HABITAT CONSERVATION PLAN

BIOLOGICAL MONITORING PROGRAM

Comal Springs/River Aquatic Ecosystem

ANNUAL REPORT

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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 2021 through a series of monitoring activities outlined in this report. Monitoring in the Comal system consisted of surveys specific to HCP Covered Species—Fountain Darter (*Etheostoma fonticola*), Comal Springs Salamander (*Eurycea* sp.), and multiple Comal Springs invertebrates. Additional community-level monitoring data were also collected on aquatic vegetation, fish, and benthic macroinvertebrates. The results from 2021 biological monitoring provide valuable data to further assess spatiotemporal trends in habitat and population performance of the Covered Species within the Comal Springs/River ecosystem.

In 2021, Comal River mean daily discharge was below long-term medians during the early portion of the year and declined steadily from January through April when the lowest value of 197 cfs was observed on April 22. This approximates a 10th percentile flow for the month of April, and therefore, spring comprehensive sampling happened under lower flows than typical conditions. However, this trend was disrupted soon thereafter, as local precipitation events in May and June resulted in multiple high flow events exceeding the 90th percentile flow (~400 cfs). Regional precipitation also boosted aquifer levels and mean daily discharge remained near monthly medians for the remainder of 2021. Summer sampling in July occurred under relatively typical flow conditions. The highest daily discharge recorded during the year was 1,850 cfs on October 14, 2021, eleven days prior to the fall sampling event. By initiation of fall sampling on October 25, flow levels had returned to typical levels. Median water temperature was similar between locations near the springs (Heidelberg, Landa Lake) and more variable in river locations (New Channel, Other Place). Maximum optimal water temperature threshold for Fountain Darter larval production was exceeded for part of the year at Blieders, Booneville Far, Old Channel, New Channel Upstream, New Channel Downstream, and Other Place. The optimal water temperature threshold for Fountain Darter egg production was also exceeded at these sites, except New Channel Upstream, though was infrequent, occurring 3 days or less.

Total aquatic vegetation coverage in 2021 was similar to long-term seasonal averages at Landa Lake, Upper New Channel, and Lower New Channel, but lower than seasonal averages at Upper Spring Run and Old Channel. Community composition data demonstrate that lower total coverage at the Upper Spring Run and Old Channel were mainly due to reductions in coverage of bryophytes. Reductions in bryophyte coverage in recent events has also been noted in Landa Lake and the New Channel. Bryophytes typically harbor the highest Fountain Darter density among vegetation taxa, but are non-rooted and susceptible to scour from high flow events. High flow events in 2021 appeared to have reduced coverage of bryophytes in riverine reaches (i.e., Old Channel and New Channel), but mechanisms for recent reductions in epiphytic bryophytes within the Upper Spring Run and Landa Lake remain unclear. Continued monitoring is important to evaluate if this critical vegetation type will rebound to previously observed levels.

Fountain Darter drop-net sampling demonstrated that Fountain Darters densities were highest in non-rooted vegetation (i.e., bryophytes, *Rhizoclonium*) and one rooted plant (i.e., *Cabomba*) that provide complex habitat at the substrate level, moderate densities in other rooted plants vegetation with complex leaf structures (i.e., *Ludwigia*, *Hygrophila*), low densities in rosette-form austere-leaved taxa (i.e., *Sagittaria*, *Vallisneria*), and minimal densities in non-vegetated

open habitats. Size distribution data demonstrated seasonal patterns in Fountain Darter size structure and recruitment were consistent with previous years. Population performance metrics examining Fountain Darter density, catch-per-unit-effort, and percent occurrence were generally comparable to historical data and showed no consistent patterns. Among reaches, Fountain Darter density in the Upper Spring Run has declined in recent events, which is concomitant with a reduction in suitable habitat in this reach and most likely related to the reductions in bryophytes as described above. Despite this, the overall amount of suitable habitat in this reach remains near its long-term mean.

Fish community sampling demonstrated that species richness and diversity were higher at Upper Spring Run, Old Channel, and New Channel compared to Landa Lake. Moreover, species richness in Landa Lake showed a downward trend from 2017–2021, though diversity, in contrast, has increased since 2017. Data on richness and relative density of spring-associated fishes show no obvious patterns, suggesting a stable community despite the dynamic nature of the data.

Overall catch rates of Comal Springs Salamander in 2021 exceeded all previous years. Salamander CPUE within the surface environments of the Comal Springs system has been steadily increasing since the return of sustained water levels after the 2014 drought. Overall, salamander populations within this spring system are persistent and have increased steadily in abundance in recent years.

Macroinvertebrate drift net sampling of spring orifices showed that the density of *Stygobromus* sp. were slightly below or similar to long-term medians. Lure sampling for Comal Springs Riffle Beetles showed that abundance/lure were above long-term medians for two of three sites during the spring. Moreover, abundances were near long-term medians in the fall, except at the Western Shoreline. Substrates at the Western Shoreline reach continue to appear vulnerable to erosion, which may be the mechanism behind reduced abundance at this location. However, due to the nature of the monitoring technique (cotton lures left in the system for long periods) and the extremely clumped distribution of Comal Springs riffle beetle, which are associated with small spring orifices, this data is inherently variable in nature. Frequent positively skewed data (i.e., mean > median) displayed by seasonal and five-year trends demonstrate their clustered distributions. Based on this, Comal Springs Riffle Beetle abundances observed over the last five years showed no clear trends across sites.

