annual mapping in July/August 2022.

SPECIES	# OF TWR STANDS	FREQUENCY (%)
Hygrophila polysperma	26	31
Sagittaria platyphylla	22	26
Hydrocotyle verticillata	11	13
Hydrilla verticillata	6	7
Ludwigia repens	6	7
Potamogeton illinoensis	5	6
Other species	7	8

Observations for vulnerable Texas Wild-rice were conducted eight times during 2022, which was the most conducted in the entirety of this monitoring program (Table D3). These qualitative measurements included the following categories: 1) the percent of the stand that was emergent (including the percent with seed or flower); and 2) the percent covered with vegetation mats or algae buildup and a categorical estimation of root exposure. Rectangular study plots, established around chosen vulnerable stands in GIS were used to locate and identify vulnerable Texas Wild-rice stands for sampling. Individual stands are mapped in GIS to provide length, width and cover estimates. Water depth and flow measurements were taken at the upstream edge of each Texas Wild-rice stand. San Marcos River mean daily discharge at the time of spring sampling was 130 cfs, which was below the historical average (186 cfs) and the highest discharge of all eight events. River discharge dropped to 90 cfs by late August and remained below this threshold for the remainder of the year, with the exception of a brief increase from a stormwater event in early September (Table D3).

As in the previous year, physical observations were made for vulnerable Texas Wild-rice stands within three general study areas: 1) Spring Lake Dam / Sewell Park location; 2) Veramendi Park; and 3) I-35. These study areas are heavily trafficked with river recreation, due to being located near river access points, where river recreationists enter, exit or linger for the duration of a given day. Therefore, during peak recreation season, Texas Wild-rice patches at these locations are typically subjected to harsher disturbances compared to patches located in other reaches of the river. At the end of this appendix, coverage of each vulnerable stand, percent of stands at water depths less than 0.50 feet, and index of root exposure for stands can be found in Table D4, Figure D5, and Figure D6, respectively.

Table D3. The dates of Texas Wild-rice observations conducted in 2021 with corresponding average daily discharge in the San Marcos River.

PHYSICAL OBSERVATIONS EVENT	EVENT TYPE	DATE	MEAN DAILY DISCHARGE (cfs)
1	Spring Biological Monitoring	April, 15	130
2	Low Flow Physical Observation	June, 7	114
3	Low Flow Physical Observation	June, 20	105
4	Low Flow Physical Observation	July, 29	99
5	Low Flow Physical Observation	August, 16	89
6	Fall Biological Monitoring	September, 29	89
7	Low Flow Physical Observation	October, 19	85
8	Low Flow Physical Observation	November, 13	87

http://nwis.waterdata.usgs.gov/tx

Spring Lake Dam/Sewell Park Reach

The stands in this reach maintained a high degree of cover in spring, but subsequently decreased afterwards and never recovered. In general, Texas Wild-rice stands in this reach were negatively impacted primarily by foot traffic followed by silt accretion and dewatering (Figure D1). All stands but #2 became increasingly fragmented by foot traffic. Stand #4/5 and #7 had large percentages of the stand elevated above the water surface during some observations. Stand #7 was highly eroded along the long edge, with clear walking paths throughout and was also the most impacted by lowered water levels (Figure D2).

Figure D1. Texas wild-rice below Aquarena Springs Drive Bridge in February of 2021 (top) compared to October of 2022 (bottom).

During spring sampling, velocity at individual stands ranged from 0.12 to 1.62 ft/s and about 10% of stands were in water less than 0.50 ft. Root exposure from scouring was noted in this section, with only moderate scouring at stand #3 and #4/5, while scouring at #7 was high. Fall sampling velocity ranged from 0.60 to 2.09 ft/s. A majority of stand #8 occurred in water depths less than 0.50 ft, with much of the growth converted to emergent leaves. Root exposure was extreme in this stand and several others. Blooming was minimal in both spring and fall (Figure D2).

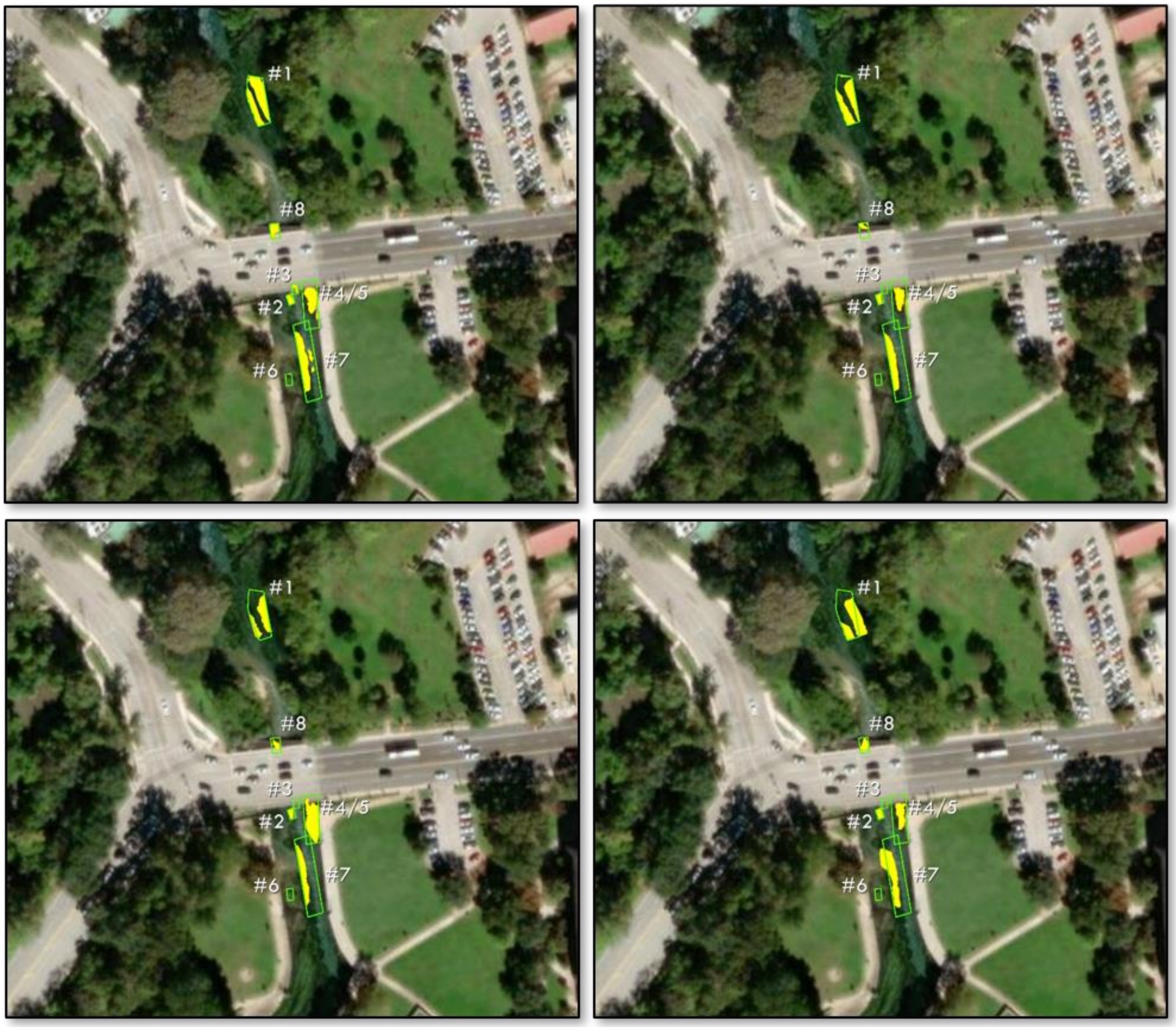

Figure D2. **Spring (top left); Event 2, 2022 (top right); Fall (bottom left); and Event 6, 2022 (bottom right) vulnerable Texas Wild-rice plots in the Spring Lake Dam / Sewell Park location. Yellow polygons indicated Texas wild-rice stands. Green rectangles indicate the stand plots. Projected in NAD 1983 UTM 14N at 1:2,250 scale.**

Veramendi Park

Total cover of vulnerable Texas Wild-rice stands in Veramendi Park was highest during spring observations and subsequently decreased dramatically thereafter. During the spring sample period, velocities ranged from 0.33 to 1.50 ft/s. All stands occurred in water depths greater than 0.50 ft. Root exposure was moderate across all stands and blooming was minimal. During the fall, sampling velocities ranged from 0.40 to 1.97 ft/s. No stands were occurred in water less than 0.50 ft in water depth. Root exposure was moderate to extreme. By the fall event, all of stand #1 had disappeared, as well as most of stand #3, which were both located in the main current of the river. Stand #2, located along the river edge, maintained high coverage for the duration of the year (Figure D3).

Figure D3. **Spring (top left); Event 2, 2022 (top right); Fall (bottom left); and Event 6, 2022 (bottom right) vulnerable Texas Wild-rice plots in the Veramendi Park location. Yellow polygons indicated Texas wild-rice stands. Green rectangles indicate the stand plots. Projected in NAD 1983 UTM 14N at 1:2,250 scale.**

I-35 Reach

The coverages of vulnerable Texas Wild-rice stands in this reach was highest during Low-flow event I and maintained a high degree of cover, with some exceptions throughout the year. The vulnerable stands were more impacted by reduced water depths and flow compared to Texas Wild-rice stands in the other study areas. Current velocities for spring sampling ranged from 0.18 to 1.75 ft/s. No stands were observed in water depths 0.50 ft or less. Root exposure was moderate on average around all stands. During fall sampling, velocities ranged from 0.00 to 1.65 ft/s. Root exposure was noted as moderate. Due to lower river flows by this time, water flow at stand #7 was diverted, leaving this stand completely dewatered and subsequently dead. Flowering was minimal in both spring and fall sampling. Over the course of 2022, this reach saw several patches expand, followed by fragmentation that depended on changes in the water current and recreational pressure. Although this section has lost the most stands of vulnerable Texas Wild-rice, some individual stands continue to do well (Figure D4).

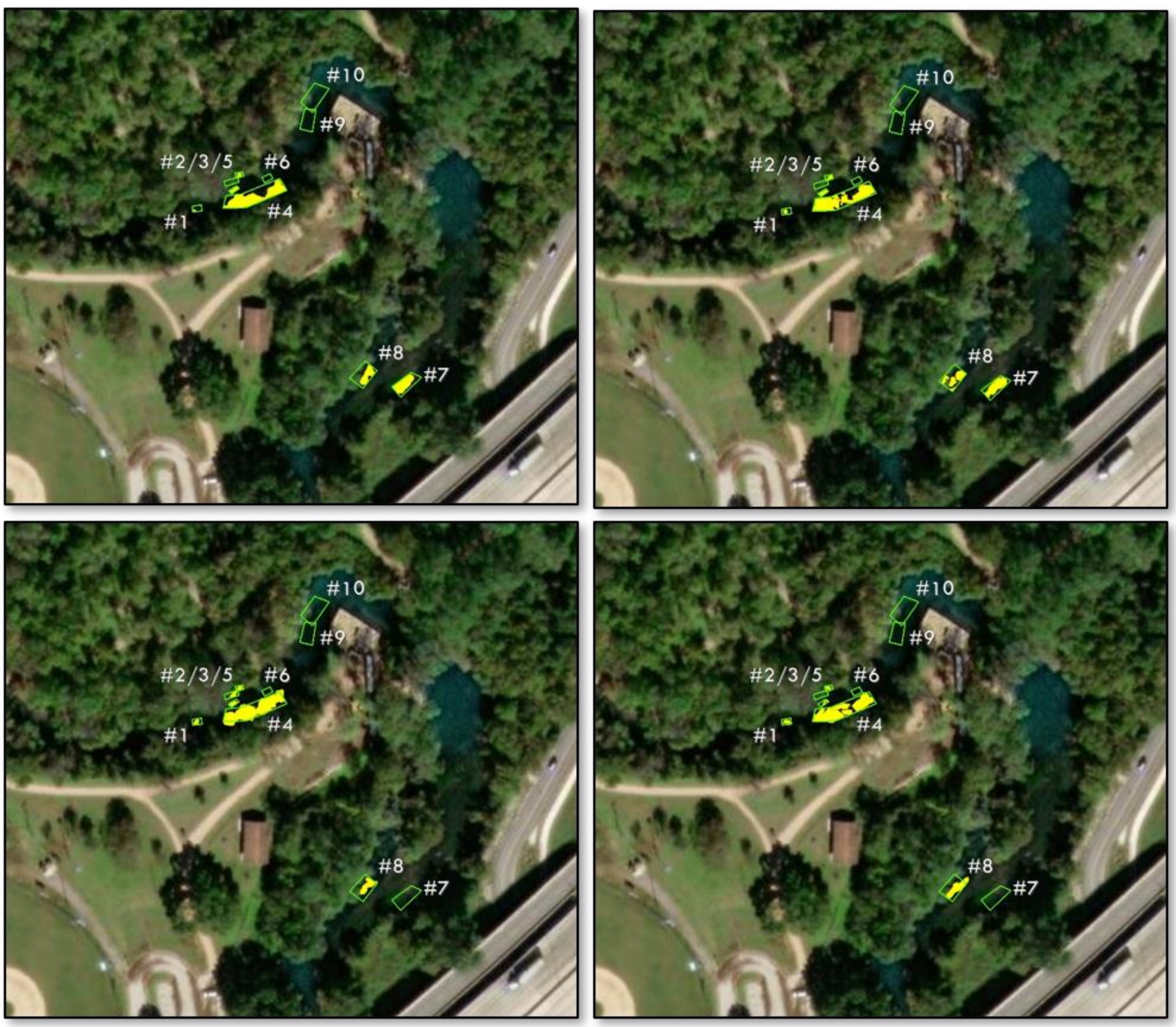

Figure D4. **Spring (top left); Event 2, 2022 (top right); Fall (bottom left); and Event 6, 2022 (bottom right) vulnerable Texas wild-rice plots in the I-35 location. Yellow polygons indicated Texas wild-rice stands. Green rectangles indicate the stand plots. Projected in NAD 1983 UTM 14N at 1:2,250 scale.**

Table D6. **Cover (m²) of individual vulnerable Texas Wild-rice stands during each sampling event. Sites labeled 'Gone' denotes vulnerable stands were absent and 'Point' denotes vulnerable stands were present, but cover was not large enough to calculate an area.**

LOCATION	SPRING 2022	LOW-FLOW EVENT I	LOW-FLOW EVENT II	LOW-FLOW EVENT III	LOW-FLOW EVENT IV	FALL 2022	LOW-FLOW EVENT V	LOW-FLOW EVENT VI
Sewell Park 1	89	89	49	64	48	49	43	67
Sewell Park 2	8	7	8	7	8	5	12	8
Sewell Park 3	4	2	1	Gone	Gone	Gone	Gone	Gone
Sewell Park 4/5	34	38	29	25	36	28	28	24
Sewell Park 6	Point	Gone	Gone	Gone	Gone	Gone	Gone	Gone
Sewell Park 7	63	68	49	50	56	57	57	67
Sewell Park 8	12	5	1	4	Gone	6	2	10
Sum of Cover	**210**	**209**	**137**	**150**	**148**	**145**	**142**	**176**
Veramendi 1	25	20	6	10	Gone	Gone	Gone	Gone
Veramendi 2	35	35	31	41	35	42	42	45
Veramendi 3	68	68	62	39	8	45	3	8
Sum of Cover	**128**	**123**	**99**	**90**	**43**	**87**	**45**	**53**
I-35-1	5	2	1	2	3	3	2	3
I-35-2	4	2	2	5	4	5	2	2
I-35-3	2	2	1	3	2	3	3	2
I-35-4	81	84	81	85	67	107	89	87
I-35-5	Gone	Gone	Gone	Gone	Gone	2	Gone	Gone
I-35-6	Gone	Gone	Gone	Gone	Gone	Gone	Gone	Gone
I-35-7	29	30	21	28	Gone	Gone	Gone	Gone
I-35-8	19	26	23	21	10	16	12	23
I-35-9	Gone	Gone	Gone	Gone	Gone	Gone	Gone	Gone
I-35-10	Gone	Gone	Gone	Gone	Gone	Gone	Gone	Gone
Sum of Cover	**140**	**146**	**129**	**144**	**86**	**136**	**108**	**117**

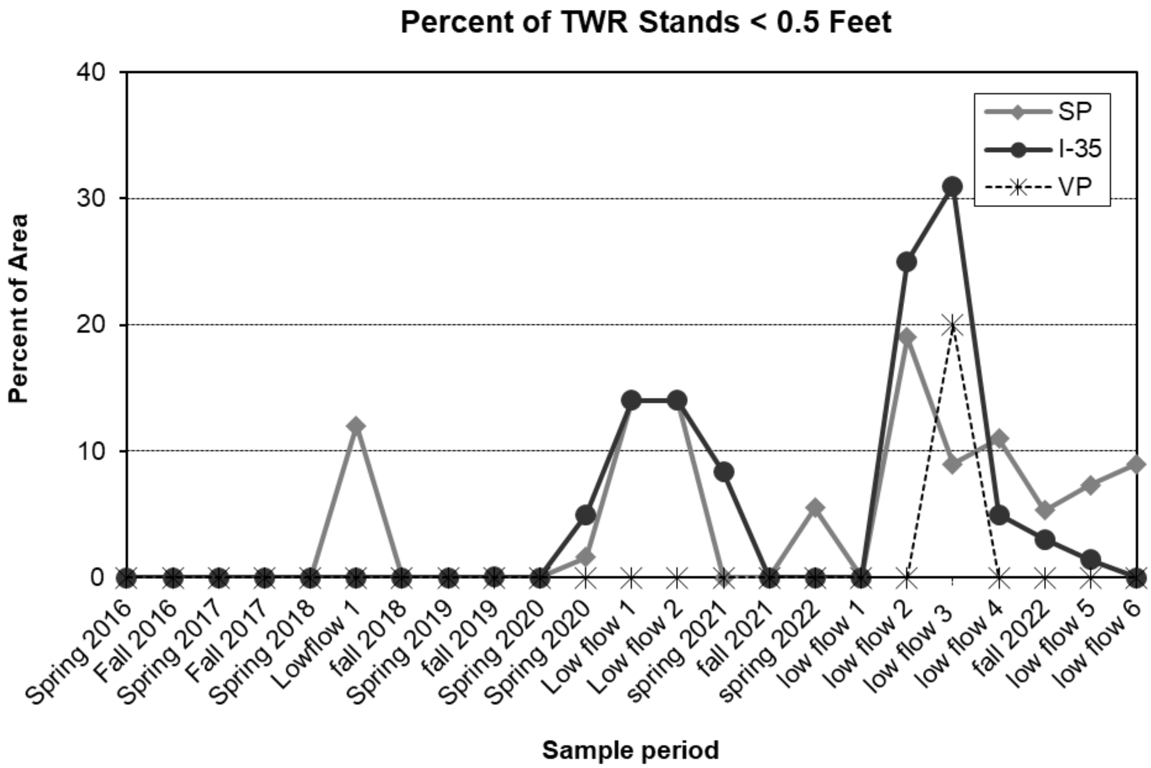

Figure D5. **Percent of Texas Wild-rice stands at water depths less than 0.5 feet 2016–2022.**

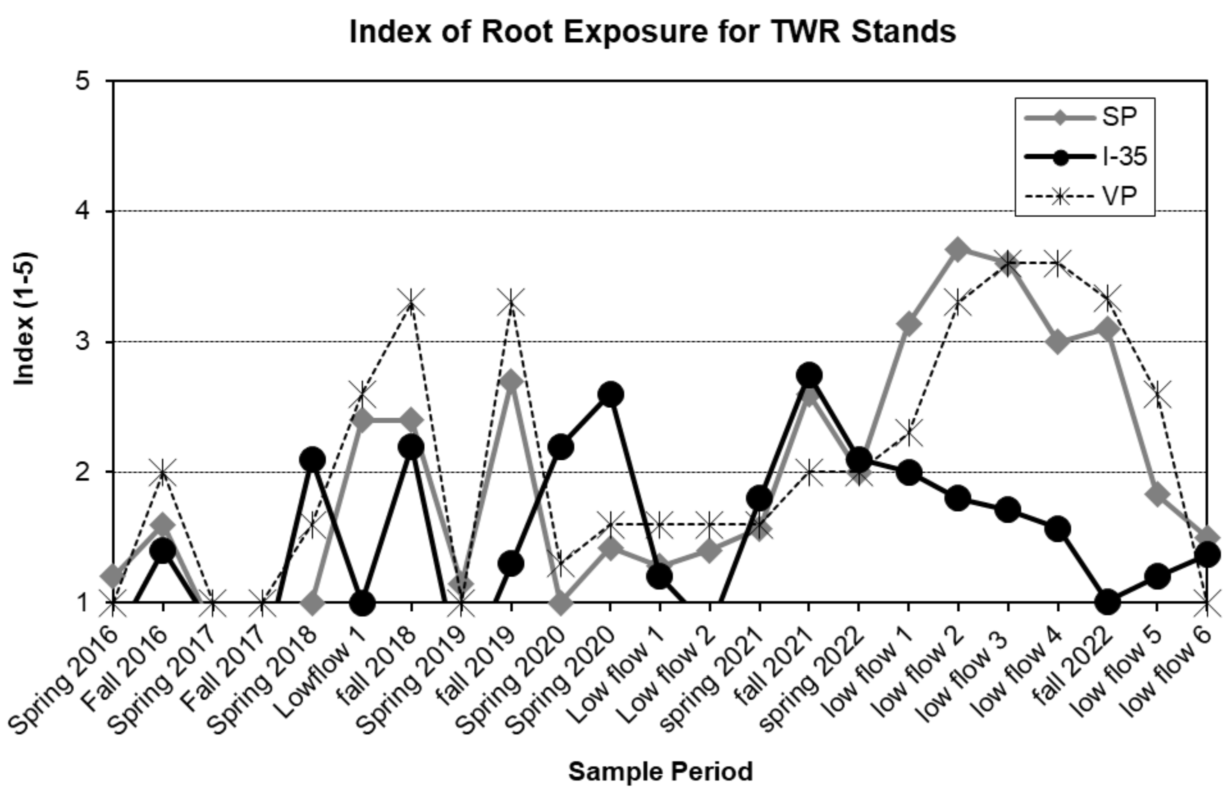

Figure D6. **Index for root exposure of Texas Wild-rice stands from 2016–2022.**

APPENDIX E: TABLES AND FIGURES

TABLES

Texas Wild-rice Mapping

Table E1. Change in cover amount (m^2) of Texas Wild-rice between August 2021 and July/August 2022 annual mapping among the Habitat Conservation Plan Long-term Biological Goals (HCP LTBG) river segments.

HCP LTBG RIVER SEGMENTS	AUGUST 2021 COVERAGE	JULY/AUGUST 2022 COVERAGE	COVERAGE CHANGE	PERCENT CHANGE
Spring Lake	Not Mapped	Not Mapped	Not Mapped	Not Mapped
Spring Lake Dam to Rio Vista Park	12,579			
I-35 Study Reach	954			
Below I-35	317			

Fish Assemblage Results:
Drop-Net and Fish Community Sampling

Table E2. Overall number (#) and percent relative abundance (%) of fishes collected from the three long-term biological goals study reaches during drop-net sampling in 2022.

TAXA	SPRING LAKE DAM		CITY PARK		I-35	
	#	%	#	%	#	%
Cyprinidae						
Dionda nigrotaeniata	5	0.72	0	0.00	0	0.00
Notropis amabilis	0	0.00	4	0.39	20	2.37
Notropis chalybaeus	0	0.00	0	0.00	1	0.12
Characidae						
*Astyanax mexicanus**	2	0.29	1	0.10	2	0.24
Ictaluridae						
Ameiurus natalis	1	0.14	3	0.29	1	0.12
Loricariidae						
*Hypostomus plecostomus**	0	0.00	0	0.00	2	0.24
Fundulidae						
Fundulus chrysotus	0	0.00	0	0.00	4	0.47
Poeciliidae						
Gambusia sp.	445	64.12	715	69.82	416	49.35
*Poecilia latipinna**	0	0.00	18	1.76	1	0.12
Centrarchidae						
*Ambloplites rupestris**	0	0.00	4	0.39	17	2.02
Lepomis gulosus	2	0.29	1	0.10	0	0.00
Lepomis macrochirus	0	0.00	1	0.10	0	0.00
Lepomis miniatus	53	7.64	15	1.46	26	3.08
Lepomis sp.	6	0.86	20	1.95	8	0.95
Micropterus salmoides	2	0.29	0	0.00	8	0.95
Percidae						
Etheostoma fonticola	176	25.36	229	22.36	329	39.03
Cichlidae						
*Herichthys cyanoguttatus**	2	0.29	13	1.27	6	0.71
*Oreochromis aureus**	0	0.00	0	0.00	2	0.24
Total	**694**		**1024**		**843**	

Asterisks (*) denotes introduced species

Table E3. **Overall number (#) and percent relative abundance (%) of fishes collected during fish community sampling in 2022.**

TAXA	SPRING LAKE		UPPER RIVER		MIDDLE RIVER		LOWER RIVER	
	#	%	#	%	#	%	#	%
Lepisosteidae								
Lepisosteus oculatus	1	0.02	1	0.04	0	0.00	0	0.00
Cyprinidae								
Campostoma anomalum	0	0.00	0	0.00	0	0.00	9	0.99
Cyprinella venusta	0	0.00	0	0.00	0	0.00	117	12.81
Dionda nigrotaeniata	1572	30.68	15	0.59	383	31.94	39	4.27
Notropis amabilis	0	0.00	1	0.04	49	4.09	321	35.16
Notropis chalybaeus	0	0.00	46	1.82	55	4.59	0	0.00
Notropis volucellus	0	0.00	0	0.00	0	0.00	59	6.46
Catastomidae								
Moxostoma congestum	0	0.00	1	0.04	3	0.25	0	0.00
Characidae								
*Astyanax mexicanus**	1323	25.82	349	13.84	38	3.17	6	0.66
Ictaluridae								
Ameiurus melas	0	0.00	3	0.12	1	0.08	0	0.00
Ameiurus natalis	0	0.00	3	0.12	0	0.00	1	0.11
Loricariidae								
Loricariidae sp.	0	0.00	8	0.32	17	1.42	116	12.71
Poeciliidae								
Gambusia affinis	0	0.00	15	0.59	1	0.08	24	2.63
Gambusia geiseri	0	0.00	1365	54.12	60	5.00	6	0.66
Gambusia sp.	689	13.45	20	0.79	188	15.68	20	2.19
*Poecilia latipinna**	0	0.00	5	0.20	0	0.00	3	0.33
Centrarchidae								
*Ambloplites rupestris**	0	0.00	2	0.08	2	0.17	2	0.22
*Lepomis auritus**	57	1.11	202	8.01	78	6.51	17	1.86
Lepomis cyanellus	0	0.00	2	0.08	0	0.00	0	0.00
Lepomis gulosus	0	0.00	8	0.32	0	0.00	3	0.33
Lepomis macrochirus	124	2.42	7	0.28	0	0.00	31	3.40
Lepomis megalotis	43	0.84	53	2.10	17	1.42	4	0.44
Lepomis microlophus	91	1.78	0	0.00	1	0.08	5	0.55
Lepomis miniatus	19	0.37	77	3.05	4	0.33	3	0.33
Lepomis sp.	522	10.19	127	5.04	117	9.76	18	1.97
Micropterus salmoides	312	6.09	49	1.94	102	8.51	18	1.97
Micropterus treculii	0	0.00	0	0.00	0	0.00	1	0.11
Percidae								
Etheostoma fonticola	354	6.91	122	4.84	40	3.34	25	2.74
Etheostoma spectabile	0	0.00	0	0.00	0	0.00	27	2.96

Percina aptristis	0	0.00	24	0.95	27	2.25	14	1.53
Percina carpodes	0	0.00	0	0.00	2	0.17	19	2.08
Percina sp.	0	0.00	0	0.00	0	0.00	1	0.11
Cichlidae								
*Herichthys cyanoguttatus**	17	0.33	17	0.67	14	1.17	4	0.44
Total	**5124**		**2522**		**1199**		**913**	

Asterisks (*) denotes introduced species

FIGURES

Aquatic Vegetation

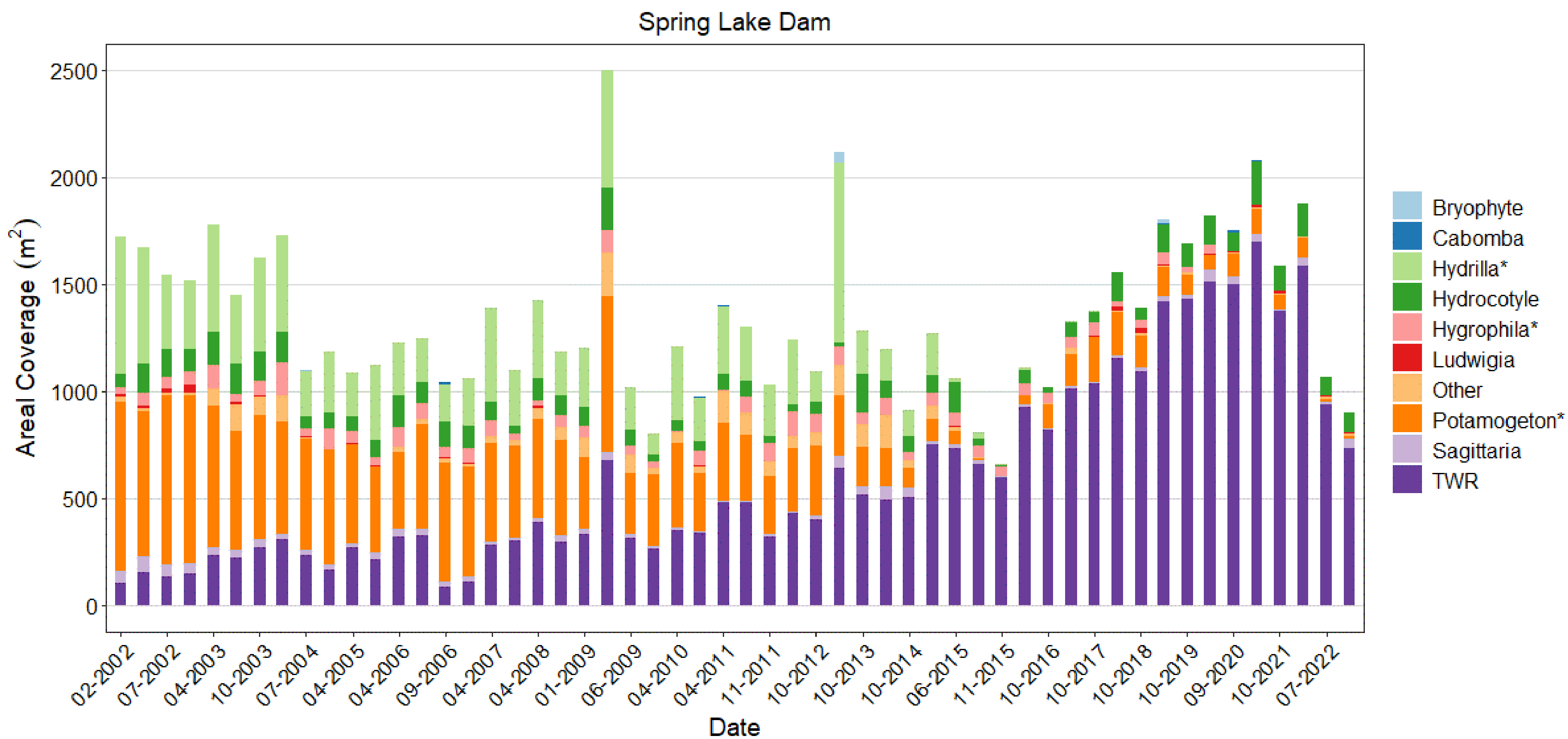

Figure E1. **Aquatic vegetation composition (m²) among select taxa from 2003–2022 at Spring Lake Dam.**

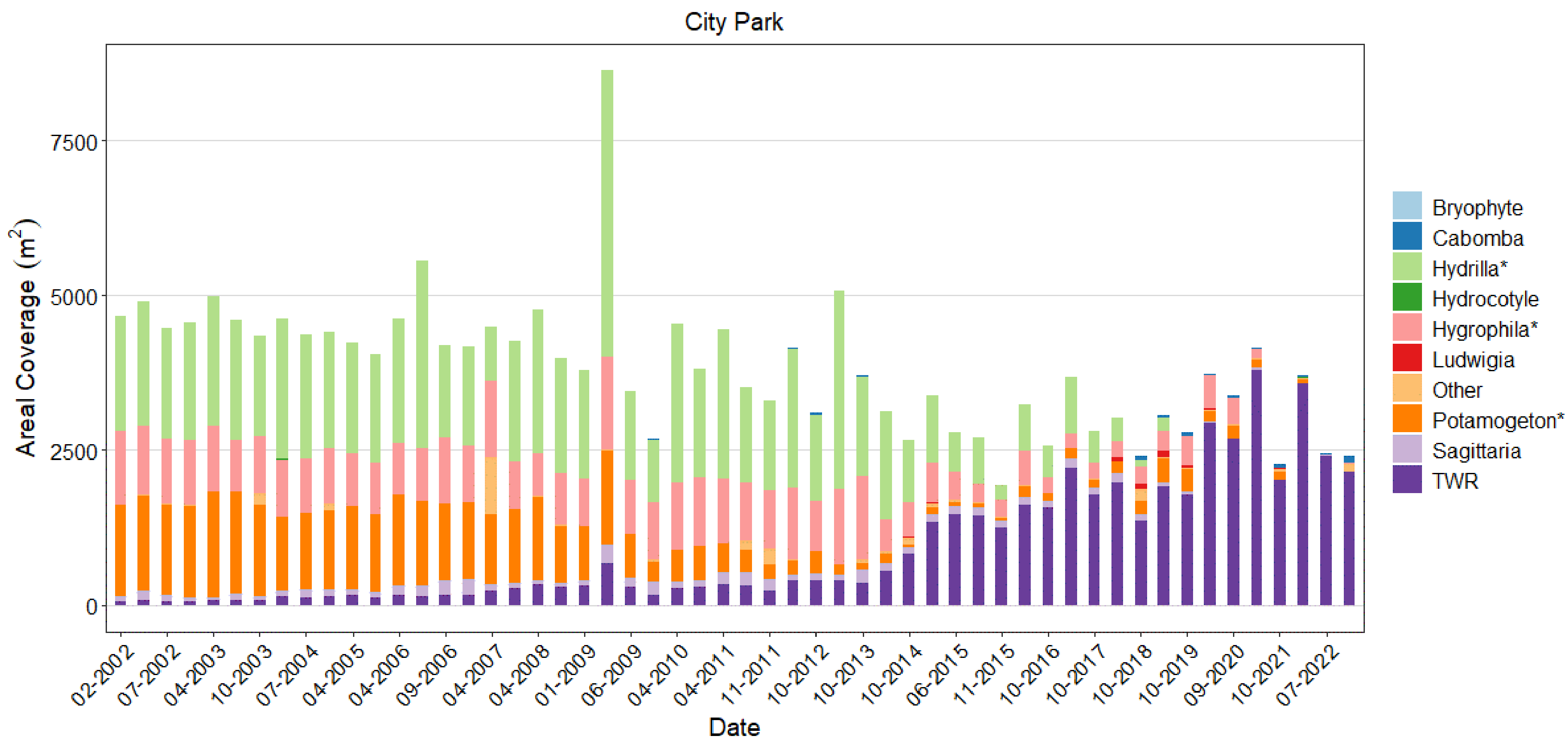

Figure E2. **Aquatic vegetation composition (m^2) among select taxa from 2003–2022 at City Park.**

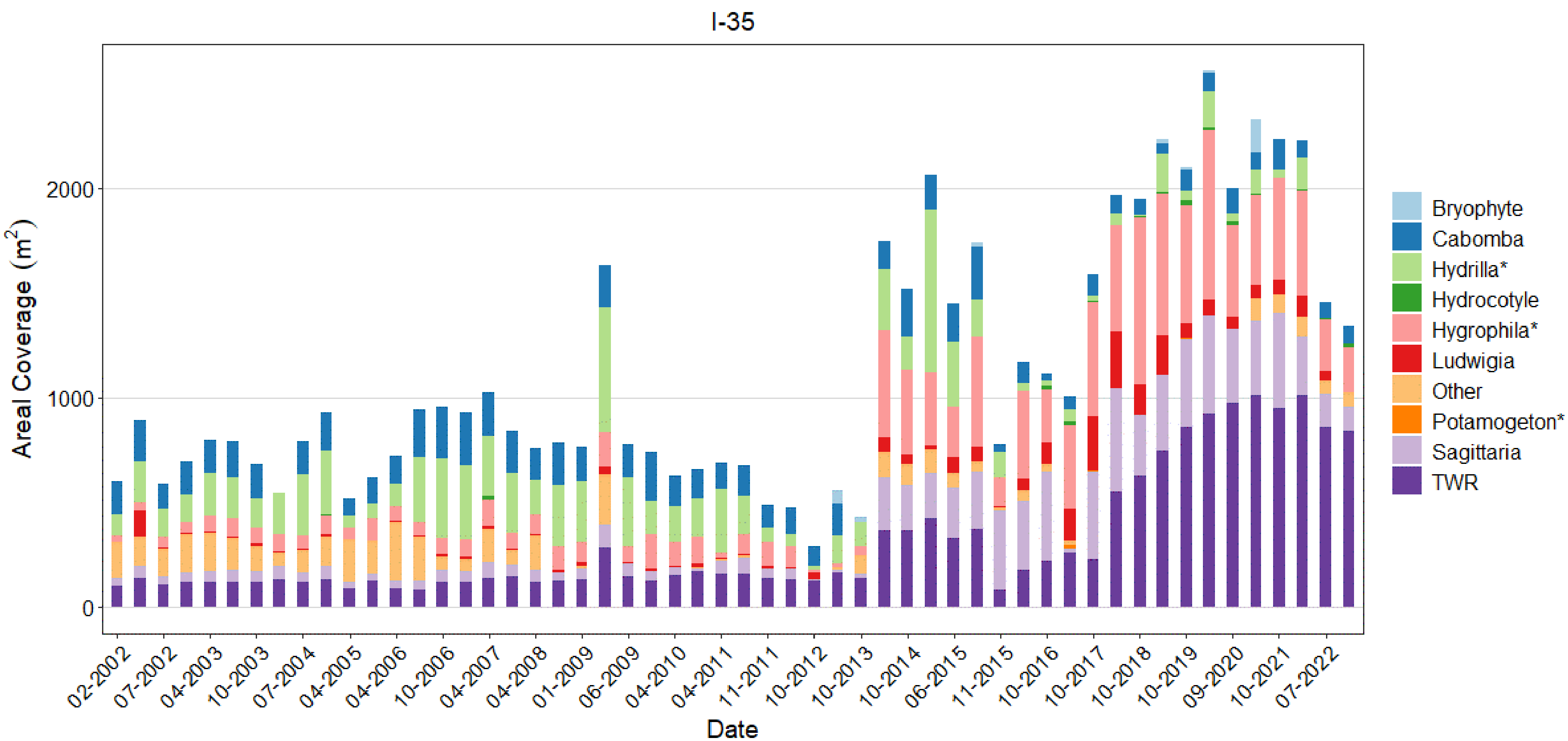

Figure E3. **Aquatic vegetation composition (m^2) among select taxa from 2003–2022 at I-35.**

Fountain Darter

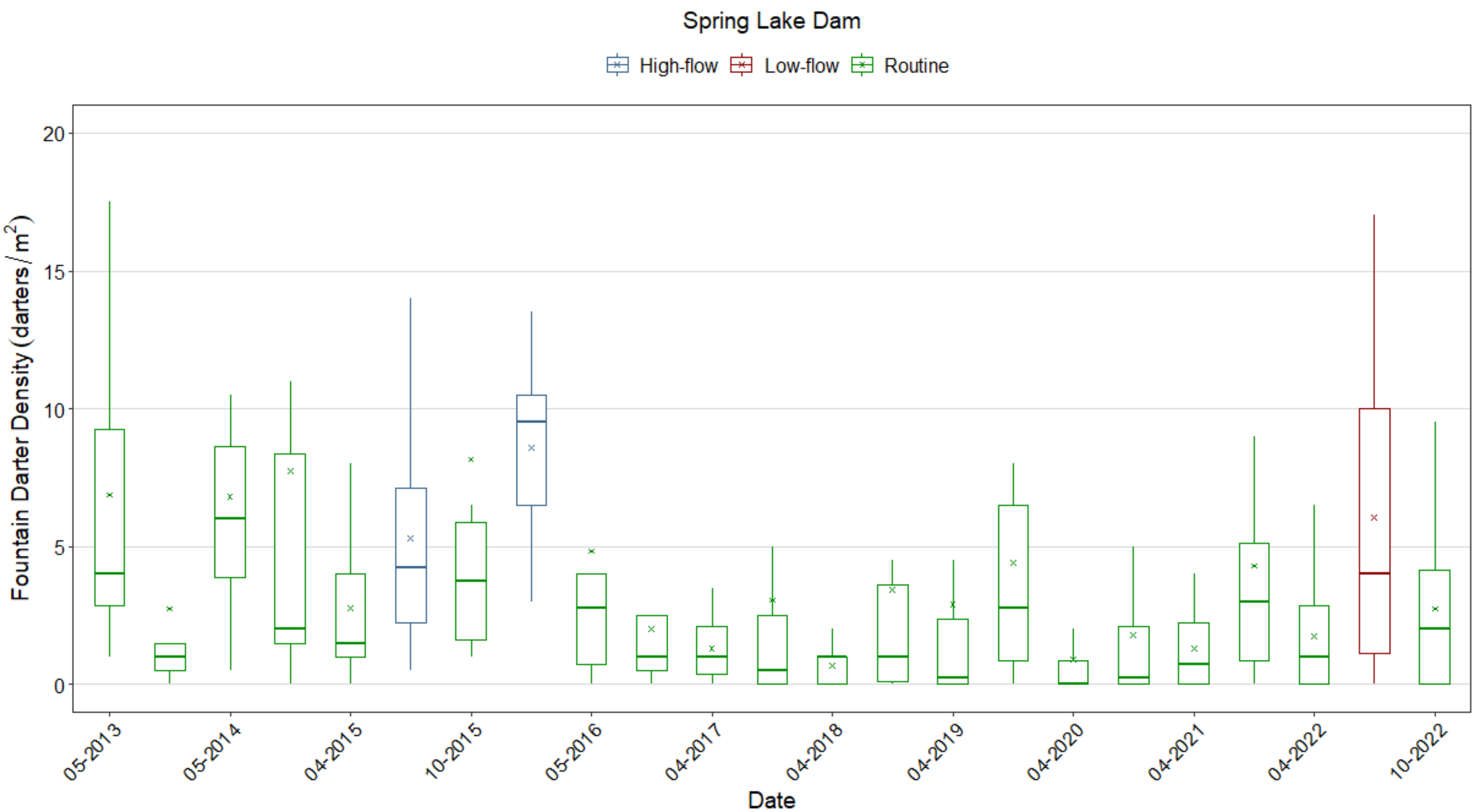

Figure E4. **Boxplots displaying temporal trends in Fountain Darter density (darters/m²) from 2013–2022 during drop-net sampling at Spring Lake Dam. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

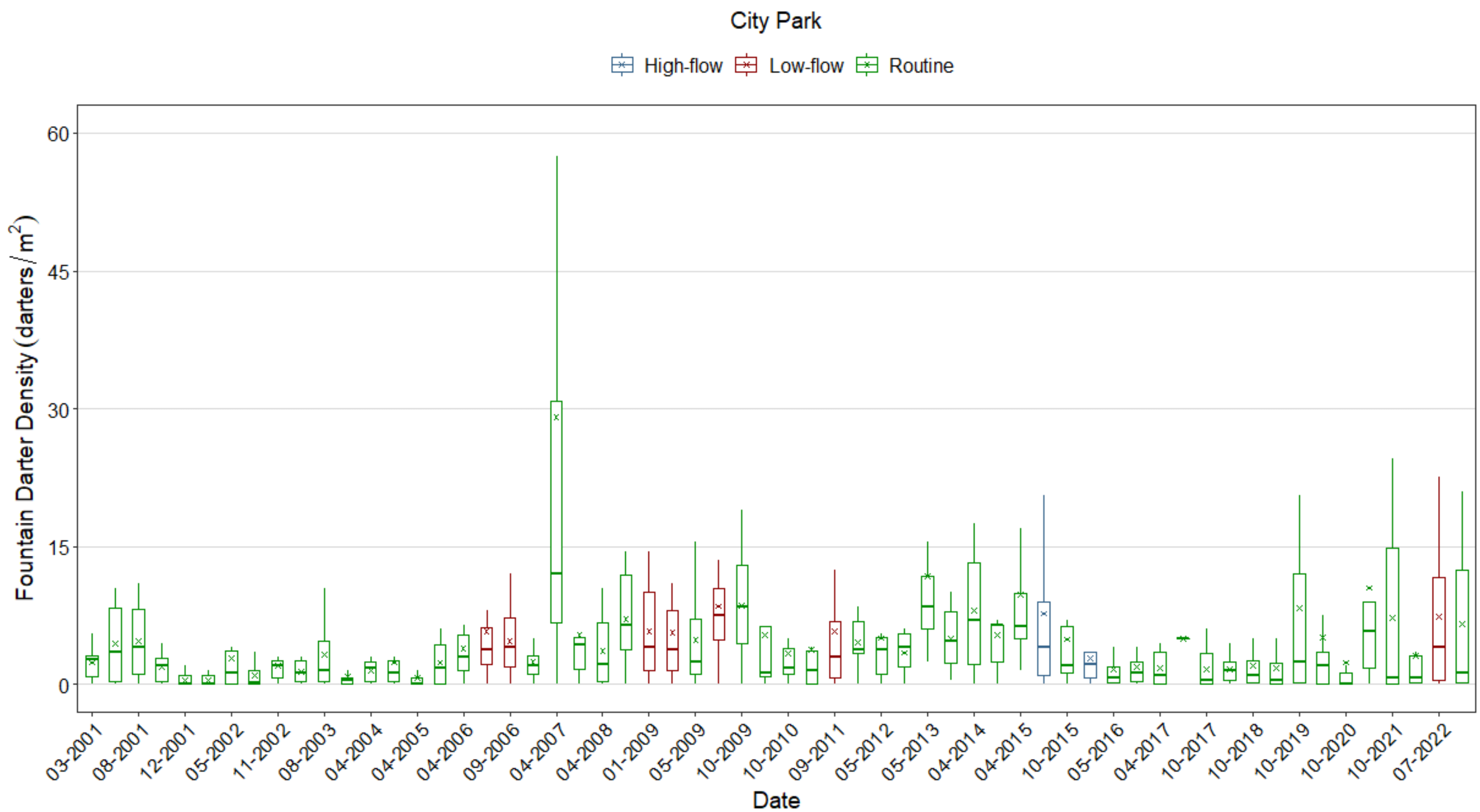

Figure E5. **Boxplots displaying temporal trends in Fountain Darter density (darters/m²) from 2001–2022 during drop-net sampling at City Park. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

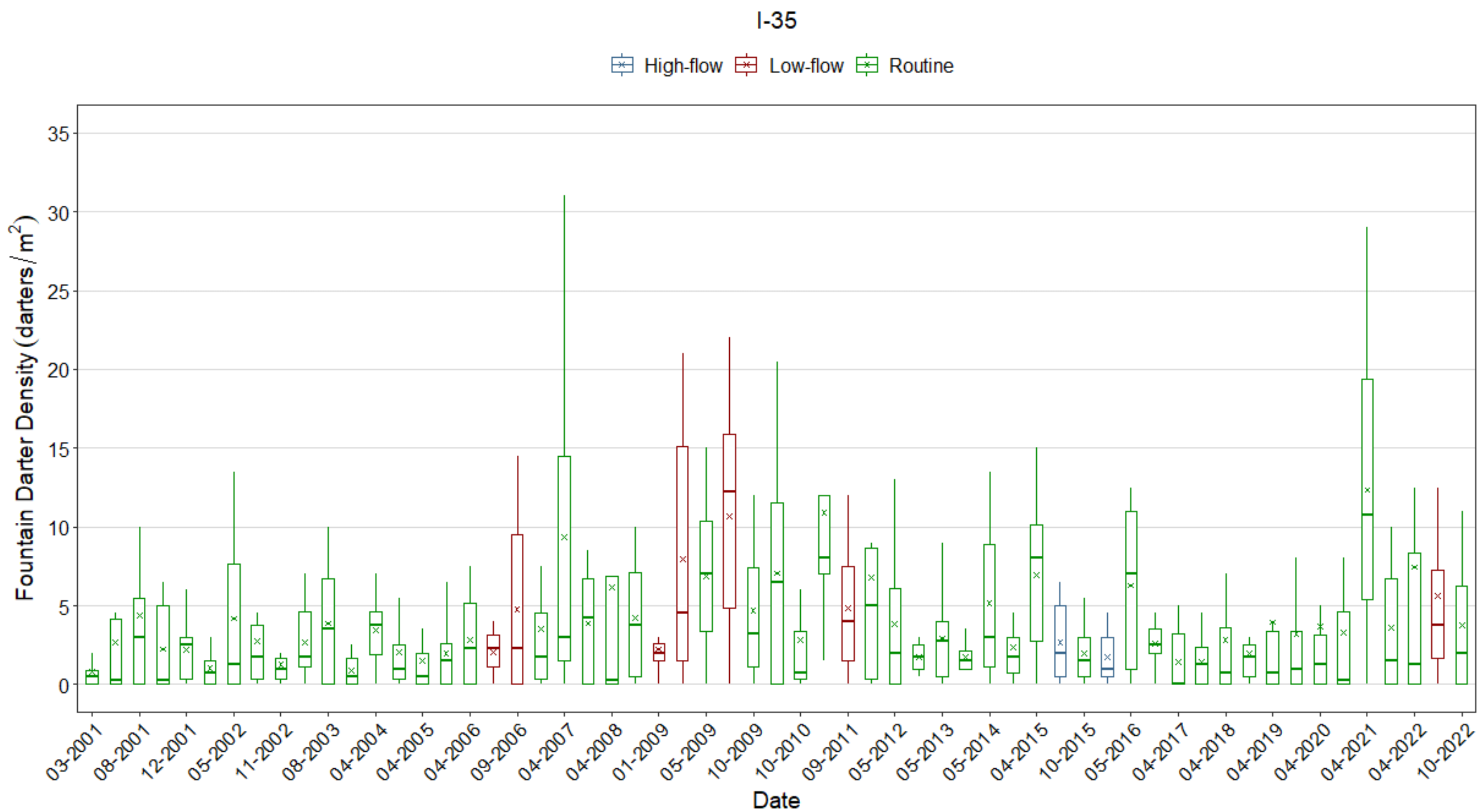

Figure E6. **Boxplots displaying temporal trends in Fountain Darter density (darters/m²) from 2001–2022 during drop-net sampling at I-35. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

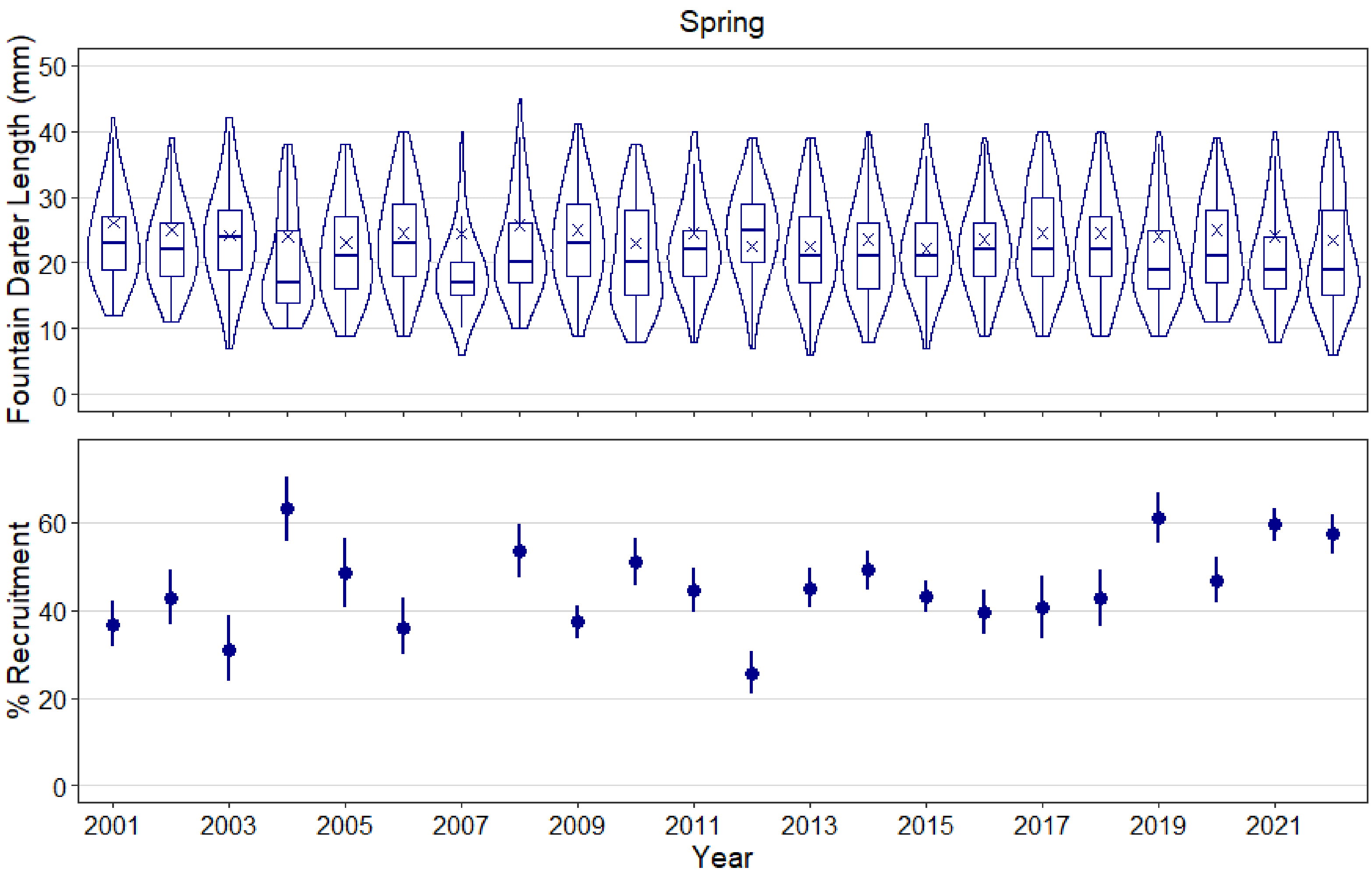

Figure E7. Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the San Marcos Springs and River during spring sampling (i.e., drop-net and timed dip-net data) events from 2001–2022. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability density; polygons outlining boxplots). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. Recruitment is the percent relative abundance (± 95% CI) of darters ≤20 mm.

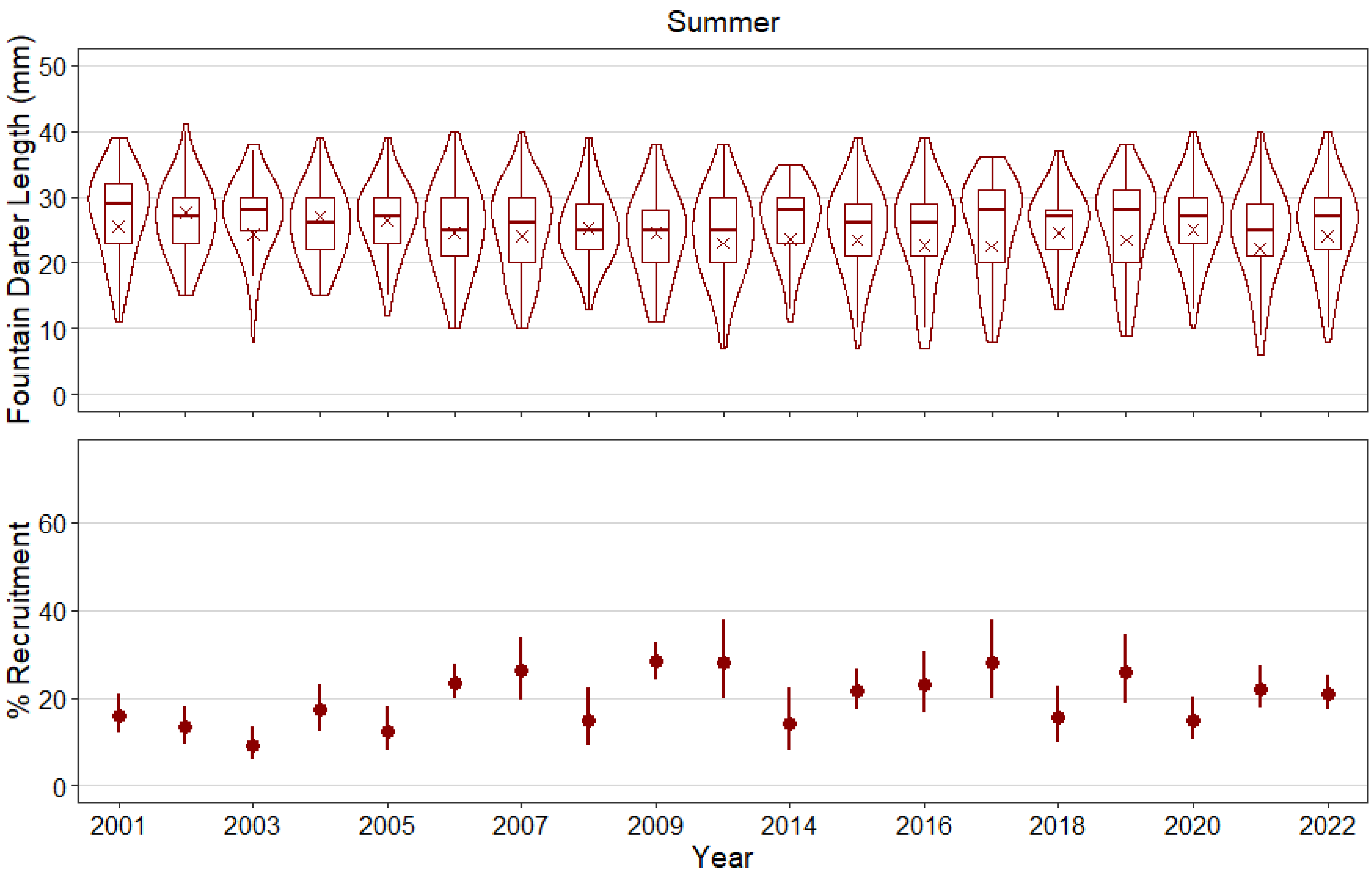

Figure E8. **Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the San Marcos Springs and River during summer sampling (i.e., drop-net and timed dip-net data) events from 2001–2022. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability density; polygons outlining boxplots). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. Recruitment is the percent relative abundance (± 95% CI) of darters ≤20 mm.**

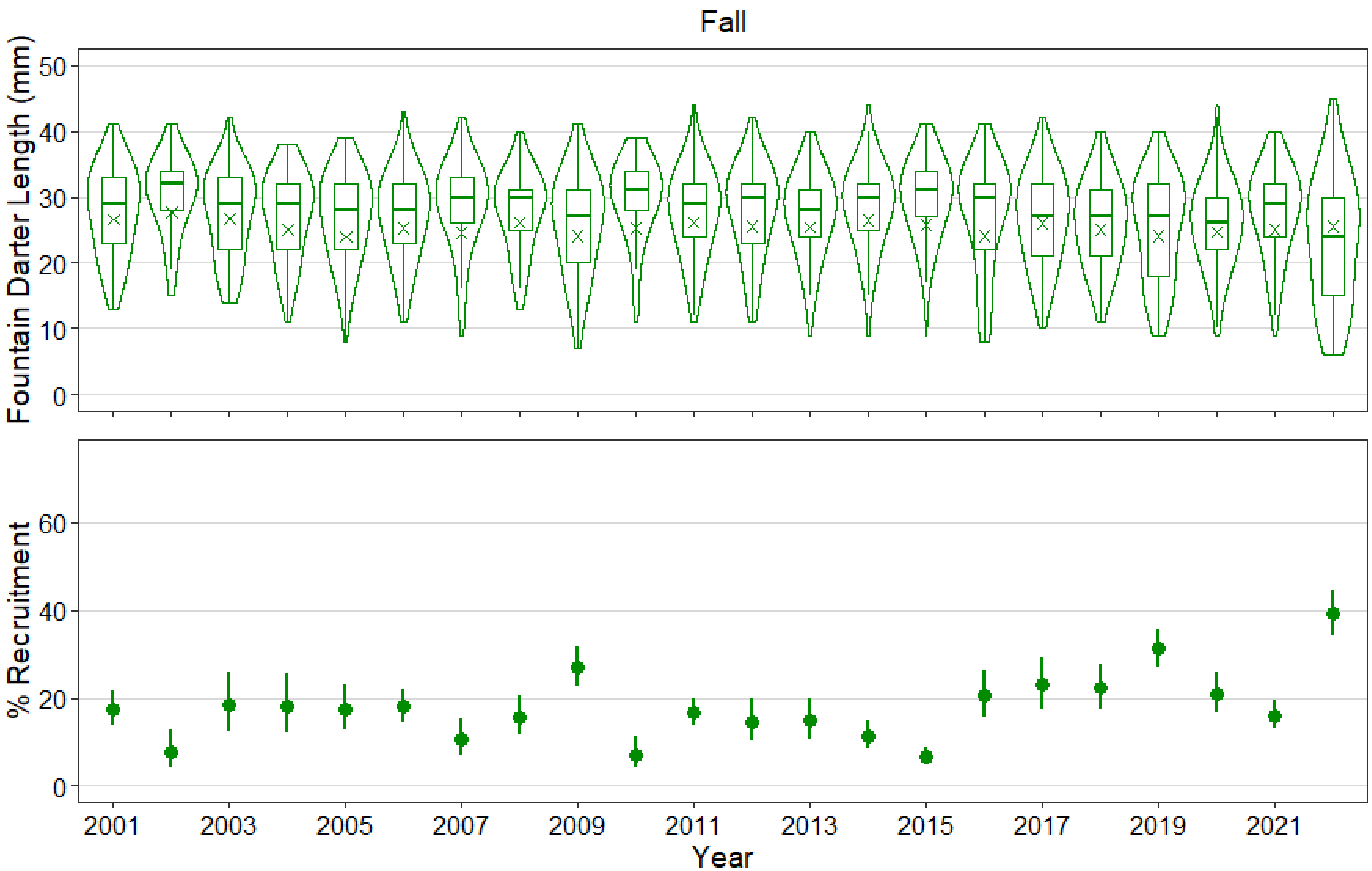

Figure E9. **Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the San Marcos Springs and River during fall sampling (i.e., drop-net and timed dip-net data) events from 2001–2022. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability density; polygons outlining boxplots). The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. Recruitment is the percent relative abundance (± 95% CI) of darters ≤20 mm.**

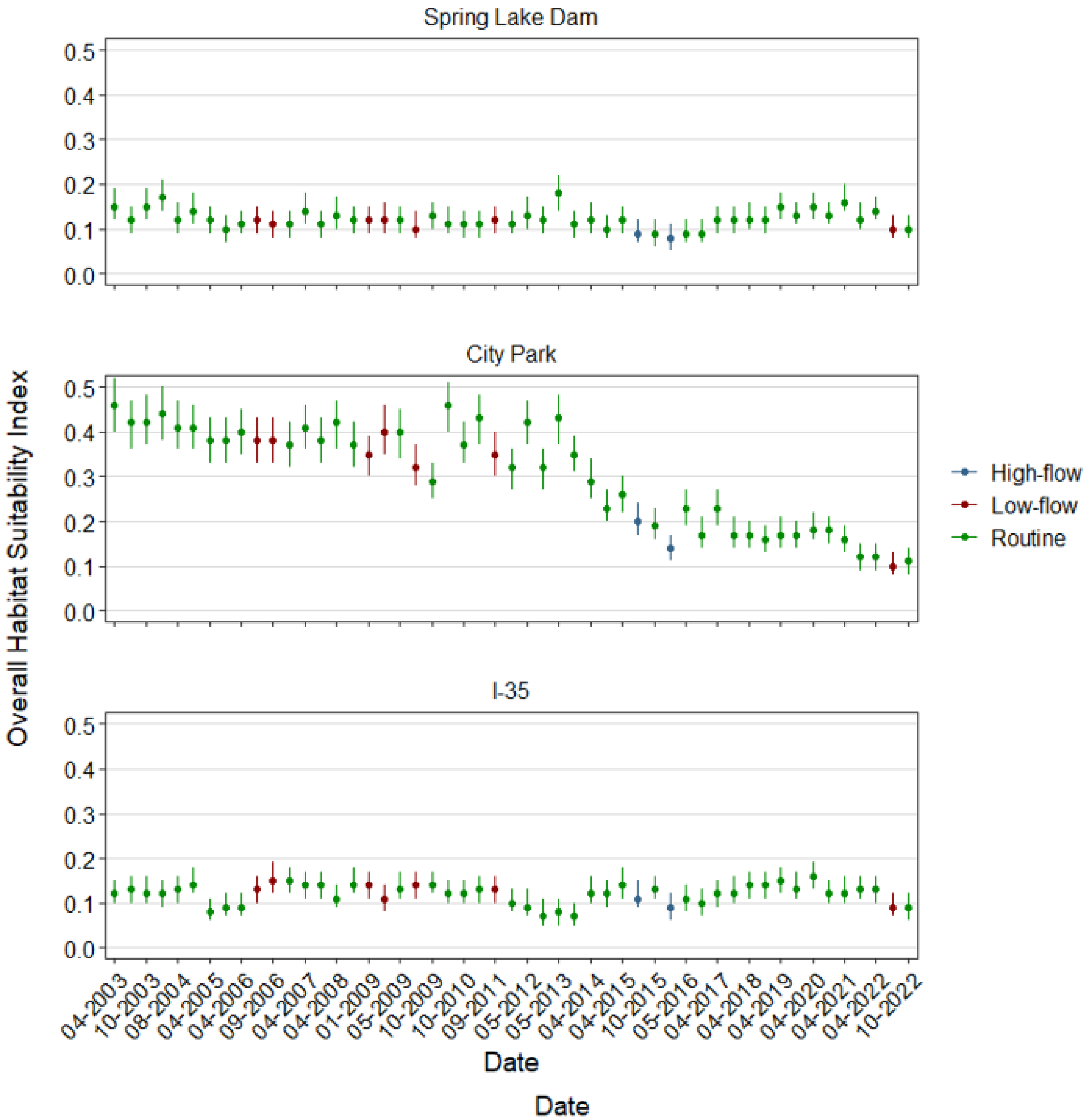

Figure E10. **Overall Habitat Suitability Index (OHSI) (±95% CI) from 2003–2022 among study reaches in the San Marcos River.**

Fish Community

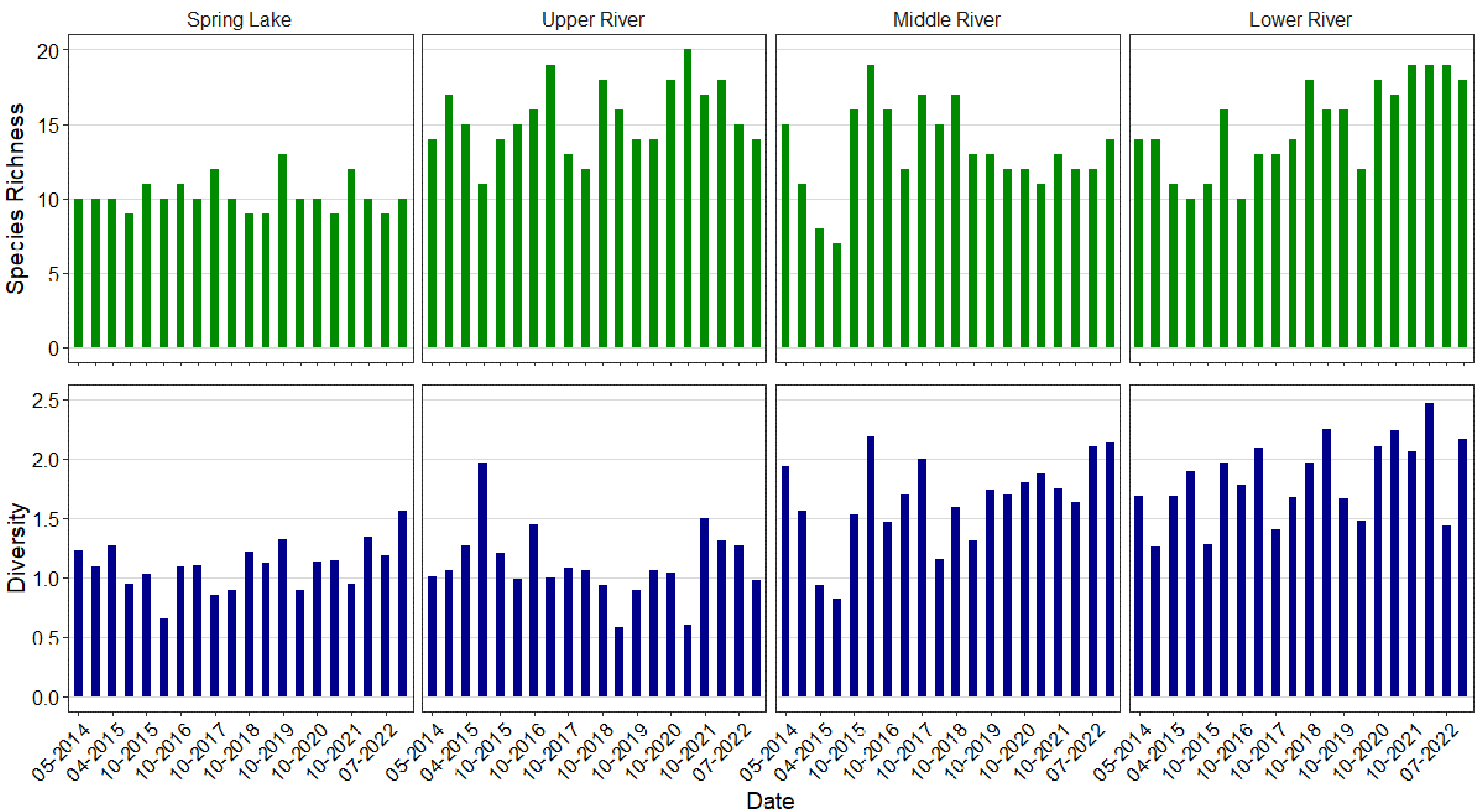

Figure E11. **Bar graphs displaying temporal trends in species richness and diversity among study reaches from 2014–2022 during fish community sampling in the San Marcos Springs/River.**

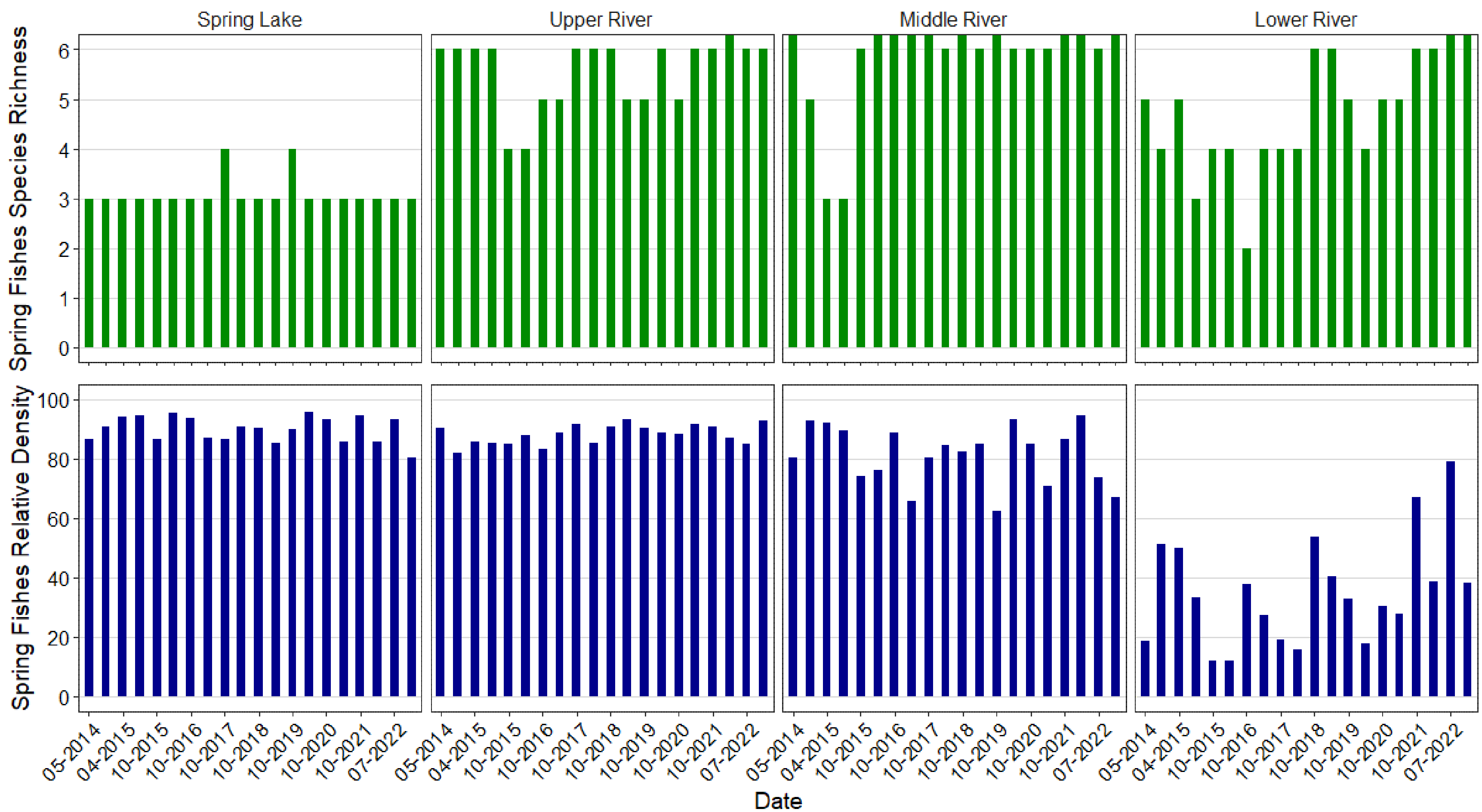

Figure E12. **Bar graphs displaying temporal trends in spring fishes species richness and percent relative density among study reaches from 2014–2022 during fish community sampling in the San Marcos Springs/River.**

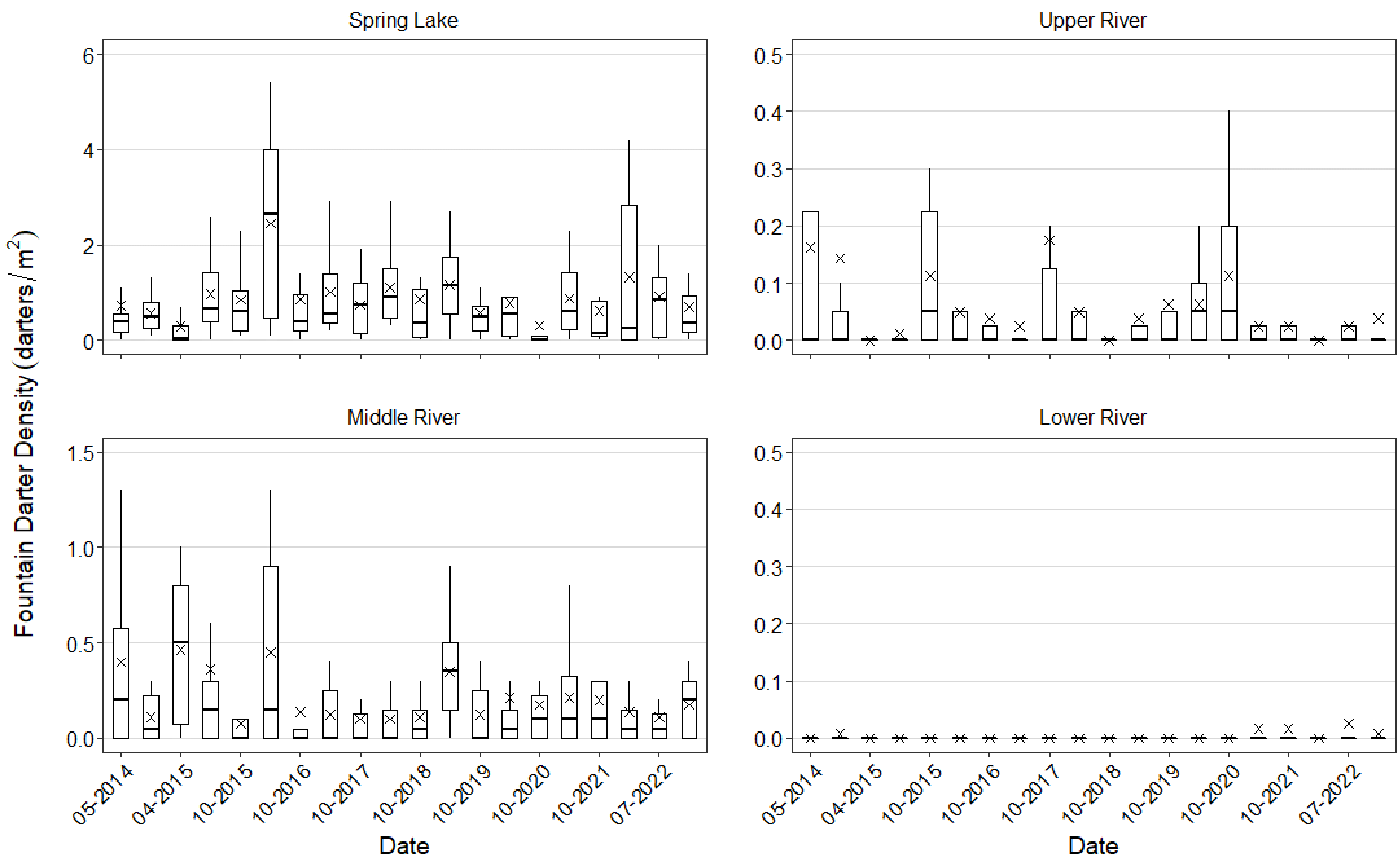

Figure E13. **Boxplots displaying temporal trends in Fountain Darter density (darters/m²) among study reaches from 2014–2022 during fish community microhabitat sampling in the San Marcos Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

San Marcos Salamander

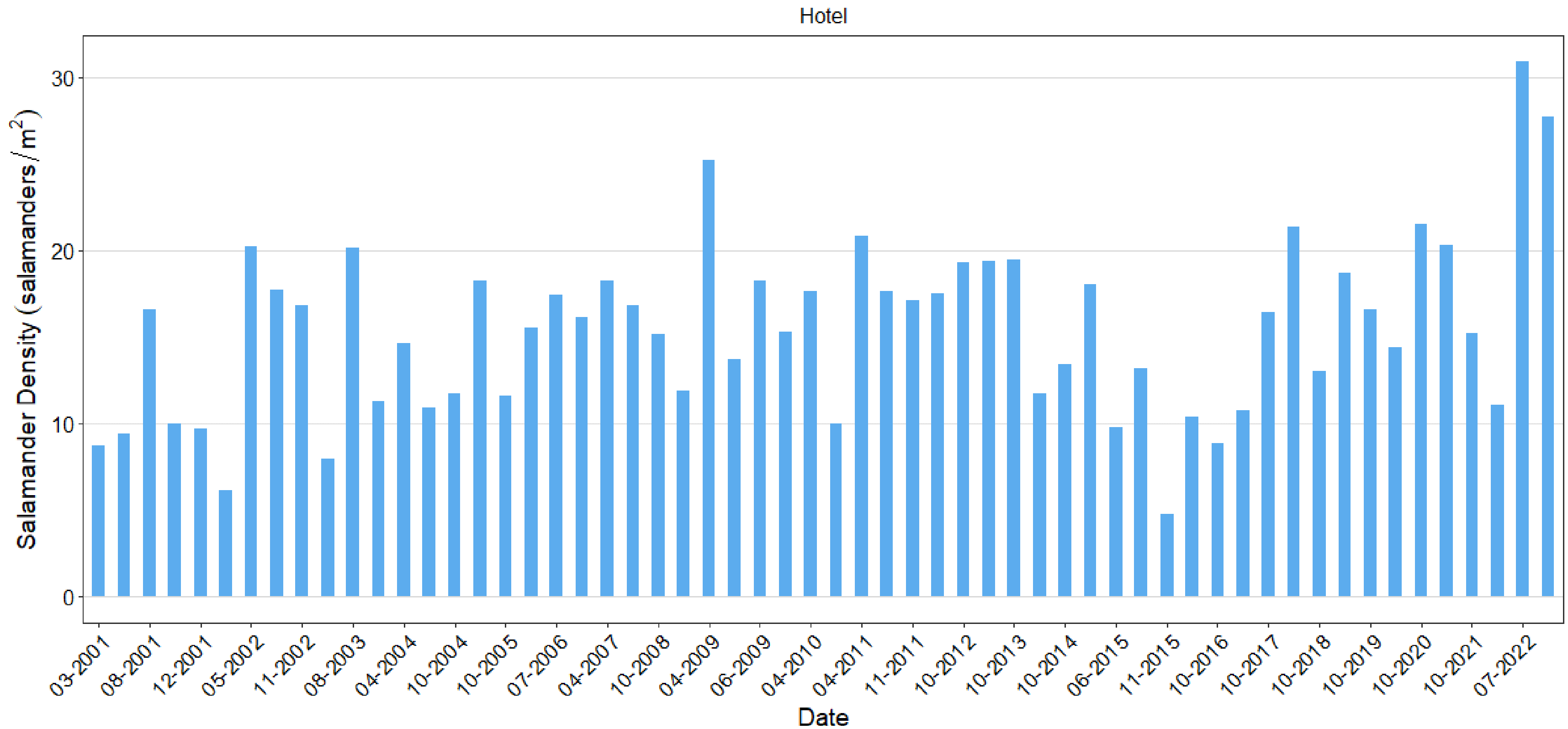

Figure E14. San Marcos Salamander density from 2001–2022 at the Hotel Site.

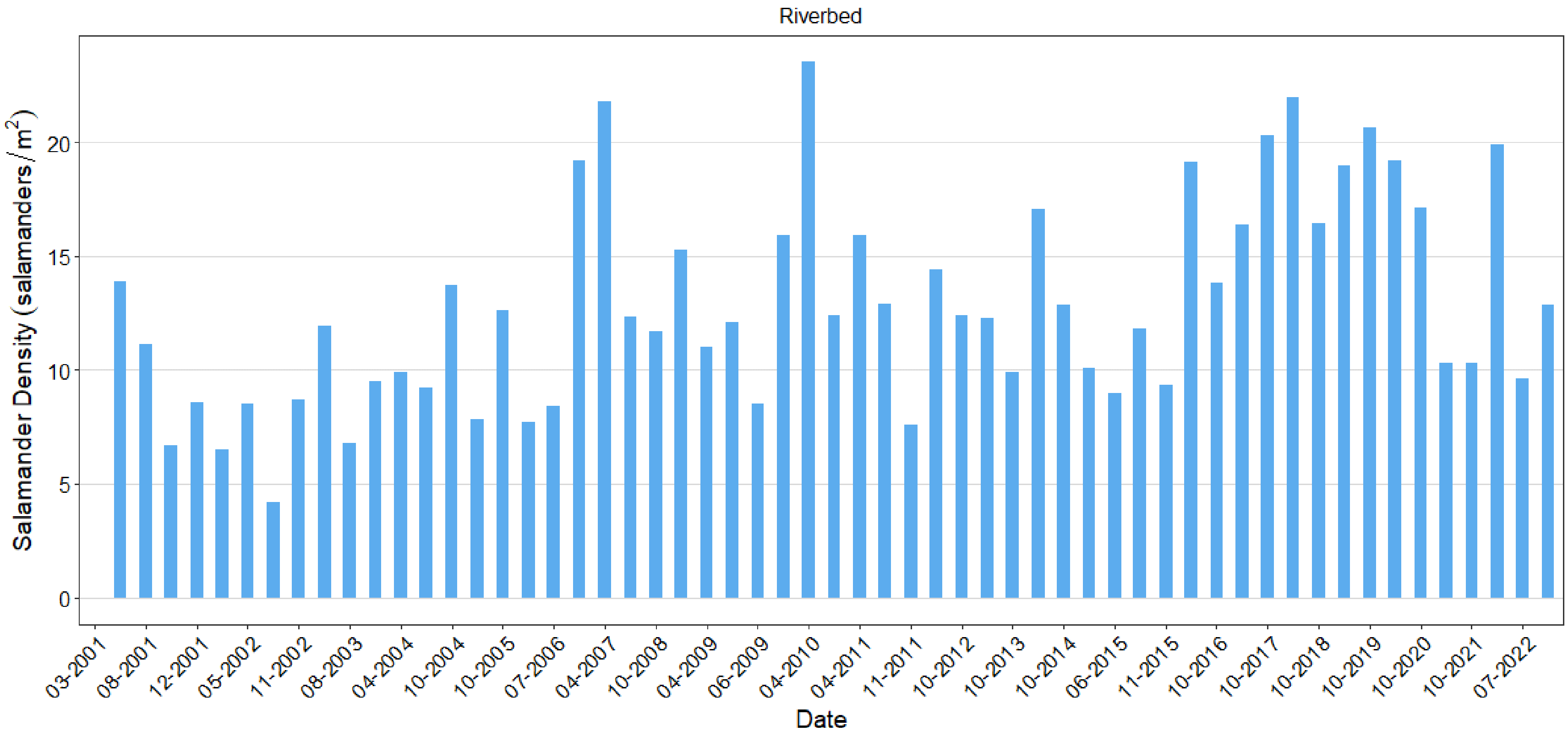

Figure E15. San Marcos Salamander density from 2001–2022 at the Riverbed Site.

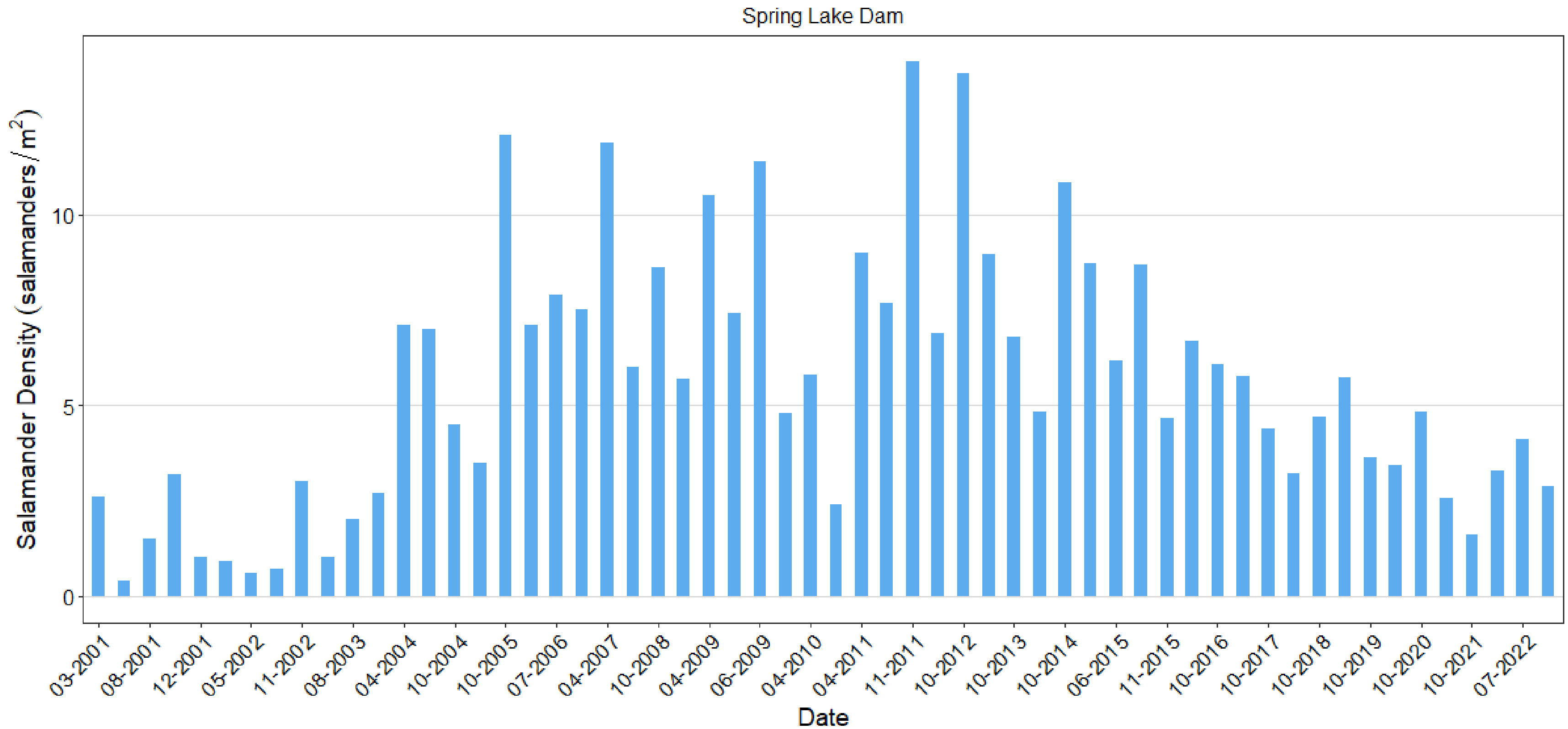

Figure E16. San Marcos Salamander density from 2001–2022 at the Spring Lake Dam Site.