Overall, 2021 biological monitoring documented the persistence of appropriate habitat conditions to support the EAHCP Covered Species and a diverse community of other spring-adapted aquatic organisms. Reductions in bryophyte coverage in multiple reaches in recent events has influenced available habitat, particularly in the Upper Spring Run, and has resulted in reductions in Fountain Darter drop-net density within this reach. Mechanisms behind reductions in bryophyte coverage in the Upper Spring Run and Landa Lake are currently unclear, but continued data collection will be critical in evaluating mechanisms influencing this important habitat. Comal Springs Salamander populations continue to thrive with increased catch rates observed in recent years. Although variable in nature, Comal Springs Riffle Beetle catch rates show no apparent trend over a five-year period. Continued monitoring will provide useful data to evaluate and better understand how this complex ecological system responds to dynamic variations in hydrologic, climatic, and anthropogenic conditions.

INTRODUCTION

The Edwards Aquifer Habitat Conservation Plan (EAHCP) was is intended to provide assurance of suitable habitat for threatened and endangered species (i.e., Covered Species) (Table 1) in both the San Marcos and Comal Springs. Established in 2012, the EAHCP supports the issuance of an Incidental Take Permit that allows the "incidental take" of Covered Species 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 HCP biological monitoring program has surpassed its initial purpose (EAHCP 2012). The biological data collected since the implementation of this monitoring program (BIO-WEST 2001–2020a) now serves as the cornerstone for several underlying sections in the HCP, 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 (EAHCP 2012).

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

SCIENTIFIC NAME	COMMON NAME	ESA STATUS
Insects		
Haideoporus texanus	Edwards Aquifer Diving Beetle	Petitioned
Heterelmis comalensis	Comal Springs Riffle Beetle	Endangered
Stygoparnus comalensis	Comal Springs Dryopid Beetle	Endangered
Crustaceans		
Lirceolus smithii	Texas Troglobitic Water Slater	Petitioned
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 2021 within the Comal Spring/River ecosystem. The results include summaries of current physiochemical conditions, as well as current conditions of floral and faunal communities. For all aquatic organisms, historic observations (BIO-WEST 2001–2021a) 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 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 HCP, 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 HCP flow triggers, which include Critical Period Low-Flow Sampling and species-specific sampling (EAHCP 2012). No low-flow sampling was conducted in 2021 and further details on species-specific triggers can be found in Appendix A.

The remaining methods sections provide brief descriptions of the procedures utilized for comprehensive 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 HCP biological monitoring program for the Comal Springs/River ecosystem (EAA 2017).

Comal River Discharge and Springflow

River hydrology in 2021 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 2021). The annual distribution of mean daily discharge was compared for the past 5-years using boxplots. The distribution of 2021 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 HACH FH90 flowmeter and adjustable wading rod. 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). 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 D.

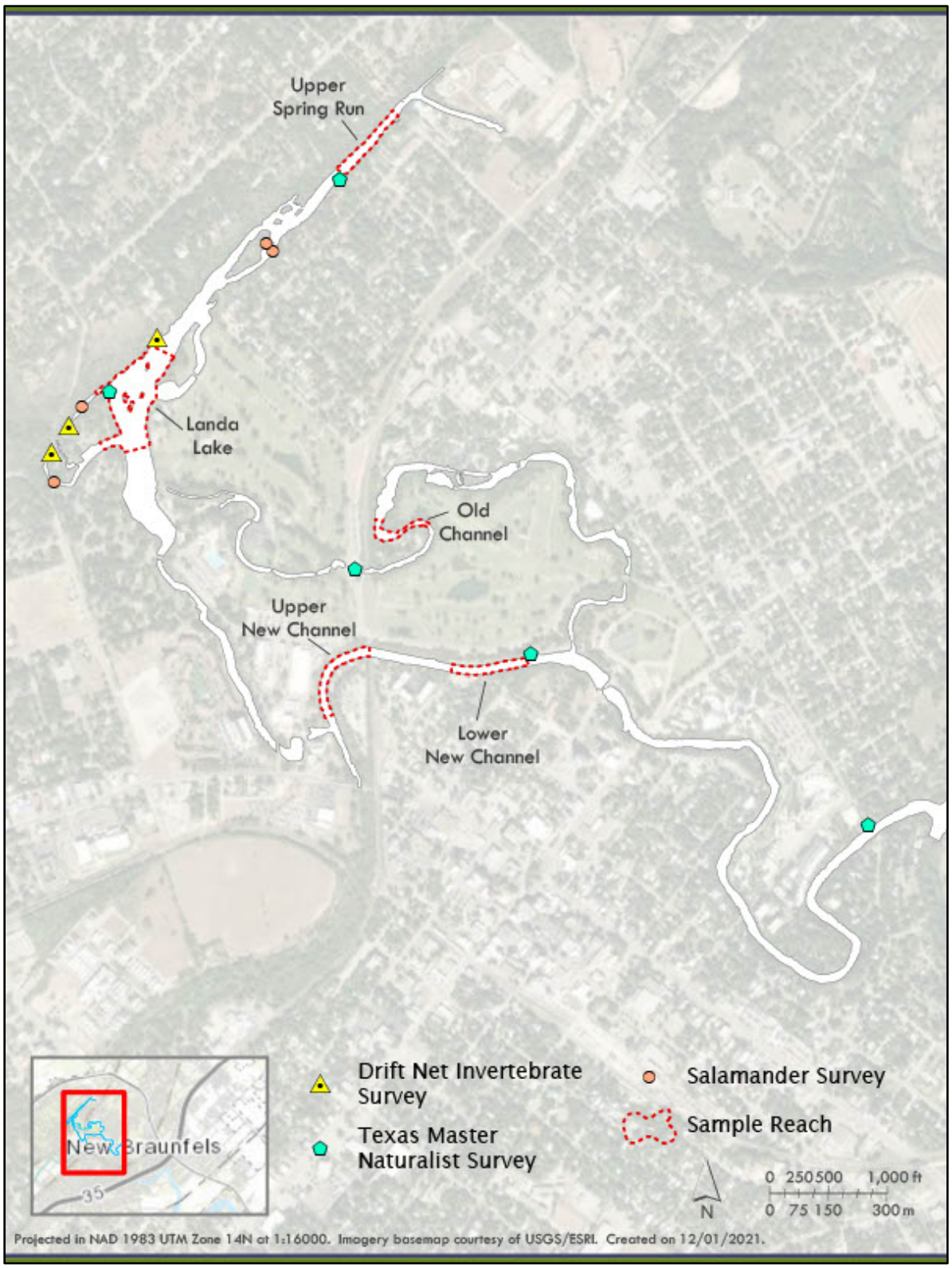

Figure 1. **Locations of drift-net invertebrate, Comal Springs Salamander, Texas Master Naturalist, and biomonitoring (includes aquatic vegetation mapping, drop-net sampling, presence/absence dip-net sampling, and macroinvertebrate community sampling) sample areas within the Comal Spring/River study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

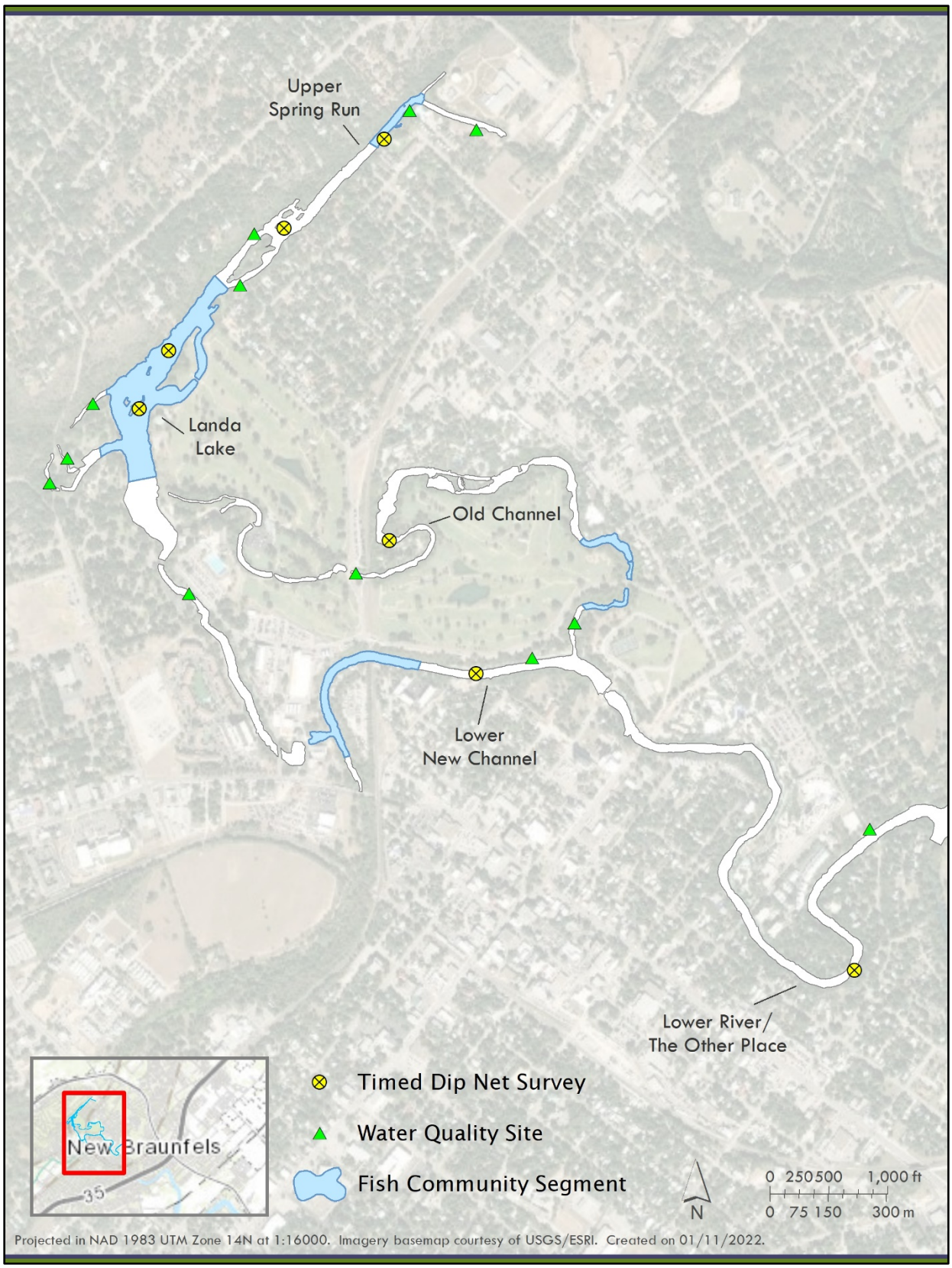

Figure 2. Locations of fish community, water quality, and Fountain Darter timed dip-net surveys within the Comal Springs/River study area.