APPENDIX F: MACROINVERTEBRATE RAW DATA

Site	Date	Class	Order	Family	FinalID	Counts
City Park	2022-05-18	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	4
City Park	2022-05-18	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	7
City Park	2022-05-18	Malacostraca	Amphipoda	Talitridae	Hyalella	51
City Park	2022-05-18	Malacostraca	Decapoda	Cambaridae	Cambaridae	1
City Park	2022-05-18	Insecta	Ephemeroptera	Baetidae	Fallceon	14
City Park	2022-05-18	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	8
City Park	2022-05-18	Insecta	Trichoptera	Glossosomatidae	Protoptila	6
City Park	2022-05-18	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	15
City Park	2022-05-18	Clitellata	Rhynchobdellida	Glossiphoniidae	Desserobdella	1
City Park	2022-05-18	Insecta	Diptera	Chironomidae	Thieaemanniella	1
City Park	2022-05-18	Clitellata	Oligochaeta		Oligochaeta	15
City Park	2022-05-18	Insecta	Hemiptera	Naucoridae	Limnocoris	3
City Park	2022-05-18	Turbellaria	Tricladida	Planarridae	Planarridae	8
City Park	2022-05-18	Insecta	Ephemeroptera	Baetidae	Baetis	10
City Park	2022-05-18	Insecta	Trichoptera	Leptoceridae	Nectopsyche	10
City Park	2022-10-18	Gastropoda	Neotaenioglossa	Thiaridae	Melanoides	38
City Park	2022-10-18	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	18
City Park	2022-10-18	Malacostraca	Amphipoda	Talitridae	Hyalella	43
City Park	2022-10-18	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	6
City Park	2022-10-18	Insecta	Coleoptera	Psephenidae	Psephenus	1
City Park	2022-10-18	Turbellaria	Tricladida	Dugesiidae	Dugesia	5
City Park	2022-10-18	Clitellata	Hirudinea	Glossosiphonidae	Hirudinea	1
City Park	2022-10-18	Insecta	Trichoptera	Leptoceridae	Oecetis	1
City Park	2022-10-18	Insecta	Trichoptera	Leptoceridae	Nectopsyche	8
City Park	2022-10-18	Insecta	Diptera	Chironomidae	Chironomidae	1
City Park	2022-10-18	Insecta	Ephemeroptera	Baetidae	Baetis	4
City Park	2022-10-18	Insecta	Ephemeroptera	Caenidae	Caenis	20
City Park	2022-10-18	Insecta	Diptera	Simuliidae	Simulium	1
I-35	2022-05-18	Malacostraca	Amphipoda	Talitridae	Hyalella	6

I-35	2022-05-18	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	4
I-35	2022-05-18	Gastropoda	Neotaenioglossa	Hydrobiidae	Hydrobiidae	1
I-35	2022-05-18	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	2
I-35	2022-05-18	Insecta	Trichoptera	Leptoceridae	Nectopsyche	9
I-35	2022-05-18	Insecta	Odonata	Gomphidae	Gomphidae	1
I-35	2022-05-18	Insecta	Hemiptera	Naucoridae	Limnocoris	12
I-35	2022-05-18	Insecta	Hemiptera	Naucoridae	Ambrysus	2
I-35	2022-05-18	Insecta	Odonata	Libellulidae	Brechmorhoga	1
I-35	2022-05-18	Insecta	Trichoptera	Philopotamidae	Chimarra	1
I-35	2022-05-18	Insecta	Trichoptera	Hydroptilidae	Hydroptila	1
I-35	2022-05-18	Insecta	Coleoptera	Gyrinidae	Dineutus	1
I-35	2022-05-18	Insecta	Ephemeroptera	Leptophlebiidae	Thraulodes	9
I-35	2022-05-18	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	29
I-35	2022-05-18	Insecta	Ephemeroptera	Leptohyphidae	Leptohyples	2
I-35	2022-05-18	Insecta	Trichoptera	Glossosomatidae	Protoptila	8
I-35	2022-05-18	Insecta	Lepidoptera		Lepidoptera	1
I-35	2022-05-18	Insecta	Diptera	Empididae	Hemerodromia	1
I-35	2022-05-18	Insecta	Trichoptera	Leptoceridae	Oecetis	1
I-35	2022-05-18	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	4
I-35	2022-05-18	Insecta	Diptera	Chironomidae	Rheotanytarsus	5
I-35	2022-05-18	Insecta	Diptera	Chironomidae	Thieaemanniella	1
I-35	2022-05-18	Clitellata	Oligochaeta		Oligochaeta	2
I-35	2022-05-18	Clitellata	Rhynchobdellida	Glossiphoniidae	Desserobdella	3
I-35	2022-05-18	Insecta	Coleoptera	Elmidae	Microcylloepus	17
I-35	2022-05-18	Turbellaria	Tricladida	Planarridae	Planarridae	13
I-35	2022-05-18	Insecta	Ephemeroptera	Baetidae	Fallceon	3
I-35	2022-05-18	Insecta	Ephemeroptera	Baetidae	Baetis	6
I-35	2022-10-18	Insecta	Hemiptera	Naucoridae	Limnocoris	18
I-35	2022-10-18	Insecta	Hemiptera	Naucoridae	Ambrysus	2
I-35	2022-10-18	Insecta	Ephemeroptera	Isonychidae	Isonychia	1

I-35	2022-10-18	Insecta	Odonata	Libellulidae	Brechmorhoga	3
I-35	2022-10-18	Turbellaria	Tricladida	Dugesiidae	Dugesia	12
I-35	2022-10-18	Insecta	Diptera	Chironomidae	Chironomidae	4
I-35	2022-10-18	Insecta	Trichoptera	Leptoceridae	Nectopsyche	17
I-35	2022-10-18	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	14
I-35	2022-10-18	Gastropoda	Neotaenioglossa	Thiaridae	Melanoides	22
I-35	2022-10-18	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	15
I-35	2022-10-18	Insecta	Ephemeroptera	Leptophlebiidae	Thraulodes	44
I-35	2022-10-18	Insecta	Trichoptera	Glossosomatidae	Culoptila	16
I-35	2022-10-18	Insecta	Odonata	Coenagrionidae	Argia	1
I-35	2022-10-18	Insecta	Ephemeroptera	Caenidae	Caenis	3
I-35	2022-10-18	Insecta	Ephemeroptera	Baetidae	Baetis	1
I-35	2022-10-18	Clitellata	Oligochaeta		Oligochaeta	1
I-35	2022-10-18	Insecta	Diptera	Simuliidae	Simulium	1
I-35	2022-10-18	Malacostraca	Amphipoda	Talitridae	Hyalella	1
I-35	2022-10-18	Insecta	Trichoptera	Philopotamidae	Chimarra	2
I-35	2022-10-18	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	2
I-35	2022-10-18	Insecta	Coleoptera	Elimidae	Heacylloepus	1
Spring Lake	2022-05-18	Gastropoda	Basommatophora	Physidae	Physa	2
Spring Lake	2022-05-18	Malacostraca	Amphipoda	Talitridae	Hyalella	140
Spring Lake	2022-05-18	Insecta	Diptera	Ceratopogonidae	Bezzia complex	1
Spring Lake	2022-05-18	Insecta	Coleoptera	Psephenidae	Psephenus	2
Spring Lake	2022-05-18	Malacostraca	Decapoda	Palaemonidae	Palaemonetes	2
Spring Lake	2022-05-18	Insecta	Odonata	Coenagrionidae	Argia	1
Spring Lake	2022-05-18	Malacostraca	Decapoda	Cambaridae	Cambaridae	3
Spring Lake	2022-05-18	Clitellata	Rhynchobdellida	Glossiphoniidae	Desserobdella	1
Spring Lake	2022-05-18	Turbellaria	Tricladida	Planarridae	Planarridae	1
Spring Lake	2022-05-18	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	6
Spring Lake	2022-05-18	Clitellata	Oligochaeta		Oligochaeta	3
Spring Lake	2022-05-18	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	13

Spring Lake	2022-05-18	Insecta	Diptera	Chironomidae	Dicrotendipas	6
Spring Lake	2022-05-18	Insecta	Diptera	Chironomidae	Cricotopas/Orthocladias	1
Spring Lake	2022-05-18	Insecta	Diptera	Chironomidae	Pseudochironomas	1
Spring Lake	2022-05-18	Insecta	Ephemeroptera	Baetidae	Callibaetis	8
Spring Lake	2022-10-18	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	9
Spring Lake	2022-10-18	Gastropoda	Basommatophora	Physidae	Physa	3
Spring Lake	2022-10-18	Malacostraca	Amphipoda	Talitridae	Hyalella	188
Spring Lake	2022-10-18	Hexanauplia	Copopoda		Copepoda	13
Spring Lake	2022-10-18	Arachnida	Hydrachinida		Hydrachinida	5
Spring Lake	2022-10-18	Insecta	Ephemeroptera	Baetidae	Callibaetis	31
Spring Lake	2022-10-18	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	18
Spring Lake	2022-10-18	Insecta	Diptera	Chironomidae	Chironomidae	8
Spring Lake	2022-10-18	Insecta	Diptera	Ceratopogonidae	Bezzia complex	1
Spring Lake	2022-10-18	Clitellata	Hirudinea	Glossosiphonidae	Hirudinea	1
Spring Lake	2022-10-18	Turbellaria	Tricladida	Dugesiidae	Dugesia	1
Spring Lake	2022-10-18	Insecta	Odonata	Coenagrionidae	Enallagma	2
Spring Lake	2022-10-18	Malacostraca	Decapoda	Palaemonidae	Palaemonetes	7
Spring Lake	2022-10-18	Malacostraca	Decopoda	Cambaridae	Cambaridae	4
Spring Lake Dam	2022-05-18	Insecta	Megaloptera	Corydalidae	Corydalus	1
Spring Lake Dam	2022-05-18	Insecta	Odonata	Libellulidae	Brechmorhoga	5
Spring Lake Dam	2022-05-18	Malacostraca	Amphipoda	Talitridae	Hyalella	50
Spring Lake Dam	2022-05-18	Insecta	Hemiptera	Naucoridae	Ambrysus	17
Spring Lake Dam	2022-05-18	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	3
Spring Lake Dam	2022-05-18	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	2
Spring Lake Dam	2022-05-18	Insecta	Trichoptera	Philopotamidae	Chimarra	14
Spring Lake Dam	2022-05-18	Insecta	Trichoptera	Hydropsychidae	Smicridea	2
Spring Lake Dam	2022-05-18	Insecta	Ephemeroptera	Baetidae	Fallceon	15
Spring Lake Dam	2022-05-18	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	6
Spring Lake Dam	2022-05-18	Insecta	Ephemeroptera	Leptohyphidae	Leptohyples	20
Spring Lake Dam	2022-05-18	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	7

Spring Lake Dam	2022-05-18	Insecta	Odonata	Coenagrionidae	Argia	1
Spring Lake Dam	2022-05-18	Insecta	Lepidoptera		Lepidoptera	1
Spring Lake Dam	2022-05-18	Insecta	Coleoptera	Psephenidae	Psephenus	1
Spring Lake Dam	2022-05-18	Insecta	Diptera	Chironomidae	Polypedilam	3
Spring Lake Dam	2022-05-18	Insecta	Diptera	Chironomidae	Rheocricotopus	8
Spring Lake Dam	2022-05-18	Insecta	Diptera	Chironomidae	Thieaemanniella	1
Spring Lake Dam	2022-05-18	Insecta	Ephemeroptera	Baetidae	Baetis	1
Spring Lake Dam	2022-05-18	Insecta	Diptera	Simuliidae	Simuliidae	9
Spring Lake Dam	2022-05-18	Clitellata	Oligochaeta		Oligochaeta	5
Spring Lake Dam	2022-05-18	Turbellaria	Tricladida	Planarridae	Planarridae	14
Spring Lake Dam	2022-05-18	Insecta	Ephemeroptera	Leptohyphidae	Allenhyphes	2
Spring Lake Dam	2022-05-18	Insecta	Coleoptera	Elimidae	Macrelmis	5
Spring Lake Dam	2022-05-18	Insecta	Coleoptera	Elmidae	Phanacerus	1
Spring Lake Dam	2022-05-18	Insecta	Coleoptera	Elimidae	Neoelmis	2
Spring Lake Dam	2022-10-18	Insecta	Trichoptera	Philopotamidae	Chimarra	47
Spring Lake Dam	2022-10-18	Insecta	Hemiptera	Naucoridae	Ambrysus	7
Spring Lake Dam	2022-10-18	Insecta	Ephemeroptera	Baetidae	Baetodes	20
Spring Lake Dam	2022-10-18	Gastropoda	Neotaenioglossa	Thiaridae	Melanoides	4
Spring Lake Dam	2022-10-18	Insecta	Trichoptera	Helicopsychidae	Helicopsyche	3
Spring Lake Dam	2022-10-18	Gastropoda	Neotaenioglossa	Hydrobiidae	Hydrobiidae	1
Spring Lake Dam	2022-10-18	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	1
Spring Lake Dam	2022-10-18	Insecta	Odonata	Libellulidae	Brechmorhoga	1
Spring Lake Dam	2022-10-18	Insecta	Odonata	Libellulidae	Erythemis	1
Spring Lake Dam	2022-10-18	Turbellaria	Tricladida	Dugesiidae	Dugesia	20
Spring Lake Dam	2022-10-18	Clitellata	Oligochaeta		Oligochaeta	8
Spring Lake Dam	2022-10-18	Insecta	Lepidoptera	Crambidae	Petrophila	1
Spring Lake Dam	2022-10-18	Gastropoda	Basommatophora	Planorbidae	Ferrissia sp.	1
Spring Lake Dam	2022-10-18	Insecta	Trichoptera	Hydropsychidae	Potamyia	20
Spring Lake Dam	2022-10-18	Malacostraca	Amphipoda	Talitridae	Hyalella	8
Spring Lake Dam	2022-10-18	Insecta	Diptera	Chironomidae	Chironomidae	7

Spring Lake Dam	2022-10-18	Insecta	Diptera	Simuliidae	Simulium	17
Spring Lake Dam	2022-10-18	Insecta	Ephemeroptera	Baetidae	Baetis	10
Spring Lake Dam	2022-10-18	Insecta	Ephemeroptera	Baetidae	Callibaetis	2
Spring Lake Dam	2022-10-18	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	6
Spring Lake Dam	2022-10-18	Insecta	Ephemeroptera	Leptohyphidae	Tricorythodes	13
Spring Lake Dam	2022-10-18	Insecta	Coleoptera	Elimidae	Heterelmis	4

APPENDIX G: DROP-NET RAW DATA

SiteCode	Reach	Site_No	Date	Dip_Net	Species	Length	Count
2749	City Park	Hydr-1	2022-04-26	1	Procambarus sp.		5
2749	City Park	Hydr-1	2022-04-26	1	Palaemonetes sp.		1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	35	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	19	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	18	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	30	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	20	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	21	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	18	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	20	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	16	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	24	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	20	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	23	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	18	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	16	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	20	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	20	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	15	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	21	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	19	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	21	1
2749	City Park	Hydr-1	2022-04-26	1	Gambusia sp.	20	1
2749	City Park	Hydr-1	2022-04-26	2	Gambusia sp.	26	1
2749	City Park	Hydr-1	2022-04-26	2	Etheostoma fonticola	34	1
2749	City Park	Hydr-1	2022-04-26	2	Procambarus sp.		1
2749	City Park	Hydr-1	2022-04-26	3	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	3	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	4	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	4	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	4	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	4	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	4	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	5	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	5	Procambarus sp.		2
2749	City Park	Hydr-1	2022-04-26	6	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	6	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	6	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	6	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	7	Gambusia sp.		1

2749	City Park	Hydr-1	2022-04-26	7	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	7	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	7	Procambarus sp.		2
2749	City Park	Hydr-1	2022-04-26	8	Procambarus sp.		1
2749	City Park	Hydr-1	2022-04-26	8	No fish collected		
2749	City Park	Hydr-1	2022-04-26	9	Procambarus sp.		2
2749	City Park	Hydr-1	2022-04-26	9	Etheostoma fonticola	37	1
2749	City Park	Hydr-1	2022-04-26	9	Etheostoma fonticola	16	1
2749	City Park	Hydr-1	2022-04-26	9	Etheostoma fonticola	21	1
2749	City Park	Hydr-1	2022-04-26	9	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	10	Procambarus sp.		2
2749	City Park	Hydr-1	2022-04-26	10	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	10	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	10	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	10	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	11	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	12	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	12	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	12	Procambarus sp.		1
2749	City Park	Hydr-1	2022-04-26	13	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	14	No fish collected		
2749	City Park	Hydr-1	2022-04-26	15	Procambarus sp.		1
2749	City Park	Hydr-1	2022-04-26	15	Gambusia sp.		1
2749	City Park	Hydr-1	2022-04-26	15	Gambusia sp.		1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	15	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	20	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	21	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	21	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	29	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	15	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	20	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	22	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	12	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	20	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	35	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	12	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	35	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	27	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	16	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	25	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	26	1

2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	21	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	16	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	18	1
2750	City Park	Hydr-2	2022-04-26	1	Gambusia sp.	15	1
2750	City Park	Hydr-2	2022-04-26	1	Etheostoma fonticola	32	1
2750	City Park	Hydr-2	2022-04-26	1	Procambarus sp.		3
2750	City Park	Hydr-2	2022-04-26	2	Gambusia sp.		1
2750	City Park	Hydr-2	2022-04-26	2	Gambusia sp.		1
2750	City Park	Hydr-2	2022-04-26	2	Gambusia sp.		1
2750	City Park	Hydr-2	2022-04-26	2	Gambusia sp.		1
2750	City Park	Hydr-2	2022-04-26	3	Procambarus sp.		1
2750	City Park	Hydr-2	2022-04-26	3	No fish collected		
2750	City Park	Hydr-2	2022-04-26	4	Gambusia sp.		1
2750	City Park	Hydr-2	2022-04-26	4	Gambusia sp.		1
2750	City Park	Hydr-2	2022-04-26	5	Gambusia sp.		1
2750	City Park	Hydr-2	2022-04-26	5	Procambarus sp.		1
2750	City Park	Hydr-2	2022-04-26	6	Procambarus sp.		1
2750	City Park	Hydr-2	2022-04-26	6	Etheostoma fonticola	34	1
2750	City Park	Hydr-2	2022-04-26	6	Gambusia sp.		1
2750	City Park	Hydr-2	2022-04-26	7	No fish collected		
2750	City Park	Hydr-2	2022-04-26	8	Procambarus sp.		1
2750	City Park	Hydr-2	2022-04-26	8	No fish collected		
2750	City Park	Hydr-2	2022-04-26	9	Procambarus sp.		1
2750	City Park	Hydr-2	2022-04-26	9	No fish collected		
2750	City Park	Hydr-2	2022-04-26	10	Gambusia sp.		1
2750	City Park	Hydr-2	2022-04-26	11	No fish collected		
2750	City Park	Hydr-2	2022-04-26	12	Procambarus sp.		2
2750	City Park	Hydr-2	2022-04-26	12	No fish collected		
2750	City Park	Hydr-2	2022-04-26	13	No fish collected		
2750	City Park	Hydr-2	2022-04-26	14	No fish collected		
2750	City Park	Hydr-2	2022-04-26	15	No fish collected		
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	30	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	15	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	21	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	13	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	18	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	15	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	12	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	18	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	13	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	10	1

2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	15	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	20	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	10	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	8	1
2751	City Park	Cabo-1	2022-04-26	1	Gambusia sp.	16	1
2751	City Park	Cabo-1	2022-04-26	1	Lepomis sp.	15	1
2751	City Park	Cabo-1	2022-04-26	1	Etheostoma fonticola	15	1
2751	City Park	Cabo-1	2022-04-26	1	Etheostoma fonticola	11	1
2751	City Park	Cabo-1	2022-04-26	2	Lepomis miniatus	102	1
2751	City Park	Cabo-1	2022-04-26	2	Procambarus sp.		1
2751	City Park	Cabo-1	2022-04-26	2	Gambusia sp.	20	1
2751	City Park	Cabo-1	2022-04-26	2	Gambusia sp.	21	1
2751	City Park	Cabo-1	2022-04-26	2	Gambusia sp.	17	1
2751	City Park	Cabo-1	2022-04-26	2	Gambusia sp.	20	1
2751	City Park	Cabo-1	2022-04-26	2	Gambusia sp.	14	1
2751	City Park	Cabo-1	2022-04-26	2	Etheostoma fonticola	25	1
2751	City Park	Cabo-1	2022-04-26	2	Etheostoma fonticola	20	1
2751	City Park	Cabo-1	2022-04-26	2	Etheostoma fonticola	18	1
2751	City Park	Cabo-1	2022-04-26	2	Etheostoma fonticola	16	1
2751	City Park	Cabo-1	2022-04-26	2	Lepomis sp.	15	1
2751	City Park	Cabo-1	2022-04-26	2	Lepomis sp.	11	1
2751	City Park	Cabo-1	2022-04-26	2	Lepomis sp.	11	1
2751	City Park	Cabo-1	2022-04-26	3	Palaemonetes sp.		1
2751	City Park	Cabo-1	2022-04-26	3	Procambarus sp.		1
2751	City Park	Cabo-1	2022-04-26	3	Etheostoma fonticola	18	1
2751	City Park	Cabo-1	2022-04-26	4	Procambarus sp.		3
2751	City Park	Cabo-1	2022-04-26	4	Etheostoma fonticola	31	1
2751	City Park	Cabo-1	2022-04-26	4	Etheostoma fonticola	17	1
2751	City Park	Cabo-1	2022-04-26	4	Etheostoma fonticola	21	1
2751	City Park	Cabo-1	2022-04-26	5	Etheostoma fonticola	37	1
2751	City Park	Cabo-1	2022-04-26	6	Procambarus sp.		2
2751	City Park	Cabo-1	2022-04-26	6	Etheostoma fonticola	20	1
2751	City Park	Cabo-1	2022-04-26	6	Etheostoma fonticola	17	1
2751	City Park	Cabo-1	2022-04-26	7	Procambarus sp.		3
2751	City Park	Cabo-1	2022-04-26	7	No fish collected		
2751	City Park	Cabo-1	2022-04-26	8	Procambarus sp.		1
2751	City Park	Cabo-1	2022-04-26	8	Etheostoma fonticola	16	1
2751	City Park	Cabo-1	2022-04-26	9	Procambarus sp.		1
2751	City Park	Cabo-1	2022-04-26	9	No fish collected		
2751	City Park	Cabo-1	2022-04-26	10	Procambarus sp.		2
2751	City Park	Cabo-1	2022-04-26	10	No fish collected		

2751	City Park	Cabo-1	2022-04-26	11	Procambarus sp.		1
2751	City Park	Cabo-1	2022-04-26	11	Etheostoma fonticola	15	1
2751	City Park	Cabo-1	2022-04-26	12	Procambarus sp.		1
2751	City Park	Cabo-1	2022-04-26	12	Lepomis miniatus	45	1
2751	City Park	Cabo-1	2022-04-26	12	Lepomis sp.	24	1
2751	City Park	Cabo-1	2022-04-26	13	Procambarus sp.		1
2751	City Park	Cabo-1	2022-04-26	13	Etheostoma fonticola	30	1
2751	City Park	Cabo-1	2022-04-26	14	Palaemonetes sp.		1
2751	City Park	Cabo-1	2022-04-26	14	Lepomis sp.	11	1
2751	City Park	Cabo-1	2022-04-26	15	Procambarus sp.		3
2751	City Park	Cabo-1	2022-04-26	15	Etheostoma fonticola	20	1
2751	City Park	Cabo-1	2022-04-26	15	Etheostoma fonticola	32	1
2751	City Park	Cabo-1	2022-04-26	16	Procambarus sp.		1
2751	City Park	Cabo-1	2022-04-26	16	No fish collected		
2752	City Park	Cab-2	2022-04-26	3	Etheostoma fonticola	31	1
2752	City Park	Cab-2	2022-04-26	3	Etheostoma fonticola	18	1
2752	City Park	Cab-2	2022-04-26	3	Etheostoma fonticola	20	1
2752	City Park	Cab-2	2022-04-26	3	Lepomis miniatus	21	1
2752	City Park	Cab-2	2022-04-26	3	Gambusia sp.	23	1
2752	City Park	Cab-2	2022-04-26	3	Lepomis sp.	15	1
2752	City Park	Cab-2	2022-04-26	3	Lepomis sp.	14	1
2752	City Park	Cab-2	2022-04-26	3	Lepomis sp.	14	1
2752	City Park	Cab-2	2022-04-26	3	Procambarus sp.		2
2752	City Park	Cab-2	2022-04-26	4	Palaemonetes sp.		2
2752	City Park	Cab-2	2022-04-26	4	Etheostoma fonticola	20	1
2752	City Park	Cab-2	2022-04-26	4	Etheostoma fonticola	25	1
2752	City Park	Cab-2	2022-04-26	4	Etheostoma fonticola	29	1
2752	City Park	Cab-2	2022-04-26	4	Etheostoma fonticola	15	1
2752	City Park	Cab-2	2022-04-26	4	Etheostoma fonticola	22	1
2752	City Park	Cab-2	2022-04-26	4	Etheostoma fonticola	18	1
2752	City Park	Cab-2	2022-04-26	5	Palaemonetes sp.		1
2752	City Park	Cab-2	2022-04-26	5	Etheostoma fonticola	18	1
2752	City Park	Cab-2	2022-04-26	5	Etheostoma fonticola	25	1
2752	City Park	Cab-2	2022-04-26	5	Etheostoma fonticola	13	1
2752	City Park	Cab-2	2022-04-26	5	Gambusia sp.	13	1
2752	City Park	Cab-2	2022-04-26	6	Etheostoma fonticola	30	1
2752	City Park	Cab-2	2022-04-26	7	Lepomis sp.	15	1
2752	City Park	Cab-2	2022-04-26	7	Lepomis sp.	16	1
2752	City Park	Cab-2	2022-04-26	7	Etheostoma fonticola	31	1
2752	City Park	Cab-2	2022-04-26	7	Gambusia sp.	13	1
2752	City Park	Cab-2	2022-04-26	8	Lepomis sp.	18	1

2752	City Park	Cab-2	2022-04-26	9	Procambarus sp.		1
2752	City Park	Cab-2	2022-04-26	9	Lepomis sp.	19	1
2752	City Park	Cab-2	2022-04-26	9	Etheostoma fonticola	34	1
2752	City Park	Cab-2	2022-04-26	10	Procambarus sp.		1
2752	City Park	Cab-2	2022-04-26	10	Etheostoma fonticola	28	1
2752	City Park	Cab-2	2022-04-26	10	Lepomis sp.	15	1
2752	City Park	Cab-2	2022-04-26	11	Etheostoma fonticola	22	1
2752	City Park	Cab-2	2022-04-26	11	Etheostoma fonticola	18	1
2752	City Park	Cab-2	2022-04-26	12	No fish collected		
2752	City Park	Cab-2	2022-04-26	13	Gambusia sp.	21	1
2752	City Park	Cab-2	2022-04-26	13	Etheostoma fonticola	14	1
2752	City Park	Cab-2	2022-04-26	14	No fish collected		
2752	City Park	Cab-2	2022-04-26	15	Lepomis miniatus	94	1
2752	City Park	Cab-2	2022-04-26	15	Lepomis sp.	16	1
2752	City Park	Cab-2	2022-04-26	1	Lepomis macrochirus	76	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	22	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	19	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	25	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	11	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	20	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	26	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	20	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	20	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	22	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	22	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	22	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	25	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	20	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	15	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	18	1
2752	City Park	Cab-2	2022-04-26	1	Gambusia sp.	10	1
2752	City Park	Cab-2	2022-04-26	1	Etheostoma fonticola	29	1
2752	City Park	Cab-2	2022-04-26	2	Procambarus sp.		1
2752	City Park	Cab-2	2022-04-26	2	Lepomis gulosus	192	1
2752	City Park	Cab-2	2022-04-26	2	Etheostoma fonticola	34	1
2752	City Park	Cab-2	2022-04-26	2	Etheostoma fonticola	16	1
2752	City Park	Cab-2	2022-04-26	2	Etheostoma fonticola	20	1
2752	City Park	Cab-2	2022-04-26	2	Etheostoma fonticola	15	1
2752	City Park	Cab-2	2022-04-26	2	Gambusia sp.	20	1
2752	City Park	Cab-2	2022-04-26	2	Lepomis sp.	18	1
2752	City Park	Cab-2	2022-04-26	3	Etheostoma fonticola	29	1

2752	City Park	Cab-2	2022-04-26	3	Etheostoma fonticola	18	1
2752	City Park	Cab-2	2022-04-26	3	Etheostoma fonticola	20	1
2752	City Park	Cab-2	2022-04-26	3	Etheostoma fonticola	17	1
2752	City Park	Cab-2	2022-04-26	3	Etheostoma fonticola	17	1
2753	City Park	Ziz-1	2022-04-26	1	No fish collected		
2753	City Park	Ziz-1	2022-04-26	2	No fish collected		
2753	City Park	Ziz-1	2022-04-26	3	No fish collected		
2753	City Park	Ziz-1	2022-04-26	4	No fish collected		
2753	City Park	Ziz-1	2022-04-26	5	No fish collected		
2753	City Park	Ziz-1	2022-04-26	6	No fish collected		
2753	City Park	Ziz-1	2022-04-26	7	No fish collected		
2753	City Park	Ziz-1	2022-04-26	8	No fish collected		
2753	City Park	Ziz-1	2022-04-26	9	No fish collected		
2753	City Park	Ziz-1	2022-04-26	10	Etheostoma fonticola	18	1
2753	City Park	Ziz-1	2022-04-26	11	No fish collected		
2753	City Park	Ziz-1	2022-04-26	12	No fish collected		
2753	City Park	Ziz-1	2022-04-26	13	No fish collected		
2753	City Park	Ziz-1	2022-04-26	14	No fish collected		
2753	City Park	Ziz-1	2022-04-26	15	No fish collected		
2754	City Park	Ziz-2	2022-04-26	1	No fish collected		
2754	City Park	Ziz-2	2022-04-26	2	No fish collected		
2754	City Park	Ziz-2	2022-04-26	3	No fish collected		
2754	City Park	Ziz-2	2022-04-26	4	No fish collected		
2754	City Park	Ziz-2	2022-04-26	5	No fish collected		
2754	City Park	Ziz-2	2022-04-26	6	No fish collected		
2754	City Park	Ziz-2	2022-04-26	7	No fish collected		
2754	City Park	Ziz-2	2022-04-26	8	No fish collected		
2754	City Park	Ziz-2	2022-04-26	9	No fish collected		
2754	City Park	Ziz-2	2022-04-26	10	No fish collected		
2755	City Park	Open-1	2022-04-27	1	No fish collected		
2755	City Park	Open-1	2022-04-27	2	No fish collected		
2755	City Park	Open-1	2022-04-27	3	No fish collected		
2755	City Park	Open-1	2022-04-27	4	No fish collected		
2755	City Park	Open-1	2022-04-27	5	No fish collected		
2755	City Park	Open-1	2022-04-27	6	No fish collected		
2755	City Park	Open-1	2022-04-27	7	No fish collected		
2755	City Park	Open-1	2022-04-27	8	No fish collected		
2755	City Park	Open-1	2022-04-27	9	No fish collected		
2755	City Park	Open-1	2022-04-27	10	No fish collected		
2756	City Park	Open-2	2022-04-27	1	No fish collected		
2756	City Park	Open-2	2022-04-27	2	No fish collected		

2756	City Park	Open-2	2022-04-27	3	No fish collected		
2756	City Park	Open-2	2022-04-27	4	No fish collected		
2756	City Park	Open-2	2022-04-27	5	No fish collected		
2756	City Park	Open-2	2022-04-27	6	No fish collected		
2756	City Park	Open-2	2022-04-27	7	No fish collected		
2756	City Park	Open-2	2022-04-27	8	No fish collected		
2756	City Park	Open-2	2022-04-27	9	No fish collected		
2756	City Park	Open-2	2022-04-27	10	No fish collected		
2757	City Park	Pota-1	2022-04-27	1	Gambusia sp.	19	1
2757	City Park	Pota-1	2022-04-27	1	Gambusia sp.	23	1
2757	City Park	Pota-1	2022-04-27	1	Gambusia sp.	17	1
2757	City Park	Pota-1	2022-04-27	1	Gambusia sp.	18	1
2757	City Park	Pota-1	2022-04-27	1	Etheostoma fonticola	20	1
2757	City Park	Pota-1	2022-04-27	2	Ambloplites rupestris	20	1
2757	City Park	Pota-1	2022-04-27	2	Ambloplites rupestris	16	1
2757	City Park	Pota-1	2022-04-27	3	Palaemonetes sp.		1
2757	City Park	Pota-1	2022-04-27	3	Ambloplites rupestris	13	1
2757	City Park	Pota-1	2022-04-27	4	Procambarus sp.		1
2757	City Park	Pota-1	2022-04-27	4	Lepomis sp.	14	1
2757	City Park	Pota-1	2022-04-27	5	Gambusia sp.	34	1
2757	City Park	Pota-1	2022-04-27	5	Procambarus sp.		1
2757	City Park	Pota-1	2022-04-27	5	Etheostoma fonticola	33	1
2757	City Park	Pota-1	2022-04-27	5	Etheostoma fonticola	31	1
2757	City Park	Pota-1	2022-04-27	5	Etheostoma fonticola	19	1
2757	City Park	Pota-1	2022-04-27	5	Lepomis sp.	14	1
2757	City Park	Pota-1	2022-04-27	5	Ambloplites rupestris	18	1
2757	City Park	Pota-1	2022-04-27	6	No fish collected		
2757	City Park	Pota-1	2022-04-27	7	No fish collected		
2757	City Park	Pota-1	2022-04-27	8	No fish collected		
2757	City Park	Pota-1	2022-04-27	9	Gambusia sp.	20	1
2757	City Park	Pota-1	2022-04-27	10	Etheostoma fonticola	30	1
2757	City Park	Pota-1	2022-04-27	10	Etheostoma fonticola	18	1
2757	City Park	Pota-1	2022-04-27	11	Lepomis miniatus	80	1
2757	City Park	Pota-1	2022-04-27	11	Etheostoma fonticola	38	1
2757	City Park	Pota-1	2022-04-27	11	Procambarus sp.		1
2757	City Park	Pota-1	2022-04-27	12	Procambarus sp.		1
2757	City Park	Pota-1	2022-04-27	12	Lepomis miniatus	75	1
2757	City Park	Pota-1	2022-04-27	13	No fish collected		
2757	City Park	Pota-1	2022-04-27	14	No fish collected		
2757	City Park	Pota-1	2022-04-27	15	No fish collected		
2758	City Park	Pota-2	2022-04-27	1	No fish collected		

2758	City Park	Pota-2	2022-04-27	2	No fish collected		
2758	City Park	Pota-2	2022-04-27	3	No fish collected		
2758	City Park	Pota-2	2022-04-27	4	No fish collected		
2758	City Park	Pota-2	2022-04-27	5	Gambusia sp.	30	1
2758	City Park	Pota-2	2022-04-27	6	No fish collected		
2758	City Park	Pota-2	2022-04-27	7	No fish collected		
2758	City Park	Pota-2	2022-04-27	8	No fish collected		
2758	City Park	Pota-2	2022-04-27	9	No fish collected		
2758	City Park	Pota-2	2022-04-27	10	No fish collected		
2758	City Park	Pota-2	2022-04-27	11	Etheostoma fonticola	29	1
2758	City Park	Pota-2	2022-04-27	12	No fish collected		
2758	City Park	Pota-2	2022-04-27	13	No fish collected		
2758	City Park	Pota-2	2022-04-27	14	No fish collected		
2758	City Park	Pota-2	2022-04-27	15	No fish collected		
2812	City Park	Sagi-1	2022-07-19	1	Etheostoma fonticola	35	1
2812	City Park	Sagi-1	2022-07-19	2	No fish collected		
2812	City Park	Sagi-1	2022-07-19	3	Etheostoma fonticola	26	1
2812	City Park	Sagi-1	2022-07-19	4	Etheostoma fonticola	26	1
2812	City Park	Sagi-1	2022-07-19	4	Etheostoma fonticola	27	1
2812	City Park	Sagi-1	2022-07-19	4	Etheostoma fonticola	30	1
2812	City Park	Sagi-1	2022-07-19	4	Procambarus sp.		1
2812	City Park	Sagi-1	2022-07-19	5	No fish collected		
2812	City Park	Sagi-1	2022-07-19	6	Etheostoma fonticola	27	1
2812	City Park	Sagi-1	2022-07-19	6	Procambarus sp.		3
2812	City Park	Sagi-1	2022-07-19	7	Etheostoma fonticola	26	1
2812	City Park	Sagi-1	2022-07-19	7	Etheostoma fonticola	27	1
2812	City Park	Sagi-1	2022-07-19	7	Etheostoma fonticola	25	1
2812	City Park	Sagi-1	2022-07-19	7	Etheostoma fonticola	24	1
2812	City Park	Sagi-1	2022-07-19	7	Procambarus sp.		1
2812	City Park	Sagi-1	2022-07-19	8	Etheostoma fonticola	26	1
2812	City Park	Sagi-1	2022-07-19	9	Procambarus sp.		1
2812	City Park	Sagi-1	2022-07-19	9	No fish collected		
2812	City Park	Sagi-1	2022-07-19	10	No fish collected		
2812	City Park	Sagi-1	2022-07-19	11	No fish collected		
2812	City Park	Sagi-1	2022-07-19	12	Etheostoma fonticola	29	1
2812	City Park	Sagi-1	2022-07-19	13	No fish collected		
2812	City Park	Sagi-1	2022-07-19	14	No fish collected		
2812	City Park	Sagi-1	2022-07-19	15	No fish collected		
2813	City Park	Sagi-2	2022-07-19	14	No fish collected		
2813	City Park	Sagi-2	2022-07-19	15	No fish collected		
2813	City Park	Sagi-2	2022-07-19	1	Etheostoma fonticola	35	1

2813	City Park	Sagi-2	2022-07-19	1	Etheostoma fonticola	25	1
2813	City Park	Sagi-2	2022-07-19	2	No fish collected		
2813	City Park	Sagi-2	2022-07-19	3	No fish collected		
2813	City Park	Sagi-2	2022-07-19	4	No fish collected		
2813	City Park	Sagi-2	2022-07-19	5	Etheostoma fonticola	29	1
2813	City Park	Sagi-2	2022-07-19	5	Procambarus sp.		1
2813	City Park	Sagi-2	2022-07-19	6	No fish collected		
2813	City Park	Sagi-2	2022-07-19	7	No fish collected		
2813	City Park	Sagi-2	2022-07-19	8	Etheostoma fonticola	30	1
2813	City Park	Sagi-2	2022-07-19	9	No fish collected		
2813	City Park	Sagi-2	2022-07-19	10	No fish collected		
2813	City Park	Sagi-2	2022-07-19	11	No fish collected		
2813	City Park	Sagi-2	2022-07-19	12	No fish collected		
2813	City Park	Sagi-2	2022-07-19	13	No fish collected		
2814	City Park	Open-1	2022-07-19	1	No fish collected		
2814	City Park	Open-1	2022-07-19	2	No fish collected		
2814	City Park	Open-1	2022-07-19	3	No fish collected		
2814	City Park	Open-1	2022-07-19	4	No fish collected		
2814	City Park	Open-1	2022-07-19	5	No fish collected		
2814	City Park	Open-1	2022-07-19	6	No fish collected		
2814	City Park	Open-1	2022-07-19	7	No fish collected		
2814	City Park	Open-1	2022-07-19	8	No fish collected		
2814	City Park	Open-1	2022-07-19	9	No fish collected		
2814	City Park	Open-1	2022-07-19	10	No fish collected		
2815	City Park	Open-2	2022-07-19	1	No fish collected		
2815	City Park	Open-2	2022-07-19	2	No fish collected		
2815	City Park	Open-2	2022-07-19	3	No fish collected		
2815	City Park	Open-2	2022-07-19	4	No fish collected		
2815	City Park	Open-2	2022-07-19	5	No fish collected		
2815	City Park	Open-2	2022-07-19	6	No fish collected		
2815	City Park	Open-2	2022-07-19	7	No fish collected		
2815	City Park	Open-2	2022-07-19	8	No fish collected		
2815	City Park	Open-2	2022-07-19	9	No fish collected		
2815	City Park	Open-2	2022-07-19	10	No fish collected		
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	34	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	41	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	10	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	14	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	31	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	12	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	14	1

2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	15	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	16	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	18	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	15	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	18	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	10	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	10	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	12	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	13	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	11	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	12	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	11	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	17	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	9	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	12	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	13	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	12	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	12	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	10	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	11	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	14	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	10	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	13	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	9	1
2816	City Park	Cabo-1	2022-07-19	1	Gambusia sp.	11	1
2816	City Park	Cabo-1	2022-07-19	1	Poecilia latipinna	27	1
2816	City Park	Cabo-1	2022-07-19	1	Poecilia latipinna	23	1
2816	City Park	Cabo-1	2022-07-19	1	Poecilia latipinna	28	1
2816	City Park	Cabo-1	2022-07-19	1	Poecilia latipinna	25	1
2816	City Park	Cabo-1	2022-07-19	1	Poecilia latipinna	20	1
2816	City Park	Cabo-1	2022-07-19	1	Herichthys cyanoguttatus	25	1
2816	City Park	Cabo-1	2022-07-19	1	Herichthys cyanoguttatus	20	1
2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	25	1
2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	12	1
2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	13	1
2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	14	1
2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	13	1
2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	13	1
2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	28	1
2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	22	1
2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	19	1

2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	20	1
2816	City Park	Cabo-1	2022-07-19	1	Etheostoma fonticola	28	1
2816	City Park	Cabo-1	2022-07-19	1	Ameiurus natalis	21	1
2816	City Park	Cabo-1	2022-07-19	1	Palaemonetes sp.		1
2816	City Park	Cabo-1	2022-07-19	1	Procambarus sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Procambarus sp.		3
2816	City Park	Cabo-1	2022-07-19	2	Palaemonetes sp.		2
2816	City Park	Cabo-1	2022-07-19	2	Etheostoma fonticola	23	1
2816	City Park	Cabo-1	2022-07-19	2	Etheostoma fonticola	35	1
2816	City Park	Cabo-1	2022-07-19	2	Etheostoma fonticola	24	1
2816	City Park	Cabo-1	2022-07-19	2	Etheostoma fonticola	19	1
2816	City Park	Cabo-1	2022-07-19	2	Etheostoma fonticola	30	1
2816	City Park	Cabo-1	2022-07-19	2	Etheostoma fonticola	19	1
2816	City Park	Cabo-1	2022-07-19	2	Etheostoma fonticola	27	1
2816	City Park	Cabo-1	2022-07-19	2	Poecilia latipinna	26	1
2816	City Park	Cabo-1	2022-07-19	2	Poecilia latipinna	32	1
2816	City Park	Cabo-1	2022-07-19	2	Poecilia latipinna	26	1
2816	City Park	Cabo-1	2022-07-19	2	Poecilia latipinna	24	1
2816	City Park	Cabo-1	2022-07-19	2	Poecilia latipinna	18	1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1

2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	2	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Ameiurus natalis	68	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	26	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	18	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	30	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	27	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	29	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	28	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	25	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	24	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	24	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	26	1
2816	City Park	Cabo-1	2022-07-19	3	Etheostoma fonticola	27	1
2816	City Park	Cabo-1	2022-07-19	3	Poecilia latipinna	18	1
2816	City Park	Cabo-1	2022-07-19	3	Herichthys cyanoguttatus	24	1
2816	City Park	Cabo-1	2022-07-19	3	Herichthys cyanoguttatus	26	1
2816	City Park	Cabo-1	2022-07-19	3	Procambarus sp.		1
2816	City Park	Cabo-1	2022-07-19	3	Palaemonetes sp.		1
2816	City Park	Cabo-1	2022-07-19	4	Procambarus sp.		1
2816	City Park	Cabo-1	2022-07-19	4	Etheostoma fonticola	19	1
2816	City Park	Cabo-1	2022-07-19	4	Etheostoma fonticola	22	1
2816	City Park	Cabo-1	2022-07-19	4	Etheostoma fonticola	24	1
2816	City Park	Cabo-1	2022-07-19	4	Etheostoma fonticola	31	1
2816	City Park	Cabo-1	2022-07-19	4	Etheostoma fonticola	28	1
2816	City Park	Cabo-1	2022-07-19	4	Etheostoma fonticola	32	1
2816	City Park	Cabo-1	2022-07-19	4	Etheostoma fonticola	26	1
2816	City Park	Cabo-1	2022-07-19	4	Poecilia latipinna	25	1
2816	City Park	Cabo-1	2022-07-19	4	Poecilia latipinna	25	1
2816	City Park	Cabo-1	2022-07-19	4	Poecilia latipinna	23	1

2816	City Park	Cabo-1	2022-07-19	4	Herichthys cyanoguttatus	26	1
2816	City Park	Cabo-1	2022-07-19	4	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	4	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	4	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	4	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	4	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	4	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	4	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	4	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	5	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	5	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	5	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	5	Procambarus sp.		1
2816	City Park	Cabo-1	2022-07-19	5	Herichthys cyanoguttatus	30	1
2816	City Park	Cabo-1	2022-07-19	5	Etheostoma fonticola	30	1
2816	City Park	Cabo-1	2022-07-19	5	Etheostoma fonticola	24	1
2816	City Park	Cabo-1	2022-07-19	5	Poecilia latipinna	21	1
2816	City Park	Cabo-1	2022-07-19	6	Lepomis miniatus	86	1
2816	City Park	Cabo-1	2022-07-19	6	Etheostoma fonticola	29	1
2816	City Park	Cabo-1	2022-07-19	6	Etheostoma fonticola	27	1
2816	City Park	Cabo-1	2022-07-19	6	Poecilia latipinna	25	1
2816	City Park	Cabo-1	2022-07-19	6	Procambarus sp.		1
2816	City Park	Cabo-1	2022-07-19	6	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	7	Procambarus sp.		1
2816	City Park	Cabo-1	2022-07-19	7	Palaemonetes sp.		1
2816	City Park	Cabo-1	2022-07-19	7	Etheostoma fonticola	25	1
2816	City Park	Cabo-1	2022-07-19	7	Etheostoma fonticola	28	1
2816	City Park	Cabo-1	2022-07-19	7	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	7	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	8	Lepomis miniatus	29	1
2816	City Park	Cabo-1	2022-07-19	8	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	8	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	9	Palaemonetes sp.		1
2816	City Park	Cabo-1	2022-07-19	9	No fish collected		
2816	City Park	Cabo-1	2022-07-19	10	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	10	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	10	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	11	Etheostoma fonticola	26	1
2816	City Park	Cabo-1	2022-07-19	11	Etheostoma fonticola	26	1
2816	City Park	Cabo-1	2022-07-19	12	Etheostoma fonticola	31	1
2816	City Park	Cabo-1	2022-07-19	12	Gambusia sp.		1

2816	City Park	Cabo-1	2022-07-19	12	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	12	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	12	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	12	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	12	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	12	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	12	Gambusia sp.		1
2816	City Park	Cabo-1	2022-07-19	13	Ameiurus natalis	82	1
2816	City Park	Cabo-1	2022-07-19	14	No fish collected		
2816	City Park	Cabo-1	2022-07-19	15	No fish collected		
2817	City Park	Cab-2	2022-07-19	1	Herichthys cyanoguttatus	23	1
2817	City Park	Cab-2	2022-07-19	2	Procambarus sp.		1
2817	City Park	Cab-2	2022-07-19	2	Etheostoma fonticola	25	1
2817	City Park	Cab-2	2022-07-19	2	Etheostoma fonticola	27	1
2817	City Park	Cab-2	2022-07-19	2	Etheostoma fonticola	22	1
2817	City Park	Cab-2	2022-07-19	2	Etheostoma fonticola	25	1
2817	City Park	Cab-2	2022-07-19	2	Lepomis sp.	12	1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1

2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	2	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Procambarus sp.		1
2817	City Park	Cab-2	2022-07-19	3	Astyanax mexicanus	37	1
2817	City Park	Cab-2	2022-07-19	3	Lepomis miniatus	142	1
2817	City Park	Cab-2	2022-07-19	3	Etheostoma fonticola	23	1
2817	City Park	Cab-2	2022-07-19	3	Etheostoma fonticola	25	1
2817	City Park	Cab-2	2022-07-19	3	Etheostoma fonticola	21	1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	3	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Etheostoma fonticola	25	1
2817	City Park	Cab-2	2022-07-19	4	Etheostoma fonticola	19	1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1

2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	4	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	5	Herichthys cyanoguttatus	20	1
2817	City Park	Cab-2	2022-07-19	5	Poecilia latipinna	16	1
2817	City Park	Cab-2	2022-07-19	5	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	5	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	5	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	5	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	5	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	5	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	5	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	5	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	5	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	6	Etheostoma fonticola	22	1

2817	City Park	Cab-2	2022-07-19	6	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	6	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	6	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	16	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	16	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	21	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	16	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	11	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	24	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	29	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	32	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	14	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	20	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	18	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	19	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	23	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	17	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	24	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	25	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	17	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	19	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	14	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	15	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	14	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	10	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	12	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	13	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	15	1
2817	City Park	Cab-2	2022-07-19	1	Gambusia sp.	10	1
2817	City Park	Cab-2	2022-07-19	1	Poecilia latipinna	17	1
2817	City Park	Cab-2	2022-07-19	1	Etheostoma fonticola	21	1
2817	City Park	Cab-2	2022-07-19	1	Etheostoma fonticola	19	1
2817	City Park	Cab-2	2022-07-19	6	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	6	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	6	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	6	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	6	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	6	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	6	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	7	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	7	Gambusia sp.		1

2817	City Park	Cab-2	2022-07-19	7	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	7	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	7	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	7	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	7	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	7	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	7	Etheostoma fonticola	31	1
2817	City Park	Cab-2	2022-07-19	7	Etheostoma fonticola	28	1
2817	City Park	Cab-2	2022-07-19	7	Palaemonetes sp.		1
2817	City Park	Cab-2	2022-07-19	7	Procambarus sp.		1
2817	City Park	Cab-2	2022-07-19	7	Herichthys cyanoguttatus	29	1
2817	City Park	Cab-2	2022-07-19	8	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	8	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	8	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	8	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	8	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	8	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	8	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	8	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	8	Etheostoma fonticola	20	1
2817	City Park	Cab-2	2022-07-19	9	Etheostoma fonticola	28	1
2817	City Park	Cab-2	2022-07-19	9	Etheostoma fonticola	24	1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1