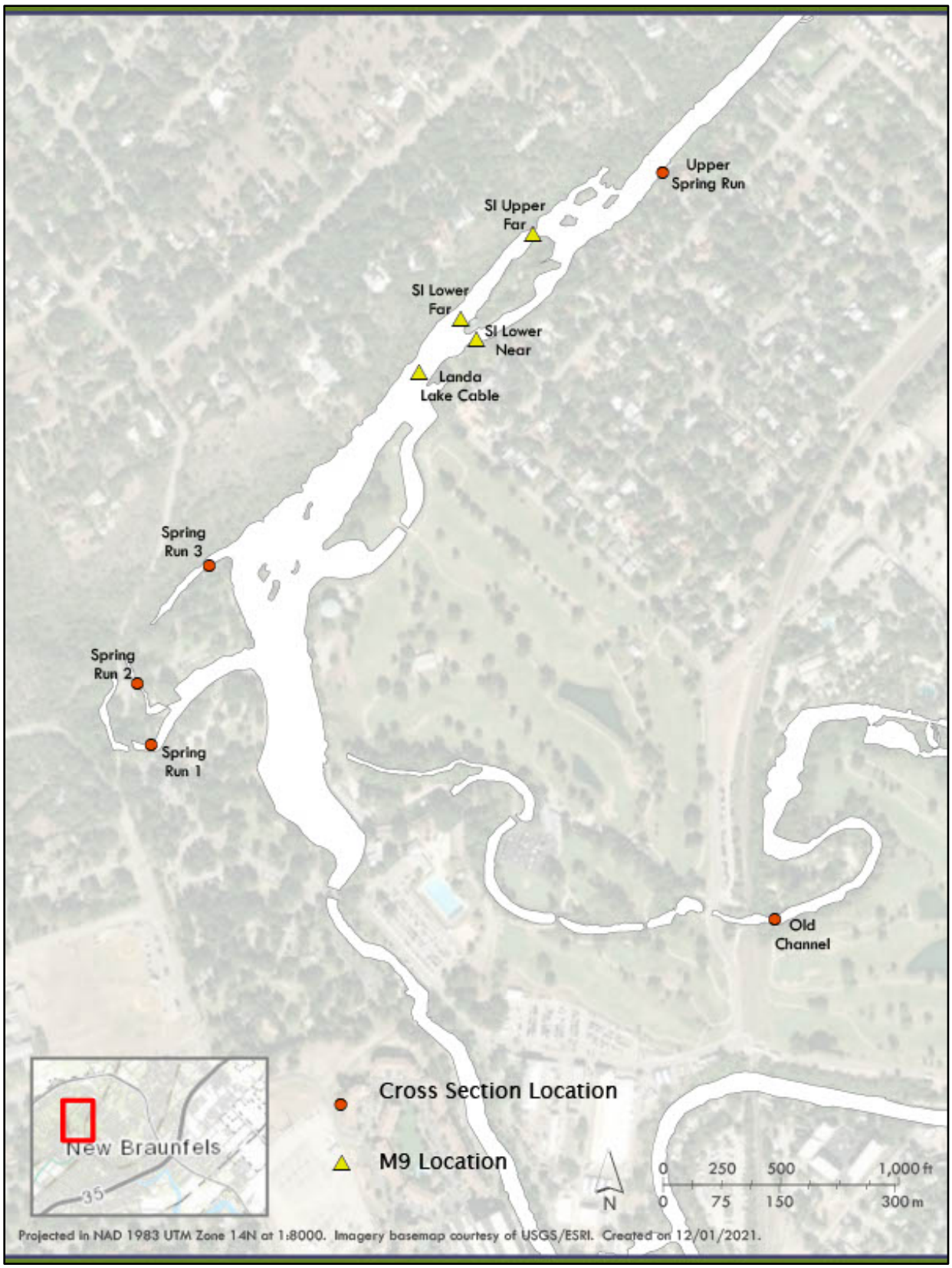

Figure 3. Cross-section and M9 discharge collection locations in the Comal Springs/River study area.

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 2021 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 C.

Aquatic Vegetation

Mapping

The team used a 10-foot sit-in kayak with a plexiglass window for visual observations to complete aquatic vegetation mapping in each sample reach (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 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) 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 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 HydroTech or YSI 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.

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). 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 D.

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 (fish/m^2). Timed dip-net total darter counts per study reach were standardized as catch-per-unit-effort (CPUE; [fish/person-hour]) 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 the proportion of occurrence (sum[darter presence]/sum[random stations]) was calculated per sampling event at each site. Fountain Darter density, CPUE, and 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 G.

Fish Community

Mesohabitat, Microhabitat, and Seine Sampling

Fish community sampling was conducted in the spring 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 Marsh McBirney Model 2000 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. To prevent recapture on subsequent seine hauls, captured fish were placed in a holding bucket containing river water. After completion of the transect, all fish were released from holding buckets. 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 velocity (ft/s) measured at 15 cm above the river bottom, at mid-column, and at the surface.

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 1) 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). 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.

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. In total, this effort represents 6 person-hours (ph) per sampling event.