2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Etheostoma fonticola	21	1
2817	City Park	Cab-2	2022-07-19	10	Etheostoma fonticola	23	1
2817	City Park	Cab-2	2022-07-19	10	Lepomis sp.	13	1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	10	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	11	Etheostoma fonticola	20	1
2817	City Park	Cab-2	2022-07-19	11	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	11	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	11	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	11	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	11	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	11	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	11	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	11	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	11	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	11	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	12	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	12	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	12	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	12	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	12	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	12	Gambusia sp.		1

2817	City Park	Cab-2	2022-07-19	12	Etheostoma fonticola	21	1
2817	City Park	Cab-2	2022-07-19	12	Etheostoma fonticola	25	1
2817	City Park	Cab-2	2022-07-19	12	Etheostoma fonticola	25	1
2817	City Park	Cab-2	2022-07-19	13	No fish collected		
2817	City Park	Cab-2	2022-07-19	14	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	14	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	14	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	14	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	14	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	14	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	15	Palaemonetes sp.		1
2817	City Park	Cab-2	2022-07-19	15	Etheostoma fonticola	25	1
2817	City Park	Cab-2	2022-07-19	15	Herichthys cyanoguttatus	26	1
2817	City Park	Cab-2	2022-07-19	15	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	15	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	15	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	15	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	15	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	16	Procambarus sp.		1
2817	City Park	Cab-2	2022-07-19	16	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	16	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	16	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	16	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	16	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	16	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	9	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	16	Etheostoma fonticola	12	1
2817	City Park	Cab-2	2022-07-19	16	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	17	Procambarus sp.		1
2817	City Park	Cab-2	2022-07-19	17	Etheostoma fonticola	35	1
2817	City Park	Cab-2	2022-07-19	17	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	17	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	17	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	17	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	17	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	18	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	18	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	18	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	18	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	18	Gambusia sp.		1

2817	City Park	Cab-2	2022-07-19	18	Etheostoma fonticola	17	1
2817	City Park	Cab-2	2022-07-19	19	Gambusia sp.		1
2817	City Park	Cab-2	2022-07-19	19	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	11	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	26	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	15	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	10	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	17	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	18	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	10	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	20	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	25	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	21	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	20	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	11	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	12	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	11	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	10	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	1	Procambarus sp.		8
2834	City Park	Cabo-1	2022-10-10	2	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	2	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	2	Gambusia sp.		1

2834	City Park	Cabo-1	2022-10-10	2	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	2	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	2	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	2	Etheostoma fonticola	26	1
2834	City Park	Cabo-1	2022-10-10	2	Etheostoma fonticola	29	1
2834	City Park	Cabo-1	2022-10-10	2	Etheostoma fonticola	17	1
2834	City Park	Cabo-1	2022-10-10	2	Palaemonetes sp.		1
2834	City Park	Cabo-1	2022-10-10	3	Notropis amabilis	45	1
2834	City Park	Cabo-1	2022-10-10	3	Notropis amabilis	42	1
2834	City Park	Cabo-1	2022-10-10	3	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	3	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	3	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	3	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	3	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	3	Etheostoma fonticola	24	1
2834	City Park	Cabo-1	2022-10-10	3	Etheostoma fonticola	24	1
2834	City Park	Cabo-1	2022-10-10	3	Etheostoma fonticola	27	1
2834	City Park	Cabo-1	2022-10-10	3	Etheostoma fonticola	25	1
2834	City Park	Cabo-1	2022-10-10	3	Herichthys cyanoguttatus	13	1
2834	City Park	Cabo-1	2022-10-10	3	Procambarus sp.		2
2834	City Park	Cabo-1	2022-10-10	3	Palaemonetes sp.		1
2834	City Park	Cabo-1	2022-10-10	4	Etheostoma fonticola	25	1
2834	City Park	Cabo-1	2022-10-10	4	Etheostoma fonticola	25	1
2834	City Park	Cabo-1	2022-10-10	4	Etheostoma fonticola	26	1
2834	City Park	Cabo-1	2022-10-10	4	Etheostoma fonticola	27	1
2834	City Park	Cabo-1	2022-10-10	4	Procambarus sp.		2
2834	City Park	Cabo-1	2022-10-10	5	Lepomis miniatus	151	1
2834	City Park	Cabo-1	2022-10-10	5	Etheostoma fonticola	32	1
2834	City Park	Cabo-1	2022-10-10	5	Etheostoma fonticola	20	1
2834	City Park	Cabo-1	2022-10-10	5	Etheostoma fonticola	23	1
2834	City Park	Cabo-1	2022-10-10	5	Etheostoma fonticola	26	1
2834	City Park	Cabo-1	2022-10-10	5	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	5	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	6	Procambarus sp.		6
2834	City Park	Cabo-1	2022-10-10	6	Etheostoma fonticola	21	1
2834	City Park	Cabo-1	2022-10-10	6	Etheostoma fonticola	21	1
2834	City Park	Cabo-1	2022-10-10	6	Etheostoma fonticola	26	1
2834	City Park	Cabo-1	2022-10-10	6	Etheostoma fonticola	25	1
2834	City Park	Cabo-1	2022-10-10	6	Etheostoma fonticola	29	1
2834	City Park	Cabo-1	2022-10-10	6	Etheostoma fonticola	34	1
2834	City Park	Cabo-1	2022-10-10	6	Etheostoma fonticola	12	1

2834	City Park	Cabo-1	2022-10-10	6	Gambusia sp.		1
2834	City Park	Cabo-1	2022-10-10	6	Lepomis miniatus	38	1
2834	City Park	Cabo-1	2022-10-10	7	Procambarus sp.		3
2834	City Park	Cabo-1	2022-10-10	7	Etheostoma fonticola	35	1
2834	City Park	Cabo-1	2022-10-10	8	Etheostoma fonticola	21	1
2834	City Park	Cabo-1	2022-10-10	9	Notropis amabilis	45	1
2834	City Park	Cabo-1	2022-10-10	10	Etheostoma fonticola	31	1
2834	City Park	Cabo-1	2022-10-10	10	Etheostoma fonticola	29	1
2834	City Park	Cabo-1	2022-10-10	10	Etheostoma fonticola	26	1
2834	City Park	Cabo-1	2022-10-10	11	Etheostoma fonticola	30	1
2834	City Park	Cabo-1	2022-10-10	12	Notropis amabilis	36	1
2834	City Park	Cabo-1	2022-10-10	12	Etheostoma fonticola	32	1
2834	City Park	Cabo-1	2022-10-10	12	Etheostoma fonticola	31	1
2834	City Park	Cabo-1	2022-10-10	13	No fish collected		
2834	City Park	Cabo-1	2022-10-10	14	Etheostoma fonticola	14	1
2834	City Park	Cabo-1	2022-10-10	15	No fish collected		
2834	City Park	Cabo-1	2022-10-10	1	Lepomis miniatus	20	1
2834	City Park	Cabo-1	2022-10-10	1	Herichthys cyanoguttatus	25	1
2834	City Park	Cabo-1	2022-10-10	1	Herichthys cyanoguttatus	20	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	28	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	25	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	24	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	23	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	30	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	31	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	23	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	20	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	24	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	27	1
2834	City Park	Cabo-1	2022-10-10	1	Etheostoma fonticola	36	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	10	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	11	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	18	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	31	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	18	1
2834	City Park	Cabo-1	2022-10-10	1	Gambusia sp.	19	1
2835	City Park	Cab-2	2022-10-10	1	Gambusia sp.	28	1
2835	City Park	Cab-2	2022-10-10	1	Gambusia sp.	10	1
2835	City Park	Cab-2	2022-10-10	1	Gambusia sp.	10	1
2835	City Park	Cab-2	2022-10-10	1	Gambusia sp.	5	1
2835	City Park	Cab-2	2022-10-10	1	Gambusia sp.	19	1

2835	City Park	Cab-2	2022-10-10	1	Etheostoma fonticola	27	1
2835	City Park	Cab-2	2022-10-10	1	Etheostoma fonticola	28	1
2835	City Park	Cab-2	2022-10-10	1	Etheostoma fonticola	18	1
2835	City Park	Cab-2	2022-10-10	1	Etheostoma fonticola	15	1
2835	City Park	Cab-2	2022-10-10	1	Etheostoma fonticola	25	1
2835	City Park	Cab-2	2022-10-10	1	Etheostoma fonticola	29	1
2835	City Park	Cab-2	2022-10-10	1	Procambarus sp.		10
2835	City Park	Cab-2	2022-10-10	1	Palaemonetes sp.		1
2835	City Park	Cab-2	2022-10-10	2	Etheostoma fonticola	32	1
2835	City Park	Cab-2	2022-10-10	2	Etheostoma fonticola	30	1
2835	City Park	Cab-2	2022-10-10	2	Etheostoma fonticola	28	1
2835	City Park	Cab-2	2022-10-10	2	Etheostoma fonticola	31	1
2835	City Park	Cab-2	2022-10-10	2	Etheostoma fonticola	15	1
2835	City Park	Cab-2	2022-10-10	2	Gambusia sp.		1
2835	City Park	Cab-2	2022-10-10	2	Procambarus sp.		6
2835	City Park	Cab-2	2022-10-10	2	Palaemonetes sp.		1
2835	City Park	Cab-2	2022-10-10	3	Gambusia sp.	15	1
2835	City Park	Cab-2	2022-10-10	3	Gambusia sp.	28	1
2835	City Park	Cab-2	2022-10-10	3	Gambusia sp.	27	1
2835	City Park	Cab-2	2022-10-10	3	Gambusia sp.	17	1
2835	City Park	Cab-2	2022-10-10	3	Gambusia sp.	10	1
2835	City Park	Cab-2	2022-10-10	3	Etheostoma fonticola	25	1
2835	City Park	Cab-2	2022-10-10	3	Etheostoma fonticola	26	1
2835	City Park	Cab-2	2022-10-10	3	Etheostoma fonticola	22	1
2835	City Park	Cab-2	2022-10-10	3	Etheostoma fonticola	20	1
2835	City Park	Cab-2	2022-10-10	3	Etheostoma fonticola	29	1
2835	City Park	Cab-2	2022-10-10	3	Etheostoma fonticola	16	1
2835	City Park	Cab-2	2022-10-10	3	Procambarus sp.		3
2835	City Park	Cab-2	2022-10-10	4	Etheostoma fonticola	30	1
2835	City Park	Cab-2	2022-10-10	4	Etheostoma fonticola	34	1
2835	City Park	Cab-2	2022-10-10	4	Etheostoma fonticola	32	1
2835	City Park	Cab-2	2022-10-10	4	Gambusia sp.	18	1
2835	City Park	Cab-2	2022-10-10	4	Procambarus sp.		8
2835	City Park	Cab-2	2022-10-10	5	Gambusia sp.	12	1
2835	City Park	Cab-2	2022-10-10	5	Procambarus sp.		1
2835	City Park	Cab-2	2022-10-10	6	Procambarus sp.		2
2835	City Park	Cab-2	2022-10-10	6	Etheostoma fonticola	27	1
2835	City Park	Cab-2	2022-10-10	7	Procambarus sp.		5
2835	City Park	Cab-2	2022-10-10	7	Etheostoma fonticola	15	1
2835	City Park	Cab-2	2022-10-10	7	Etheostoma fonticola	25	1
2835	City Park	Cab-2	2022-10-10	8	Procambarus sp.		1

2835	City Park	Cab-2	2022-10-10	8	Etheostoma fonticola	25	1
2835	City Park	Cab-2	2022-10-10	9	Etheostoma fonticola	26	1
2835	City Park	Cab-2	2022-10-10	9	Etheostoma fonticola	27	1
2835	City Park	Cab-2	2022-10-10	9	Etheostoma fonticola	23	1
2835	City Park	Cab-2	2022-10-10	9	Procambarus sp.		2
2835	City Park	Cab-2	2022-10-10	10	Procambarus sp.		1
2835	City Park	Cab-2	2022-10-10	10	No fish collected		
2835	City Park	Cab-2	2022-10-10	11	Etheostoma fonticola	24	1
2835	City Park	Cab-2	2022-10-10	11	Etheostoma fonticola	26	1
2835	City Park	Cab-2	2022-10-10	11	Procambarus sp.		2
2835	City Park	Cab-2	2022-10-10	12	Procambarus sp.		1
2835	City Park	Cab-2	2022-10-10	12	No fish collected		
2835	City Park	Cab-2	2022-10-10	13	No fish collected		
2835	City Park	Cab-2	2022-10-10	14	Etheostoma fonticola	29	1
2835	City Park	Cab-2	2022-10-10	14	Etheostoma fonticola	30	1
2835	City Park	Cab-2	2022-10-10	15	Etheostoma fonticola	27	1
2835	City Park	Cab-2	2022-10-10	16	No fish collected		
2836	City Park	Open-1	2022-10-10	1	No fish collected		
2836	City Park	Open-1	2022-10-10	2	No fish collected		
2836	City Park	Open-1	2022-10-10	3	No fish collected		
2836	City Park	Open-1	2022-10-10	4	No fish collected		
2836	City Park	Open-1	2022-10-10	5	No fish collected		
2836	City Park	Open-1	2022-10-10	6	No fish collected		
2836	City Park	Open-1	2022-10-10	7	No fish collected		
2836	City Park	Open-1	2022-10-10	8	No fish collected		
2836	City Park	Open-1	2022-10-10	9	No fish collected		
2836	City Park	Open-1	2022-10-10	10	No fish collected		
2837	City Park	Open-2	2022-10-10	1	No fish collected		
2837	City Park	Open-2	2022-10-10	2	No fish collected		
2837	City Park	Open-2	2022-10-10	3	No fish collected		
2837	City Park	Open-2	2022-10-10	4	No fish collected		
2837	City Park	Open-2	2022-10-10	5	No fish collected		
2837	City Park	Open-2	2022-10-10	6	No fish collected		
2837	City Park	Open-2	2022-10-10	7	No fish collected		
2837	City Park	Open-2	2022-10-10	8	No fish collected		
2837	City Park	Open-2	2022-10-10	9	No fish collected		
2837	City Park	Open-2	2022-10-10	10	No fish collected		
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	10	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	22	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	25	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	18	1

2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	13	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	11	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	34	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	18	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	21	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	21	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	22	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	16	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	17	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	18	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	20	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	17	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	10	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	10	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	10	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	11	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.	7	1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	1	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Etheostoma fonticola	23	1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1

2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	2	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	3	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	3	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	4	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	4	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	4	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	5	Lepomis miniatus	47	1
2838	City Park	Pota-1	2022-10-10	5	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	5	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	6	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	6	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	6	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	6	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	6	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	6	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	6	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	6	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	6	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	6	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	7	No fish collected		
2838	City Park	Pota-1	2022-10-10	8	Lepomis miniatus	97	1
2838	City Park	Pota-1	2022-10-10	8	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	8	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	8	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	9	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	9	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	9	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	10	No fish collected		
2838	City Park	Pota-1	2022-10-10	11	No fish collected		
2838	City Park	Pota-1	2022-10-10	12	No fish collected		
2838	City Park	Pota-1	2022-10-10	13	No fish collected		
2838	City Park	Pota-1	2022-10-10	14	Procambarus sp.		1
2838	City Park	Pota-1	2022-10-10	14	No fish collected		
2838	City Park	Pota-1	2022-10-10	15	Etheostoma fonticola	34	1
2838	City Park	Pota-1	2022-10-10	16	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	16	Gambusia sp.		1
2838	City Park	Pota-1	2022-10-10	16	Gambusia sp.		1

2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	11	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	13	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	16	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	17	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	16	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	25	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	12	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	11	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	11	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.		1

2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	18	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	15	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	20	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	15	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	15	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	11	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	15	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	17	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	12	1
2839	City Park	Pota-2	2022-10-10	1	Etheostoma fonticola	22	1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	2	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	3	Etheostoma fonticola	20	1
2839	City Park	Pota-2	2022-10-10	3	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	3	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	3	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	3	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	3	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	3	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	4	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	4	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	4	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	4	Gambusia sp.		1

2839	City Park	Pota-2	2022-10-10	4	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	12	1
2839	City Park	Pota-2	2022-10-10	1	Gambusia sp.	13	1
2839	City Park	Pota-2	2022-10-10	4	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	4	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	4	Etheostoma fonticola	19	1
2839	City Park	Pota-2	2022-10-10	5	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	5	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	5	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	6	Lepomis miniatus	45	1
2839	City Park	Pota-2	2022-10-10	6	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	6	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	6	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	6	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	7	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	7	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	7	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	7	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	7	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	7	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	7	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	7	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	7	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	8	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	8	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	8	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	8	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	9	No fish collected		
2839	City Park	Pota-2	2022-10-10	10	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	11	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	11	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	11	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	11	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	11	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	11	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	12	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	12	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	12	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	12	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	12	Gambusia sp.		1
2839	City Park	Pota-2	2022-10-10	13	No fish collected		

2839	City Park	Pota-2	2022-10-10	14	No fish collected		
2839	City Park	Pota-2	2022-10-10	15	Gambusia sp.		1
2761	I-35	Hyg-1	2022-04-27	1	Procambarus sp.		17
2761	I-35	Hyg-1	2022-04-27	1	Gambusia sp.	37	1
2761	I-35	Hyg-1	2022-04-27	1	Gambusia sp.	12	1
2761	I-35	Hyg-1	2022-04-27	1	Gambusia sp.	16	1
2761	I-35	Hyg-1	2022-04-27	1	Gambusia sp.	9	1
2761	I-35	Hyg-1	2022-04-27	1	Gambusia sp.	17	1
2761	I-35	Hyg-1	2022-04-27	1	Gambusia sp.	6	1
2761	I-35	Hyg-1	2022-04-27	1	Gambusia sp.	6	1
2761	I-35	Hyg-1	2022-04-27	1	Gambusia sp.	12	1
2761	I-35	Hyg-1	2022-04-27	1	Gambusia sp.	12	1
2761	I-35	Hyg-1	2022-04-27	1	Gambusia sp.	12	1
2761	I-35	Hyg-1	2022-04-27	1	Ambloplites rupestris	82	1
2761	I-35	Hyg-1	2022-04-27	1	Ambloplites rupestris	18	1
2761	I-35	Hyg-1	2022-04-27	1	Etheostoma fonticola	16	1
2761	I-35	Hyg-1	2022-04-27	1	Etheostoma fonticola	14	1
2761	I-35	Hyg-1	2022-04-27	1	Etheostoma fonticola	18	1
2761	I-35	Hyg-1	2022-04-27	1	Etheostoma fonticola	21	1
2761	I-35	Hyg-1	2022-04-27	1	Etheostoma fonticola	15	1
2761	I-35	Hyg-1	2022-04-27	1	Etheostoma fonticola	19	1
2761	I-35	Hyg-1	2022-04-27	2	Procambarus sp.		17
2761	I-35	Hyg-1	2022-04-27	2	Gambusia sp.	11	1
2761	I-35	Hyg-1	2022-04-27	2	Gambusia sp.	30	1
2761	I-35	Hyg-1	2022-04-27	2	Gambusia sp.	13	1
2761	I-35	Hyg-1	2022-04-27	2	Gambusia sp.	11	1
2761	I-35	Hyg-1	2022-04-27	2	Gambusia sp.	22	1
2761	I-35	Hyg-1	2022-04-27	2	Etheostoma fonticola	20	1
2761	I-35	Hyg-1	2022-04-27	2	Etheostoma fonticola	18	1
2761	I-35	Hyg-1	2022-04-27	2	Etheostoma fonticola	16	1
2761	I-35	Hyg-1	2022-04-27	2	Etheostoma fonticola	17	1
2761	I-35	Hyg-1	2022-04-27	2	Etheostoma fonticola	18	1
2761	I-35	Hyg-1	2022-04-27	2	Etheostoma fonticola	14	1
2761	I-35	Hyg-1	2022-04-27	2	Etheostoma fonticola	11	1
2761	I-35	Hyg-1	2022-04-27	2	Etheostoma fonticola	13	1
2761	I-35	Hyg-1	2022-04-27	3	Etheostoma fonticola	23	1
2761	I-35	Hyg-1	2022-04-27	3	Procambarus sp.		12
2761	I-35	Hyg-1	2022-04-27	3	Etheostoma fonticola	22	1
2761	I-35	Hyg-1	2022-04-27	3	Etheostoma fonticola	6	1
2761	I-35	Hyg-1	2022-04-27	3	Etheostoma fonticola	16	1
2761	I-35	Hyg-1	2022-04-27	3	Etheostoma fonticola	15	1

2761	I-35	Hyg-1	2022-04-27	3	Etheostoma fonticola	15	1
2761	I-35	Hyg-1	2022-04-27	3	Etheostoma fonticola	14	1
2761	I-35	Hyg-1	2022-04-27	3	Etheostoma fonticola	15	1
2761	I-35	Hyg-1	2022-04-27	3	Gambusia sp.	15	1
2761	I-35	Hyg-1	2022-04-27	3	Gambusia sp.	18	1
2761	I-35	Hyg-1	2022-04-27	3	Gambusia sp.	14	1
2761	I-35	Hyg-1	2022-04-27	3	Gambusia sp.	15	1
2761	I-35	Hyg-1	2022-04-27	4	Procambarus sp.		5
2761	I-35	Hyg-1	2022-04-27	4	Gambusia sp.	10	1
2761	I-35	Hyg-1	2022-04-27	4	Etheostoma fonticola	37	1
2761	I-35	Hyg-1	2022-04-27	5	Procambarus sp.		4
2761	I-35	Hyg-1	2022-04-27	5	Etheostoma fonticola	17	1
2761	I-35	Hyg-1	2022-04-27	6	Gambusia sp.		1
2761	I-35	Hyg-1	2022-04-27	7	Lepomis miniatus	62	1
2761	I-35	Hyg-1	2022-04-27	7	Procambarus sp.		1
2761	I-35	Hyg-1	2022-04-27	8	No fish collected		
2761	I-35	Hyg-1	2022-04-27	9	No fish collected		
2761	I-35	Hyg-1	2022-04-27	10	Procambarus sp.		3
2761	I-35	Hyg-1	2022-04-27	10	No fish collected		
2761	I-35	Hyg-1	2022-04-27	11	Etheostoma fonticola	21	1
2761	I-35	Hyg-1	2022-04-27	11	Procambarus sp.		1
2761	I-35	Hyg-1	2022-04-27	12	Procambarus sp.		1
2761	I-35	Hyg-1	2022-04-27	12	No fish collected		
2761	I-35	Hyg-1	2022-04-27	13	No fish collected		
2761	I-35	Hyg-1	2022-04-27	14	No fish collected		
2761	I-35	Hyg-1	2022-04-27	15	No fish collected		
2762	I-35	Sag-1	2022-04-27	1	Gambusia sp.	30	1
2762	I-35	Sag-1	2022-04-27	1	Gambusia sp.	35	1
2762	I-35	Sag-1	2022-04-27	1	Gambusia sp.	26	1
2762	I-35	Sag-1	2022-04-27	1	Gambusia sp.	17	1
2762	I-35	Sag-1	2022-04-27	1	Gambusia sp.	27	1
2762	I-35	Sag-1	2022-04-27	1	Gambusia sp.	17	1
2762	I-35	Sag-1	2022-04-27	1	Gambusia sp.	22	1
2762	I-35	Sag-1	2022-04-27	1	Gambusia sp.	30	1
2762	I-35	Sag-1	2022-04-27	1	Astyanax mexicanus	61	1
2762	I-35	Sag-1	2022-04-27	2	Procambarus sp.		1
2762	I-35	Sag-1	2022-04-27	2	Gambusia sp.	17	1
2762	I-35	Sag-1	2022-04-27	2	Gambusia sp.	18	1
2762	I-35	Sag-1	2022-04-27	2	Ambloplites rupestris	20	1
2762	I-35	Sag-1	2022-04-27	3	Procambarus sp.		3
2762	I-35	Sag-1	2022-04-27	3	Gambusia sp.	27	1

2762	I-35	Sag-1	2022-04-27	3	Gambusia sp.	10	1
2762	I-35	Sag-1	2022-04-27	4	Procambarus sp.		1
2762	I-35	Sag-1	2022-04-27	4	Gambusia sp.	19	1
2762	I-35	Sag-1	2022-04-27	5	No fish collected		
2762	I-35	Sag-1	2022-04-27	6	Gambusia sp.	44	1
2762	I-35	Sag-1	2022-04-27	7	No fish collected		
2762	I-35	Sag-1	2022-04-27	8	No fish collected		
2762	I-35	Sag-1	2022-04-27	9	No fish collected		
2762	I-35	Sag-1	2022-04-27	10	No fish collected		
2762	I-35	Sag-1	2022-04-27	11	Procambarus sp.		2
2762	I-35	Sag-1	2022-04-27	11	No fish collected		
2762	I-35	Sag-1	2022-04-27	12	No fish collected		
2762	I-35	Sag-1	2022-04-27	13	No fish collected		
2762	I-35	Sag-1	2022-04-27	14	No fish collected		
2762	I-35	Sag-1	2022-04-27	15	No fish collected		
2763	I-35	Hyg-2	2022-04-27	1	Procambarus sp.		29
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	14	1
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	41	1
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	11	1
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	12	1
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	15	1
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	15	1
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	19	1
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	18	1
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	27	1
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	10	1
2763	I-35	Hyg-2	2022-04-27	1	Gambusia sp.	6	1
2763	I-35	Hyg-2	2022-04-27	1	Etheostoma fonticola	38	1
2763	I-35	Hyg-2	2022-04-27	2	Procambarus sp.		8
2763	I-35	Hyg-2	2022-04-27	2	Gambusia sp.	27	1
2763	I-35	Hyg-2	2022-04-27	2	Gambusia sp.	20	1
2763	I-35	Hyg-2	2022-04-27	2	Gambusia sp.	9	1
2763	I-35	Hyg-2	2022-04-27	2	Gambusia sp.	22	1
2763	I-35	Hyg-2	2022-04-27	2	Gambusia sp.	12	1
2763	I-35	Hyg-2	2022-04-27	2	Gambusia sp.	13	1
2763	I-35	Hyg-2	2022-04-27	3	Procambarus sp.		11
2763	I-35	Hyg-2	2022-04-27	3	Gambusia sp.	40	1
2763	I-35	Hyg-2	2022-04-27	3	Gambusia sp.	38	1
2763	I-35	Hyg-2	2022-04-27	3	Gambusia sp.	21	1
2763	I-35	Hyg-2	2022-04-27	4	Procambarus sp.		5
2763	I-35	Hyg-2	2022-04-27	4	No fish collected		

2763	I-35	Hyg-2	2022-04-27	5	Procambarus sp.		3
2763	I-35	Hyg-2	2022-04-27	5	No fish collected		
2763	I-35	Hyg-2	2022-04-27	6	Procambarus sp.		1
2763	I-35	Hyg-2	2022-04-27	6	No fish collected		
2763	I-35	Hyg-2	2022-04-27	7	Procambarus sp.		3
2763	I-35	Hyg-2	2022-04-27	7	Gambusia sp.		1
2763	I-35	Hyg-2	2022-04-27	8	Procambarus sp.		3
2763	I-35	Hyg-2	2022-04-27	8	Etheostoma fonticola	33	1
2763	I-35	Hyg-2	2022-04-27	8	Etheostoma fonticola	33	1
2763	I-35	Hyg-2	2022-04-27	8	Gambusia sp.		1
2763	I-35	Hyg-2	2022-04-27	9	Procambarus sp.		4
2763	I-35	Hyg-2	2022-04-27	9	No fish collected		
2763	I-35	Hyg-2	2022-04-27	10	No fish collected		
2763	I-35	Hyg-2	2022-04-27	11	Procambarus sp.		4
2763	I-35	Hyg-2	2022-04-27	11	No fish collected		
2763	I-35	Hyg-2	2022-04-27	12	Etheostoma fonticola	37	1
2763	I-35	Hyg-2	2022-04-27	13	No fish collected		
2763	I-35	Hyg-2	2022-04-27	14	No fish collected		
2763	I-35	Hyg-2	2022-04-27	15	Procambarus sp.		1
2763	I-35	Hyg-2	2022-04-27	15	No fish collected		
2764	I-35	Sag-2	2022-04-27	1	Procambarus sp.		1
2764	I-35	Sag-2	2022-04-27	1	Gambusia sp.	40	1
2764	I-35	Sag-2	2022-04-27	1	Gambusia sp.	32	1
2764	I-35	Sag-2	2022-04-27	1	Gambusia sp.	21	1
2764	I-35	Sag-2	2022-04-27	1	Gambusia sp.	25	1
2764	I-35	Sag-2	2022-04-27	1	Gambusia sp.	21	1
2764	I-35	Sag-2	2022-04-27	1	Gambusia sp.	11	1
2764	I-35	Sag-2	2022-04-27	2	Gambusia sp.	20	1
2764	I-35	Sag-2	2022-04-27	3	Procambarus sp.		3
2764	I-35	Sag-2	2022-04-27	3	No fish collected		
2764	I-35	Sag-2	2022-04-27	4	Procambarus sp.		3
2764	I-35	Sag-2	2022-04-27	4	No fish collected		
2764	I-35	Sag-2	2022-04-27	5	Procambarus sp.		2
2764	I-35	Sag-2	2022-04-27	5	Lepomis miniatus	75	1
2764	I-35	Sag-2	2022-04-27	5	Gambusia sp.	25	1
2764	I-35	Sag-2	2022-04-27	6	No fish collected		
2764	I-35	Sag-2	2022-04-27	7	Procambarus sp.		1
2764	I-35	Sag-2	2022-04-27	7	No fish collected		
2764	I-35	Sag-2	2022-04-27	8	Procambarus sp.		2
2764	I-35	Sag-2	2022-04-27	8	No fish collected		
2764	I-35	Sag-2	2022-04-27	9	Lepomis miniatus	85	1

2764	I-35	Sag-2	2022-04-27	10	No fish collected		
2764	I-35	Sag-2	2022-04-27	11	Procambarus sp.		1
2764	I-35	Sag-2	2022-04-27	11	No fish collected		
2764	I-35	Sag-2	2022-04-27	12	No fish collected		
2764	I-35	Sag-2	2022-04-27	13	Procambarus sp.		2
2764	I-35	Sag-2	2022-04-27	13	No fish collected		
2764	I-35	Sag-2	2022-04-27	14	Gambusia sp.	14	1
2764	I-35	Sag-2	2022-04-27	15	No fish collected		
2765	I-35	Ziz-2	2022-04-27	1	Gambusia sp.		1
2765	I-35	Ziz-2	2022-04-27	1	Gambusia sp.		1
2765	I-35	Ziz-2	2022-04-27	1	Gambusia sp.		1
2765	I-35	Ziz-2	2022-04-27	1	Gambusia sp.		1
2765	I-35	Ziz-2	2022-04-27	2	Gambusia sp.		1
2765	I-35	Ziz-2	2022-04-27	3	No fish collected		
2765	I-35	Ziz-2	2022-04-27	4	Etheostoma fonticola		1
2765	I-35	Ziz-2	2022-04-27	4	Gambusia sp.		1
2765	I-35	Ziz-2	2022-04-27	4	Gambusia sp.		1
2765	I-35	Ziz-2	2022-04-27	4	Gambusia sp.		1
2765	I-35	Ziz-2	2022-04-27	5	Gambusia sp.		1
2765	I-35	Ziz-2	2022-04-27	6	No fish collected		
2765	I-35	Ziz-2	2022-04-27	7	No fish collected		
2765	I-35	Ziz-2	2022-04-27	8	No fish collected		
2765	I-35	Ziz-2	2022-04-27	9	No fish collected		
2765	I-35	Ziz-2	2022-04-27	10	No fish collected		
2765	I-35	Ziz-2	2022-04-27	11	Gambusia sp.		1
2765	I-35	Ziz-2	2022-04-27	12	No fish collected		
2765	I-35	Ziz-2	2022-04-27	13	No fish collected		
2765	I-35	Ziz-2	2022-04-27	14	No fish collected		
2765	I-35	Ziz-2	2022-04-27	15	No fish collected		
2766	I-35	Lud-1	2022-04-27	1	Procambarus sp.		2
2766	I-35	Lud-1	2022-04-27	1	Gambusia sp.	20	1
2766	I-35	Lud-1	2022-04-27	1	Gambusia sp.	18	1
2766	I-35	Lud-1	2022-04-27	1	Gambusia sp.	28	1
2766	I-35	Lud-1	2022-04-27	1	Gambusia sp.	22	1
2766	I-35	Lud-1	2022-04-27	1	Gambusia sp.	20	1
2766	I-35	Lud-1	2022-04-27	1	Gambusia sp.	17	1
2766	I-35	Lud-1	2022-04-27	1	Etheostoma fonticola	32	1
2766	I-35	Lud-1	2022-04-27	1	Etheostoma fonticola	20	1
2766	I-35	Lud-1	2022-04-27	1	Etheostoma fonticola	25	1
2766	I-35	Lud-1	2022-04-27	1	Etheostoma fonticola	17	1
2766	I-35	Lud-1	2022-04-27	2	Procambarus sp.		2

2766	I-35	Lud-1	2022-04-27	2	Gambusia sp.	30	1
2766	I-35	Lud-1	2022-04-27	2	Gambusia sp.	24	1
2766	I-35	Lud-1	2022-04-27	2	Gambusia sp.	19	1
2766	I-35	Lud-1	2022-04-27	2	Gambusia sp.	23	1
2766	I-35	Lud-1	2022-04-27	2	Gambusia sp.	28	1
2766	I-35	Lud-1	2022-04-27	2	Gambusia sp.	20	1
2766	I-35	Lud-1	2022-04-27	2	Gambusia sp.	22	1
2766	I-35	Lud-1	2022-04-27	2	Gambusia sp.	21	1
2766	I-35	Lud-1	2022-04-27	2	Gambusia sp.	17	1
2766	I-35	Lud-1	2022-04-27	2	Gambusia sp.	15	1
2766	I-35	Lud-1	2022-04-27	3	Procambarus sp.		2
2766	I-35	Lud-1	2022-04-27	3	Gambusia sp.	21	1
2766	I-35	Lud-1	2022-04-27	3	Gambusia sp.	17	1
2766	I-35	Lud-1	2022-04-27	3	Gambusia sp.	24	1
2766	I-35	Lud-1	2022-04-27	3	Gambusia sp.	15	1
2766	I-35	Lud-1	2022-04-27	3	Gambusia sp.	13	1
2766	I-35	Lud-1	2022-04-27	3	Gambusia sp.	26	1
2766	I-35	Lud-1	2022-04-27	4	No fish collected		
2766	I-35	Lud-1	2022-04-27	5	Procambarus sp.		1
2766	I-35	Lud-1	2022-04-27	5	Etheostoma fonticola	31	1
2766	I-35	Lud-1	2022-04-27	5	Gambusia sp.		1
2766	I-35	Lud-1	2022-04-27	6	Procambarus sp.		1
2766	I-35	Lud-1	2022-04-27	6	Gambusia sp.		1
2766	I-35	Lud-1	2022-04-27	6	Etheostoma fonticola	20	1
2766	I-35	Lud-1	2022-04-27	7	No fish collected		
2766	I-35	Lud-1	2022-04-27	8	Procambarus sp.		1
2766	I-35	Lud-1	2022-04-27	8	Etheostoma fonticola	33	1
2766	I-35	Lud-1	2022-04-27	9	Etheostoma fonticola	15	1
2766	I-35	Lud-1	2022-04-27	10	No fish collected		
2766	I-35	Lud-1	2022-04-27	11	No fish collected		
2766	I-35	Lud-1	2022-04-27	12	No fish collected		
2766	I-35	Lud-1	2022-04-27	13	No fish collected		
2766	I-35	Lud-1	2022-04-27	14	No fish collected		
2766	I-35	Lud-1	2022-04-27	15	No fish collected		
2767	I-35	Lud-2	2022-04-27	1	Procambarus sp.		5
2767	I-35	Lud-2	2022-04-27	1	Lepomis miniatus	45	1
2767	I-35	Lud-2	2022-04-27	1	Etheostoma fonticola	19	1
2767	I-35	Lud-2	2022-04-27	1	Etheostoma fonticola	17	1
2767	I-35	Lud-2	2022-04-27	1	Etheostoma fonticola	15	1
2767	I-35	Lud-2	2022-04-27	1	Etheostoma fonticola	13	1
2767	I-35	Lud-2	2022-04-27	1	Etheostoma fonticola	11	1

2767	I-35	Lud-2	2022-04-27	1	Etheostoma fonticola	18	1
2767	I-35	Lud-2	2022-04-27	1	Etheostoma fonticola	17	1
2767	I-35	Lud-2	2022-04-27	1	Etheostoma fonticola	13	1
2767	I-35	Lud-2	2022-04-27	2	Procambarus sp.		4
2767	I-35	Lud-2	2022-04-27	2	Etheostoma fonticola	20	1
2767	I-35	Lud-2	2022-04-27	2	Etheostoma fonticola	22	1
2767	I-35	Lud-2	2022-04-27	2	Gambusia sp.	21	1
2767	I-35	Lud-2	2022-04-27	2	Gambusia sp.	12	1
2767	I-35	Lud-2	2022-04-27	2	Gambusia sp.	13	1
2767	I-35	Lud-2	2022-04-27	2	Gambusia sp.	10	1
2767	I-35	Lud-2	2022-04-27	3	Procambarus sp.		2
2767	I-35	Lud-2	2022-04-27	3	Etheostoma fonticola	20	1
2767	I-35	Lud-2	2022-04-27	3	Etheostoma fonticola	17	1
2767	I-35	Lud-2	2022-04-27	4	Procambarus sp.		7
2767	I-35	Lud-2	2022-04-27	4	Etheostoma fonticola	21	1
2767	I-35	Lud-2	2022-04-27	5	Procambarus sp.		7
2767	I-35	Lud-2	2022-04-27	5	Gambusia sp.	18	1
2767	I-35	Lud-2	2022-04-27	5	Etheostoma fonticola	6	1
2767	I-35	Lud-2	2022-04-27	5	Etheostoma fonticola	15	1
2767	I-35	Lud-2	2022-04-27	6	Etheostoma fonticola	18	1
2767	I-35	Lud-2	2022-04-27	7	Procambarus sp.		4
2767	I-35	Lud-2	2022-04-27	7	Etheostoma fonticola	15	1
2767	I-35	Lud-2	2022-04-27	7	Etheostoma fonticola	17	1
2767	I-35	Lud-2	2022-04-27	8	No fish collected		
2767	I-35	Lud-2	2022-04-27	9	Procambarus sp.		3
2767	I-35	Lud-2	2022-04-27	9	Etheostoma fonticola	20	1
2767	I-35	Lud-2	2022-04-27	10	No fish collected		
2767	I-35	Lud-2	2022-04-27	11	Procambarus sp.		1
2767	I-35	Lud-2	2022-04-27	11	No fish collected		
2767	I-35	Lud-2	2022-04-27	12	No fish collected		
2767	I-35	Lud-2	2022-04-27	13	Procambarus sp.		2
2767	I-35	Lud-2	2022-04-27	13	No fish collected		
2767	I-35	Lud-2	2022-04-27	14	Procambarus sp.		1
2767	I-35	Lud-2	2022-04-27	14	No fish collected		
2767	I-35	Lud-2	2022-04-27	15	Procambarus sp.		1
2767	I-35	Lud-2	2022-04-27	15	No fish collected		
2768	I-35	Cab-2	2022-04-27	1	Micropterus salmoides	25	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	13	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	12	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	16	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	11	1

2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	19	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	21	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	14	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	11	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	12	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	19	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	15	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	14	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	12	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	11	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	10	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	13	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	15	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	10	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	18	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.	17	1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1

2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	1	Etheostoma fonticola	19	1
2768	I-35	Cab-2	2022-04-27	1	Etheostoma fonticola	18	1
2768	I-35	Cab-2	2022-04-27	1	Ambloplites rupestris	14	1
2768	I-35	Cab-2	2022-04-27	1	Notropis chalybaeus	13	1
2768	I-35	Cab-2	2022-04-27	1	Procambarus sp.		2
2768	I-35	Cab-2	2022-04-27	2	Procambarus sp.		6
2768	I-35	Cab-2	2022-04-27	2	Ambloplites rupestris	28	1
2768	I-35	Cab-2	2022-04-27	2	Ambloplites rupestris	20	1
2768	I-35	Cab-2	2022-04-27	2	Etheostoma fonticola	15	1
2768	I-35	Cab-2	2022-04-27	2	Etheostoma fonticola	21	1
2768	I-35	Cab-2	2022-04-27	2	Etheostoma fonticola	24	1
2768	I-35	Cab-2	2022-04-27	2	Etheostoma fonticola	11	1
2768	I-35	Cab-2	2022-04-27	2	Etheostoma fonticola	25	1
2768	I-35	Cab-2	2022-04-27	2	Etheostoma fonticola	17	1
2768	I-35	Cab-2	2022-04-27	2	Etheostoma fonticola	16	1
2768	I-35	Cab-2	2022-04-27	2	Etheostoma fonticola	19	1
2768	I-35	Cab-2	2022-04-27	2	Etheostoma fonticola	20	1
2768	I-35	Cab-2	2022-04-27	2	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	2	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	2	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	2	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	2	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	3	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	4	Procambarus sp.		1
2768	I-35	Cab-2	2022-04-27	4	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	5	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	5	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	5	Procambarus sp.		1
2768	I-35	Cab-2	2022-04-27	6	Procambarus sp.		4
2768	I-35	Cab-2	2022-04-27	6	Etheostoma fonticola	36	1
2768	I-35	Cab-2	2022-04-27	6	Etheostoma fonticola	15	1
2768	I-35	Cab-2	2022-04-27	6	Etheostoma fonticola	16	1
2768	I-35	Cab-2	2022-04-27	6	Ambloplites rupestris	20	1
2768	I-35	Cab-2	2022-04-27	7	Procambarus sp.		2
2768	I-35	Cab-2	2022-04-27	7	Etheostoma fonticola	19	1
2768	I-35	Cab-2	2022-04-27	8	Procambarus sp.		2
2768	I-35	Cab-2	2022-04-27	8	No fish collected		
2768	I-35	Cab-2	2022-04-27	9	Procambarus sp.		1

2768	I-35	Cab-2	2022-04-27	9	No fish collected		
2768	I-35	Cab-2	2022-04-27	10	No fish collected		
2768	I-35	Cab-2	2022-04-27	11	Procambarus sp.		1
2768	I-35	Cab-2	2022-04-27	11	No fish collected		
2768	I-35	Cab-2	2022-04-27	12	No fish collected		
2768	I-35	Cab-2	2022-04-27	13	No fish collected		
2768	I-35	Cab-2	2022-04-27	14	Procambarus sp.		1
2768	I-35	Cab-2	2022-04-27	14	Etheostoma fonticola	19	1
2768	I-35	Cab-2	2022-04-27	14	Gambusia sp.		1
2768	I-35	Cab-2	2022-04-27	15	No fish collected		
2768	I-35	Cab-2	2022-04-27	3	Procambarus sp.		1
2759	I-35	Cabo-1	2022-04-27	1	Procambarus sp.		18
2759	I-35	Cabo-1	2022-04-27	1	Ambloplites rupestris	16	1
2759	I-35	Cabo-1	2022-04-27	1	Ambloplites rupestris	17	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	18	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	35	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	38	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	18	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	15	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	18	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	9	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	10	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	9	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	11	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	12	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	12	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	8	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	12	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	9	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	10	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	10	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	10	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	12	1
2759	I-35	Cabo-1	2022-04-27	1	Gambusia sp.	14	1
2759	I-35	Cabo-1	2022-04-27	1	Lepomis sp.	12	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	30	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	18	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	19	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	19	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	18	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	20	1

2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	20	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	32	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	31	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	26	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	21	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	19	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	23	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	18	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	16	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	16	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	18	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	16	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	14	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	21	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	14	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	16	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	14	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	12	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	17	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	17	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	13	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	19	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	22	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	12	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	13	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	16	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	17	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	14	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	11	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	12	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	14	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	14	1

2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	11	1
2759	I-35	Cabo-1	2022-04-27	1	Etheostoma fonticola	14	1
2759	I-35	Cabo-1	2022-04-27	2	Procambarus sp.		8
2759	I-35	Cabo-1	2022-04-27	2	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	2	Ambloplites rupestris	15	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	20	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	17	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	20	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	27	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	11	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	22	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	19	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	11	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	12	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	19	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	12	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	20	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	21	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	17	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	13	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	21	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	14	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	12	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	13	1
2759	I-35	Cabo-1	2022-04-27	2	Etheostoma fonticola	11	1
2759	I-35	Cabo-1	2022-04-27	3	Procambarus sp.		7
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	3	Gambusia sp.		1

2759	I-35	Cabo-1	2022-04-27	3	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	3	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	3	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	3	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	3	Etheostoma fonticola	10	1
2759	I-35	Cabo-1	2022-04-27	4	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	4	Etheostoma fonticola	14	1
2759	I-35	Cabo-1	2022-04-27	4	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	4	Etheostoma fonticola	16	1
2759	I-35	Cabo-1	2022-04-27	5	Procambarus sp.		2
2759	I-35	Cabo-1	2022-04-27	5	Etheostoma fonticola	19	1
2759	I-35	Cabo-1	2022-04-27	5	Etheostoma fonticola	17	1
2759	I-35	Cabo-1	2022-04-27	5	Etheostoma fonticola	18	1
2759	I-35	Cabo-1	2022-04-27	5	Etheostoma fonticola	17	1
2759	I-35	Cabo-1	2022-04-27	6	Procambarus sp.		2
2759	I-35	Cabo-1	2022-04-27	6	Etheostoma fonticola	34	1
2759	I-35	Cabo-1	2022-04-27	6	Etheostoma fonticola	11	1
2759	I-35	Cabo-1	2022-04-27	6	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	7	Procambarus sp.		2
2759	I-35	Cabo-1	2022-04-27	7	Etheostoma fonticola	25	1
2759	I-35	Cabo-1	2022-04-27	7	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	7	Etheostoma fonticola	21	1
2759	I-35	Cabo-1	2022-04-27	8	Procambarus sp.		1
2759	I-35	Cabo-1	2022-04-27	8	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	8	Etheostoma fonticola	18	1
2759	I-35	Cabo-1	2022-04-27	8	Etheostoma fonticola	12	1
2759	I-35	Cabo-1	2022-04-27	9	Micropterus salmoides	15	1
2759	I-35	Cabo-1	2022-04-27	9	Procambarus sp.		1
2759	I-35	Cabo-1	2022-04-27	9	Etheostoma fonticola	29	1
2759	I-35	Cabo-1	2022-04-27	10	Etheostoma fonticola	30	1
2759	I-35	Cabo-1	2022-04-27	10	Etheostoma fonticola	18	1
2759	I-35	Cabo-1	2022-04-27	10	Procambarus sp.		1
2759	I-35	Cabo-1	2022-04-27	11	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	12	Etheostoma fonticola	36	1
2759	I-35	Cabo-1	2022-04-27	12	Etheostoma fonticola	26	1
2759	I-35	Cabo-1	2022-04-27	13	No fish collected		
2759	I-35	Cabo-1	2022-04-27	14	Procambarus sp.		1
2759	I-35	Cabo-1	2022-04-27	14	Etheostoma fonticola	16	1
2759	I-35	Cabo-1	2022-04-27	15	Procambarus sp.		2
2759	I-35	Cabo-1	2022-04-27	15	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	16	Etheostoma fonticola	23	1

2759	I-35	Cabo-1	2022-04-27	16	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	17	Etheostoma fonticola	17	1
2759	I-35	Cabo-1	2022-04-27	18	Etheostoma fonticola	18	1
2759	I-35	Cabo-1	2022-04-27	19	No fish collected		
2759	I-35	Cabo-1	2022-04-27	4	Procambarus sp.		4
2759	I-35	Cabo-1	2022-04-27	4	Gambusia sp.		1
2759	I-35	Cabo-1	2022-04-27	4	Etheostoma fonticola	15	1
2759	I-35	Cabo-1	2022-04-27	4	Etheostoma fonticola	16	1
2760	I-35	Ziz-1	2022-04-27	1	Procambarus sp.		2
2760	I-35	Ziz-1	2022-04-27	1	Astyanax mexicanus	70	1
2760	I-35	Ziz-1	2022-04-27	1	Gambusia sp.	25	1
2760	I-35	Ziz-1	2022-04-27	1	Gambusia sp.	25	1
2760	I-35	Ziz-1	2022-04-27	1	Gambusia sp.	38	1
2760	I-35	Ziz-1	2022-04-27	1	Gambusia sp.	26	1
2760	I-35	Ziz-1	2022-04-27	1	Gambusia sp.	18	1
2760	I-35	Ziz-1	2022-04-27	1	Gambusia sp.	20	1
2760	I-35	Ziz-1	2022-04-27	1	Gambusia sp.	18	1
2760	I-35	Ziz-1	2022-04-27	2	Gambusia sp.	21	1
2760	I-35	Ziz-1	2022-04-27	2	Gambusia sp.	17	1
2760	I-35	Ziz-1	2022-04-27	3	Gambusia sp.	25	1
2760	I-35	Ziz-1	2022-04-27	4	No fish collected		
2760	I-35	Ziz-1	2022-04-27	5	Gambusia sp.	17	1
2760	I-35	Ziz-1	2022-04-27	6	No fish collected		
2760	I-35	Ziz-1	2022-04-27	7	No fish collected		
2760	I-35	Ziz-1	2022-04-27	8	No fish collected		
2760	I-35	Ziz-1	2022-04-27	9	No fish collected		
2760	I-35	Ziz-1	2022-04-27	10	Ambloplites rupestris	77	1
2760	I-35	Ziz-1	2022-04-27	11	No fish collected		
2760	I-35	Ziz-1	2022-04-27	12	No fish collected		
2760	I-35	Ziz-1	2022-04-27	13	No fish collected		
2760	I-35	Ziz-1	2022-04-27	14	Gambusia sp.	45	1
2760	I-35	Ziz-1	2022-04-27	15	Gambusia sp.	17	1
2769	I-35	Open-1	2022-04-27	1	No fish collected		
2769	I-35	Open-1	2022-04-27	2	No fish collected		
2769	I-35	Open-1	2022-04-27	3	No fish collected		
2769	I-35	Open-1	2022-04-27	4	No fish collected		
2769	I-35	Open-1	2022-04-27	5	No fish collected		
2769	I-35	Open-1	2022-04-27	6	No fish collected		
2769	I-35	Open-1	2022-04-27	7	No fish collected		
2769	I-35	Open-1	2022-04-27	8	No fish collected		
2769	I-35	Open-1	2022-04-27	9	No fish collected		

2769	I-35	Open-1	2022-04-27	10	No fish collected		
2770	I-35	Open-2	2022-04-27	1	No fish collected		
2770	I-35	Open-2	2022-04-27	2	No fish collected		
2770	I-35	Open-2	2022-04-27	3	No fish collected		
2770	I-35	Open-2	2022-04-27	4	No fish collected		
2770	I-35	Open-2	2022-04-27	5	No fish collected		
2770	I-35	Open-2	2022-04-27	6	No fish collected		
2770	I-35	Open-2	2022-04-27	7	No fish collected		
2770	I-35	Open-2	2022-04-27	8	No fish collected		
2770	I-35	Open-2	2022-04-27	9	No fish collected		
2770	I-35	Open-2	2022-04-27	10	No fish collected		
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	20	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	20	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	21	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	24	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	25	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	26	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	25	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	15	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	12	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	24	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	14	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	14	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	22	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	25	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	25	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	26	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	26	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	28	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	20	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	25	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	30	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	30	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	25	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	27	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	30	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	33	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	33	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	37	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	18	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	15	1

2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	20	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	15	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	24	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	20	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	29	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	32	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.	14	1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	1	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	2	Procambarus sp.		1
2818	I-35	Cabo-1	2022-07-20	2	Lepomis sp.	20	1
2818	I-35	Cabo-1	2022-07-20	2	Palaemonetes sp.		1
2818	I-35	Cabo-1	2022-07-20	2	Etheostoma fonticola	25	1
2818	I-35	Cabo-1	2022-07-20	2	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	2	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	2	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	2	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	2	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	2	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	2	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	2	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	3	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	3	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	3	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	4	Lepomis miniatus	42	1
2818	I-35	Cabo-1	2022-07-20	4	Etheostoma fonticola	15	1
2818	I-35	Cabo-1	2022-07-20	5	Procambarus sp.		2

2818	I-35	Cabo-1	2022-07-20	5	No fish collected		
2818	I-35	Cabo-1	2022-07-20	6	No fish collected		
2818	I-35	Cabo-1	2022-07-20	7	Lepomis miniatus	95	1
2818	I-35	Cabo-1	2022-07-20	7	Procambarus sp.		1
2818	I-35	Cabo-1	2022-07-20	8	No fish collected		
2818	I-35	Cabo-1	2022-07-20	9	Procambarus sp.		1
2818	I-35	Cabo-1	2022-07-20	9	Etheostoma fonticola	35	1
2818	I-35	Cabo-1	2022-07-20	10	No fish collected		
2818	I-35	Cabo-1	2022-07-20	11	Etheostoma fonticola	18	1
2818	I-35	Cabo-1	2022-07-20	11	Etheostoma fonticola	18	1
2818	I-35	Cabo-1	2022-07-20	11	Procambarus sp.		1
2818	I-35	Cabo-1	2022-07-20	11	Micropterus salmoides	51	1
2818	I-35	Cabo-1	2022-07-20	12	No fish collected		
2818	I-35	Cabo-1	2022-07-20	13	Gambusia sp.		1
2818	I-35	Cabo-1	2022-07-20	14	Etheostoma fonticola	21	1
2818	I-35	Cabo-1	2022-07-20	15	Lepomis miniatus	70	1
2818	I-35	Cabo-1	2022-07-20	15	Lepomis miniatus	31	1
2818	I-35	Cabo-1	2022-07-20	15	Lepomis miniatus	89	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	29	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	32	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	32	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	15	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	17	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	12	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	30	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	18	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	17	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	18	1
2819	I-35	Cab-2	2022-07-20	1	Procambarus sp.		1
2819	I-35	Cab-2	2022-07-20	2	Gambusia sp.	30	1
2819	I-35	Cab-2	2022-07-20	2	Gambusia sp.	25	1
2819	I-35	Cab-2	2022-07-20	2	Gambusia sp.	23	1
2819	I-35	Cab-2	2022-07-20	2	Gambusia sp.	20	1
2819	I-35	Cab-2	2022-07-20	2	Ambloplites rupestris	13	1
2819	I-35	Cab-2	2022-07-20	3	Procambarus sp.		2
2819	I-35	Cab-2	2022-07-20	3	Gambusia sp.	12	1
2819	I-35	Cab-2	2022-07-20	3	Etheostoma fonticola	28	1
2819	I-35	Cab-2	2022-07-20	3	Etheostoma fonticola	21	1
2819	I-35	Cab-2	2022-07-20	4	Etheostoma fonticola	28	1
2819	I-35	Cab-2	2022-07-20	4	Etheostoma fonticola	33	1
2819	I-35	Cab-2	2022-07-20	4	Etheostoma fonticola	29	1

2819	I-35	Cab-2	2022-07-20	4	Gambusia sp.	22	1
2819	I-35	Cab-2	2022-07-20	5	Gambusia sp.	35	1
2819	I-35	Cab-2	2022-07-20	6	Procambarus sp.		1
2819	I-35	Cab-2	2022-07-20	6	No fish collected		
2819	I-35	Cab-2	2022-07-20	7	Procambarus sp.		1
2819	I-35	Cab-2	2022-07-20	7	Etheostoma fonticola	31	1
2819	I-35	Cab-2	2022-07-20	8	Procambarus sp.		1
2819	I-35	Cab-2	2022-07-20	8	No fish collected		
2819	I-35	Cab-2	2022-07-20	9	No fish collected		
2819	I-35	Cab-2	2022-07-20	10	No fish collected		
2819	I-35	Cab-2	2022-07-20	11	Procambarus sp.		1
2819	I-35	Cab-2	2022-07-20	11	Etheostoma fonticola	26	1
2819	I-35	Cab-2	2022-07-20	11	Lepomis sp.	15	1
2819	I-35	Cab-2	2022-07-20	12	Gambusia sp.		1
2819	I-35	Cab-2	2022-07-20	13	Etheostoma fonticola	27	1
2819	I-35	Cab-2	2022-07-20	14	No fish collected		
2819	I-35	Cab-2	2022-07-20	15	Etheostoma fonticola	20	1
2819	I-35	Cab-2	2022-07-20	16	Etheostoma fonticola	30	1
2819	I-35	Cab-2	2022-07-20	16	Procambarus sp.		2
2819	I-35	Cab-2	2022-07-20	17	Etheostoma fonticola	27	1
2819	I-35	Cab-2	2022-07-20	18	No fish collected		
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	25	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	25	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	31	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	28	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	19	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	20	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	20	1
2819	I-35	Cab-2	2022-07-20	1	Gambusia sp.	20	1
2820	I-35	Lud-1	2022-07-20	1	Procambarus sp.		4
2820	I-35	Lud-1	2022-07-20	1	Etheostoma fonticola	33	1
2820	I-35	Lud-1	2022-07-20	1	Etheostoma fonticola	25	1
2820	I-35	Lud-1	2022-07-20	1	Etheostoma fonticola	35	1
2820	I-35	Lud-1	2022-07-20	1	Etheostoma fonticola	14	1
2820	I-35	Lud-1	2022-07-20	1	Etheostoma fonticola	25	1
2820	I-35	Lud-1	2022-07-20	1	Etheostoma fonticola	18	1
2820	I-35	Lud-1	2022-07-20	1	Etheostoma fonticola	20	1
2820	I-35	Lud-1	2022-07-20	1	Gambusia sp.	15	1
2820	I-35	Lud-1	2022-07-20	1	Lepomis miniatus	80	1
2820	I-35	Lud-1	2022-07-20	2	Procambarus sp.		13
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	11	1

2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	14	1
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	15	1
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	15	1
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	32	1
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	25	1
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	12	1
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	23	1
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	24	1
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	17	1
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	17	1
2820	I-35	Lud-1	2022-07-20	2	Etheostoma fonticola	15	1
2820	I-35	Lud-1	2022-07-20	3	Procambarus sp.		2
2820	I-35	Lud-1	2022-07-20	3	No fish collected		
2820	I-35	Lud-1	2022-07-20	4	Procambarus sp.		4
2820	I-35	Lud-1	2022-07-20	4	Etheostoma fonticola	31	1
2820	I-35	Lud-1	2022-07-20	4	Etheostoma fonticola	28	1
2820	I-35	Lud-1	2022-07-20	4	Etheostoma fonticola	17	1
2820	I-35	Lud-1	2022-07-20	5	Gambusia sp.	25	1
2820	I-35	Lud-1	2022-07-20	5	Procambarus sp.		1
2820	I-35	Lud-1	2022-07-20	6	No fish collected		
2820	I-35	Lud-1	2022-07-20	7	No fish collected		
2820	I-35	Lud-1	2022-07-20	8	No fish collected		
2820	I-35	Lud-1	2022-07-20	9	Etheostoma fonticola	25	1
2820	I-35	Lud-1	2022-07-20	10	Procambarus sp.		2
2820	I-35	Lud-1	2022-07-20	10	Etheostoma fonticola	22	1
2820	I-35	Lud-1	2022-07-20	10	Etheostoma fonticola	31	1
2820	I-35	Lud-1	2022-07-20	11	No fish collected		
2820	I-35	Lud-1	2022-07-20	12	No fish collected		
2820	I-35	Lud-1	2022-07-20	13	No fish collected		
2820	I-35	Lud-1	2022-07-20	14	No fish collected		
2820	I-35	Lud-1	2022-07-20	15	No fish collected		
2821	I-35	Sagi-1	2022-07-20	1	Ambloplites rupestris	53	1
2821	I-35	Sagi-1	2022-07-20	1	Ambloplites rupestris	54	1
2821	I-35	Sagi-1	2022-07-20	1	Ambloplites rupestris	39	1
2821	I-35	Sagi-1	2022-07-20	1	Gambusia sp.	30	1
2821	I-35	Sagi-1	2022-07-20	1	Gambusia sp.	18	1
2821	I-35	Sagi-1	2022-07-20	1	Gambusia sp.	25	1
2821	I-35	Sagi-1	2022-07-20	1	Gambusia sp.	19	1
2821	I-35	Sagi-1	2022-07-20	1	Gambusia sp.	36	1
2821	I-35	Sagi-1	2022-07-20	1	Gambusia sp.	19	1
2821	I-35	Sagi-1	2022-07-20	1	Procambarus sp.		4

2821	I-35	Sagi-1	2022-07-20	2	Procambarus sp.		4
2821	I-35	Sagi-1	2022-07-20	2	Etheostoma fonticola	38	1
2821	I-35	Sagi-1	2022-07-20	2	Gambusia sp.	24	1
2821	I-35	Sagi-1	2022-07-20	2	Gambusia sp.	11	1
2821	I-35	Sagi-1	2022-07-20	3	Gambusia sp.	19	1
2821	I-35	Sagi-1	2022-07-20	4	Procambarus sp.		3
2821	I-35	Sagi-1	2022-07-20	4	No fish collected		
2821	I-35	Sagi-1	2022-07-20	5	Procambarus sp.		5
2821	I-35	Sagi-1	2022-07-20	5	Etheostoma fonticola	14	1
2821	I-35	Sagi-1	2022-07-20	6	Procambarus sp.		4
2821	I-35	Sagi-1	2022-07-20	6	Etheostoma fonticola	28	1
2821	I-35	Sagi-1	2022-07-20	7	Procambarus sp.		2
2821	I-35	Sagi-1	2022-07-20	7	No fish collected		
2821	I-35	Sagi-1	2022-07-20	8	Etheostoma fonticola	31	1
2821	I-35	Sagi-1	2022-07-20	8	Procambarus sp.		5
2821	I-35	Sagi-1	2022-07-20	9	Procambarus sp.		1
2821	I-35	Sagi-1	2022-07-20	9	No fish collected		
2821	I-35	Sagi-1	2022-07-20	10	Procambarus sp.		1
2821	I-35	Sagi-1	2022-07-20	10	No fish collected		
2821	I-35	Sagi-1	2022-07-20	11	Procambarus sp.		1
2821	I-35	Sagi-1	2022-07-20	11	No fish collected		
2821	I-35	Sagi-1	2022-07-20	12	Procambarus sp.		1
2821	I-35	Sagi-1	2022-07-20	12	No fish collected		
2821	I-35	Sagi-1	2022-07-20	13	Procambarus sp.		1
2821	I-35	Sagi-1	2022-07-20	13	No fish collected		
2821	I-35	Sagi-1	2022-07-20	14	Procambarus sp.		1
2821	I-35	Sagi-1	2022-07-20	14	No fish collected		
2821	I-35	Sagi-1	2022-07-20	15	Gambusia sp.	35	1
2822	I-35	Hyg-1	2022-07-20	1	Procambarus sp.		26
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	24	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	20	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	18	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	16	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	25	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	25	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	26	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	26	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	27	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	24	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	27	1
2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	20	1

2822	I-35	Hyg-1	2022-07-20	1	Etheostoma fonticola	21	1
2822	I-35	Hyg-1	2022-07-20	1	Gambusia sp.	15	1
2822	I-35	Hyg-1	2022-07-20	2	Procambarus sp.		12
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	37	1
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	31	1
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	31	1
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	31	1
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	20	1
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	32	1
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	28	1
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	34	1
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	26	1
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	27	1
2822	I-35	Hyg-1	2022-07-20	2	Etheostoma fonticola	24	1
2822	I-35	Hyg-1	2022-07-20	2	Gambusia sp.	22	1
2822	I-35	Hyg-1	2022-07-20	2	Gambusia sp.	16	1
2822	I-35	Hyg-1	2022-07-20	3	Procambarus sp.		6
2822	I-35	Hyg-1	2022-07-20	3	Gambusia sp.	17	1
2822	I-35	Hyg-1	2022-07-20	3	Etheostoma fonticola	28	1
2822	I-35	Hyg-1	2022-07-20	3	Etheostoma fonticola	25	1
2822	I-35	Hyg-1	2022-07-20	3	Etheostoma fonticola	23	1
2822	I-35	Hyg-1	2022-07-20	3	Etheostoma fonticola	26	1
2822	I-35	Hyg-1	2022-07-20	3	Etheostoma fonticola	23	1
2822	I-35	Hyg-1	2022-07-20	3	Etheostoma fonticola	27	1
2822	I-35	Hyg-1	2022-07-20	4	Procambarus sp.		3
2822	I-35	Hyg-1	2022-07-20	4	No fish collected		
2822	I-35	Hyg-1	2022-07-20	5	No fish collected		
2822	I-35	Hyg-1	2022-07-20	6	Etheostoma fonticola	28	1
2822	I-35	Hyg-1	2022-07-20	7	Etheostoma fonticola	23	1
2822	I-35	Hyg-1	2022-07-20	7	Etheostoma fonticola	26	1
2822	I-35	Hyg-1	2022-07-20	8	No fish collected		
2822	I-35	Hyg-1	2022-07-20	9	Procambarus sp.		1
2822	I-35	Hyg-1	2022-07-20	9	No fish collected		
2822	I-35	Hyg-1	2022-07-20	10	No fish collected		
2822	I-35	Hyg-1	2022-07-20	11	Procambarus sp.		1
2822	I-35	Hyg-1	2022-07-20	11	No fish collected		
2822	I-35	Hyg-1	2022-07-20	12	No fish collected		
2822	I-35	Hyg-1	2022-07-20	13	No fish collected		
2822	I-35	Hyg-1	2022-07-20	14	Etheostoma fonticola	32	1
2822	I-35	Hyg-1	2022-07-20	15	No fish collected		
2823	I-35	Sagi-2	2022-07-20	1	Procambarus sp.		7

2823	I-35	Sagi-2	2022-07-20	1	Etheostoma fonticola	32	1
2823	I-35	Sagi-2	2022-07-20	1	Etheostoma fonticola	37	1
2823	I-35	Sagi-2	2022-07-20	1	Etheostoma fonticola	29	1
2823	I-35	Sagi-2	2022-07-20	1	Etheostoma fonticola	24	1
2823	I-35	Sagi-2	2022-07-20	1	Gambusia sp.	32	1
2823	I-35	Sagi-2	2022-07-20	1	Gambusia sp.	35	1
2823	I-35	Sagi-2	2022-07-20	1	Gambusia sp.	13	1
2823	I-35	Sagi-2	2022-07-20	2	Procambarus sp.		4
2823	I-35	Sagi-2	2022-07-20	2	Gambusia sp.	33	1
2823	I-35	Sagi-2	2022-07-20	3	Procambarus sp.		9
2823	I-35	Sagi-2	2022-07-20	3	Etheostoma fonticola	36	1
2823	I-35	Sagi-2	2022-07-20	3	Etheostoma fonticola	25	1
2823	I-35	Sagi-2	2022-07-20	3	Ambloplites rupestris	37	1
2823	I-35	Sagi-2	2022-07-20	4	Procambarus sp.		3
2823	I-35	Sagi-2	2022-07-20	4	Etheostoma fonticola	30	1
2823	I-35	Sagi-2	2022-07-20	5	No fish collected		
2823	I-35	Sagi-2	2022-07-20	6	No fish collected		
2823	I-35	Sagi-2	2022-07-20	7	Procambarus sp.		1
2823	I-35	Sagi-2	2022-07-20	7	Etheostoma fonticola	27	1
2823	I-35	Sagi-2	2022-07-20	8	Lepomis miniatus	71	1
2823	I-35	Sagi-2	2022-07-20	8	Etheostoma fonticola	37	1
2823	I-35	Sagi-2	2022-07-20	9	Procambarus sp.		1
2823	I-35	Sagi-2	2022-07-20	9	No fish collected		
2823	I-35	Sagi-2	2022-07-20	10	No fish collected		
2823	I-35	Sagi-2	2022-07-20	11	No fish collected		
2823	I-35	Sagi-2	2022-07-20	12	Procambarus sp.		1
2823	I-35	Sagi-2	2022-07-20	12	No fish collected		
2823	I-35	Sagi-2	2022-07-20	13	Procambarus sp.		1
2823	I-35	Sagi-2	2022-07-20	13	No fish collected		
2823	I-35	Sagi-2	2022-07-20	14	Procambarus sp.		3
2823	I-35	Sagi-2	2022-07-20	14	No fish collected		
2823	I-35	Sagi-2	2022-07-20	15	No fish collected		
2824	I-35	Open-1	2022-07-20	1	No fish collected		
2824	I-35	Open-1	2022-07-20	2	No fish collected		
2824	I-35	Open-1	2022-07-20	3	No fish collected		
2824	I-35	Open-1	2022-07-20	4	Etheostoma fonticola	14	1
2824	I-35	Open-1	2022-07-20	5	No fish collected		
2824	I-35	Open-1	2022-07-20	6	No fish collected		
2824	I-35	Open-1	2022-07-20	7	No fish collected		
2824	I-35	Open-1	2022-07-20	8	No fish collected		
2824	I-35	Open-1	2022-07-20	9	No fish collected		

2824	I-35	Open-1	2022-07-20	10	No fish collected		
2824	I-35	Open-1	2022-07-20	11	No fish collected		
2824	I-35	Open-1	2022-07-20	12	No fish collected		
2824	I-35	Open-1	2022-07-20	13	No fish collected		
2824	I-35	Open-1	2022-07-20	14	No fish collected		
2824	I-35	Open-1	2022-07-20	15	No fish collected		
2825	I-35	Open-2	2022-07-20	1	No fish collected		
2825	I-35	Open-2	2022-07-20	2	No fish collected		
2825	I-35	Open-2	2022-07-20	3	No fish collected		
2825	I-35	Open-2	2022-07-20	4	No fish collected		
2825	I-35	Open-2	2022-07-20	5	No fish collected		
2825	I-35	Open-2	2022-07-20	6	No fish collected		
2825	I-35	Open-2	2022-07-20	7	No fish collected		
2825	I-35	Open-2	2022-07-20	8	No fish collected		
2825	I-35	Open-2	2022-07-20	9	No fish collected		
2825	I-35	Open-2	2022-07-20	10	No fish collected		
2840	I-35	Hyg-1	2022-10-11	1	Notropis amabilis	49	1
2840	I-35	Hyg-1	2022-10-11	1	Notropis amabilis	52	1
2840	I-35	Hyg-1	2022-10-11	1	Notropis amabilis	43	1
2840	I-35	Hyg-1	2022-10-11	1	Notropis amabilis	35	1
2840	I-35	Hyg-1	2022-10-11	1	Notropis amabilis	41	1
2840	I-35	Hyg-1	2022-10-11	1	Notropis amabilis	44	1
2840	I-35	Hyg-1	2022-10-11	1	Notropis amabilis	32	1
2840	I-35	Hyg-1	2022-10-11	1	Notropis amabilis	32	1
2840	I-35	Hyg-1	2022-10-11	1	Procambarus sp.		1
2840	I-35	Hyg-1	2022-10-11	2	Procambarus sp.		1
2840	I-35	Hyg-1	2022-10-11	2	Notropis amabilis	42	1
2840	I-35	Hyg-1	2022-10-11	2	Notropis amabilis	35	1
2840	I-35	Hyg-1	2022-10-11	2	Notropis amabilis	55	1
2840	I-35	Hyg-1	2022-10-11	2	Notropis amabilis	35	1
2840	I-35	Hyg-1	2022-10-11	2	Notropis amabilis	25	1
2840	I-35	Hyg-1	2022-10-11	2	Notropis amabilis	22	1
2840	I-35	Hyg-1	2022-10-11	2	Etheostoma fonticola	30	1
2840	I-35	Hyg-1	2022-10-11	2	Etheostoma fonticola	27	1
2840	I-35	Hyg-1	2022-10-11	2	Etheostoma fonticola	13	1
2840	I-35	Hyg-1	2022-10-11	2	Lepomis sp.	15	1
2840	I-35	Hyg-1	2022-10-11	2	Lepomis sp.	10	1
2840	I-35	Hyg-1	2022-10-11	2	Micropterus salmoides	98	1
2840	I-35	Hyg-1	2022-10-11	3	Notropis amabilis	51	1
2840	I-35	Hyg-1	2022-10-11	3	Notropis amabilis	31	1
2840	I-35	Hyg-1	2022-10-11	3	Notropis amabilis	32	1

2840	I-35	Hyg-1	2022-10-11	3	Notropis amabilis	16	1
2840	I-35	Hyg-1	2022-10-11	3	Etheostoma fonticola	20	1
2840	I-35	Hyg-1	2022-10-11	3	Etheostoma fonticola	33	1
2840	I-35	Hyg-1	2022-10-11	3	Etheostoma fonticola	29	1
2840	I-35	Hyg-1	2022-10-11	3	Etheostoma fonticola	15	1
2840	I-35	Hyg-1	2022-10-11	3	Gambusia sp.	10	1
2840	I-35	Hyg-1	2022-10-11	3	Procambarus sp.		2
2840	I-35	Hyg-1	2022-10-11	4	Etheostoma fonticola	22	1
2840	I-35	Hyg-1	2022-10-11	4	Etheostoma fonticola	32	1
2840	I-35	Hyg-1	2022-10-11	4	Procambarus sp.		3
2840	I-35	Hyg-1	2022-10-11	5	Etheostoma fonticola	24	1
2840	I-35	Hyg-1	2022-10-11	5	Procambarus sp.		2
2840	I-35	Hyg-1	2022-10-11	6	Notropis amabilis	48	1
2840	I-35	Hyg-1	2022-10-11	6	Lepomis miniatus	44	1
2840	I-35	Hyg-1	2022-10-11	6	Procambarus sp.		3
2840	I-35	Hyg-1	2022-10-11	7	No fish collected		
2840	I-35	Hyg-1	2022-10-11	8	Procambarus sp.		3
2840	I-35	Hyg-1	2022-10-11	8	Etheostoma fonticola	24	1
2840	I-35	Hyg-1	2022-10-11	8	Etheostoma fonticola	24	1
2840	I-35	Hyg-1	2022-10-11	9	Etheostoma fonticola	26	1
2840	I-35	Hyg-1	2022-10-11	9	Procambarus sp.		1
2840	I-35	Hyg-1	2022-10-11	10	Procambarus sp.		3
2840	I-35	Hyg-1	2022-10-11	10	Etheostoma fonticola	21	1
2840	I-35	Hyg-1	2022-10-11	10	Etheostoma fonticola	30	1
2840	I-35	Hyg-1	2022-10-11	11	Etheostoma fonticola	16	1
2840	I-35	Hyg-1	2022-10-11	11	Etheostoma fonticola	25	1
2840	I-35	Hyg-1	2022-10-11	11	Etheostoma fonticola	25	1
2840	I-35	Hyg-1	2022-10-11	12	Notropis amabilis	53	1
2840	I-35	Hyg-1	2022-10-11	12	Etheostoma fonticola	30	1
2840	I-35	Hyg-1	2022-10-11	12	Procambarus sp.		2
2840	I-35	Hyg-1	2022-10-11	13	Etheostoma fonticola	31	1
2840	I-35	Hyg-1	2022-10-11	13	Procambarus sp.		2
2840	I-35	Hyg-1	2022-10-11	14	Procambarus sp.		2
2840	I-35	Hyg-1	2022-10-11	14	No fish collected		
2840	I-35	Hyg-1	2022-10-11	15	No fish collected		
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	21	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	21	1
2841	I-35	Cabo-1	2022-10-11	1	Lepomis sp.	15	1
2841	I-35	Cabo-1	2022-10-11	1	Procambarus sp.		4
2841	I-35	Cabo-1	2022-10-11	2	Etheostoma fonticola	15	1
2841	I-35	Cabo-1	2022-10-11	2	Gambusia sp.	13	1

2841	I-35	Cabo-1	2022-10-11	2	Gambusia sp.	24	1
2841	I-35	Cabo-1	2022-10-11	2	Gambusia sp.	42	1
2841	I-35	Cabo-1	2022-10-11	2	Gambusia sp.	19	1
2841	I-35	Cabo-1	2022-10-11	2	Gambusia sp.	20	1
2841	I-35	Cabo-1	2022-10-11	2	Gambusia sp.	20	1
2841	I-35	Cabo-1	2022-10-11	2	Gambusia sp.	20	1
2841	I-35	Cabo-1	2022-10-11	2	Gambusia sp.	21	1
2841	I-35	Cabo-1	2022-10-11	2	Gambusia sp.	10	1
2841	I-35	Cabo-1	2022-10-11	3	Lepomis miniatus	36	1
2841	I-35	Cabo-1	2022-10-11	3	Gambusia sp.	36	1
2841	I-35	Cabo-1	2022-10-11	3	Gambusia sp.	38	1
2841	I-35	Cabo-1	2022-10-11	3	Gambusia sp.	18	1
2841	I-35	Cabo-1	2022-10-11	3	Gambusia sp.		1
2841	I-35	Cabo-1	2022-10-11	3	Gambusia sp.		1
2841	I-35	Cabo-1	2022-10-11	3	Gambusia sp.		1
2841	I-35	Cabo-1	2022-10-11	4	Lepomis miniatus	35	1
2841	I-35	Cabo-1	2022-10-11	4	Gambusia sp.		1
2841	I-35	Cabo-1	2022-10-11	4	Gambusia sp.		1
2841	I-35	Cabo-1	2022-10-11	4	Gambusia sp.		1
2841	I-35	Cabo-1	2022-10-11	4	Procambarus sp.		3
2841	I-35	Cabo-1	2022-10-11	5	Etheostoma fonticola	20	1
2841	I-35	Cabo-1	2022-10-11	5	Gambusia sp.		1
2841	I-35	Cabo-1	2022-10-11	5	Gambusia sp.		1
2841	I-35	Cabo-1	2022-10-11	6	Etheostoma fonticola	10	1
2841	I-35	Cabo-1	2022-10-11	6	Etheostoma fonticola	14	1
2841	I-35	Cabo-1	2022-10-11	7	No fish collected		
2841	I-35	Cabo-1	2022-10-11	8	Procambarus sp.		1
2841	I-35	Cabo-1	2022-10-11	8	No fish collected		
2841	I-35	Cabo-1	2022-10-11	9	Lepomis sp.	20	1
2841	I-35	Cabo-1	2022-10-11	9	Etheostoma fonticola	25	1
2841	I-35	Cabo-1	2022-10-11	10	Gambusia sp.		1
2841	I-35	Cabo-1	2022-10-11	10	Etheostoma fonticola	32	1
2841	I-35	Cabo-1	2022-10-11	11	Lepomis miniatus	40	1
2841	I-35	Cabo-1	2022-10-11	12	Etheostoma fonticola	32	1
2841	I-35	Cabo-1	2022-10-11	12	Gambusia sp.		1
2841	I-35	Cabo-1	2022-10-11	13	Micropterus salmoides	85	1
2841	I-35	Cabo-1	2022-10-11	13	Procambarus sp.		1
2841	I-35	Cabo-1	2022-10-11	14	No fish collected		
2841	I-35	Cabo-1	2022-10-11	15	No fish collected		
2841	I-35	Cabo-1	2022-10-11	1	Etheostoma fonticola	16	1
2841	I-35	Cabo-1	2022-10-11	1	Lepomis miniatus	64	1

2841	I-35	Cabo-1	2022-10-11	1	Lepomis miniatus	45	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	25	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	25	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	35	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	28	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	25	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	33	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	17	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	22	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	18	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	20	1
2841	I-35	Cabo-1	2022-10-11	1	Gambusia sp.	21	1
2842	I-35	Sagi-1	2022-10-11	1	Gambusia sp.	14	1
2842	I-35	Sagi-1	2022-10-11	1	Gambusia sp.	14	1
2842	I-35	Sagi-1	2022-10-11	1	Gambusia sp.	15	1
2842	I-35	Sagi-1	2022-10-11	1	Gambusia sp.	10	1
2842	I-35	Sagi-1	2022-10-11	1	Gambusia sp.	10	1
2842	I-35	Sagi-1	2022-10-11	1	Gambusia sp.	10	1
2842	I-35	Sagi-1	2022-10-11	1	Procambarus sp.		3
2842	I-35	Sagi-1	2022-10-11	2	Gambusia sp.	15	1
2842	I-35	Sagi-1	2022-10-11	2	Gambusia sp.	12	1
2842	I-35	Sagi-1	2022-10-11	2	Gambusia sp.	9	1
2842	I-35	Sagi-1	2022-10-11	2	Gambusia sp.	10	1
2842	I-35	Sagi-1	2022-10-11	2	Procambarus sp.		7
2842	I-35	Sagi-1	2022-10-11	3	Fundulus chrysotus	35	1
2842	I-35	Sagi-1	2022-10-11	3	Gambusia sp.	15	1
2842	I-35	Sagi-1	2022-10-11	3	Gambusia sp.	10	1
2842	I-35	Sagi-1	2022-10-11	4	Gambusia sp.	20	1
2842	I-35	Sagi-1	2022-10-11	4	Gambusia sp.	10	1
2842	I-35	Sagi-1	2022-10-11	4	Procambarus sp.		10
2842	I-35	Sagi-1	2022-10-11	5	Gambusia sp.	16	1
2842	I-35	Sagi-1	2022-10-11	5	Gambusia sp.	13	1
2842	I-35	Sagi-1	2022-10-11	5	Procambarus sp.		11
2842	I-35	Sagi-1	2022-10-11	6	Gambusia sp.	10	1
2842	I-35	Sagi-1	2022-10-11	6	Procambarus sp.		2
2842	I-35	Sagi-1	2022-10-11	7	Fundulus chrysotus	37	1
2842	I-35	Sagi-1	2022-10-11	7	Gambusia sp.	11	1
2842	I-35	Sagi-1	2022-10-11	8	Gambusia sp.	11	1
2842	I-35	Sagi-1	2022-10-11	8	Procambarus sp.		1
2842	I-35	Sagi-1	2022-10-11	9	Gambusia sp.	10	1
2842	I-35	Sagi-1	2022-10-11	9	Gambusia sp.	15	1

2842	I-35	Sagi-1	2022-10-11	9	Procambarus sp.		2
2842	I-35	Sagi-1	2022-10-11	10	Fundulus chrysotus	30	1
2842	I-35	Sagi-1	2022-10-11	11	Procambarus sp.		1
2842	I-35	Sagi-1	2022-10-11	11	No fish collected		
2842	I-35	Sagi-1	2022-10-11	12	Procambarus sp.		2
2842	I-35	Sagi-1	2022-10-11	12	No fish collected		
2842	I-35	Sagi-1	2022-10-11	13	Fundulus chrysotus	32	1
2842	I-35	Sagi-1	2022-10-11	15	No fish collected		
2842	I-35	Sagi-1	2022-10-11	14	Procambarus sp.		1
2842	I-35	Sagi-1	2022-10-11	14	No fish collected		
2843	I-35	Sag-2	2022-10-11	1	Procambarus sp.		4
2843	I-35	Sag-2	2022-10-11	1	No fish collected		
2843	I-35	Sag-2	2022-10-11	2	Procambarus sp.		6
2843	I-35	Sag-2	2022-10-11	2	No fish collected		
2843	I-35	Sag-2	2022-10-11	3	Gambusia sp.	10	1
2843	I-35	Sag-2	2022-10-11	3	Procambarus sp.		5
2843	I-35	Sag-2	2022-10-11	4	Gambusia sp.	7	1
2843	I-35	Sag-2	2022-10-11	4	Procambarus sp.		1
2843	I-35	Sag-2	2022-10-11	5	Procambarus sp.		4
2843	I-35	Sag-2	2022-10-11	5	Gambusia sp.	9	1
2843	I-35	Sag-2	2022-10-11	6	Gambusia sp.	10	1
2843	I-35	Sag-2	2022-10-11	6	Gambusia sp.	10	1
2843	I-35	Sag-2	2022-10-11	6	Procambarus sp.		3
2843	I-35	Sag-2	2022-10-11	7	Gambusia sp.	8	1
2843	I-35	Sag-2	2022-10-11	7	Gambusia sp.	15	1
2843	I-35	Sag-2	2022-10-11	7	Procambarus sp.		4
2843	I-35	Sag-2	2022-10-11	8	Gambusia sp.	10	1
2843	I-35	Sag-2	2022-10-11	8	Procambarus sp.		7
2843	I-35	Sag-2	2022-10-11	9	No fish collected		
2843	I-35	Sag-2	2022-10-11	10	Gambusia sp.	15	1
2843	I-35	Sag-2	2022-10-11	10	Gambusia sp.	7	1
2843	I-35	Sag-2	2022-10-11	10	Gambusia sp.	10	1
2843	I-35	Sag-2	2022-10-11	10	Gambusia sp.	5	1
2843	I-35	Sag-2	2022-10-11	10	Procambarus sp.		2
2843	I-35	Sag-2	2022-10-11	11	Procambarus sp.		1
2843	I-35	Sag-2	2022-10-11	11	No fish collected		
2843	I-35	Sag-2	2022-10-11	12	Gambusia sp.	12	1
2843	I-35	Sag-2	2022-10-11	12	Gambusia sp.	11	1
2843	I-35	Sag-2	2022-10-11	12	Procambarus sp.		1
2843	I-35	Sag-2	2022-10-11	13	Gambusia sp.	11	1
2843	I-35	Sag-2	2022-10-11	13	Procambarus sp.		1

2843	I-35	Sag-2	2022-10-11	14	Procambarus sp.		3
2843	I-35	Sag-2	2022-10-11	14	No fish collected		
2843	I-35	Sag-2	2022-10-11	15	Procambarus sp.		1
2843	I-35	Sag-2	2022-10-11	15	No fish collected		
2844	I-35	Open-1	2022-10-11	1	No fish collected		
2844	I-35	Open-1	2022-10-11	2	No fish collected		
2844	I-35	Open-1	2022-10-11	3	Hypostomus plecostomus	27	1
2844	I-35	Open-1	2022-10-11	4	No fish collected		
2844	I-35	Open-1	2022-10-11	5	No fish collected		
2844	I-35	Open-1	2022-10-11	6	No fish collected		
2844	I-35	Open-1	2022-10-11	7	No fish collected		
2844	I-35	Open-1	2022-10-11	8	No fish collected		
2844	I-35	Open-1	2022-10-11	9	No fish collected		
2844	I-35	Open-1	2022-10-11	10	No fish collected		
2844	I-35	Open-1	2022-10-11	11	No fish collected		
2844	I-35	Open-1	2022-10-11	12	No fish collected		
2844	I-35	Open-1	2022-10-11	13	No fish collected		
2844	I-35	Open-1	2022-10-11	14	No fish collected		
2844	I-35	Open-1	2022-10-11	15	No fish collected		
2845	I-35	Hyg-2	2022-10-11	1	Etheostoma fonticola	30	1
2845	I-35	Hyg-2	2022-10-11	1	Etheostoma fonticola	27	1
2845	I-35	Hyg-2	2022-10-11	1	Etheostoma fonticola	29	1
2845	I-35	Hyg-2	2022-10-11	1	Etheostoma fonticola	27	1
2845	I-35	Hyg-2	2022-10-11	1	Etheostoma fonticola	20	1
2845	I-35	Hyg-2	2022-10-11	1	Etheostoma fonticola	33	1
2845	I-35	Hyg-2	2022-10-11	1	Gambusia sp.	22	1
2845	I-35	Hyg-2	2022-10-11	1	Gambusia sp.	30	1
2845	I-35	Hyg-2	2022-10-11	1	Gambusia sp.	10	1
2845	I-35	Hyg-2	2022-10-11	1	Gambusia sp.	15	1
2845	I-35	Hyg-2	2022-10-11	1	Gambusia sp.	23	1
2845	I-35	Hyg-2	2022-10-11	1	Gambusia sp.	13	1
2845	I-35	Hyg-2	2022-10-11	1	Procambarus sp.		23
2845	I-35	Hyg-2	2022-10-11	2	Etheostoma fonticola	31	1
2845	I-35	Hyg-2	2022-10-11	2	Etheostoma fonticola	25	1
2845	I-35	Hyg-2	2022-10-11	2	Herichthys cyanoguttatus	25	1
2845	I-35	Hyg-2	2022-10-11	2	Gambusia sp.	19	1
2845	I-35	Hyg-2	2022-10-11	2	Procambarus sp.		5
2845	I-35	Hyg-2	2022-10-11	3	Herichthys cyanoguttatus	22	1
2845	I-35	Hyg-2	2022-10-11	3	Oreochromis aureus	55	1
2845	I-35	Hyg-2	2022-10-11	3	Etheostoma fonticola	25	1
2845	I-35	Hyg-2	2022-10-11	3	Etheostoma fonticola	28	1

2845	I-35	Hyg-2	2022-10-11	3	Procambarus sp.		25
2845	I-35	Hyg-2	2022-10-11	4	Gambusia sp.	31	1
2845	I-35	Hyg-2	2022-10-11	4	Etheostoma fonticola	31	1
2845	I-35	Hyg-2	2022-10-11	4	Procambarus sp.		6
2845	I-35	Hyg-2	2022-10-11	5	Herichthys cyanoguttatus	40	1
2845	I-35	Hyg-2	2022-10-11	5	Herichthys cyanoguttatus	31	1
2845	I-35	Hyg-2	2022-10-11	5	Etheostoma fonticola	30	1
2845	I-35	Hyg-2	2022-10-11	5	Hypostomus plecostomus	20	1
2845	I-35	Hyg-2	2022-10-11	5	Procambarus sp.		5
2845	I-35	Hyg-2	2022-10-11	6	Ameiurus natalis	32	1
2845	I-35	Hyg-2	2022-10-11	6	Etheostoma fonticola	30	1
2845	I-35	Hyg-2	2022-10-11	6	Etheostoma fonticola	28	1
2845	I-35	Hyg-2	2022-10-11	6	Etheostoma fonticola	30	1
2845	I-35	Hyg-2	2022-10-11	6	Procambarus sp.		5
2845	I-35	Hyg-2	2022-10-11	7	Etheostoma fonticola	34	1
2845	I-35	Hyg-2	2022-10-11	7	Etheostoma fonticola	31	1
2845	I-35	Hyg-2	2022-10-11	7	Etheostoma fonticola	24	1
2845	I-35	Hyg-2	2022-10-11	7	Etheostoma fonticola	34	1
2845	I-35	Hyg-2	2022-10-11	7	Procambarus sp.		8
2845	I-35	Hyg-2	2022-10-11	8	Etheostoma fonticola	32	1
2845	I-35	Hyg-2	2022-10-11	9	Procambarus sp.		6
2845	I-35	Hyg-2	2022-10-11	8	Poecilia latipinna	9	1
2845	I-35	Hyg-2	2022-10-11	9	No fish collected		
2845	I-35	Hyg-2	2022-10-11	10	Procambarus sp.		1
2845	I-35	Hyg-2	2022-10-11	10	No fish collected		
2845	I-35	Hyg-2	2022-10-11	11	Etheostoma fonticola	28	1
2845	I-35	Hyg-2	2022-10-11	11	Etheostoma fonticola	29	1
2845	I-35	Hyg-2	2022-10-11	11	Herichthys cyanoguttatus	21	1
2845	I-35	Hyg-2	2022-10-11	11	Procambarus sp.		4
2845	I-35	Hyg-2	2022-10-11	12	Procambarus sp.		1
2845	I-35	Hyg-2	2022-10-11	12	No fish collected		
2845	I-35	Hyg-2	2022-10-11	13	Oreochromis aureus	64	1
2845	I-35	Hyg-2	2022-10-11	13	Procambarus sp.		1
2845	I-35	Hyg-2	2022-10-11	14	No fish collected		
2845	I-35	Hyg-2	2022-10-11	15	No fish collected		
2846	I-35	Open-2	2022-10-11	1	No fish collected		
2846	I-35	Open-2	2022-10-11	2	No fish collected		
2846	I-35	Open-2	2022-10-11	3	No fish collected		
2846	I-35	Open-2	2022-10-11	4	No fish collected		
2846	I-35	Open-2	2022-10-11	5	No fish collected		
2846	I-35	Open-2	2022-10-11	6	No fish collected		