Data Analysis

Comal Springs Salamander number of observations and CPUE (salamanders/person hour) for spring and fall routine sampling and the long-term average (2001–present) are presented in a tabular format. Salamander CPUEs 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 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 Hydrotech multiprobe (MS5) water-quality meter and Hach (FH950) 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 D. 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. 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. 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.

Comal Springs Riffle Beetle abundance per 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 beetle abundance per lure 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).

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 & DISCUSSION

River Discharge and Springflow

Median daily discharge in the Comal River did not vary substantially over the past five years, ranging from 270 cfs in 2021 to 358 cfs in 2019. The narrower interquartile range (IQR) in 2021 (259–290 cfs) demonstrates less dispersion from the median, indicating daily discharge was generally less variable in 2021 compared to previous years. That being said, minimum daily discharge in 2021 (197 cfs on April 22) was lower than all years except 2018 (161 cfs). Moreover, maximum daily discharge was highest in 2021 (1,850 cfs on October 14th). During the past five years, discharge greater than 1,000 cfs are a 99th percentile discharge level and was only observed one other day in 2017 (1,200 cfs), demonstrating the high flow pulse occurring in 2021 was relatively uncommon event (Figure 4A). Although 1,850 cfs pulse in 2021 is an infrequent high magnitude event, maximum daily discharge since 1928 has exceeded 20,000 cfs (USGS 2021).

Among months, median daily discharge ranged from 215 cfs in April to 302 cfs in July. The early part of 2021 was drier than usual with median daily discharge below the long-term median from January (-43 cfs) to April (-98 cfs). In contrast, median daily discharge was more similar to long-term medians from May (-34 cfs) to October (-3 cfs), and during this time, the system experienced multiple flow events that were near or exceeded long-term 90th percentiles.

Daily discharge differed for each month that sampling occurred. In April (spring sampling), daily discharge values were more closely aligned with its long-term 10th percentile (197 cfs) than long-term median (312 cfs). Daily discharge in July (summer sampling) ranged from 275–364 cfs (median = 302) and most days were similar to the long-term median (296 cfs). Lastly, in October (fall sampling), daily discharge was more variable compared to other months, ranging from 241–1,850 cfs. It should be noted that the maximum discharge of 1,850 cfs occurred one day prior to drop-net sampling in the Upper New Channel Reach (Figure 4B).