2846	I-35	Open-2	2022-10-11	7	No fish collected		
2846	I-35	Open-2	2022-10-11	8	No fish collected		
2846	I-35	Open-2	2022-10-11	9	No fish collected		
2846	I-35	Open-2	2022-10-11	10	No fish collected		
2847	I-35	Cab-2	2022-10-11	1	Lepomis miniatus	120	1
2847	I-35	Cab-2	2022-10-11	1	Lepomis miniatus	56	1
2847	I-35	Cab-2	2022-10-11	1	Lepomis miniatus	25	1
2847	I-35	Cab-2	2022-10-11	1	Micropterus salmoides	94	1
2847	I-35	Cab-2	2022-10-11	1	Herichthys cyanoguttatus	33	1
2847	I-35	Cab-2	2022-10-11	1	Etheostoma fonticola	34	1
2847	I-35	Cab-2	2022-10-11	1	Etheostoma fonticola	24	1
2847	I-35	Cab-2	2022-10-11	1	Etheostoma fonticola	35	1
2847	I-35	Cab-2	2022-10-11	1	Etheostoma fonticola	34	1
2847	I-35	Cab-2	2022-10-11	1	Etheostoma fonticola	34	1
2847	I-35	Cab-2	2022-10-11	1	Gambusia sp.	9	1
2847	I-35	Cab-2	2022-10-11	1	Gambusia sp.	10	1
2847	I-35	Cab-2	2022-10-11	1	Gambusia sp.	11	1
2847	I-35	Cab-2	2022-10-11	1	Gambusia sp.	10	1
2847	I-35	Cab-2	2022-10-11	1	Gambusia sp.	9	1
2847	I-35	Cab-2	2022-10-11	1	Ambloplites rupestris	48	1
2847	I-35	Cab-2	2022-10-11	1	Procambarus sp.		18
2847	I-35	Cab-2	2022-10-11	2	Lepomis miniatus	133	1
2847	I-35	Cab-2	2022-10-11	2	Gambusia sp.	15	1
2847	I-35	Cab-2	2022-10-11	2	Gambusia sp.	12	1
2847	I-35	Cab-2	2022-10-11	2	Etheostoma fonticola	19	1
2847	I-35	Cab-2	2022-10-11	2	Etheostoma fonticola	26	1
2847	I-35	Cab-2	2022-10-11	2	Procambarus sp.		5
2847	I-35	Cab-2	2022-10-11	2	Palaemonetes sp.		1
2847	I-35	Cab-2	2022-10-11	3	Lepomis miniatus	125	1
2847	I-35	Cab-2	2022-10-11	3	Lepomis miniatus	58	1
2847	I-35	Cab-2	2022-10-11	3	Micropterus salmoides	48	1
2847	I-35	Cab-2	2022-10-11	3	Gambusia sp.	13	1
2847	I-35	Cab-2	2022-10-11	3	Gambusia sp.	13	1
2847	I-35	Cab-2	2022-10-11	3	Lepomis sp.	16	1
2847	I-35	Cab-2	2022-10-11	3	Procambarus sp.		5
2847	I-35	Cab-2	2022-10-11	4	Procambarus sp.		2
2847	I-35	Cab-2	2022-10-11	4	Etheostoma fonticola	28	1
2847	I-35	Cab-2	2022-10-11	5	Procambarus sp.		5
2847	I-35	Cab-2	2022-10-11	5	Gambusia sp.	10	1
2847	I-35	Cab-2	2022-10-11	6	Gambusia sp.	20	1
2847	I-35	Cab-2	2022-10-11	6	Procambarus sp.		2

2847	I-35	Cab-2	2022-10-11	7	Lepomis miniatus	25	1
2847	I-35	Cab-2	2022-10-11	8	Procambarus sp.		1
2847	I-35	Cab-2	2022-10-11	8	No fish collected		
2847	I-35	Cab-2	2022-10-11	9	Etheostoma fonticola	35	1
2847	I-35	Cab-2	2022-10-11	9	Procambarus sp.		1
2847	I-35	Cab-2	2022-10-11	10	Lepomis miniatus	68	1
2847	I-35	Cab-2	2022-10-11	10	Gambusia sp.	12	1
2847	I-35	Cab-2	2022-10-11	11	No fish collected		
2847	I-35	Cab-2	2022-10-11	12	Procambarus sp.		1
2847	I-35	Cab-2	2022-10-11	12	No fish collected		
2847	I-35	Cab-2	2022-10-11	13	Procambarus sp.		2
2847	I-35	Cab-2	2022-10-11	13	Lepomis miniatus	28	1
2847	I-35	Cab-2	2022-10-11	14	Micropterus salmoides	74	1
2847	I-35	Cab-2	2022-10-11	14	Gambusia sp.	10	1
2847	I-35	Cab-2	2022-10-11	14	Procambarus sp.		1
2847	I-35	Cab-2	2022-10-11	15	Etheostoma fonticola	34	1
2847	I-35	Cab-2	2022-10-11	15	Procambarus sp.		5
2847	I-35	Cab-2	2022-10-11	16	Procambarus sp.		3
2847	I-35	Cab-2	2022-10-11	16	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	1	Procambarus sp.		2
2739	Spring Lake Dam	Sagi-1	2022-04-26	1	Palaemonetes sp.		4
2739	Spring Lake Dam	Sagi-1	2022-04-26	1	Lepomis miniatus	30	1
2739	Spring Lake Dam	Sagi-1	2022-04-26	1	Lepomis miniatus	25	1
2739	Spring Lake Dam	Sagi-1	2022-04-26	1	Etheostoma fonticola	22	1
2739	Spring Lake Dam	Sagi-1	2022-04-26	1	Etheostoma fonticola	14	1
2739	Spring Lake Dam	Sagi-1	2022-04-26	2	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	3	Procambarus sp.		3
2739	Spring Lake Dam	Sagi-1	2022-04-26	3	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	4	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	5	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	6	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	7	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	8	Procambarus sp.		3
2739	Spring Lake Dam	Sagi-1	2022-04-26	8	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	9	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	10	Procambarus sp.		1
2739	Spring Lake Dam	Sagi-1	2022-04-26	10	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	11	Etheostoma fonticola	36	1
2739	Spring Lake Dam	Sagi-1	2022-04-26	11	Procambarus sp.		1
2739	Spring Lake Dam	Sagi-1	2022-04-26	12	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	13	No fish collected		

2739	Spring Lake Dam	Sagi-1	2022-04-26	14	No fish collected		
2739	Spring Lake Dam	Sagi-1	2022-04-26	15	Etheostoma fonticola	35	1
2739	Spring Lake Dam	Sagi-1	2022-04-26	16	Etheostoma fonticola	33	1
2739	Spring Lake Dam	Sagi-1	2022-04-26	17	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	1	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	2	Etheostoma fonticola	14	1
2740	Spring Lake Dam	Pota-1	2022-04-26	3	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	4	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	5	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	6	Etheostoma fonticola	15	1
2740	Spring Lake Dam	Pota-1	2022-04-26	7	Etheostoma fonticola	20	1
2740	Spring Lake Dam	Pota-1	2022-04-26	8	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	9	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	10	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	11	Etheostoma fonticola	17	1
2740	Spring Lake Dam	Pota-1	2022-04-26	12	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	13	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	14	No fish collected		
2740	Spring Lake Dam	Pota-1	2022-04-26	15	No fish collected		
2741	Spring Lake Dam	Pota-2	2022-04-26	1	No fish collected		
2741	Spring Lake Dam	Pota-2	2022-04-26	2	Etheostoma fonticola	12	1
2741	Spring Lake Dam	Pota-2	2022-04-26	3	No fish collected		
2741	Spring Lake Dam	Pota-2	2022-04-26	4	Etheostoma fonticola	22	1
2741	Spring Lake Dam	Pota-2	2022-04-26	5	No fish collected		
2741	Spring Lake Dam	Pota-2	2022-04-26	6	No fish collected		
2741	Spring Lake Dam	Pota-2	2022-04-26	7	No fish collected		
2741	Spring Lake Dam	Pota-2	2022-04-26	8	Etheostoma fonticola	20	1
2741	Spring Lake Dam	Pota-2	2022-04-26	9	Etheostoma fonticola	19	1
2741	Spring Lake Dam	Pota-2	2022-04-26	10	No fish collected		
2741	Spring Lake Dam	Pota-2	2022-04-26	11	Etheostoma fonticola	14	1
2741	Spring Lake Dam	Pota-2	2022-04-26	11	Etheostoma fonticola	21	1
2741	Spring Lake Dam	Pota-2	2022-04-26	12	No fish collected		
2741	Spring Lake Dam	Pota-2	2022-04-26	13	No fish collected		
2741	Spring Lake Dam	Pota-2	2022-04-26	14	Etheostoma fonticola	16	1
2741	Spring Lake Dam	Pota-2	2022-04-26	15	No fish collected		
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Procambarus sp.		1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Palaemonetes sp.		1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	20	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	22	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	28	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	21	1

2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	28	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	22	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	16	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	23	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	21	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	20	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	16	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	23	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Gambusia sp.	18	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Lepomis miniatus	25	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Etheostoma fonticola	34	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Etheostoma fonticola	17	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	1	Etheostoma fonticola	15	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	2	Lepomis sp.	21	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	2	Procambarus sp.		1
2742	Spring Lake Dam	Sagi-2	2022-04-26	3	No fish collected		
2742	Spring Lake Dam	Sagi-2	2022-04-26	4	Procambarus sp.		4
2742	Spring Lake Dam	Sagi-2	2022-04-26	4	No fish collected		
2742	Spring Lake Dam	Sagi-2	2022-04-26	5	No fish collected		
2742	Spring Lake Dam	Sagi-2	2022-04-26	6	Lepomis sp.	16	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	7	Etheostoma fonticola	31	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	7	Etheostoma fonticola	32	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	7	Gambusia sp.	25	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	8	Etheostoma fonticola	40	1
2742	Spring Lake Dam	Sagi-2	2022-04-26	9	No fish collected		
2742	Spring Lake Dam	Sagi-2	2022-04-26	10	Procambarus sp.		1
2742	Spring Lake Dam	Sagi-2	2022-04-26	10	No fish collected		
2742	Spring Lake Dam	Sagi-2	2022-04-26	11	No fish collected		
2742	Spring Lake Dam	Sagi-2	2022-04-26	12	No fish collected		
2742	Spring Lake Dam	Sagi-2	2022-04-26	13	No fish collected		
2742	Spring Lake Dam	Sagi-2	2022-04-26	14	Procambarus sp.		1
2742	Spring Lake Dam	Sagi-2	2022-04-26	14	No fish collected		
2742	Spring Lake Dam	Sagi-2	2022-04-26	15	Lepomis miniatus	44	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	21	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	21	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	23	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	22	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	19	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	26	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	24	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	14	1

2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	23	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	35	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	22	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	16	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	22	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	19	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	15	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	15	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	16	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	14	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	18	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	18	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	16	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	1	Gambusia sp.	18	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	2	Gambusia sp.	14	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	2	Gambusia sp.	45	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	2	Gambusia sp.	25	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	2	Gambusia sp.	21	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	2	Gambusia sp.	20	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	2	Gambusia sp.	10	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	2	Gambusia sp.	12	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	2	Gambusia sp.	31	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	3	Gambusia sp.	15	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	3	Gambusia sp.	23	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	3	Gambusia sp.	20	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	3	Gambusia sp.	29	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	3	Gambusia sp.	27	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	3	Gambusia sp.	26	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	3	Gambusia sp.	16	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	3	Gambusia sp.	22	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	4	Gambusia sp.	40	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	4	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	4	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	4	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	4	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	4	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	4	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	4	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	4	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	4	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	5	Gambusia sp.		1

2743	Spring Lake Dam	Ziz-1	2022-04-26	5	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	6	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	6	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	7	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	8	No fish collected		
2743	Spring Lake Dam	Ziz-1	2022-04-26	9	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	9	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	9	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	10	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	11	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	11	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	12	Lepomis miniatus	53	1
2743	Spring Lake Dam	Ziz-1	2022-04-26	13	No fish collected		
2743	Spring Lake Dam	Ziz-1	2022-04-26	14	Gambusia sp.		1
2743	Spring Lake Dam	Ziz-1	2022-04-26	15	No fish collected		
2744	Spring Lake Dam	Ziz-2	2022-04-26	1	Astyanax mexicanus	71	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	1	Procambarus sp.		1
2744	Spring Lake Dam	Ziz-2	2022-04-26	1	Gambusia sp.	25	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	1	Gambusia sp.	28	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	1	Gambusia sp.	25	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	1	Gambusia sp.	37	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	1	Gambusia sp.	22	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	1	Gambusia sp.	20	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	2	Gambusia sp.	21	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	3	Gambusia sp.	20	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	3	Gambusia sp.	21	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	4	Gambusia sp.	19	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	4	Gambusia sp.	24	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	4	Gambusia sp.	20	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	4	Gambusia sp.	20	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	5	No fish collected		
2744	Spring Lake Dam	Ziz-2	2022-04-26	6	No fish collected		
2744	Spring Lake Dam	Ziz-2	2022-04-26	7	Gambusia sp.	26	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	8	Gambusia sp.	25	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	8	Gambusia sp.	21	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	8	Gambusia sp.	12	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	9	Gambusia sp.	15	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	10	Gambusia sp.	35	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	11	No fish collected		
2744	Spring Lake Dam	Ziz-2	2022-04-26	12	Gambusia sp.	21	1
2744	Spring Lake Dam	Ziz-2	2022-04-26	13	Gambusia sp.		1

2744	Spring Lake Dam	Ziz-2	2022-04-26	14	No fish collected		
2744	Spring Lake Dam	Ziz-2	2022-04-26	15	No fish collected		
2745	Spring Lake Dam	Hydr-1	2022-04-26	1	Procambarus sp.		1
2745	Spring Lake Dam	Hydr-1	2022-04-26	1	Etheostoma fonticola	35	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	1	Etheostoma fonticola	31	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	1	Etheostoma fonticola	26	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	1	Etheostoma fonticola	19	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	1	Etheostoma fonticola	28	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	1	Etheostoma fonticola	22	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	2	Etheostoma fonticola	21	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	2	Etheostoma fonticola	37	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	2	Etheostoma fonticola	36	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	2	Procambarus sp.		1
2745	Spring Lake Dam	Hydr-1	2022-04-26	3	Etheostoma fonticola	21	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	3	Etheostoma fonticola	26	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	3	Etheostoma fonticola	18	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	4	Procambarus sp.		1
2745	Spring Lake Dam	Hydr-1	2022-04-26	4	No fish collected		
2745	Spring Lake Dam	Hydr-1	2022-04-26	5	Procambarus sp.		1
2745	Spring Lake Dam	Hydr-1	2022-04-26	5	No fish collected		
2745	Spring Lake Dam	Hydr-1	2022-04-26	6	No fish collected		
2745	Spring Lake Dam	Hydr-1	2022-04-26	7	Etheostoma fonticola	24	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	8	No fish collected		
2745	Spring Lake Dam	Hydr-1	2022-04-26	9	No fish collected		
2745	Spring Lake Dam	Hydr-1	2022-04-26	10	No fish collected		
2745	Spring Lake Dam	Hydr-1	2022-04-26	11	Procambarus sp.		1
2745	Spring Lake Dam	Hydr-1	2022-04-26	11	No fish collected		
2745	Spring Lake Dam	Hydr-1	2022-04-26	12	Ameiurus natalis	28	1
2745	Spring Lake Dam	Hydr-1	2022-04-26	13	Procambarus sp.		1
2745	Spring Lake Dam	Hydr-1	2022-04-26	13	No fish collected		
2745	Spring Lake Dam	Hydr-1	2022-04-26	14	No fish collected		
2745	Spring Lake Dam	Hydr-1	2022-04-26	15	No fish collected		
2746	Spring Lake Dam	Hydr-2	2022-04-26	1	No fish collected		
2746	Spring Lake Dam	Hydr-2	2022-04-26	2	No fish collected		
2746	Spring Lake Dam	Hydr-2	2022-04-26	3	No fish collected		
2746	Spring Lake Dam	Hydr-2	2022-04-26	4	No fish collected		
2746	Spring Lake Dam	Hydr-2	2022-04-26	5	No fish collected		
2746	Spring Lake Dam	Hydr-2	2022-04-26	5	Procambarus sp.		1
2746	Spring Lake Dam	Hydr-2	2022-04-26	6	No fish collected		
2746	Spring Lake Dam	Hydr-2	2022-04-26	7	No fish collected		
2746	Spring Lake Dam	Hydr-2	2022-04-26	8	No fish collected		

2746	Spring Lake Dam	Hydr-2	2022-04-26	9	No fish collected		
2746	Spring Lake Dam	Hydr-2	2022-04-26	10	No fish collected		
2747	Spring Lake Dam	Open-1	2022-04-26	1	No fish collected		
2747	Spring Lake Dam	Open-1	2022-04-26	2	No fish collected		
2747	Spring Lake Dam	Open-1	2022-04-26	3	No fish collected		
2747	Spring Lake Dam	Open-1	2022-04-26	4	No fish collected		
2747	Spring Lake Dam	Open-1	2022-04-26	5	No fish collected		
2747	Spring Lake Dam	Open-1	2022-04-26	6	No fish collected		
2747	Spring Lake Dam	Open-1	2022-04-26	7	No fish collected		
2747	Spring Lake Dam	Open-1	2022-04-26	8	No fish collected		
2747	Spring Lake Dam	Open-1	2022-04-26	9	No fish collected		
2747	Spring Lake Dam	Open-1	2022-04-26	10	No fish collected		
2748	Spring Lake Dam	Open-2	2022-04-26	1	No fish collected		
2748	Spring Lake Dam	Open-2	2022-04-26	2	No fish collected		
2748	Spring Lake Dam	Open-2	2022-04-26	3	No fish collected		
2748	Spring Lake Dam	Open-2	2022-04-26	4	No fish collected		
2748	Spring Lake Dam	Open-2	2022-04-26	5	No fish collected		
2748	Spring Lake Dam	Open-2	2022-04-26	6	No fish collected		
2748	Spring Lake Dam	Open-2	2022-04-26	7	No fish collected		
2748	Spring Lake Dam	Open-2	2022-04-26	8	No fish collected		
2748	Spring Lake Dam	Open-2	2022-04-26	9	No fish collected		
2748	Spring Lake Dam	Open-2	2022-04-26	10	No fish collected		
2806	Spring Lake Dam	Open-1	2022-07-18	1	No fish collected		
2806	Spring Lake Dam	Open-1	2022-07-18	2	No fish collected		
2806	Spring Lake Dam	Open-1	2022-07-18	3	No fish collected		
2806	Spring Lake Dam	Open-1	2022-07-18	4	No fish collected		
2806	Spring Lake Dam	Open-1	2022-07-18	5	No fish collected		
2806	Spring Lake Dam	Open-1	2022-07-18	6	No fish collected		
2806	Spring Lake Dam	Open-1	2022-07-18	7	No fish collected		
2806	Spring Lake Dam	Open-1	2022-07-18	8	No fish collected		
2806	Spring Lake Dam	Open-1	2022-07-18	9	No fish collected		
2806	Spring Lake Dam	Open-1	2022-07-18	10	No fish collected		
2807	Spring Lake Dam	Open-2	2022-07-18	2	No fish collected		
2807	Spring Lake Dam	Open-2	2022-07-18	3	No fish collected		
2807	Spring Lake Dam	Open-2	2022-07-18	4	No fish collected		
2807	Spring Lake Dam	Open-2	2022-07-18	5	No fish collected		
2807	Spring Lake Dam	Open-2	2022-07-18	6	No fish collected		
2807	Spring Lake Dam	Open-2	2022-07-18	7	No fish collected		
2807	Spring Lake Dam	Open-2	2022-07-18	8	No fish collected		
2807	Spring Lake Dam	Open-2	2022-07-18	9	No fish collected		
2807	Spring Lake Dam	Open-2	2022-07-18	10	No fish collected		

2807	Spring Lake Dam	Open-2	2022-07-18	1	No fish collected		
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Procambarus sp.		9
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	19	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	9	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	9	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	15	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	12	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	9	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	18	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	17	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	17	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	19	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	22	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	25	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	22	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	10	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	21	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	23	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	13	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	10	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Gambusia sp.	11	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Dionda nigrotaeniata	38	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Lepomis miniatus	38	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Lepomis miniatus	38	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Lepomis miniatus	39	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	1	Palaemonetes sp.		1
2808	Spring Lake Dam	Sagi-1	2022-07-18	2	Procambarus sp.		2
2808	Spring Lake Dam	Sagi-1	2022-07-18	2	Lepomis miniatus	44	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	2	Lepomis miniatus	57	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	2	Lepomis miniatus	30	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	2	Gambusia sp.	21	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	2	Gambusia sp.	17	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	3	Procambarus sp.		1
2808	Spring Lake Dam	Sagi-1	2022-07-18	3	Lepomis miniatus	33	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	3	Gambusia sp.	20	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	4	Procambarus sp.		1
2808	Spring Lake Dam	Sagi-1	2022-07-18	4	Lepomis miniatus	76	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	4	Micropterus salmoides	86	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	5	Lepomis miniatus	107	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	6	Etheostoma fonticola	37	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	7	Lepomis miniatus	37	1

2808	Spring Lake Dam	Sagi-1	2022-07-18	7	Etheostoma fonticola	31	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	7	Etheostoma fonticola	29	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	8	Procambarus sp.		3
2808	Spring Lake Dam	Sagi-1	2022-07-18	8	Lepomis sp.	24	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	8	Lepomis miniatus	41	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	9	No fish collected		
2808	Spring Lake Dam	Sagi-1	2022-07-18	10	Lepomis miniatus	35	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	10	Lepomis miniatus	31	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	11	Procambarus sp.		1
2808	Spring Lake Dam	Sagi-1	2022-07-18	11	Lepomis sp.	35	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	12	No fish collected		
2808	Spring Lake Dam	Sagi-1	2022-07-18	13	Procambarus sp.		2
2808	Spring Lake Dam	Sagi-1	2022-07-18	13	No fish collected		
2808	Spring Lake Dam	Sagi-1	2022-07-18	14	Gambusia sp.	10	1
2808	Spring Lake Dam	Sagi-1	2022-07-18	15	Micropterus salmoides	66	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Palaemonetes sp.		11
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	34	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	16	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	12	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	27	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	21	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	18	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	33	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	32	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	20	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	43	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	37	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	24	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	23	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	16	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	19	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	20	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	20	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	20	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	25	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	22	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	23	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	18	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	13	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	22	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	1	Gambusia sp.	19	1

2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Lepomis sp.	30	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Palaemonetes sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Etheostoma fonticola	26	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Lepomis miniatus	33	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	2	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	3	Palaemonetes sp.		3
2809	Spring Lake Dam	Sagi-2	2022-07-18	3	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	4	Procambarus sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	4	Herichthys cyanoguttatus	60	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	4	Astyanax mexicanus	35	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	4	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	4	Gambusia sp.		1

2809	Spring Lake Dam	Sagi-2	2022-07-18	5	Procambarus sp.		2
2809	Spring Lake Dam	Sagi-2	2022-07-18	5	Palaemonetes sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	5	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	5	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	5	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	5	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	6	Procambarus sp.		2
2809	Spring Lake Dam	Sagi-2	2022-07-18	6	Etheostoma fonticola	28	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	7	Procambarus sp.		4
2809	Spring Lake Dam	Sagi-2	2022-07-18	7	Palaemonetes sp.		3
2809	Spring Lake Dam	Sagi-2	2022-07-18	7	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	7	Etheostoma fonticola	29	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	8	Procambarus sp.		3
2809	Spring Lake Dam	Sagi-2	2022-07-18	8	No fish collected		
2809	Spring Lake Dam	Sagi-2	2022-07-18	9	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	9	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	9	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	10	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	10	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	10	Lepomis miniatus	36	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	10	Procambarus sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	11	Procambarus sp.		3
2809	Spring Lake Dam	Sagi-2	2022-07-18	11	Palaemonetes sp.		2
2809	Spring Lake Dam	Sagi-2	2022-07-18	11	Etheostoma fonticola	27	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	11	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	12	No fish collected		
2809	Spring Lake Dam	Sagi-2	2022-07-18	13	Palaemonetes sp.		2
2809	Spring Lake Dam	Sagi-2	2022-07-18	13	Etheostoma fonticola	34	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	13	Etheostoma fonticola	29	1
2809	Spring Lake Dam	Sagi-2	2022-07-18	13	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	14	Palaemonetes sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	14	Procambarus sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	14	No fish collected		
2809	Spring Lake Dam	Sagi-2	2022-07-18	15	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	3	Gambusia sp.		1
2809	Spring Lake Dam	Sagi-2	2022-07-18	11	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	15	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	15	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	20	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	10	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	15	1

2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	16	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	16	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	35	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	10	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	13	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	16	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	18	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	11	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	16	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	14	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	14	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	14	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	14	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	17	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	18	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	20	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	15	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	21	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	14	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	12	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	12	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	11	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Gambusia sp.	13	1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Procambarus sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	1	Palaemonetes sp.		28
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Lepomis miniatus	41	1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Palaemonetes sp.		5
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Etheostoma fonticola	27	1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Etheostoma fonticola	26	1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	2	Gambusia sp.		1

2810	Spring Lake Dam	Pota-1	2022-07-18	3	Procambarus sp.		2
2810	Spring Lake Dam	Pota-1	2022-07-18	3	Palaemonetes sp.		4
2810	Spring Lake Dam	Pota-1	2022-07-18	3	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	3	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	3	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	3	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	4	Lepomis miniatus	41	1
2810	Spring Lake Dam	Pota-1	2022-07-18	4	Procambarus sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	4	Palaemonetes sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	4	Etheostoma fonticola	31	1
2810	Spring Lake Dam	Pota-1	2022-07-18	4	Etheostoma fonticola	26	1
2810	Spring Lake Dam	Pota-1	2022-07-18	4	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	5	Etheostoma fonticola	25	1
2810	Spring Lake Dam	Pota-1	2022-07-18	5	Palaemonetes sp.		6
2810	Spring Lake Dam	Pota-1	2022-07-18	5	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	5	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	6	Procambarus sp.		2
2810	Spring Lake Dam	Pota-1	2022-07-18	6	Palaemonetes sp.		2
2810	Spring Lake Dam	Pota-1	2022-07-18	6	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	6	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	7	Etheostoma fonticola	35	1
2810	Spring Lake Dam	Pota-1	2022-07-18	7	Etheostoma fonticola	25	1
2810	Spring Lake Dam	Pota-1	2022-07-18	7	Palaemonetes sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	7	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	7	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	7	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	8	Lepomis miniatus	59	1
2810	Spring Lake Dam	Pota-1	2022-07-18	8	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	8	Gambusia sp.		1
2810	Spring Lake Dam	Pota-1	2022-07-18	8	Etheostoma fonticola	25	1
2810	Spring Lake Dam	Pota-1	2022-07-18	9	No fish collected		
2810	Spring Lake Dam	Pota-1	2022-07-18	10	Lepomis miniatus	34	1
2810	Spring Lake Dam	Pota-1	2022-07-18	11	Lepomis sp.	36	1
2810	Spring Lake Dam	Pota-1	2022-07-18	12	Procambarus sp.		2
2810	Spring Lake Dam	Pota-1	2022-07-18	12	Lepomis miniatus	40	1
2810	Spring Lake Dam	Pota-1	2022-07-18	12	Etheostoma fonticola	17	1
2810	Spring Lake Dam	Pota-1	2022-07-18	13	Procambarus sp.		2
2810	Spring Lake Dam	Pota-1	2022-07-18	13	No fish collected		
2810	Spring Lake Dam	Pota-1	2022-07-18	14	Palaemonetes sp.		2
2810	Spring Lake Dam	Pota-1	2022-07-18	14	Etheostoma fonticola	26	1
2810	Spring Lake Dam	Pota-1	2022-07-18	15	Palaemonetes sp.		3

2810	Spring Lake Dam	Pota-1	2022-07-18	15	Gambusia sp.		1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	27	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	28	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	30	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	16	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	27	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	19	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	18	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	16	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	30	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	16	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Etheostoma fonticola	17	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Gambusia sp.	14	1
2811	Spring Lake Dam	Pota-2	2022-07-18	1	Gambusia sp.	15	1
2811	Spring Lake Dam	Pota-2	2022-07-18	2	Palaemonetes sp.		3
2811	Spring Lake Dam	Pota-2	2022-07-18	2	Dionda nigrotaeniata	37	1
2811	Spring Lake Dam	Pota-2	2022-07-18	2	Etheostoma fonticola	17	1
2811	Spring Lake Dam	Pota-2	2022-07-18	3	Etheostoma fonticola	26	1
2811	Spring Lake Dam	Pota-2	2022-07-18	3	Etheostoma fonticola	18	1
2811	Spring Lake Dam	Pota-2	2022-07-18	3	Etheostoma fonticola	24	1
2811	Spring Lake Dam	Pota-2	2022-07-18	3	Gambusia sp.	13	1
2811	Spring Lake Dam	Pota-2	2022-07-18	3	Gambusia sp.	9	1
2811	Spring Lake Dam	Pota-2	2022-07-18	4	Gambusia sp.	40	1
2811	Spring Lake Dam	Pota-2	2022-07-18	4	Gambusia sp.	20	1
2811	Spring Lake Dam	Pota-2	2022-07-18	4	Palaemonetes sp.		1
2811	Spring Lake Dam	Pota-2	2022-07-18	4	Etheostoma fonticola	25	1
2811	Spring Lake Dam	Pota-2	2022-07-18	4	Etheostoma fonticola	23	1
2811	Spring Lake Dam	Pota-2	2022-07-18	4	Etheostoma fonticola	19	1
2811	Spring Lake Dam	Pota-2	2022-07-18	5	Gambusia sp.	25	1
2811	Spring Lake Dam	Pota-2	2022-07-18	5	Etheostoma fonticola	28	1
2811	Spring Lake Dam	Pota-2	2022-07-18	5	Etheostoma fonticola	12	1
2811	Spring Lake Dam	Pota-2	2022-07-18	5	Etheostoma fonticola	26	1
2811	Spring Lake Dam	Pota-2	2022-07-18	5	Etheostoma fonticola	25	1
2811	Spring Lake Dam	Pota-2	2022-07-18	6	Etheostoma fonticola	21	1
2811	Spring Lake Dam	Pota-2	2022-07-18	6	Etheostoma fonticola	11	1
2811	Spring Lake Dam	Pota-2	2022-07-18	6	Etheostoma fonticola	20	1
2811	Spring Lake Dam	Pota-2	2022-07-18	6	Etheostoma fonticola	13	1
2811	Spring Lake Dam	Pota-2	2022-07-18	7	Etheostoma fonticola	30	1
2811	Spring Lake Dam	Pota-2	2022-07-18	7	Etheostoma fonticola	14	1
2811	Spring Lake Dam	Pota-2	2022-07-18	7	Etheostoma fonticola	13	1
2811	Spring Lake Dam	Pota-2	2022-07-18	7	Gambusia sp.	22	1

2811	Spring Lake Dam	Pota-2	2022-07-18	8	Dionda nigrotaeniata	42	1
2811	Spring Lake Dam	Pota-2	2022-07-18	8	Palaemonetes sp.		1
2811	Spring Lake Dam	Pota-2	2022-07-18	9	Palaemonetes sp.		1
2811	Spring Lake Dam	Pota-2	2022-07-18	9	Etheostoma fonticola	25	1
2811	Spring Lake Dam	Pota-2	2022-07-18	9	Etheostoma fonticola	26	1
2811	Spring Lake Dam	Pota-2	2022-07-18	10	No fish collected		
2811	Spring Lake Dam	Pota-2	2022-07-18	11	No fish collected		
2811	Spring Lake Dam	Pota-2	2022-07-18	12	Etheostoma fonticola	25	1
2811	Spring Lake Dam	Pota-2	2022-07-18	12	Etheostoma fonticola	18	1
2811	Spring Lake Dam	Pota-2	2022-07-18	13	Dionda nigrotaeniata	45	1
2811	Spring Lake Dam	Pota-2	2022-07-18	13	Dionda nigrotaeniata	30	1
2811	Spring Lake Dam	Pota-2	2022-07-18	13	Etheostoma fonticola	31	1
2811	Spring Lake Dam	Pota-2	2022-07-18	14	No fish collected		
2811	Spring Lake Dam	Pota-2	2022-07-18	15	Gambusia sp.	19	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Etheostoma fonticola	33	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Etheostoma fonticola	29	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Etheostoma fonticola	28	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Etheostoma fonticola	27	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Etheostoma fonticola	26	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Etheostoma fonticola	15	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Gambusia sp.	21	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Gambusia sp.	22	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Gambusia sp.	15	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Gambusia sp.	14	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Gambusia sp.	19	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Gambusia sp.	21	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	1	Procambarus sp.	1	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	2	Gambusia sp.	34	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	2	Gambusia sp.	21	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	2	Gambusia sp.	21	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	3	Etheostoma fonticola	34	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	3	Etheostoma fonticola	30	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	3	Etheostoma fonticola	40	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	3	Etheostoma fonticola	27	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	3	Etheostoma fonticola	35	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	3	Gambusia sp.	14	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	3	Procambarus sp.		1
2804	Spring Lake Dam	Hydro-1	2022-07-18	4	Etheostoma fonticola	27	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	5	Etheostoma fonticola	29	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	5	Etheostoma fonticola	37	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	6	Etheostoma fonticola	35	1

2804	Spring Lake Dam	Hydro-1	2022-07-18	7	Gambusia sp.	21	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	7	Gambusia sp.	28	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	8	Gambusia sp.	12	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	8	Etheostoma fonticola	35	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	9	Etheostoma fonticola	29	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	9	Gambusia sp.	19	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	10	No fish collected		
2804	Spring Lake Dam	Hydro-1	2022-07-18	11	Gambusia sp.	27	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	12	No fish collected		
2804	Spring Lake Dam	Hydro-1	2022-07-18	13	Etheostoma fonticola	27	1
2804	Spring Lake Dam	Hydro-1	2022-07-18	14	No fish collected		
2804	Spring Lake Dam	Hydro-1	2022-07-18	15	Gambusia sp.	24	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	1	Gambusia sp.	20	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	1	Gambusia sp.	24	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	1	Gambusia sp.	22	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	1	Gambusia sp.	22	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	1	Etheostoma fonticola	27	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	2	Etheostoma fonticola	28	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	2	Etheostoma fonticola	27	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	2	Etheostoma fonticola	24	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	2	Etheostoma fonticola	33	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	2	Gambusia sp.	30	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	2	Gambusia sp.	18	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	3	Gambusia sp.	17	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	3	Gambusia sp.	23	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	3	Gambusia sp.	22	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	3	Gambusia sp.	20	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	3	Gambusia sp.	25	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	3	Etheostoma fonticola	33	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	3	Etheostoma fonticola	35	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	3	Etheostoma fonticola	34	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	3	Procambarus sp.		1
2805	Spring Lake Dam	Hydro-2	2022-07-18	4	Gambusia sp.	24	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	5	Etheostoma fonticola	30	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	5	Etheostoma fonticola	24	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	6	Etheostoma fonticola	24	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	6	Etheostoma fonticola	17	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	6	Gambusia sp.	23	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	7	Gambusia sp.	24	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	8	Etheostoma fonticola	29	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	8	Etheostoma fonticola	30	1

2805	Spring Lake Dam	Hydro-2	2022-07-18	8	Etheostoma fonticola	30	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	9	Procambarus sp.		1
2805	Spring Lake Dam	Hydro-2	2022-07-18	9	Etheostoma fonticola	34	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	9	Gambusia sp.	30	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	10	Etheostoma fonticola	36	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	10	Etheostoma fonticola	22	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	10	Procambarus sp.		1
2805	Spring Lake Dam	Hydro-2	2022-07-18	11	Gambusia sp.	30	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	11	Etheostoma fonticola	28	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	11	Etheostoma fonticola	31	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	11	Etheostoma fonticola	27	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	11	Etheostoma fonticola	29	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	12	Etheostoma fonticola	14	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	13	Etheostoma fonticola	36	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	14	No fish collected		
2805	Spring Lake Dam	Hydro-2	2022-07-18	15	Procambarus sp.		1
2805	Spring Lake Dam	Hydro-2	2022-07-18	15	Etheostoma fonticola	31	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	16	Etheostoma fonticola	31	1
2805	Spring Lake Dam	Hydro-2	2022-07-18	17	Procambarus sp.		1
2805	Spring Lake Dam	Hydro-2	2022-07-18	17	No fish collected		
2826	Spring Lake Dam	Pota-1	2022-10-10	1	Lepomis miniatus	95	1
2826	Spring Lake Dam	Pota-1	2022-10-10	1	Procambarus sp.		1
2826	Spring Lake Dam	Pota-1	2022-10-10	2	Palaemonetes sp.		1
2826	Spring Lake Dam	Pota-1	2022-10-10	2	No fish collected		
2826	Spring Lake Dam	Pota-1	2022-10-10	3	Etheostoma fonticola	26	1
2826	Spring Lake Dam	Pota-1	2022-10-10	3	Palaemonetes sp.		1
2826	Spring Lake Dam	Pota-1	2022-10-10	4	Procambarus sp.		1
2826	Spring Lake Dam	Pota-1	2022-10-10	4	Etheostoma fonticola	15	1
2826	Spring Lake Dam	Pota-1	2022-10-10	4	Palaemonetes sp.		1
2826	Spring Lake Dam	Pota-1	2022-10-10	5	Etheostoma fonticola	27	1
2826	Spring Lake Dam	Pota-1	2022-10-10	6	No fish collected		
2826	Spring Lake Dam	Pota-1	2022-10-10	7	No fish collected		
2826	Spring Lake Dam	Pota-1	2022-10-10	8	Etheostoma fonticola	24	1
2826	Spring Lake Dam	Pota-1	2022-10-10	9	Etheostoma fonticola	22	1
2826	Spring Lake Dam	Pota-1	2022-10-10	10	Etheostoma fonticola	37	1
2826	Spring Lake Dam	Pota-1	2022-10-10	10	Palaemonetes sp.		1
2826	Spring Lake Dam	Pota-1	2022-10-10	11	Etheostoma fonticola	34	1
2826	Spring Lake Dam	Pota-1	2022-10-10	12	No fish collected		
2826	Spring Lake Dam	Pota-1	2022-10-10	13	No fish collected		
2826	Spring Lake Dam	Pota-1	2022-10-10	14	No fish collected		
2826	Spring Lake Dam	Pota-1	2022-10-10	15	No fish collected		

2826	Spring Lake Dam	Pota-1	2022-10-10	16	No fish collected		
2826	Spring Lake Dam	Pota-1	2022-10-10	17	No fish collected		
2826	Spring Lake Dam	Pota-1	2022-10-10	18	Etheostoma fonticola	12	1
2826	Spring Lake Dam	Pota-1	2022-10-10	19	No fish collected		
2826	Spring Lake Dam	Pota-1	2022-10-10	20	No fish collected		
2827	Spring Lake Dam	Pota-2	2022-10-10	1	Palaemonetes sp.		1
2827	Spring Lake Dam	Pota-2	2022-10-10	1	Gambusia sp.	21	1
2827	Spring Lake Dam	Pota-2	2022-10-10	2	Procambarus sp.		2
2827	Spring Lake Dam	Pota-2	2022-10-10	2	Lepomis miniatus	51	1
2827	Spring Lake Dam	Pota-2	2022-10-10	2	Lepomis miniatus	32	1
2827	Spring Lake Dam	Pota-2	2022-10-10	2	Lepomis miniatus	47	1
2827	Spring Lake Dam	Pota-2	2022-10-10	3	Gambusia sp.	7	1
2827	Spring Lake Dam	Pota-2	2022-10-10	4	No fish collected		
2827	Spring Lake Dam	Pota-2	2022-10-10	5	Procambarus sp.		1
2827	Spring Lake Dam	Pota-2	2022-10-10	5	No fish collected		
2827	Spring Lake Dam	Pota-2	2022-10-10	6	Procambarus sp.		1
2827	Spring Lake Dam	Pota-2	2022-10-10	6	Etheostoma fonticola	33	1
2827	Spring Lake Dam	Pota-2	2022-10-10	7	Etheostoma fonticola	12	1
2827	Spring Lake Dam	Pota-2	2022-10-10	8	No fish collected		
2827	Spring Lake Dam	Pota-2	2022-10-10	9	Palaemonetes sp.		1
2827	Spring Lake Dam	Pota-2	2022-10-10	9	No fish collected		
2827	Spring Lake Dam	Pota-2	2022-10-10	10	Etheostoma fonticola	14	1
2827	Spring Lake Dam	Pota-2	2022-10-10	11	Procambarus sp.		1
2827	Spring Lake Dam	Pota-2	2022-10-10	11	Etheostoma fonticola	37	1
2827	Spring Lake Dam	Pota-2	2022-10-10	12	No fish collected		
2827	Spring Lake Dam	Pota-2	2022-10-10	13	Lepomis miniatus	80	1
2827	Spring Lake Dam	Pota-2	2022-10-10	13	Lepomis miniatus	63	1
2827	Spring Lake Dam	Pota-2	2022-10-10	13	Etheostoma fonticola	21	1
2827	Spring Lake Dam	Pota-2	2022-10-10	13	Etheostoma fonticola	18	1
2827	Spring Lake Dam	Pota-2	2022-10-10	14	No fish collected		
2827	Spring Lake Dam	Pota-2	2022-10-10	15	No fish collected		
2827	Spring Lake Dam	Pota-2	2022-10-10	16	No fish collected		
2828	Spring Lake Dam	Sag-1	2022-10-10	1	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	1	Gambusia sp.	20	1
2828	Spring Lake Dam	Sag-1	2022-10-10	1	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	1	Gambusia sp.	18	1
2828	Spring Lake Dam	Sag-1	2022-10-10	1	Gambusia sp.	17	1
2828	Spring Lake Dam	Sag-1	2022-10-10	1	Etheostoma fonticola	18	1
2828	Spring Lake Dam	Sag-1	2022-10-10	1	Etheostoma fonticola	33	1
2828	Spring Lake Dam	Sag-1	2022-10-10	1	Procambarus sp.		3
2828	Spring Lake Dam	Sag-1	2022-10-10	2	Gambusia sp.	14	1

2828	Spring Lake Dam	Sag-1	2022-10-10	2	Gambusia sp.	18	1
2828	Spring Lake Dam	Sag-1	2022-10-10	2	Gambusia sp.	10	1
2828	Spring Lake Dam	Sag-1	2022-10-10	2	Gambusia sp.	19	1
2828	Spring Lake Dam	Sag-1	2022-10-10	2	Gambusia sp.	17	1
2828	Spring Lake Dam	Sag-1	2022-10-10	2	Gambusia sp.	16	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	18	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	12	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	18	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	12	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	21	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	20	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	12	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	18	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	10	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Gambusia sp.	11	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Etheostoma fonticola	32	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Etheostoma fonticola	26	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Etheostoma fonticola	24	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Etheostoma fonticola	21	1
2828	Spring Lake Dam	Sag-1	2022-10-10	3	Palaemonetes sp.		2
2828	Spring Lake Dam	Sag-1	2022-10-10	4	Etheostoma fonticola	26	1
2828	Spring Lake Dam	Sag-1	2022-10-10	4	Gambusia sp.	18	1
2828	Spring Lake Dam	Sag-1	2022-10-10	4	Gambusia sp.	11	1
2828	Spring Lake Dam	Sag-1	2022-10-10	4	Gambusia sp.	22	1
2828	Spring Lake Dam	Sag-1	2022-10-10	4	Gambusia sp.	18	1
2828	Spring Lake Dam	Sag-1	2022-10-10	4	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	4	Gambusia sp.	25	1
2828	Spring Lake Dam	Sag-1	2022-10-10	4	Gambusia sp.	14	1
2828	Spring Lake Dam	Sag-1	2022-10-10	4	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	5	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	5	Gambusia sp.	18	1
2828	Spring Lake Dam	Sag-1	2022-10-10	5	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	5	Gambusia sp.	10	1
2828	Spring Lake Dam	Sag-1	2022-10-10	5	Gambusia sp.	15	1
2828	Spring Lake Dam	Sag-1	2022-10-10	5	Etheostoma fonticola	28	1
2828	Spring Lake Dam	Sag-1	2022-10-10	5	Etheostoma fonticola	34	1

2828	Spring Lake Dam	Sag-1	2022-10-10	5	Palaemonetes sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	6	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	7	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	7	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	7	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	7	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	8	Etheostoma fonticola	35	1
2828	Spring Lake Dam	Sag-1	2022-10-10	8	Etheostoma fonticola	25	1
2828	Spring Lake Dam	Sag-1	2022-10-10	8	Palaemonetes sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	9	Palaemonetes sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	9	Etheostoma fonticola	28	1
2828	Spring Lake Dam	Sag-1	2022-10-10	9	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	9	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	10	Palaemonetes sp.		2
2828	Spring Lake Dam	Sag-1	2022-10-10	10	Etheostoma fonticola	35	1
2828	Spring Lake Dam	Sag-1	2022-10-10	11	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	11	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	11	Etheostoma fonticola	35	1
2828	Spring Lake Dam	Sag-1	2022-10-10	11	Etheostoma fonticola	30	1
2828	Spring Lake Dam	Sag-1	2022-10-10	11	Palaemonetes sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	12	Procambarus sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	12	Etheostoma fonticola	25	1
2828	Spring Lake Dam	Sag-1	2022-10-10	12	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	12	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	12	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	12	Gambusia sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	12	Palaemonetes sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	13	Etheostoma fonticola	37	1
2828	Spring Lake Dam	Sag-1	2022-10-10	14	Procambarus sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	14	No fish collected		
2828	Spring Lake Dam	Sag-1	2022-10-10	15	Etheostoma fonticola	31	1

2828	Spring Lake Dam	Sag-1	2022-10-10	15	Procambarus sp.		1
2828	Spring Lake Dam	Sag-1	2022-10-10	16	No fish collected		
2828	Spring Lake Dam	Sag-1	2022-10-10	15	Etheostoma fonticola	34	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Procambarus sp.		1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Palaemonetes sp.		1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Lepomis miniatus	76	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Lepomis miniatus	26	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Lepomis miniatus	30	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Lepomis miniatus	50	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Lepomis miniatus	62	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Lepomis miniatus	32	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Gambusia sp.	20	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Gambusia sp.	15	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Gambusia sp.	36	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Gambusia sp.	15	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Gambusia sp.	10	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Gambusia sp.	10	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Gambusia sp.	10	1
2829	Spring Lake Dam	Sag-2	2022-10-10	1	Gambusia sp.	10	1
2829	Spring Lake Dam	Sag-2	2022-10-10	2	Lepomis miniatus	63	1
2829	Spring Lake Dam	Sag-2	2022-10-10	2	Gambusia sp.	30	1
2829	Spring Lake Dam	Sag-2	2022-10-10	2	Gambusia sp.	26	1
2829	Spring Lake Dam	Sag-2	2022-10-10	2	Gambusia sp.	10	1
2829	Spring Lake Dam	Sag-2	2022-10-10	2	Gambusia sp.	10	1
2829	Spring Lake Dam	Sag-2	2022-10-10	2	Gambusia sp.	24	1
2829	Spring Lake Dam	Sag-2	2022-10-10	2	Gambusia sp.	12	1
2829	Spring Lake Dam	Sag-2	2022-10-10	2	Gambusia sp.	20	1
2829	Spring Lake Dam	Sag-2	2022-10-10	2	Palaemonetes sp.		1
2829	Spring Lake Dam	Sag-2	2022-10-10	3	Lepomis miniatus	109	1
2829	Spring Lake Dam	Sag-2	2022-10-10	3	Lepomis miniatus	89	1
2829	Spring Lake Dam	Sag-2	2022-10-10	3	Lepomis miniatus	60	1
2829	Spring Lake Dam	Sag-2	2022-10-10	3	Lepomis gulosus	135	1
2829	Spring Lake Dam	Sag-2	2022-10-10	3	Gambusia sp.	25	1
2829	Spring Lake Dam	Sag-2	2022-10-10	3	Gambusia sp.	18	1
2829	Spring Lake Dam	Sag-2	2022-10-10	3	Gambusia sp.	20	1
2829	Spring Lake Dam	Sag-2	2022-10-10	3	Palaemonetes sp.		1
2829	Spring Lake Dam	Sag-2	2022-10-10	4	Lepomis miniatus	85	1
2829	Spring Lake Dam	Sag-2	2022-10-10	4	Lepomis miniatus	25	1
2829	Spring Lake Dam	Sag-2	2022-10-10	4	Herichthys cyanoguttatus	30	1
2829	Spring Lake Dam	Sag-2	2022-10-10	4	Gambusia sp.	30	1
2829	Spring Lake Dam	Sag-2	2022-10-10	4	Gambusia sp.	12	1