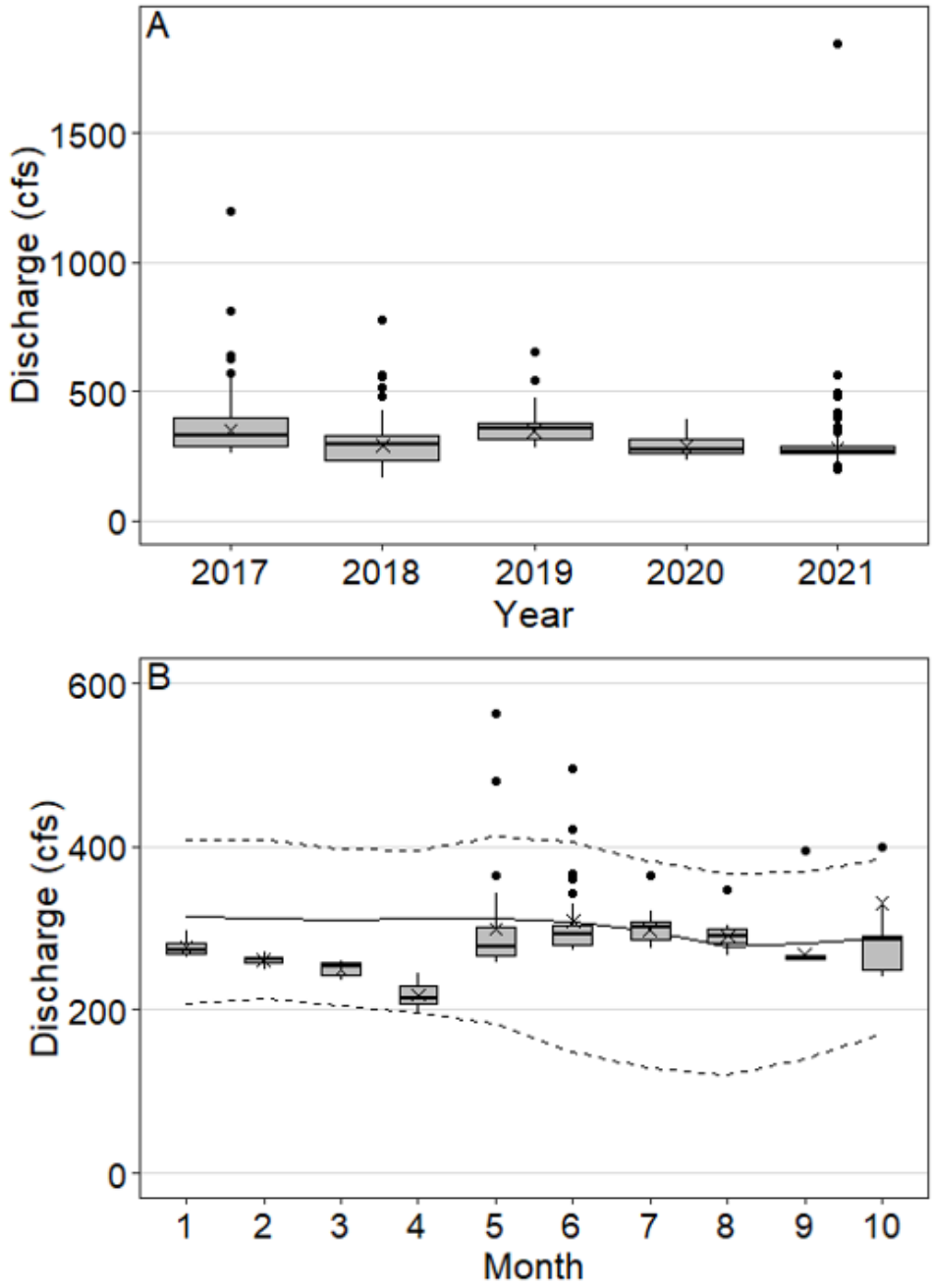

Figure 4. **Boxplots displaying Comal River mean daily discharge annually from 2017-2021 (A) and among months (January–October) in 2021 (B). Each month is compared to the 10th percentile (lower dashed line), median (solid line), and 90th percentile (upper dashed line) of their long-term (1956–2021) daily 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. Not all outliers are shown in panel B.**

Temporal trends in discharge varied within cross-section stations, but generally were low compared to five-year and long-term datasets in the spring and typical during the fall. Percent total discharge (PTD) exhibited the largest change within the Old Channel Reach. Flow in the Old Channel Reach is regulated by culverts at Landa Lake Dam and stays relatively consistent near 60 cfs despite changes to total flow in the system. When total flow in the system is low, as in spring 2021, it makes up a larger percentage of the total. When total flow increases, the percent contribution by flow in the Old Channel Reach declines (Figure 5).

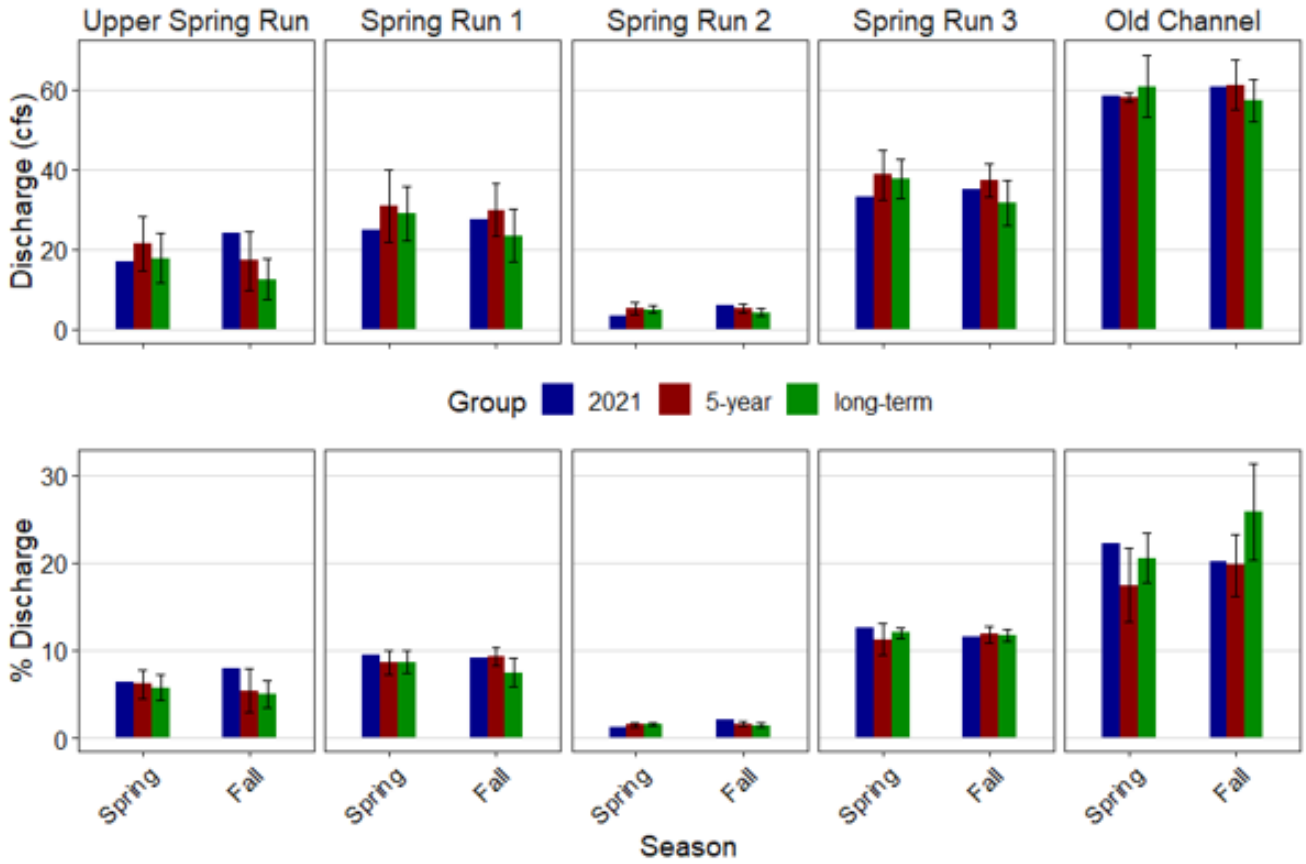

Figure 5. **Current (blue bars), five-year (2017–2021; red bars), and long-term (2003–2021; green bars) discharge and percent total discharge based on spring and fall cross-section measurements in the Comal Springs/River. Five-year and long-term values are represented as means and error bars denote 95% confidence intervals.**