2829	Spring Lake Dam	Sag-2	2022-10-10	4	Gambusia sp.		1
2829	Spring Lake Dam	Sag-2	2022-10-10	5	Lepomis miniatus	51	1
2829	Spring Lake Dam	Sag-2	2022-10-10	5	Lepomis miniatus	68	1
2829	Spring Lake Dam	Sag-2	2022-10-10	5	Lepomis gulosus	140	1
2829	Spring Lake Dam	Sag-2	2022-10-10	5	Gambusia sp.		1
2829	Spring Lake Dam	Sag-2	2022-10-10	5	Gambusia sp.		1
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2829	Spring Lake Dam	Sag-2	2022-10-10	9	Lepomis miniatus	46	1
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2829	Spring Lake Dam	Sag-2	2022-10-10	11	Lepomis miniatus		1
2829	Spring Lake Dam	Sag-2	2022-10-10	12	Lepomis miniatus		1
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2830	Spring Lake Dam	Open-1	2022-10-10	2	Gambusia sp.	20	1
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2830	Spring Lake Dam	Open-1	2022-10-10	2	Gambusia sp.	21	1
2830	Spring Lake Dam	Open-1	2022-10-10	2	Gambusia sp.	24	1
2830	Spring Lake Dam	Open-1	2022-10-10	2	Gambusia sp.	15	1
2830	Spring Lake Dam	Open-1	2022-10-10	2	Gambusia sp.	18	1
2830	Spring Lake Dam	Open-1	2022-10-10	2	Gambusia sp.	21	1
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2830	Spring Lake Dam	Open-1	2022-10-10	2	Gambusia sp.	18	1
2830	Spring Lake Dam	Open-1	2022-10-10	2	Gambusia sp.	22	1
2830	Spring Lake Dam	Open-1	2022-10-10	2	Gambusia sp.	22	1

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2830	Spring Lake Dam	Open-1	2022-10-10	3	Gambusia sp.		1
2830	Spring Lake Dam	Open-1	2022-10-10	3	Gambusia sp.		1
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2830	Spring Lake Dam	Open-1	2022-10-10	3	Gambusia sp.		1
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2830	Spring Lake Dam	Open-1	2022-10-10	6	No fish collected		
2830	Spring Lake Dam	Open-1	2022-10-10	7	Gambusia sp.		1
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2830	Spring Lake Dam	Open-1	2022-10-10	12	No fish collected		
2830	Spring Lake Dam	Open-1	2022-10-10	13	No fish collected		
2830	Spring Lake Dam	Open-1	2022-10-10	14	No fish collected		
2830	Spring Lake Dam	Open-1	2022-10-10	15	No fish collected		
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2831	Spring Lake Dam	Hydro-1	2022-10-10	1	Gambusia sp.	22	1
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2831	Spring Lake Dam	Hydro-1	2022-10-10	4	No fish collected		
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2831	Spring Lake Dam	Hydro-1	2022-10-10	6	No fish collected		
2831	Spring Lake Dam	Hydro-1	2022-10-10	7	Etheostoma fonticola	31	1
2831	Spring Lake Dam	Hydro-1	2022-10-10	7	Etheostoma fonticola	23	1
2831	Spring Lake Dam	Hydro-1	2022-10-10	7	Procambarus sp.		1
2831	Spring Lake Dam	Hydro-1	2022-10-10	8	No fish collected		
2831	Spring Lake Dam	Hydro-1	2022-10-10	9	Gambusia sp.	24	1
2831	Spring Lake Dam	Hydro-1	2022-10-10	10	No fish collected		
2831	Spring Lake Dam	Hydro-1	2022-10-10	11	Procambarus sp.		1

2831	Spring Lake Dam	Hydro-1	2022-10-10	11	No fish collected		
2831	Spring Lake Dam	Hydro-1	2022-10-10	12	No fish collected		
2831	Spring Lake Dam	Hydro-1	2022-10-10	13	Procambarus sp.		1
2831	Spring Lake Dam	Hydro-1	2022-10-10	13	No fish collected		
2831	Spring Lake Dam	Hydro-1	2022-10-10	14	Gambusia sp.	25	1
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2832	Spring Lake Dam	Hydro-2	2022-10-10	1	Gambusia sp.	20	1
2832	Spring Lake Dam	Hydro-2	2022-10-10	1	Gambusia sp.	15	1
2832	Spring Lake Dam	Hydro-2	2022-10-10	1	Gambusia sp.	21	1
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2832	Spring Lake Dam	Hydro-2	2022-10-10	1	Gambusia sp.	15	1
2832	Spring Lake Dam	Hydro-2	2022-10-10	1	Gambusia sp.	18	1
2832	Spring Lake Dam	Hydro-2	2022-10-10	1	Gambusia sp.	18	1
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2832	Spring Lake Dam	Hydro-2	2022-10-10	2	Gambusia sp.	19	1
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2832	Spring Lake Dam	Hydro-2	2022-10-10	3	Gambusia sp.	14	1
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2832	Spring Lake Dam	Hydro-2	2022-10-10	4	Gambusia sp.	18	1
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2832	Spring Lake Dam	Hydro-2	2022-10-10	6	No fish collected		
2832	Spring Lake Dam	Hydro-2	2022-10-10	7	Gambusia sp.		1
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2832	Spring Lake Dam	Hydro-2	2022-10-10	9	Gambusia sp.		1
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2832	Spring Lake Dam	Hydro-2	2022-10-10	11	Procambarus sp.		1
2832	Spring Lake Dam	Hydro-2	2022-10-10	12	Gambusia sp.		1
2832	Spring Lake Dam	Hydro-2	2022-10-10	13	No fish collected		
2832	Spring Lake Dam	Hydro-2	2022-10-10	14	Etheostoma fonticola	31	1
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2833	Spring Lake Dam	Open-2	2022-10-10	3	No fish collected		
2833	Spring Lake Dam	Open-2	2022-10-10	4	No fish collected		
2833	Spring Lake Dam	Open-2	2022-10-10	5	No fish collected		
2833	Spring Lake Dam	Open-2	2022-10-10	6	No fish collected		
2833	Spring Lake Dam	Open-2	2022-10-10	7	No fish collected		
2833	Spring Lake Dam	Open-2	2022-10-10	8	No fish collected		
2833	Spring Lake Dam	Open-2	2022-10-10	9	No fish collected		
2833	Spring Lake Dam	Open-2	2022-10-10	10	No fish collected		

APPENDIX H: FOUNTAIN DARTER HABITAT SUITABILITY ANALYTICAL FRAMEWORK

OBJECTIVES

The goal of this analysis was to develop an index to quantify Fountain Darter habitat suitability within biological monitoring study reaches based on aquatic vegetation composition. Specific objectives included: (1) build Habitat Suitability Criteria (HSC) for each vegetation taxa; (2) use HSC to calculate an Overall Habitat Suitability Index (OHSI) based on vegetation community composition mapped at a given study reach during each monitoring event; (3) evaluate the efficacy of OHSI as a measure of Fountain Darter habitat suitability by testing whether Fountain Darter occurrence can be predicted based on OHSI.

METHODS

Habitat Suitability Criteria

HSC are a form of resource selection function (RSF) defined as any function that is proportional to the probability of use by an organism (Manly et al. 1993). HSC were built separately for the Comal and San Marcos river/springs systems using logistic regression based on random-station dip-net data and drop-net data converted to presence/absence. Logistic regression is a form of classification model that uses presence/absence data to predict probabilities based on a set of covariates (Hastie et al. 2009). The response variable for this analysis, probability of darter occurrence, was used to quantify criteria for each vegetation type, ranging from 0 (i.e., not suitable) to 1 (i.e., most suitable) (Figure G1).

OHSI Calculation

To calculate the OHSI for each monitoring event, HSC values for each vegetation strata were first multiplied by the areal coverage of that vegetation strata, and these values were summed across all vegetation strata within each study reach, to generate a Weighted Usable Area (WUA) of vegetation only as follows:

Eq. 1 $$WUA = \sum_{i=1}^{N}(A_i \; x \; HSC_i)$$

where N is the total number of vegetation types, A_i is the areal coverage of a single vegetation type, and HSC_i is the habitat suitability criteria of that single vegetation type (Yao & Bamal 2014).

This WUA was then divided by the total wetted area within the reach to generate OHSI, as follows:

Eq. 2 $$OHSI = \frac{WUA}{\sum_{i=1}^{N}(A_i)}$$

In this way, OHSI can also be thought of as the proportion of weighted usable area (Yao & Bamal 2014), ranging from 0 (unsuitable overall habitat) to 1 (most suitable overall habitat). Standardizing by reach size allows for a comparison of habitat quality between reaches of different sizes.

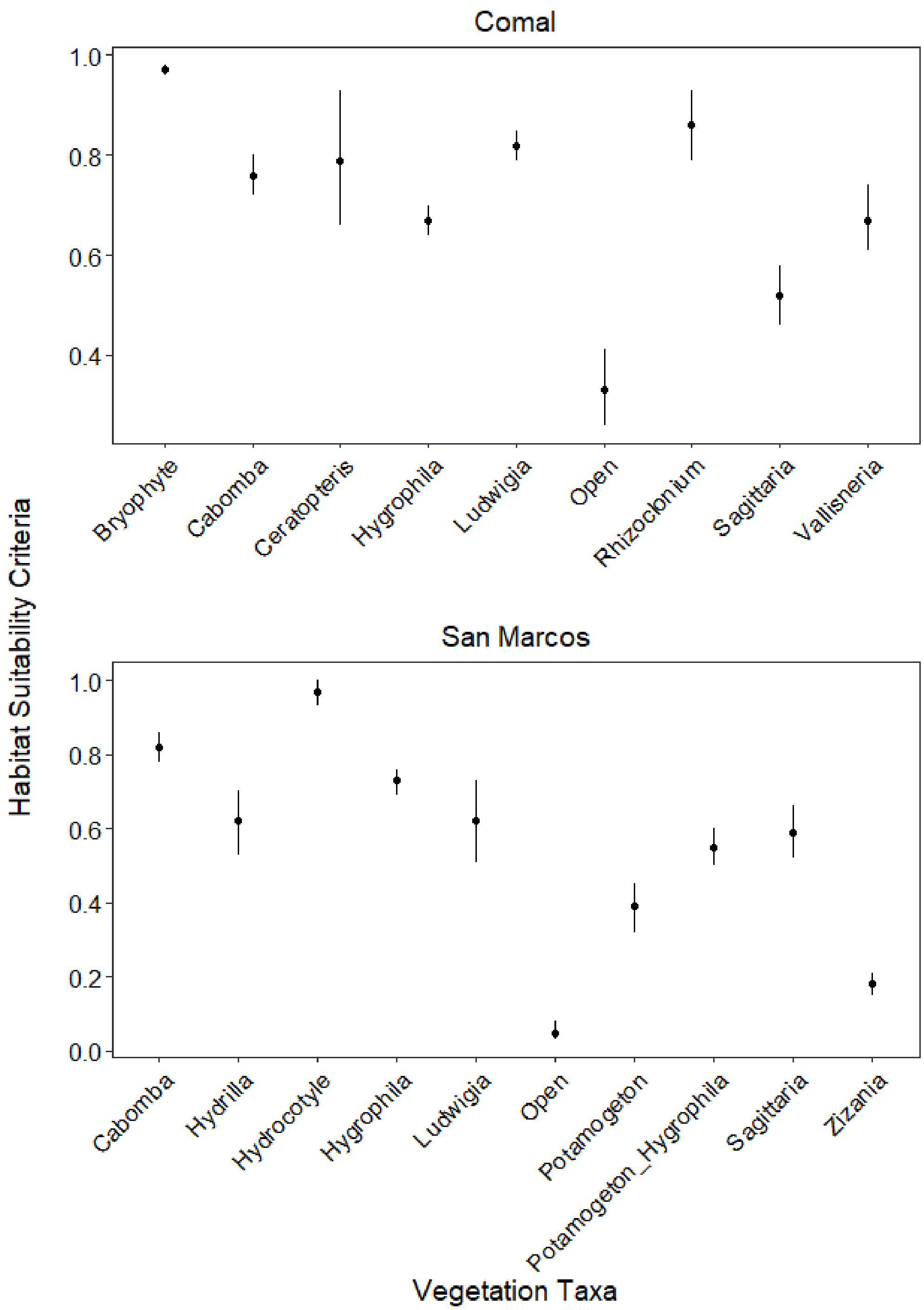

Figure H1. **Aquatic vegetation habitat suitability criteria (±95% CI) built with drop-net and random dip-net datasets using logistic regression.**

OHSI Evaluation

OHSI Evaluation Methods

To examine the relationship between OHSI and Fountain Darter population metrics, random-station dip-net data from 2017-2020 was organized in a way that treats each monitoring event per study reach as independent. This results in the response variable quantified as the proportional occurrence of Fountain Darters per reach at a given monitoring event based on the independent variable OHSI.

To predict Fountain Darter occurrence, two modeling approaches that are able to analyze proportions were used, which included: (1) GLM with a binomial distribution and (2) Random Forest Regression (RF). RF is an ensemble learning technique that builds many decision trees to predict a response variable (Breiman et al. 1984). Each decision tree of the "forest" is built by selecting a random subset of the dataset with replacement and a random set of covariates (Liaw & Wiener 2002). RF are considered more advantageous compared to traditional decision tree models and GLM because they correct for overfitting (Breiman 2001) and can provide more accurate predictions with many covariates (Cutler et al. 2007). For this analysis, we built RF models with 500 trees.

GLMs and RFs were built separately for the Comal and San Marcos systems. First, 50% of each dataset was randomly selected to train each model. Second, 5-fold cross validation (CV) was used to independently test the predictive performance of each model with the remaining 50% of the dataset (i.e., test data). Predictive performance was compared among models based on the correlation (R) and deviance (D) between observed and predicted values. Mean CV R ± standard error (SE) and CV D ± SE were calculated based on predictions from the 5 CV folds. Models with the highest CV R were considered as the best models for making predictions and elaborated on further in the results.

Lastly, figures were built to display fitted predictions across observed OHSI values to examine if there was a positive relationship between Fountain Darter occurrence and OHSI. Fitted predictions were also presented with a LOWESS smoothed function to visualize if trends of OHSI are linear or nonlinear (Milborrow 2020). In sum, if the models displayed strong predictive power and Fountain Darter occurrence showed a positive relationship with OHSI, then OHSI was considered a useful measurement of habitat suitability for Fountain Darters.

OHSI Evaluation Results

Predictive performance for the Comal models showed that RF (0.81 ± 0.18) predictions were more accurate than GLM (0.62 ± 0.20). San Marcos models were similar, showing better predictive accuracy for RF (0.97 ± 0.02) compared to GLM (0.93 ± 0.06) (Table G1). Comparisons between observed vs. predicted occurrence for the RF 5-fold CV demonstrated lowest predictive accuracy at observed proportions about 0.20 or less for the Comal and San Marcos (Figure G2).

Fitted predictions of occurrence as a function of OHSI showed that occurrence increased with increasing OHSI for the Comal and San Marcos. In the Comal, LOWESS smoothed predictions exhibited a non-linear asymptotic trend. Occurrence increased about 0.60 to 0.80 when OHSI increased from about 0.65 to 0.75 and remained around 0.80 at OHSI values >0.75. In the San Marcos, LOWESS smoothed predictions exhibited a more linear trend compared to the Comal and occurrence increased from about 0.25 to 0.55 as OHSI increased from 0.25 to 0.60 (Figure G3).

Table H1. Summary model performance statistics for predicting Fountain Darter occurrence based on OHSI. Summary statistics includes deviance (D) and correlation (R) for training data and 5-fold cross-validation (SE).

	Comal		San Marcos	
	GLM	RF	GLM	RF
Training Data				
Deviance	1.10	1.03	1.23	1.20
Correlation	0.48	0.77	0.70	0.89
Cross-Validation				
Deviance	1.12 (0.05)	1.05 (0.06)	1.24 (0.07)	1.21 (0.05)
Correlation	0.62 (0.20)	0.81 (0.18)	0.93 (0.06)	0.97 (0.02)

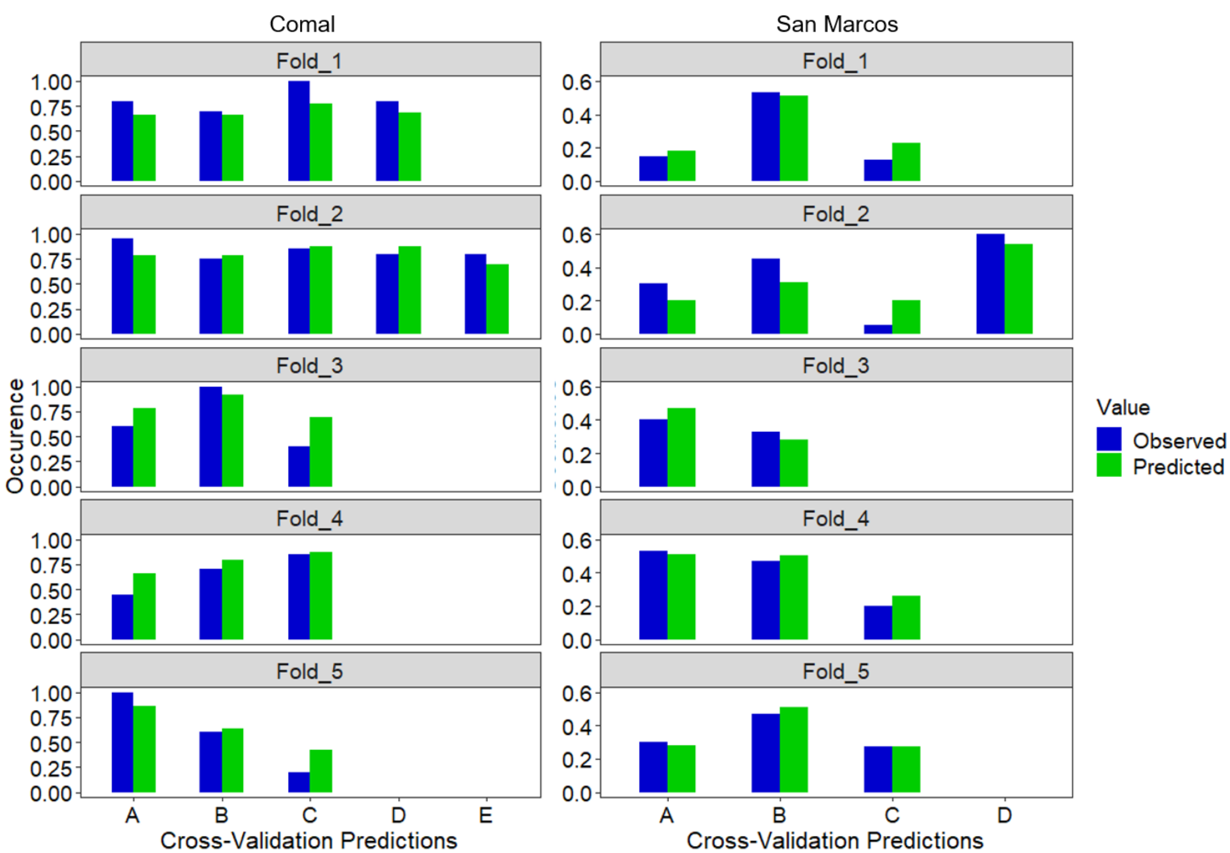

Figure H2. Observed vs. predicted Fountain Darter occurrence in relationship to OHSI from Random Forest 5-fold cross-validation.

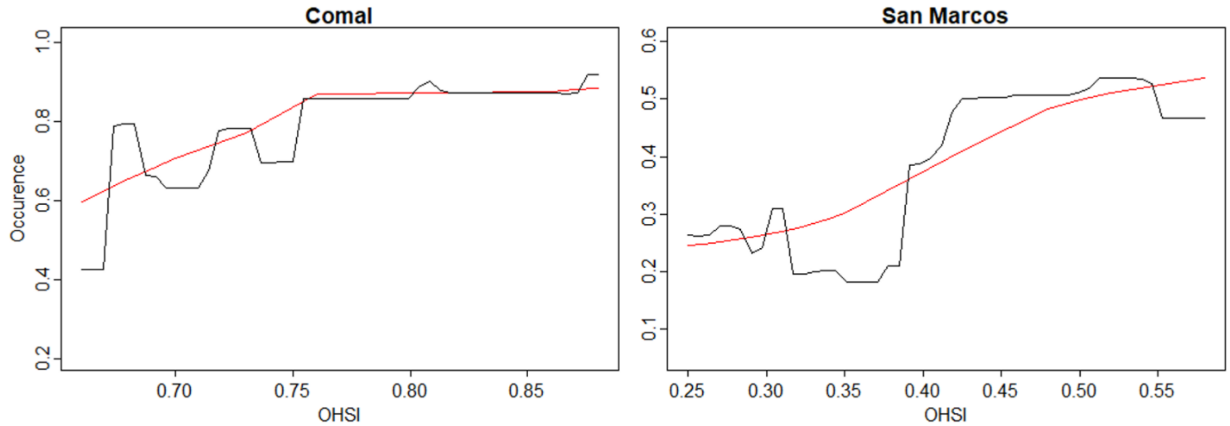

Figure H3. **Fitted occurrence predictions for OHSI in the Comal Springs/River and San Marcos River. The red lines are LOWESS smoothed fitted predictions used to visualize nonlinear trends.**

OHSI EVALUATION DISCUSSION

Model CV R >0.80 for all RFs demonstrate good model performance and that Fountain Darter occurrence can be accurately predicted based on OHSI. Further, similar performance statistics for training data and test data via cross-validation indicated that the training models were not overfit and can reliably predict independent observations in the future. That being said, predictions were least accurate at observed occurrence values about 0.20 or less, which is likely due to smaller sample sizes in this range. As random station dip-net sampling continues during future biomonitoring activities, predictions at these lower occurrence values will likely improve. Fountain Darter occurrence also increased with increasing OHSI. The positive relationship between occurrence and OHSI and good model performance supports that OHSI is an ecologically relevant index for evaluating Fountain Darter habitat suitability based on vegetation community composition.

In sum, this analysis demonstrated that OHSI based on vegetation-specific HSC and reach-level vegetation composition data can accurately predict Fountain Darter occurrence and is a useful measurement for quantifying habitat suitability. However, additional data collection can assist in addressing multiple limitations of this analysis. Firstly, random station dip-net data with simple random sampling is only available from about 2017-2020, which limits the ability to predict occurrence from historical observations. Further, model performance would likely improve at lower occurrence values as additional data are collected and a more robust dataset is generated. Secondly, this analysis assumed that vegetation alone determines Fountain Darter occurrence. For example, decreased predictive accuracy at lower darter occurrence values may be due to other habitat factors (e.g., depth-flow conditions, river discharge) or biotic factors (e.g., competition, predation) rather than due to smaller sample sizes of lower occurrence values; however, a multi-factor ecological model is beyond the scope of this work. In addition, OHSI can only be assessed for vegetation taxa that have been sampled previously and building HSC for rare vegetation taxa not represented may improve predictions. That being said, RF models demonstrated that occurrence can be predicted accurately without including additional habitat variables or vegetation types, supporting that this assumption does not hinder this analysis and does not appear to restrict the inference value of OHSI.

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Appendix F4 | **EAHCP Permit Renewal Listen and Learn Report**

PERMIT RENEWAL FOR THE EDWARDS AQUIFER HABITAT CONSERVATION PLAN

LISTEN AND LEARN REPORT

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December 2022

ICF. 2022. *Permit Renewal for the Edwards Aquifer Habitat Conservation Plan: Listen and Learn Report*. December 2022. (ICF 104503.0.001.01) Austin, Texas. Prepared for Edwards Aquifer Authority, San Antonio, Texas.

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List of Acronyms and Abbreviations

ASR	Aquatic Storage Recovery
EAA	Edwards Aquifer Authority
EAA Act	Edwards Aquifer Authority Act
EAHCP	Edwards Aquifer Habitat Conservation Plan
EARIP	Edwards Aquifer Recovery Implementation Program
ESA	Endangered Species Act
HCP	Habitat Conservation Plan
HCP Handbook	*USFWS Habitat Conservation Planning Handbook*
ITP	Incidental Take Permit
SAV	Submerged Aquatic Vegetation
SAWS	San Antonio Water System
SMART	Specific, Measurable, Achievable, Result-oriented, Time-fixed
USFWS	U.S. Fish and Wildlife Service
VISPO	Voluntary Irrigation Suspension Program Option

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Chapter 1
Introduction

The Listen and Learn Report is a summary of the feedback received from four Listen and Learn workshops conducted as the first phase of the permit renewal process for the Edwards Aquifer Habitat Conservation Plan (EAHCP). Workshops were conducted to receive input and data sources from members of the community and other interested parties about important topics to the permit renewal process, including the approach to the permit renewal, biological goals and objectives, climate change and system vulnerability, and conservation measures. This report documents the Listen and Learn process conducted and the input received.

1.1 Purpose of the Permit Renewal

The EAHCP is beginning a planning process to amend the existing EAHCP and renew the Incidental Take Permit (ITP) to extend its permit term beyond the expiration date of March 31, 2028. The permit renewal process presents an opportunity to reflect on and assess implementation progress and adjust the EAHCP so that it may incorporate lessons learned and adapt to new situations.

The Permittees began planning for the end of the current permit term through the Permit Options Report (ICF 2020), which identified five potential options for the plan and permit, summarized as follows:

- Option 1: Allow Permit to Expire
    - The current permit would expire March 31, 2028. Permittees would need to apply for ITPs for their activities likely to result in take of listed species. Although the Permittees would not allow the permit to expire, this option serves as a useful reference point to demonstrate the value of the EAHCP.
- Option 2: Renew Permit
    - The simplest form of Habitat Conservation Plan (HCP) amendment, this option would only change the expiration date of the permit.
- Option 3: Administrative Changes
    - Non-substantive changes to the plan and its implementation that represent clarifications or minor administrative amendments (e.g., revisions to monitoring or reporting procedures).
- Option 4: Major Permit Amendment
    - Changes that must be made to the actual ITP (e.g., adding or removing a covered species) or changes to the HCP that exceed the scope of what has already been analyzed and advertised to the public (e.g., increasing the size of the Plan Area).
- Option 5: Replace EAHCP with New HCP
    - A replacement HCP is typically considered for HCPs that are very old (i.e., more than 20 years old), when situations arise in which there are new regulations, or if the plan is not functioning well. The criteria for this option do not apply to the EAHCP.

The EAHCP Permit Options Report recommended a combination of Option 3 and Option 4, allowing for administrative changes, as needed, prior to the end of the permit term in 2028 and completion of a major permit amendment prior to the end of the permit term. The process to complete this major amendment comprises the permit renewal process for the EAHCP.

1.2 Overview of the Permit Renewal Process

The permit renewal process allows the EAHCP Permittees to extend the permit beyond its expiration date. It also provides opportunities to improve the EAHCP by reinforcing its accomplishments and adjusting components that could work better. The permit renewal process includes five phases (Figure 1). This report completes Phase 1 of the permit renewal process.

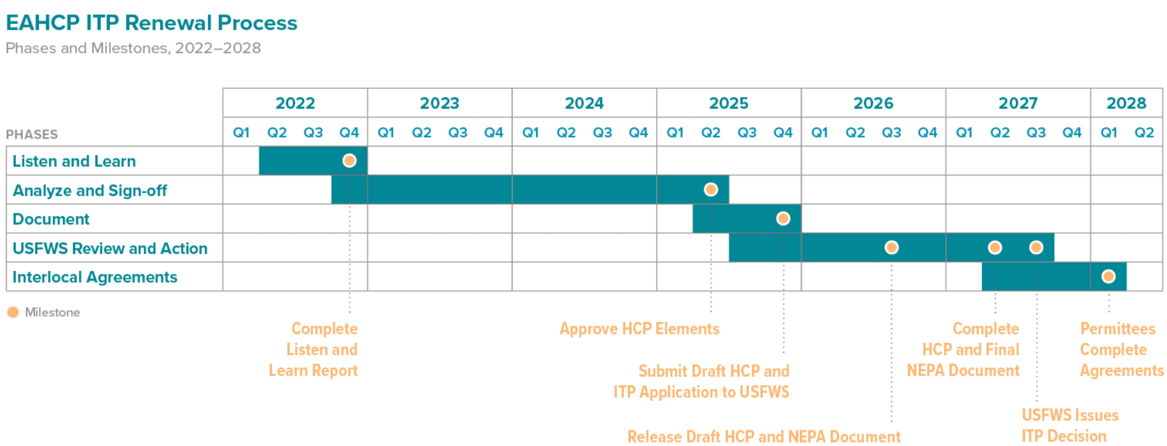

Figure 1. Phases and Milestones of the EAHCP ITP Renewal Process

1.3 Overview of EAHCP

The EAHCP was approved by the U.S. Fish and Wildlife Service (USFWS) in 2013. Activities covered under the plan include groundwater pumping from the Edwards Aquifer, surface water management, aquatic and riparian habitat management, and recreational use in the aboveground springs fed by the aquifer in the cities of New Braunfels and San Marcos. The HCP and its Endangered Species Act (ESA) permit provide authorization for these covered activities to *take*[1] of threatened and endangered species covered by the plan.

The approval of the EAHCP in 2013 was a major achievement toward balancing the growing water demand from the Edwards Aquifer with the ecological needs of the unique and imperiled species that depend on it. In response to growing water demands and concerns about the effect of pumping on ESA-listed species, the Texas Legislature passed the Edwards Aquifer Authority Act (EAA Act) in 1996. The EAA Act created the Edwards Aquifer Authority (EAA) to regulate pumping from the

[1] The Endangered Species Act defines *take* as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any endangered and most threatened wildlife species. *Harm* may include significant habitat modification where it actually kills or injures a listed species through impairment of essential behavior (e.g., nesting or reproduction).

aquifer and pursue a program "to ensure that the continuous minimum springflows of the Comal Springs and the San Marcos Springs are maintained to protect endangered and threatened species to the extent required by federal law…" (EAA Act § 1.14). The Texas Legislature amended the EAA Act in 2007 to form the Edwards Aquifer Recovery Implementation Program (EARIP) and directed the EARIP to work with USFWS to prepare an HCP. The EARIP process, including years of negotiations among the eventual Permittees and interested/affected parties, led to the completion of the EAHCP in 2013.The EAHCP's permit term is 15 years, expiring on March 31, 2028.

1.3.1 EAHCP Key Elements

In accordance with agency regulations and guidance, all HCPs have the same basic elements. One or more permit holders, called *permittees*, are covered by the ITP. An HCP has a defined permit area, in which all permitted activities occur. The permit is issued for a specific duration, called the *permit term*. An HCP must also define the *covered species* for which take authorization is being requested. Covered species can be listed at the time the permit is issued or not. Covered species not yet listed as threatened or endangered by the ESA are often covered because they are expected to become listed during the permit duration. An HCP also describes the activities or projects expected to take the covered species, called *covered activities*. HCPs must also define *conservation measures* to offset the authorized take of the covered species and meet permit issuance criteria.[2] These basic elements of the EAHCP are as follows.

Permittees: Edwards Aquifer Authority, City of San Antonio (through its San Antonio Water System [SAWS]), City of San Marcos, City of New Braunfels, and Texas State University.

Permit Area: For the purposes of the EAHCP, the permit area is the same as the plan area. It is approximately 3.3 million acres, coinciding exactly with the jurisdictional boundaries of the EAA over which it regulates groundwater uses (not surface water uses): all of three counties (Bexar, Medina, Uvalde) and portions of five counties (Atascosa, Comal, Caldwell, Hays, and Guadalupe).

Permit Term: 15 years (March 18, 2013, to March 31, 2028)

Covered Species: Table 1 lists the species covered by the EAHCP. There have been two status changes to covered species since the EAHCP was approved. The USFWS published a proposed rule in 2021 to delist the San Marcos gambusia due to extinction, but has not yet issued a final rule to delist the species. The petition to list the Comal Springs salamander was withdrawn in 2022.

[2] The key permit issuance criterion related to conservation measures is that, collectively, they must minimize and mitigate the impact of the taking on each covered species to the maximum extent practicable

Table 1. Species Covered by the EAHCP

Species	Federal Listing Status
Texas wild-rice (*Zizania texana*)	Endangered
Texas blind salamander (*Eurycea rathbuni*)	Endangered
Fountain darter (*Etheostoma fonticola*)	Endangered
Comal Springs dryopid beetle (*Stygoparnus comalensis*)	Endangered
Comal Springs riffle beetle (*Heterelmis comalensis*)	Endangered
Peck's cave amphipod (*Stygobromus pecki*)	Endangered
San Marcos salamander (*Eurycea nana*)	Threatened
Texas troglobitic water slater (*Lirceolus smithii*)	Petitioned for Listing
Edwards Aquifer diving beetle (*Haideoporus texanus*)	Petitioned for Listing
Comal Springs salamander (*Eurycea sp.*)	Not Listed[a]
San Marcos gambusia (*Gambusia georgei*)	Proposed for Delisting[b]

Notes:
[a] The petition for listing the Comal Springs salamander was withdrawn in 2021.
[b] U.S. Fish and Wildlife Service published a proposed rule in 2021 to delist the San Marcos gambusia due to extinction but is yet to issue a final rule.
EAHCP = Edwards Aquifer Habitat Conservation Plan.

Covered Activities: The EAHCP covers activities associated with use of the Edwards Aquifer (including Comal and San Marcos springs) by EAA, SAWS, the City of San Marcos, the City of New Braunfels, and Texas State University (the Permittees). These covered activities include, in summary:

- Groundwater Withdrawal
  - Groundwater withdrawal programs and regulations, as well as permit transfers and amendments
- Management and Operations
  - Water management to maintain consistent flows in the Comal and San Marcos springs
  - Diversion of surface water in accordance with state laws
  - Operation of boats and the spring-fed pool at Comal and San Marcos springs
  - Infrastructure to manage aquatic recreation access
  - Educational activities in Spring Lake
  - Golf course maintenance
- Aquatic Recreation
  - Recreational activities in Comal and San Marcos springs and river ecosystems
- Conservation
  - Minimization, mitigation, and conservation measures to contribute to species recovery

Authorized Take: The EAHCP's take authorization is documented in the ITP. Incidental take coverage applies to the incidental taking of covered species as a result of covered activities. For ESA-listed covered species, take is authorized over the 15-year permit with the following limits:

- 797,000 fountain darters in Comal Springs, Landa Lake, and the Comal River, and no more than 549,129 fountain darters in the San Marcos Springs, Spring Lake, and San Marcos River
- 11,179 Comal Springs riffle beetles
- 1,543 Comal Springs dryopid beetles
- 18,224 Peck's cave amphipods
- 10 Texas blind salamanders
- 263,857 San Marcos salamanders

For non-listed covered species, the permit provides incidental take authorization based on minimum springflow requirements, noting that take limits will be exceeded if minimum flow rates are not met.

Figure 2, below, summarizes the cumulative amount of take that has occurred and is remaining for each listed species through 2021.

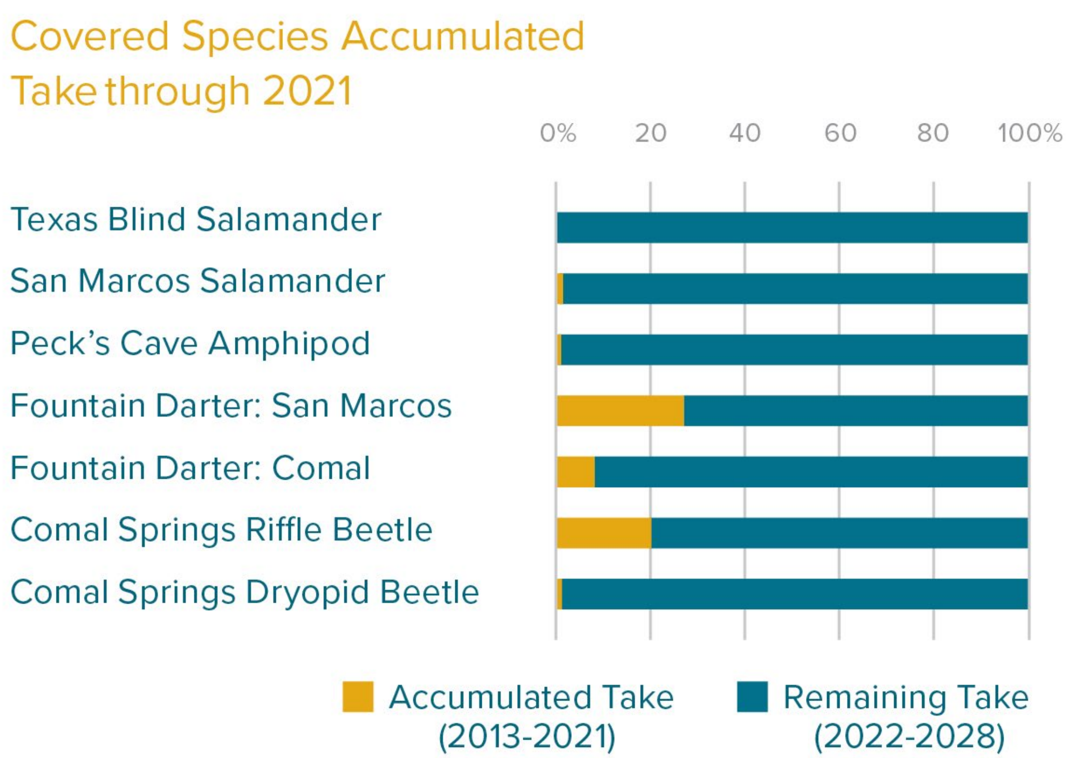

Figure 2. Covered Species Accumulated Take through 2021

Conservation Measures: The EAHCP includes three general types of conservation measures to mitigate the impact of take of covered species.

- Springflow protection measures, including the Aquatic Storage Recovery (ASR) program, Regional Water Conservation Plan, Voluntary Irrigation Suspension Program Option (VISPO), and Stage V Critical Period Management Reductions
- Habitat conservation measures, including measures to promote native aquatic and riparian vegetation restoration, control of non-native species, and water quality, as well as habitat management to minimize impacts from Covered Activities
- Supporting measures, including biological monitoring and calculating incidental take to comply with the ITP, applied research, ecological modeling, expanded water quality monitoring, and the Refugia Program

Chapter 2
Listen and Learn Process

The Listen and Learn process included in-person workshops and online resources to inform interested parties and to gather input from participants to be considered in the permit renewal process. The following sections describe this process.

2.1 Listen and Learn Workshops

Four Listen and Learn workshops provided the public with information about the EAHCP and the permit renewal process and facilitated gathering input from interested parties to inform the permit renewal process. Each workshop, listed below, focused on a key topic to be addressed through the permit renewal process. Meeting locations were selected throughout the EAHCP Plan Area.

- **Workshop 1: Permit Renewal Approach**
  Tuesday, August 2, 2022, 3:30 p.m.–6:30 p.m.
  Norris Conference Center
  618 NW Loop 410, Suite 207, San Antonio, TX 78216
- **Workshop 2: Biological Goals and Objectives**
  Tuesday, August 30, 2022, 3:30 p.m.–6:30 p.m.
  Medina County Fair Hall
  733 FM 462 North, Hondo, TX 78861
- **Workshop 3: Climate Change and System Vulnerability**
  Thursday, September 22, 2022, 3:30 p.m.–6:30 p.m.
  Dunbar Recreation Center
  801 W. Martin Luther King Drive, San Marcos, TX 78666
- **Workshop 4: Conservation Measures**
  Tuesday, October 4, 2022, 3:30 p.m.–6:30 p.m.
  New Braunfels Civic Center – Garden Room
  375 S Castell Avenue, New Braunfels, TX 78130

2.1.1 Noticing

Interested parties and members of the community were encouraged to participate in the workshops, both in-person and/or online, through the permit renewal website. Workshop information was shared via the following methods.

- The EAHCP permit renewal website (https://www.eahcprenewal.org)
- EAA social media accounts such as the EAA's LinkedIn website and NewsDrop magazine
- The EAHCP Steward newsletter
- Email distribution to the EAHCP mailing lists
- Media release to local newspaper and television stations

- Informing the EAHCP Implementing Committee, Stakeholder Committee, and Science Committee

2.1.2 Workshop Format

Workshops were designed to be interactive opportunities for participants to learn about the HCP, permit renewal, and the specific meeting topic, and then to provide their input, knowledge, and opinions. Each meeting included a series of display boards providing background on the EAHCP, describing the permit renewal process, and providing a summary of key considerations for each workshop's specific topic. The project team (EAHCP and ICF staff) were available at the display boards to answer questions. ICF provided a presentation that summarized the information provided on the display boards.

Each workshop also included two to three interactive exercises facilitated by project team members as the primary means for gathering input from workshop participants. All workshop materials, including online feedback forms, were available on the permit renewal website at https://www.eahcprenewal.org.

2.1.3 Participation

Attendance at the workshops included EAHCP Permittees, federal, state, and local government agencies, representatives of environmental and non-governmental organizations, industry consultants, farmers, representatives from the EAHCP Committees, and other individuals and interested parties.

Attendance at each meeting was as follows:

- Workshop 1 – 30 participants
- Workshop 2 – 15 participants
- Workshop 3 – 23 participants
- Workshop 4 – 20 participants

2.2 Online Materials

Materials and information presented at the in-person workshops were available on the permit renewal website (https://www.eahcprenewal.org) to allow interested parties to participate who were unable to attend the in-person workshops. The website was designed to provide a comparable level of information and opportunity to provide input to online participants as those who participated in-person.

Posted materials included copies of all poster boards, a recorded, narrated presentation, and an online survey designed to collect the same input as the in-person exercises. Materials for each workshop were posted on the EAHCP permit renewal website approximately 1 week in advance of each meeting, and notification was provided via email and through the website. The webpage received a total of 292 sessions[3] conducted by 194 users[4].

Users submitted a total of eight online surveys. Information received from the online surveys and via email have been incorporated with the input received at the in-person workshops in Chapter 3, *Workshop Topics and Public Input*.

[3] Google Analytics defines a *session* as the period of time a user is actively engaged with the website.

[4] Google Analytics defines *users* as those who have initiated at least one session.

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Chapter 3
Workshop Topics and Public Input

This chapter is organized by each of the four Listen and Learn workshops. Each section describes the topic and purpose of the workshop, the interactive exercises conducted, and the input received from participants. Comments provided by participants have been edited for clarity. Rows in tables summarizing participants' votes have been ordered from highest number of votes to lowest number of votes.

3.1 Workshop 1: Permit Renewal Approach

The purpose of Workshop 1 was to provide context and background on the permit renewal approach, including information about the permit area, Permittees, and program components. The workshop included an overview of the permit renewal options and renewal process and consideration of potential changes to the covered activities, covered species, and permit duration.

The workshop included three exercises (described below) that served to collect input on 1) potential changes to covered activities; 2) potential changes to covered species; and 3) permit duration.

3.1.1 Exercise 1: Activities Considered for Coverage

Exercise 1 of Workshop 1 included a poster board that posed the following question: "During the permit renewal process, what activities should be removed or considered for coverage that are not already covered?" Participants used stickers and Post-it® Notes to indicate activities that they thought should be added or removed as covered activities and provide comments explaining their choices.

Similarly, the online survey asked participants, "Should the permit renewal process consider adding new activities to the Incidental Take Permit?" and "Should the permit renewal process consider removing certain activities that are currently covered from the Incidental Take Permit?" Participants selected either *Yes, No, Possibly*, or *Unsure* and could elaborate on their choice in a text box.

3.1.1.1 Input Received

Table 2, below, summarizes the input received on Exercise 1 from the in-person workshop and the related online survey. In addition to the responses to the exercise questions, some participants provided additional feedback on this topic, summarized further below.

Table 2. Input on Activities Considered for Coverage

What activities should be considered for coverage that are not already covered?			
Suggested Listed Activity	**Agree/Add Number of Votes**	**Neutral Number of Votes**	**Disagree/Remove Number of Votes**
Enforcement	9	6	0
Construction activities	6[a]	0	0
Determine recreational carrying capacity, enforce existing rules, and add recreational carrying capacity for low flows	3	0	0
Fences to protect riparian buffer	2	0	0
Expand ASR and reduce critical period to 35%	2	0	0
Major construction projects	1	0	0
Revise the HCP regarding number of divers, boaters, etc., in Spring Lake	1	0	0
Add Texas State activities in Spring Lake that are not covered, such as paddleboarding	1	0	0
Revise Texas State golf course to intramural fields	1	0	0
Operation and maintenance of USGS gauge[b]	0	0	0
Operations and maintenance of surface water diversions and structures, including removal of Texas wild-rice and fountain darter habitat (e.g., intake clearing)[b]	0	0	0
Bridge maintenance or replacement (Texas Department of Transportation or Local)[b]	0	0	0
Activities occurring on banks[b]	0	0	0

Notes:
[a] Includes one online survey submission for dam construction-related activities.
[b] Activity suggested by participants but did not receive any additional agree, neutral, or disagree votes pertaining to the activity.
ASR = Aquatic Storage Recovery; HCP = habitat conservation plan; USGS = U.S. Geological Survey

Additional Feedback

- Although other activities have the potential to adversely affect species, expanding the scope of the HCP to address them may introduce too much uncertainty and complexity to allow for a successful permit amendment.
- Major construction projects should be considered because they can have great impacts on covered species. For example, three dams in San Marcos require either routine maintenance or large-scale reconstruction.

- While recreation management is a covered activity, many attendees noted that there needs to be more enforcement and oversight of recreation activities to help reduce harm to the species and their habitat.
- All these activities have potential impacts on covered species; therefore, all must be considered.

3.1.2 Exercise 2: Species Considered for Coverage

Exercise 2 of Workshop 1 included a poster board that posed the following question: "During the permit renewal process, what species should be removed or considered for coverage that are not already covered?" Participants used stickers and Post-it® Notes to indicate species that should be added or removed and to provide comments explaining their choices.

Similarly, the online survey asked participants "Should the permit renewal process consider adding new species to the Incidental Take Permit?" and "Should the permit renewal process consider removing certain species that are currently covered from the Incidental Take Permit?" Participants selected either *Yes, No, Possibly*, or *Unsure* and could elaborate on their choice in a text box.