Water Temperature

Median water temperature was similar across stations and varied less than 1 °C, ranging from 23.33 °C at Spring Run 2 to 23.95 °C at Landa Lake Lower. Stations displaying minimal dispersion from the median (i.e., stability) that didn't exceed Fountain Darter temperature thresholds included Heidelberg, Booneville Near, Landa Lake Upper, Spring Run 1, Spring Run 2, Spring Run 3, and Landa Lake Lower. Blieders, Booneville Far, Old Channel, New Channel Upstream, New Channel Downstream, and Other Place exceeded larval or egg productions thresholds in 2021 (hereafter 'exceedance stations'). Among these stations, the upper bound of each box (i.e., 75th percentile) did not exceed 25 °C and demonstrated that the majority of 4-hr measurements did not surpass the larvae production threshold (Figure 6).

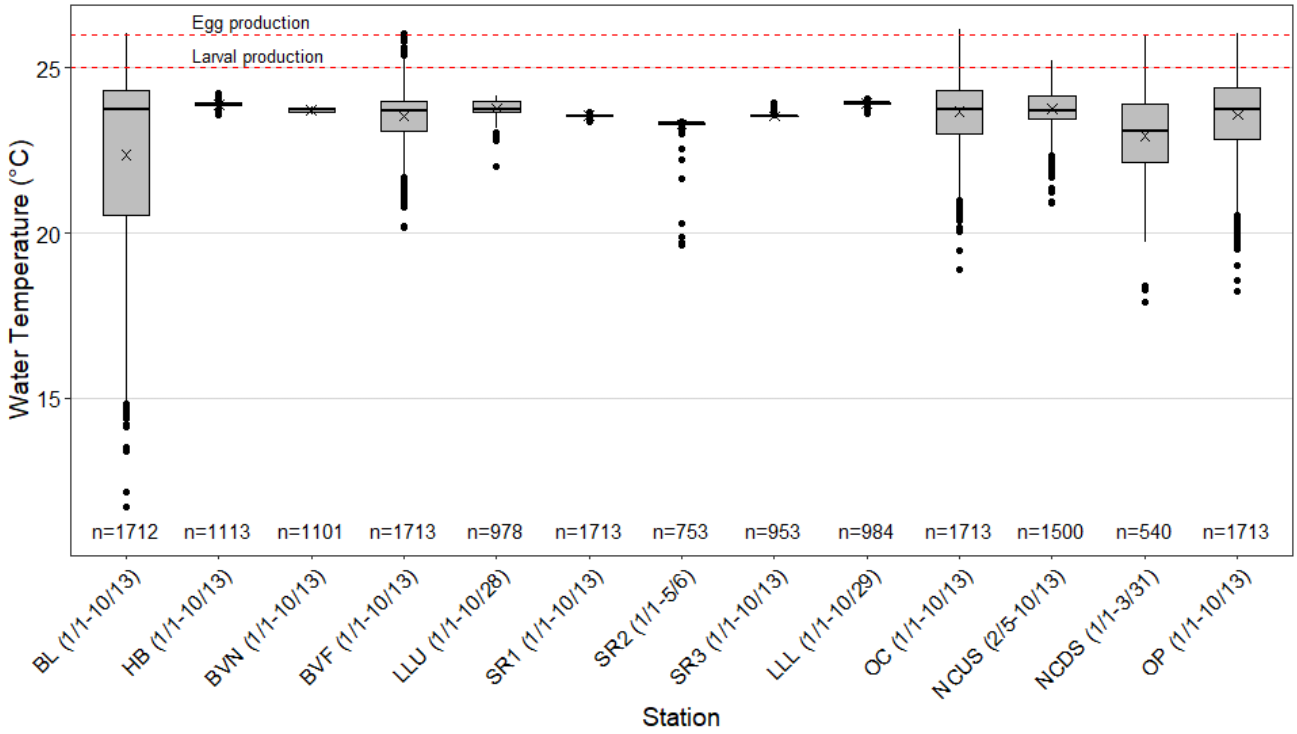

Figure 6. **Boxplots displaying 2021 water temperatures at logger stations (data collection timeframe [Month/Day]). Water temperature data are based on measurements collected at 4-hour increments. Stations include Blieders (BL), Heidelberg (HB), Boonville Near (BVN), Boonville Far (BVF), Landa Lake Upper (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).**

Larval and egg threshold exceedance occurred from March to October. The frequency of days and 4-hr measurements per month at temperatures above the larval threshold differed across exceedance stations. Larval exceedance mostly occurred at 1-2 4-hr measurements per day at Booneville Far (April–September [56 days]), Old Channel (March–October [140 days]), and New Channel Upstream (April–September [31 days]). Exceedance occurred up to 3 4-hr measurement per day at Blieders (April–September [76 days]), New Channel Downstream (March [11 days]), and Other Place (April-October [117 days]). Measurements above the egg threshold were infrequent for most stations and only occurred once per day at Blieders (May [1 day]), Booneville Far (April [1 day]), New Channel Downstream (March [1 day]), Old Channel (May–August [5 days]), and Other Place (Junes [3 days]).