3.1.2.1 Input Received

Table 3, below, summarizes the input received on Exercise 2 from the in-person workshop and the online survey. In addition to the responses to the exercise questions, some participants provided additional feedback on this topic, summarized further below.

Table 3. Input on Species Considered for Coverage

Which species should be considered for coverage?				
Suggested Species	**Add/Keep Number of Votes**	**Neutral Number of Votes**	**Do Not Add/Remove Number of Votes**	**Total Number of Votes**
San Marcos gambusia[a,b]	1	1	5	7
Comal Springs salamander[a,c]	2	1	2	5
Texas wild-rice[a]	3	0	0	3
Whooping crane	1	0	5	6
Cagel's map turtle	1	1	1	3
Guadalupe orb	2	0	1	3
San Marcos saddle-case caddisfly	2	1	0	3

Notes:
[a] Currently covered by EAHCP.
[b] U.S. Fish and Wildlife Service published a proposed rule in 2021 to delist the San Marcos gambusia due to extinction but is yet to issue a final rule.
[c] The petition for listing the Comal Springs salamander was withdrawn in 2021.

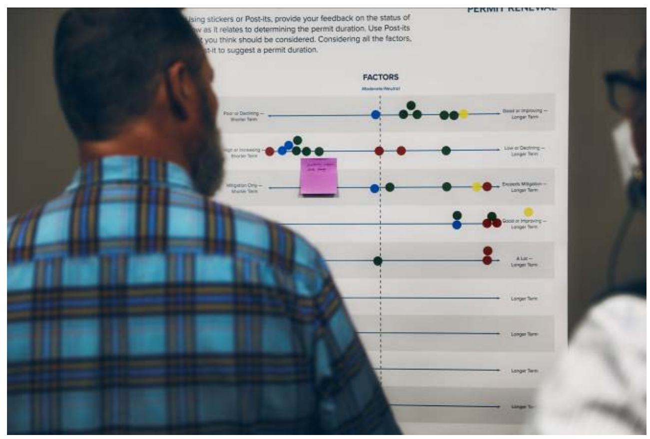
Additional Feedback

- Add endangered species found in the San Marcos, Guadalupe, and San Antonio rivers because they are listed species, and actions within and around the rivers affect them.

- Add species expected to be listed in Covered Area, i.e., Blanco blind salamander (*Eurycea robusta*), Comal blind salamander (*Eurycea tridentifera*), Texas salamander (*Eurycea neotenes*), toothless blindcat (*Trogloglanis pattersoni*), and widemouth blindcat (*Satan eurystomus*).
- The Guadalupe orb (*Cyclonaias necki*) should be considered because it has been proposed for listing. One population of the species is indicated as occurring in the San Marcos River, and flow from the San Marcos springs provides for the flow that supports the population. On the other hand, including the species could introduce challenges, like determining adequate flow levels to avoid take.
- All federally listed species that are currently covered should continue to be covered to avoid species suffering more losses.

3.1.3 Exercise 3: Consideration of Permit Duration

Exercise 3 of Workshop 1 included a poster board that posed the following question: "During the renewal process, what factors should be considered when determining the permit duration?" Participants provided feedback about the status of five factors (see Figure 3, below) as they related to determining the permit duration by placing the stickers or Post-it® Notes on a scale. The prompts at the ends of each scale varied, depending on the factor, but included phrases like *Poor or Declining* and *Good or Improving* in relation to the question "How do you view the status of covered species?" Using additional Post-it® Notes, participants also had the opportunity to add factors not listed that they thought should be considered and suggest a permit duration that considered all the factors.



Similarly, the online survey asked participants "During the renewal process, what factors should be considered when determining the permit duration?" Participants provided feedback about the status of the same factors provided in the in-person workshop, as they related to determining the permit duration. Participants also had the opportunity to elaborate on their responses in text boxes and add any factors not listed that they thought should be considered. Participants were then asked to consider all the factors and suggest a permit duration.

3.1.3.1 Input Received

Figure 3 and Table 4, below, summarize the input received on Exercise 3 from the in-person workshop and online survey. In addition to the responses to the exercise questions, some participants provided additional feedback on this topic, summarized further below.

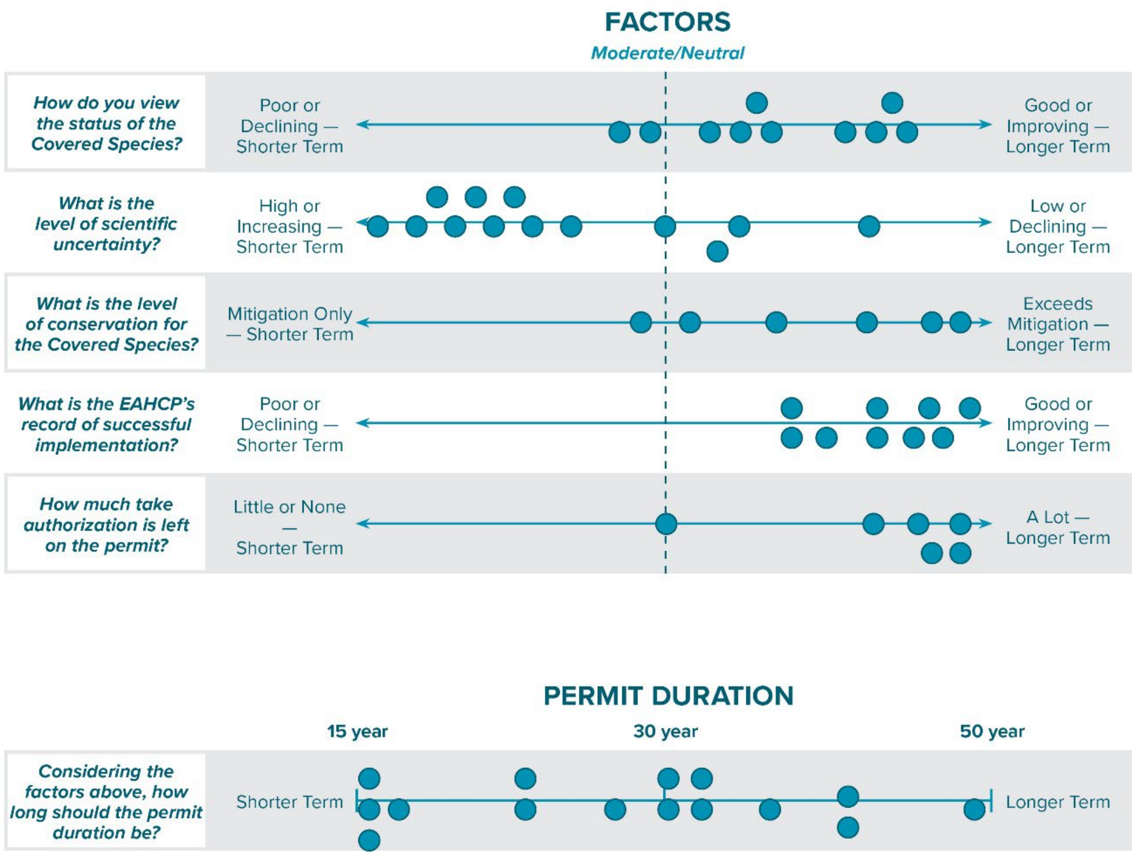


Figure 3. Distribution of Input Received on Permit Duration

Table 4. Feedback on Permit Duration Factors

What factors should be considered when determining the permit duration?	
Factor	**Input**
How do you view the status of the covered species?	• There are many unknowns about the status of various species. Although some appear to be doing well, we have not experienced a prolonged period of extreme low flows under the current EAHCP, so how they will fare during such conditions is unclear. We know very little and have little assurance we could identify problems if they were already occurring.
What is the level of scientific uncertainty?	• There is high uncertainty about climate change and its impacts, future development impacts, and exempt pumping with development. • Due to climate change, uncertainty is very high for the critical factor of future flow levels. • There is great uncertainty about recharge levels, both direct recharge from runoff and recharge from the Trinity aquifer. • There is uncertainty because of limited knowledge about the status and requirements of species.

What factors should be considered when determining the permit duration?	
Factor	**Input**
What is the level of conservation for the covered species?	• Because of unknowns about impacts during extreme drought, it is hard to know how well conservation for covered species is doing. Although programs have been very successful during more moderate conditions, there is uncertainty about species response to sustained drought.
What is the EAHCP's record of successful implementation?	• No additional feedback was provided for this factor.
How much take authorization is left on the permit?	• It is unclear how the current take numbers relate to population dynamics and whether the take numbers are reasonable or inflated when assessed parallel to population dynamics. • Although much take authorization remains, the bulk of that take would be expected to occur during sustained drought periods. Because the EAHCP has not been challenged by such a period, the high level of remaining take authorization does not seem like a strong indicator supporting a long-term permit duration.
Considering the factors above, how long should the permit duration be?	• The permit should be assessed regularly (every 20 years).

EAHCP = Edwards Aquifer Habitat Conservation Plan.

Additional Feedback

- Anything longer than a 15- to 20-year permit term would need a two-phase approach and include increased protections triggered at the beginning of the second phase, unless information demonstrating the absence of need is available.
- With a longer permit term, it would be necessary to develop a more robust approach for ensuring adequate funding, including accounting for inflation and the impacts of climate change.
- With a longer permit term, there would need to be a more definite and robust adaptive management process that includes a mechanism to ensure action in response to defined circumstances.
- A longer-duration HCP will need to consider the potential for impacts on water quality from development once impervious cover reaches a certain threshold level.

3.2 Workshop 2: Biological Goals and Objectives

The purpose of Workshop 2 was to: 1) provide context and background for the biological goals and objectives, including agency guidance for developing biological goals and objectives provided in the *Habitat Conservation Planning Handbook* (HCP Handbook; USFWS and NMFS 2016); and 2) gain feedback about potential changes to the EAHCP's biological goals and objectives that should be considered in the permit renewal process.

The workshop included two exercises (described below) that served to collect input on 1) new biological goals and objectives for the EAHCP; and 2) improving existing biological objectives.

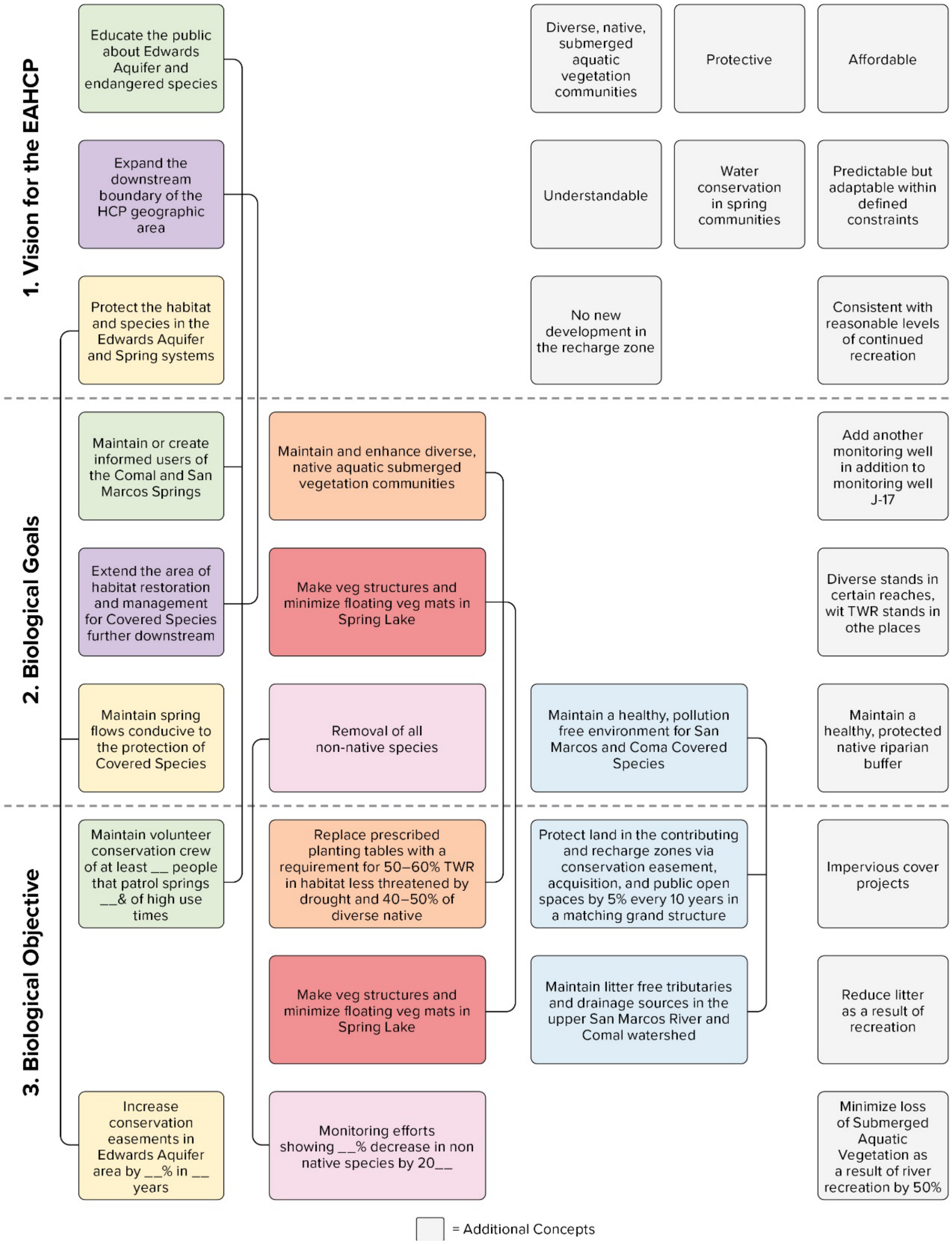
3.2.1 Exercise 1: Developing Biological Goals and Objectives

Exercise 1 of Workshop 2 included a poster board that prompted in-person participants to: "Follow the steps below to develop your own biological goals and objectives for the Edwards Aquifer Habitat Conservation Plan" and provided a brief explanation of what a vision statement (a *vision statement* can help provide broad, guiding principles for developing biological goals), biological goal, and biological objective should entail. Participants then used Post-it® Notes to suggest a vision statement, concept, or word, biological goals, and biological objectives. Participants drew a line linking objectives to goals, establishing the hierarchical relationship of biological goals and objectives endorsed by the HCP Handbook (USFWS and NMFS 2016). Participants used green stickers to up-vote a vision, goal, or objective.

Similarly, the online survey asked participants to "Follow the steps below to develop your own biological goals and objectives for the Edwards Aquifer Habitat Conservation Plan" and provided a short explanation of a vision statement, biological goal, and biological objective (as well as links to boards and worksheets used at the in-person meetings). Participants used text boxes to suggest vision statements, biological goals, and biological objectives.

3.2.1.1 Input Received

Figure 4, below, summarizes the Exercise 1 input received from the in-person workshop and online survey.



NOTE: The colors and lines used in Figure 4 are for the sole purpose of showing which concepts are connected to each other, as intended by the commenters, and have no significance outside of conveying which concepts the commenters felt were related.

Figure 4. Input on Developing Biological Goals and Objectives

3.2.2 Exercise 2: Evaluating Existing EAHCP Objectives

Exercise 2 of Workshop 2 included a poster board that listed condensed versions of four current EAHCP objectives specific to the Comal or San Marcos Springs Systems and posed the following four questions that relate to HCP Handbook (USFWS and NMFS 2016) guidance for developing biological goals and objectives: 1) "How might we make this objective more specific?" 2) "How might we make this objective more measurable?" 3) "How could we make this objective more achievable?" and 4) "What should be monitored to measure achievement of this objective?" Participants used Post-it® Notes to answer the questions for each objective.

Similarly, the online survey asked participants to "Answer questions below about existing EAHCP objectives" and prompted them to refer to documents used at the in-person meeting that had been uploaded to the EAHCP's ITP Permit Renewal Process website for additional context. Participants stated how each objective could be made more specific, measurable, and achievable, as well as what should be monitored.

3.2.2.1 Input Received

Table 5, below, summarizes the input received on Exercise 2 from the in-person workshop and online survey.

Table 5. Input Received on EAHCP Objectives Related to the Comal and San Marcos Systems

Question/Objective	Input/Response
Comal System – Fountain Darter: *Native vegetation restoration and protection will be implemented in Landa Lake and the Old Channel.*	
How might we make this objective more specific?	• Identify vegetation types. • Identify specific locales. • Identify and quantify protection measures. • Define protection.
How might we make this objective more measurable?	• Measure percentage of cover, area coverage, and quantitative vegetation/plant measurements.
How might we make this objective more achievable?	• Establish system-wide coverage goals.
What should be monitored to measure achievement of this objective?	• Percent cover and area coverage.
Comal System – Comal Springs Riffle Beetle: *Restoration of riparian habitat adjacent to spring openings (Spring Run 3 and Western Shoreline) will be implemented to limit the sedimentation that is experienced following rainfall events.*	
How might we make this objective more specific?	• Provide details of where and coverage amounts. • Map specific areas to be restored and provide criteria for species to be used in plantings.
How might we make this objective more measurable?	• Identify habitat available for measurement. • Define a percentage of cover to be achieved.
How might we make this objective more achievable?	• Remove limiting sedimentation as a target.

Question/Objective	Input/Response
What should be monitored to measure achievement of this objective?	• The amount of vegetated shoreline planted/covered and composition of vegetation. • The composition of vegetation. • Percent cover and sedimentation rate.
San Marcos System – Texas wild-rice*: Restoration of Texas wild-rice expansion efforts and long-term monitoring focused on high-quality habitat areas.*	
How might we make this objective more specific?	• Define high-quality habitat. • Define how high-quality habitat areas will be identified.
How might we make this objective more measurable?	• Measure percentage of cover and areal coverage. • Define percentage of coverage and density goals.
How might we make this objective more achievable?	• Establish an approach for adaptation because high-quality habitats may shift over time.
What should be monitored to measure achievement of this objective?	• The location of areas of potential high-quality habitat and the extent of Texas wild-rice within those areas.
San Marcos System – San Marcos Salamander*: Recreation control will be implemented in the eastern spillway below Spring Lake Dam, particularly at total San Marcos discharge of <100 cubic feet per second.*	
How might we make this objective more specific?	• Define recreation control. • Define the area more specifically.
How might we make this objective more measurable?	• Define the level of recreation control based on flow levels.
How might we make this objective more achievable?	• Create a robust plan for implementation.
What should be monitored to measure achievement of this objective?	• The level of recreational impacts at various flow levels.

3.3 Workshop 3: Climate Change and System Vulnerability

The purpose of Workshop 3 was to obtain input on climate change as it related to the EAHCP species and systems. The current EAHCP's conservation strategy does not address the potential effects of climate change on the springflows in the Comal and San Marcos springs systems, which is one reason why the ITP has a fairly short, 15-year permit duration. To renew the ITP for a duration of 20–30 years beyond its 2028 expiration date, the EAHCP will need to address the potential effects of climate change on covered species. Two workshop exercises, described below, were designed to collect feedback about the effect of climate change on the Edwards Aquifer system more generally, and specifically on covered species.

3.3.1 Exercise 1: Climate Change Concerns

Exercise 1 of Workshop 3 included a poster board that posed the following question: “Which effects of climate change are the most concerning to you?” Participants used up to three stickers to indicate which climate change effects listed on the poster board concerned them the most. Participants also used Post-it® Notes to explain their concerns and add climate change effects that concern them, but that were not already listed.

The online survey asked participants to “Use the drop-down menus below to indicate which climate change effects concern you the most, with 1 = most important, 2 = somewhat important, and 3 = less important.” Online participants were then asked to “Use the space below to explain why the climate change effect you ranked as 1/2/3 concerns you.”

3.3.1.1 Input Received

Table 6, below, summarizes the input received on Exercise 1 from the in-person workshop and online survey. In addition to the responses to the exercise questions, some participants provided additional feedback on this topic, summarized further below.

Table 6. Input on the Effects of Climate Change

Which effects of climate change are the most concerning?		
Climate Change Effect	**Number of Votes**	**Explanation of Concern**
Temperature increase	16	• An increase in temperature will result in less rainfall. • Will result in a decrease in habitability. • An increase in temperature will cause an increase in evaporation/evapotranspiration, which will increase the vulnerability of riparian plants and animals. • Can negatively affect reproduction of covered species. • Coupled with lower flows, will have more impact to covered species. • More variability in temperatures will create colder winters and hotter summers. • Increased temperature will result in lessened water availability and increased water demand, making it more difficult and expensive to implement springflow protection measures.

Which effects of climate change are the most concerning?		
Climate Change Effect	**Number of Votes**	**Explanation of Concern**
Change in drought duration/ frequency	14	• Drought will affect springflow. • Springs are already reaching historic lows. • Increased drought will stress the ecosystem, killing plants needed as buffers and as water storage and cause clay soil to become rock, decreasing infiltration rates of water into ground. • We need more knowledge of recharge and impervious cover correlations. • We need to plan for much less water than the current drought of record. • There is a lack of public knowledge with water use and poor construction practices. There needs to be more outreach education. • There is a need to gain regulatory capacity to limit impervious cover over the recharge zone. • Longer, more frequent, and more severe droughts have a cumulative effect on the biome. • Changes in precipitation patterns, with more intense drought and more intense rainfall, will make the impacts harder to address and will make the identification of triggers for action to address drought more difficult.
Change in precipitation intensity	11	• More severe flooding will cause damage to riparian zone and plant diversity. • Will lead to greater sediment loads and less favorable habitats and filling of recharge features. • Will impair water quality. • Can cause increased sediment runoff and accumulation in the system. • Changes in precipitation includes changes in overall amount and pattern. Changes in pattern of precipitation can dramatically affect the amount of recharge and the likelihood of damaging flood conditions in species' habitat.
Decrease in soil moisture	5	• Will cause damage to plant life in the riparian zone. • There needs to be collaborative soil restoration across the riparian and critical zones.
Increase in maximum night-time temperature	2	• Will result in sea level rise. • Night temperature is a driver of drought. • Plants, soil, and infrastructure release accumulated heat at night, and higher night temperatures cause greater stress.
I am not concerned about climate change	0	• No additional feedback was provided for this effect.

Additional Feedback

- EAHCP needs to put an official limit for impervious cover over the recharge zone.
- Increased unpredictability of recharge and of springflow levels is a significant concern. The current EAHCP relies on a recurrence of historical conditions to identify triggers for actions to help maintain springflow levels. Developing alternative trigger mechanisms that are adequately protective for the species, while also providing participants in forbearance-type approaches with adequate predictability, is likely to be quite challenging.

3.3.2 Exercise 2: Potential Effects of Climate Change on Covered Species

Exercise 2 of Workshop 3 included a poster board that posed the question "Which covered species are you most concerned about being affected by climate change?" Participants used up to three stickers to indicate which covered species they were most concerned about being affected. They also used Post-it® Notes to explain why or to add other species not currently covered by the EAHCP that they were concerned about.

The online survey asked participants to "Use the drop-down menus below to indicate which covered species you are most concerned about being affected by climate change, with 1= most important, 2 = somewhat important, and 3 = less important." Online participants were then asked to "Use the space below to explain why the covered species you ranked as 1/2/3 concerns you."

3.3.2.1 Input Received

Table 7, below, summarizes the input received on Exercise 2 from the in-person workshop and online survey. In addition to the responses to the exercise questions, some participants provided additional feedback on this topic, summarized further below.

Table 7. Input on Climate Change as it Relates to Covered Species

What covered species are you most concerned about being affected by climate change?		
Covered Species	**Number of Votes**	**Explanation of Concern**
San Marcos salamander	14	• Introduced disease and fungus in higher concentrations from low flow conditions affect stressed salamanders. • The species has very limited range in a high-vulnerability area. Many are trampled as they stay under rocks, and, as water levels lower, people trample over rocks more because there is little enforcement of prohibited recreational activities. • Salamanders occurring downstream of Spring Lake are likely to be vulnerable during extended periods of low flow.
Texas wild-rice	9	• Less springflow will mean less physical habitat for species. • Negatively affected by recreational damage to habitat. • Will be extremely difficult to protect species from recreational impacts during extended low flows, and current programs do not appear adequate to do so.

What covered species are you most concerned about being affected by climate change?		
Covered Species	**Number of Votes**	**Explanation of Concern**
Fountain darter	7	• Fountain darters lie on the river bottom and do not have a swim bladder. As stream levels lower, there is greater impact from recreational traffic, but no limits on those activities. • Fountain darters are adversely affected even by lesser levels of drought. • There is a known threat from gill parasites, for which we lack an effective control mechanism, and the extent of threat during extended extreme drought is unknown. • There is an unknown level of threat from the potential die-off of aquatic vegetation during extended periods of extreme drought.
Texas blind salamander	5	• Species are indicators of water quality. • Species is vulnerable due to less nutrient flow as a result of decreased precipitation. • Flood events increase sediment loads, which degrades water quality and fill in recharge features, lessening water quantity for species.
Comal Springs dryopid beetle	4	• Species has a small and limited home range and requires interaction between terrestrial and spring habitats that are negatively affected by low flows.
Comal Springs salamander	4	• Water quality and quantity affects salamanders right away.
Peck's cave amphipod	4	• We need to know more about these species through an increased research focus.
Comal Springs riffle beetle	2	• The use of spring outflow habitat that is void of fine substrate would likely increase during low flow conditions, as a result of climate change, and reduce available habitat. • We know very little about the species and how it behaves and survives during periods of extreme drought and how its population has been affected by historical drought periods.
Edwards Aquifer diving beetle	0	–
Texas troglobitic water slater	0	–
San Marcos gambusia	0	–

"–" = Participants did not provide a response.

Additional Feedback

- We know very little about most of the other species, which also is a concern.

3.4 Workshop 4: Conservation Measures

The purpose of Workshop 4 was to provide information about existing EAHCP conservation measures that are carried out by Permittees in the permit area as part of EAHCP implementation. These measures encompass habitat conservation and springflow protection. Two workshop exercises, described below, collected feedback about what changes to the existing EAHCP conservation measures should be considered as part of the permit renewal process.

3.4.1 Exercise 1: Evaluating Existing EAHCP Conservation Measures

Exercise 1 of Workshop 4 included a poster board that posed the following question: "How successful are existing EAHCP conservation measures?" Participants used a sticker to rate how important selected conservation measures are to them, selecting *Very important, Somewhat important, Neutral, or Not important*.

Participants also used Post-it® Notes to answer questions about conservation measures: 1) "What works well for this conservation measure?" 2) "How could this conservation measure be improved?" and 3) "Are there alternative funding sources or third-party partnerships that could support implementation of this conservation measure?"

Similarly, the online survey asked participants "How important is each conservation measure" and prompted users to click a space under *Very important, Somewhat important, Neutral, and Not important* to indicate their preferences. For each of the 11 measures, the survey asked: 1) "What works well for this conservation measure?" 2) "How could this conservation measure be improved?" and 3) "Are there alternative funding sources or third-party partnerships that could support implementation of this conservation measure?"

3.4.1.1 Input Received

Table 8 and Table 9, below, summarize the input received on Exercise 1 from the in-person workshop and from the online survey.

Table 8. Input on Importance of Existing Conservation Measures

How important is each conservation measure?				
	(Number of Votes)			
Selected Conservation Measures	Very Important	Somewhat Important	Neutral	Not Important
Management of public recreation	11	1	0	0
Aquatic vegetation restoration and maintenance	11	1	0	0
Non-native animal species control	10	0	0	0
Management of litter	8	3	0	0

How important is each conservation measure?				
	(Number of Votes)			
Selected Conservation Measures	Very Important	Somewhat Important	Neutral	Not Important
Impervious cover/water quality protection	8	2	0	0
Minimizing impacts of contaminated runoff & water quality protection	8	2	0	0
Management of floating vegetation mats	8	2	0	0
Native riparian vegetation restoration	7	4	0	0
Management of household hazardous waste	4	7	0	0
Dissolved oxygen management	1	5	2	0
Monitoring and reduction of gill parasites	0	5	2	1

Table 9. Evaluation of Each Conservation Measure

How successful is each conservation measure?			
Selected Conservation Measure	What works well for this conservation measure?	How could this conservation measure be improved?	Are there alternative funding sources or third-party partnerships that could support implementation?
Management of public recreation	• We saw during COVID-19 lockdowns how effective reducing recreation can be on habitat restoration. • Having limited access points to focus recreational impacts helps preserve other areas. • Direct recreation to confined areas with infrastructure.	• Add managing recreation at flows < 85 cubic feet per section, and do not allow wading/standing in areas less than 3 feet deep. • The current protection is limited more during periods of low flow, which allows for more foot traffic throughout the river and creates a small, wetted channel for recreation. • Protect areas where recreation is expanding.	–
Aquatic vegetation restoration and maintenance	• The shift to a top-down approach has been very successful in both the reduction of non-native vegetation and the increase in native vegetation.	• Add a new control measure for removing floating invasive plants from the San Marcos River. • More flexibility in dealing with low-flow conditions, recreation, ever-expanding areas of maintenance, and new non-native plant species.	• There is already additional funding being applied to this effort via financial aid funding work-study students.

How successful is each conservation measure?			
Selected Conservation Measure	**What works well for this conservation measure?**	**How could this conservation measure be improved?**	**Are there alternative funding sources or third-party partnerships that could support implementation?**
Non-native animal species control	• Community involvement and volunteers make a significant impact on this effort. • The armored catfish bounty and the tournament are excellent additions to the funded work.	• As urbanization increases, potential introductions of non-native species increase, so this measure will likely continue to need additional effort over time. • Periodic population surveys to assess the removal efforts.	• Texas Parks & Wildlife Department/ USFWS
Management of litter	• This measure only works due to supplemental effort. • Dedicated contractors are doing well in certain areas.	• Expand area of litter into watersheds and reduce litter from roads and culverts. • Efforts only occur within the recreational focused areas (above Interstate 35), but not downstream far enough, where significant litter ends up. • Increased involvement from the local community.	• There is already funding helping with this from the Lion's Club and volunteers. • Alternative funding is already being utilized, with volunteers doing a large amount of this work.
Impervious cover/water quality protection	–	• Support conservation easements in the recharge zone. • The HCP could offer a source of funding for water quality improvement projects that are matched by a grant, agency, or institution.	–

How successful is each conservation measure?			
Selected Conservation Measure	**What works well for this conservation measure?**	**How could this conservation measure be improved?**	**Are there alternative funding sources or third-party partnerships that could support implementation?**
Management of floating vegetation mats	• The City of New Braunfels has a contractor that does a great job in managing floating vegetation in Landa Lake. • Floating vegetation mat removal is key to TWR enhancement and has made a significant impact on the expansion of TWR. • Wild-rice has expanded in the San Marcos River, and vegetation mat control has helped in this.	• Consider funding the effort in such a way that total removal of the floating vegetation from the river system is possible to avoid the downstream effects of floating vegetation. • The control of floating vegetation, including water sprite and watercress in Spring Lake, needs to be funded.	• Alternative funding is already being utilized. • The funding allocated for this is flexible enough – as Texas wild-rice has increased, the effort required to mitigate the veg mat impact has increased.
Native riparian vegetation restoration	• The fences have been highly successful.	• Expand invasive plant removal into and along the four tributaries to reduce/eliminate direct seed source. • Efforts will never be fully successful because property owners are allowed to keep non-native and impactful species on their riverfront property. • Keep the restored areas fenced off.	–
Management of household hazardous waste	–	• Support city-sponsored days to receive household hazardous waste.	–
Dissolved oxygen management	We need to know more about this in drought conditions.	• It is premature to write this off for future prolonged drought, but should consider options.	–
Monitoring and Reduction of Gill Parasites	–	• It is premature to dismiss parasite issues during future droughts because we don't know enough.	–

Notes:
Although given the opportunity to, no in-person or online participants commented on the *minimizing impacts of contaminated runoff and water quality protection* conservation measure, so it is not listed in Table 9.
"–" = Participants did not provide a response.

3.4.2 Exercise 2: Changes to Conservation Measures

Exercise 2 of Workshop 4 included a poster board that posed the following question: "What changes to the EAHCP conservation measures should the permit renewal process consider?" and provided changes to conservation measures for consideration. Participants indicated whether they agreed with the change, and if they responded with a no, why they did not agree. The exercise then listed nine different conservation measures, with an explanation of the challenge each conservation measure faces, along with the rationale for change. Participants selected *Yes* or *No* and explained why they did or not agree with the change.

The online survey included the same questions and response options as the in-person workshop.

3.4.2.1 Input Received

Table 10, below, summarizes the input received on Exercise 2 from the in-person workshop and online survey.

Table 10. Input on Changes to Conservation Measures

What changes to the EAHCP conservation measures should the permit renewal consider?			
	Number of Votes		
Recommended Change	**Agree**	**Disagree**	**Public Input**
Establish clear targets or standards for control of non-native animal species.	13	0	• A regular population survey or effectiveness study on methods would be a better way to determine success. • There needs to be a way to measure volunteer effort for such measures, because effort-per-unit-removed can seem deflated if volunteer effort is not being accounted for. • There is currently a large economic impact piece missing for impacts on these species and how much the removal effort is/could reduce this. • Effective population surveys need to be funded to help the contractors measure their success (TPWD is currently funding some studies on armored catfish).

What changes to the EAHCP conservation measures should the permit renewal consider?			
	Number of Votes		
Recommended Change	Agree	Disagree	Public Input
Control recreational use and public access areas further in the San Marcos River during peak recreation periods.	12	0	• This must be done carefully to achieve community acceptance. • Increased recreation, along with potential seasonal low flows, magnifies the overall impact, creating a smaller river footprint with more people in it; additional signage or outreach might help. • Areas of high recreation should be restricted to specific locations because instream foot traffic is the main causes of damage. • Set a condition on low flows and defined periods, like holidays and weekends, if under those conditions.
Extend ASR and VISPO groundwater leases and lease options (i.e., forbearance agreements) beyond the permit term expiration of 2028.	11	0	• ASR especially beats pumping reductions and should replace some reduction.
Establish performance standards for riparian restoration.	9	0	–
Increase flexibility of the EAHCP to achieve springflow protection through additional water conservation programs or recuring new sources of supply.	7	1[a]	• This seems overbroad; without more specifics, it is less likely that benefits would be adequately quantifiable. • The EAA is not a water purveyor, and I do not think they should be charged with exploring alternative supplies for the region. • Unsure if this is effective, or if EAA should be involved in other utility supplies.
Combine the triggers and payment structure of the two groundwater forbearance programs currently in the EAHCP into one program, with the same pumping-reduction target of 90,000 acre-feet per year in a drought of record.	7	0	• Must look at triggers to see if they are sensitive enough and make sense after review of the climate data.
Revise dissolved oxygen management as a conservation measure.	7	0	–
Revise the conservation measure to reduce gill parasites.	7	0	–

What changes to the EAHCP conservation measures should the permit renewal consider?			
	Number of Votes		
Recommended Change	Agree	Disagree	Public Input
Add flexibility to the groundwater rights purchase programs to allow the EAA to purchase water rights instead of only allowing long-term leases or lease options.	6	2	• I do not think the EAA should purchase water rights, and I think that the current lease program works just fine. Also, these rights are very expensive. I cannot imagine the current aquifer-management fee could support a transition to outright purchases of rights. I understand the want for long-term security through outright ownership, but I am not sure that is financially practical.

Notes:
[a] Although three participants provided additional public input for this recommended change, only one disagree vote was given, as shown in the table. Additionally, one participant selected both agree and disagree to indicate that they were unsure, or neutral.
"–" = Participants did not provide a response .

3.5 Other EAHCP Feedback

During the Listen and Learn process, additional public comments were submitted to EAHCP staff via email. These comments provide general feedback and recommendations related to species conservation and system management and are included for consideration in Appendix A.

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Chapter 4

Key Takeaways and Next Steps in the Permit Renewal Process

4.1 Key Takeaways

The feedback received from interested parties and members of the community during the Listen and Learn process identified key issues and topics that will be evaluated, considered, and incorporated (as appropriate) in the permit renewal. A summary of key takeaways from the input received are as follows.

- Commenters are interested in seeing additional activities covered under the HCP in favor of those activities that would provide beneficial uses, such as enforcement, fences to protect riparian habitat, and others. There is support for adding construction activities, although less support for major construction projects or dam repairs.
- There is support for including additional covered species, with an emphasis on species that are anticipated to be listed (e.g., those proposed for listing) and those already listed that are found in adjacent, interrelated water systems.
- The majority of commenters prefer a permit duration of 25–35 years, based on EAHCPs successful implementation, take authorization remaining on permit, and high level of species conservation, species improvements, and scientific uncertainly.
- The biological goals and objectives developed by participants focus on educating the public and permit holders, ensuring flow and vegetative conditions that will support covered species, removing non-native species from key habitats, and protecting key areas (e.g., recharge areas) through conservation easements, volunteer support, responsible recreation, and monitoring.
- Commenters think that there should be more focus on increasing the specificity, measurability, and achievability of HCP objectives, and commenter input provided a starting point for examining some specific improvements in these areas.
- Commenter concerns about climate change related to EAHCP systems are focused on temperature increase, changes in drought duration/frequency, and change in precipitation intensity, all of which were thought to have the potential to affect springflow conditions and covered species within the system.
- Commenters are most concerned about the San Marcos salamander, Texas wild-rice, and fountain darter, which are all known to be highly affected by springflow conditions, such as water quality and/or quantity, and vulnerable to impacts from recreation.
- When evaluating EAHCP conservation measures, participants indicated that management of public recreation, aquatic vegetation restoration and maintenance, and non-native species control are the most important measures, whereas monitoring and reduction of gill parasites was the least important measure.

- Commenters provided insight about the benefits and drawbacks of each conservation measure, which will be important in evaluating how to improve conservation measures based on lessons learned through implementing them to improve their effectiveness.

4.2 Next Steps

This report serves to conclude the Listen and Learn phase of the permit renewal process and leads to the next phase, Analyze and Sign-off, which will begin at the end of 2022 and proceed through 2024. The Analyze and Sign-off phase will include compiling and analyzing data to thoroughly consider potential changes to the components of the EAHCP. The consultant team, working with EAHCP staff, will develop technical memoranda describing the analyses conducted and potential changes to the EAHCP. To document key decisions through the permit renewal process, these memoranda will be reviewed by the EAHCP Committees and USFWS before the Implementing Committee signs off on them.

Chapter 5
References

ICF. 2020. *Edwards Aquifer Habitat Conservation Plan Permit Options Report*. September. (ICF 704.19.) Austin, Texas. Prepared for Edwards Aquifer Authority, San Antonio, Texas.

USFWS and National Marine Fisheries Service (NMFS). 2016. *Habitat Conservation Planning and Incidental Take Permit Processing Handbook*. December 21.

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Appendix A
Other EAHCP Feedback

During the Listen and Learn process, additional public comments were submitted to EAHCP staff outside of the in-person workshops and online surveys via email. These comments provide general feedback and recommendations related to species conservation and system management. Three comments were received and are included below.

Comment 1

Date Submitted: October 12, 2022
Submitted to: EAHCP@edwardsaquifer.org
Source: Stakeholder 1 (Individual)

Section 1.14 (a) of the EAA Act requires the Authority to "protect species that are designated as threatened or endangered under applicable federal or state law."

Section 1.14 also requires EAA to "maximize the beneficial use of water available for withdrawal from the aquifer."

Protection of minimum springflows for the benefit of endangered species has been a remarkable success. In the severe 2011 to 2014 drought, Comal springs continued to flow above the required minimum, even though Comal had ceased to flow in the 1950's drought of record with a quarter of the population. EAA and our regional partners accomplished this by utilizing measures adopted in the EARIP process of Conservation, VISPO, ASR and Critical Period reductions, along with many measures to enhance endangered species habitat.

Responsibility to protect water supply has had some significant attention: The San Antonio Region created a successful HCP and received an Incidental Take Permit to draw water supply legally from the aquifer, and the Legislature raised the Cap on pumping to 572,000 af. However, firm yield from the Edwards Aquifer for water supply has been reduced from 350,000 acre-feet in the 2001 Region L Plan to at least 263,000-acre feet for the EAHCP. The cost of replacing that much water as the population continues rapid growth is significant, serious, and expensive. This year, 32,000 customers in San Antonio have been unable to pay their water bills. Smaller communities, especially, have limited options for increasing water supply.

I. My request for EAHCP permit renewal is that we increase firm yield of water supply to meet the statutory requirement to protect water supply as well as species. It is possible to do this while also increasing the reliability of measures to protect minimum springflows.

We can increase firm yield by substituting Aquifer Storage and Recovery for Stage V, 4% additional critical period reduction, and possibly even Stage IV, additional 5% pumping reduction. The benefits would be achieved by every permit holder in the San Antonio Region, and springflows and downstream flows would also be made more reliable—a "win/win/win."

Reconnaissance analysis of ASR capability in the Carrizo Aquifer has already been done:
https://www.sciencedirect.com/science/article/pii/S2214581817302628?via%3Dihub

The process may be lengthy, but well worth the effort. If you compare the cost of SAWS ASR at approximately $250 million with the cost of Vista Ridge at $2.7 billion, it appears to be a very attractive and feasible long-range approach to support both water supply and springflows and should be included in the 2028 EAHCP.

Including an ASR program for regional benefit would have to be carried out by a water supplier with technical input from EAA and highly qualified support from contractors and possibly state agencies. The EAHCP is not isolated from the impacts of population growth and increased water demand.

II. Additional strategies should be included in the next HCP

(a) The first is additional easements, as contemplated in the "Next Generation" program of seeking to protect springflows and water supply with conservation easements upgradient of Comal and San Marcos Springs.

(b) Since 80% of recharge for the Edwards Aquifer originates in the Contributing Zone of the Edwards Aquifer, easements in the Contributing Zone should also be eligible for consideration.

(a) Soil regeneration, preferably on easements, but also in other dedicated areas such as parks, should be encouraged. Financial incentives to increase infiltration of rainfall into soil might be available in the long run, as EAA research at the Field Research Park is able to quantify benefits of various strategies to slow down and infiltrate overland flow.

If the average infiltration across the entire 5400 square miles of Contributing Zone were increased by just 2 inches, there could be long term benefits to abatement of flood and drought impacts for streams, springs and downstream.

(b) A "how to guidance manual" just to inform individual landowners of the benefits of soil on their own properties may have an impact as well.

Low Impact Development. Increased impervious cover in the Recharge and Contributing Zones, especially due to development in Hays, Comal, Kendall, and Bexar Counties can also be expected to have an impact on stream flow and recharge to the Edwards and Trinity aquifers. Regional collaboration, including with the development community, for such a program is needed. Ennis, Texas, has redone its main street with pervious cover and the trees that line it don't need watering**.**

Comment 2

Date Submitted: October 12, 2022
Submitted to: EAHCP@edwardsaquifer.org
Source: Stakeholder 2 (Individual)

Also, please consider that as Climate Change effects are finally quantified and increases in Impervious Cover in the Edwards Recharge Zone and Contributing Zone are considered, increasing ASR Carrizo Storage with accompanying increases in Edwards well forbearance and/or recharge of the Edwards Aquifer with ASR waters upgradient of Comal and San Marcos springs could completely neutralize what would otherwise be adverse effects on Minimum Springflow.

We are asking that this increased ASR response to Climate Change and Increases in Impervious Cover also be considered by the EAHCP in formulating the application for a new Incidental Take Permit as well.

Comment 3

Date Submitted: October 12, 2022
Submitted to: EAHCP@edwardsaquifer.org
Source: Stakeholder 1, Stakeholder 2, and Stakeholder 3 (Regional Clean Air and Water Association)

We ask that the following strategies be considered as part of the EAHCP process presently underway. A Response to these comments would likely require, among other things, use of the Edwards groundwater model and some economic and legal analysis as well.

These comments are intended to put strategies on the table for consideration as part of a process that will eventually result in an application to renew the Incidental Take Permit that will be presented to the US Fish and Wildlife in 2028.

Suggested Strategies:

1. Edwards Aquifer Firm Yield Water Supply could be enhanced for all EAA Permit Holders by eliminating or modifying the Critical Period Pumping Reductions currently found in Stage V, Critical Period Management Plan, changing the Maximum Pumping Reduction to a lower percentage figure than the present 44%, which modification would automatically increase Firm Yield Water Supply for all EAA Aquifer Permit holders while simultaneously providing for
2. Better Protection of endangered species by providing more certainty for obtaining Minimum Spring Flows in the severest months of a repeat of the Drought of Record at Comal Springs and San Marcos Springs;
3. All to be accomplished by increasing EAHCP ASR Storage of Edwards waters in a Carrizo Aquifer ASR project, AND by using those additional stored waters in ASR during severest drought times to provide for minimum springflow protection, EITHER
    a. by increasing forbearance of Edwards Wells pumping near and upgradient of Comal and San Marcos Springs, AND/OR
    b. by increasing recharge into the Edwards Aquifer from the ASR Stored waters up-gradient of Comal Springs and San Marcos Springs.

Increasing Firm Yield of all EAA Pumping Permits:

By eliminating or modifying the 44% maximum pumping reduction found on all Edwards permits in Stage V of the Critical Period Management Program for the San Antonio Pool and the Uvalde Pool, Edwards permit holders will all be subjected to lower Maximum Pumping Reductions. That modification would increase the water supply from the Edwards that can be counted on at all times - including severest droughts - which is the Firm Yield Water Supply of the EAA Edwards Withdrawal Permits for each and every EAA Edwards permit holder.

The precise new Maximum Pumping Reduction percentage can be determined by a carefully designed analysis that can be done by EAA Staff or by a well-qualified Consultant, using the most current, up-to-date Edwards groundwater model available.

That newly determined Maximum Withdrawal Reduction percentage could be decreased by adding additional ASR Carrizo Aquifer storage to the 50,000 acre feet of ASR Storage that had been accepted in the ITP Permit granted by US Fish in 2013 by increasing the available ASR Carrizo Storage for

EAHCP purposes by using either the existing SAWS ASR facility or by using a new regionally sponsored ASR facility.

There are many promising potential additional ASR Sites in the Carrizo Aquifer for storage of waters according to recent studies done for the Texas Water Development Board.

REQUEST OF REGIONAL CLEAN AIR AND WATER ASSOCIATION

Regional Clean Air and Water Association is requesting that this strategy of increasing ASR Storage for EAHCP purposes become part of the rollover renewal of the existing Edwards INCIDENTAL TAKE PERMIT - for 30 years or longer - with an opportunity every five years after 2028 to review and increase the ASR Storage Program to provide for additional ASR Storage to provide additional protection to meet Minimum Springflow Requirements based on the reality of how much ASR storage has been provided at any given point in time in. the future, and additional reductions in the Maximum Pumping Reductions found in Critical Period Management Plan.

The resulting new Maximum Pumping Reduction percentages can be calculated for each new level of ASR Storage by using the most up to date Edwards groundwater model available, either by the EAA science staff or by a well-qualified consultant chosen by EAA/EAHCP processes.