Aquatic Vegetation

Upper Spring Run Reach

In 2021, spring vegetation cover in the Upper Spring Run was about 1,000 m^2 below its long-term average and was also outside the lower 95% CI for that event. Fall vegetation coverage increased from spring and was similar to its long-term average (Figure 7). *Sagittaria* was the most dominant taxa in the spring and fall. The second most abundant taxa were *Rhizoclonium* and bryophyte in the spring and fall, respectively. The diversity of aquatic plant species is historically lower in this reach compared to other study reaches. Upper Spring Run is typically dominated by *Sagittaria* and bryophytes, while *Ludwigia* is less prevalent and occurs as a result of planting associated with the habitat restoration program. *Rhizoclonium* was not calculated as part of total vegetation coverage because it tends to grow over other vegetation types. However, the distribution of *Rhizoclonium* was mapped in recent years as this habitat type is becoming more persistent and was a large component of community composition in the spring (Figure 8). Lower total vegetation coverages in 2021 was mostly attributed to reductions in bryophytes (Figures 7 and 8). Bryophytes are non-rooted plants which are more susceptible to disturbances compared to rooted taxa, and bryophyte coverage in Upper Spring Run was reduced during the past two years compared to previous years (Figure 8). Historically, this reach has experienced frequent and rapid oscillations in vegetation coverage as result of disturbance events (i.e., low/high flows, recreation; BIO-WEST 2003–2020). However, no sustained extreme low or high flows have been observed over the past two years and mechanisms for reductions in bryophyte coverage over this period are currently unclear. That being said, recovery is typically rapid when site conditions improve and growth is expansive under optimal conditions, and data from fall 2021 suggest bryophyte coverage is increasing in this reach once again.

Landa Lake Reach

Aquatic vegetation cover in Landa Lake exhibits less annual variability and less impact from high and low flows compared to other study reaches. In 2021, both spring and fall total seasonal coverages were at or near their respective seasonal averages (Figure 7). Landa Lake was dominated by two taxa; *Vallisneria* (11,975–12,531 m^2), which usually accounts for greater than 50% of the total coverage, and *Sagittaria* (3,625–4206 m^2) (Figure 8). Both species tend to remain consistent in coverage season to season. Vegetation mapping over the previous three to four years has shown *Sagittaria* expanding its coverage particularly in the upper third of the study reach and along the eastern shoreline. Bryophytes (427–761 m^2) were uncommon in Landa

Lake throughout the year, accounting for less than 5% of the community (Figure 8). Some bryophyte beds have been replaced by encroaching *Sagittaria* or have not formed large and dense patches previously observed. *Rhizoclonium* was not mapped in the spring because it was uncommon. Fall mapping recorded 315 m^2 of *Rhizoclonium*. Coverage of *Ludwigia* and *Cabomba* increased from spring (698 and 238 m^2, respectively) to fall (1,129 and 432 m^2, respectively), which can be attributed to successful planting during habitat restoration efforts (Figure 8). *Ludwigia* has exhibited the greatest positive response from restoration plantings in 2021, reaching the highest coverage recorded since biological monitoring began. The annual Comal River Restoration Report provides more information regarding the restoration of native vegetation (BIO-WEST 2021b).

Old Channel Reach

Seasonal mapping in the Old Channel showed spring and fall total coverage was about 300 m^2 below their respective long-term averages and also slightly below their lower 95% CI (Figure 7). However, community composition data from the last five years demonstrate positive changes resulting from vegetation restoration activities in this reach. Through spring 2018 this reach was dominated by non-native *Hygrophila*. However, following removal of this non-native vegetation in 2018, the Old Channel has exhibited an increasing trend in the amount of rooted native vegetation (i.e., *Ludwigia* and *Cabomba*). *Ludwigia* and *Cabomba* coverage increased from spring (234 and 89 m^2, respectively) to fall (340 and 397 m^2, respectively) (Figure 8). Increase in coverage from spring to fall is typical for both taxa, demonstrating cyclical annual trends most likely related to seasonal variation in light availability. Bryophyte coverage (211–596 m^2) was lower than recent years, particularly in the fall (Figure 8). Bryophytes were the dominant taxa from 2018 to 2020 and exceeded coverages of 600 m^2. Despite lower coverage of bryophytes in 2021, the vegetation community in the Old Channel is much improved from the monotypic stands of non-native *Hygrophila* previously present. Moreover, recent observations indicate that *Ludwigia* and *Cabomba* are self-sustaining due to limited occurrence of competitive species and consistent growing conditions.

Upper New Channel Reach

Mapping in 2021 showed that total coverage was about 150 m^2 below the long-term average in the spring, but bounced back to typical conditions in the fall (Figure 7). The most substantial changes in community composition in 2021 were an increase in *Hygrophila* (739 to 947 m^2) cover and decrease in bryophytes (288 to 0 m^2) from spring to fall (Figure 8). Shortly before fall mapping a high-flow event occurred along Dry Comal Creek, a major tributary to the New Channel Reach. This event displaced bryophytes which usually accumulate at the lower end of this reach (BIO-WEST 2001–2020), but evidently had little impact on the rooted *Hygrophila*.

Lower New Channel Reach

Spring and fall coverages were similar in 2021 and both were greater than their respective long-term averages (Figure 7). This reach typically exhibits seasonal variation in coverage with lower total coverage in the spring and higher totals in the fall. Similar seasonal coverages in 2021 can be attributed to decreases in coverages for *Hygrophila* (633 to 492 m^2) and *Sagittaria* (35 to 0 m^2) from spring to fall. Similar to the Upper New Channel, rooted-plant composition was mostly unaffected by the high flow pulse in October. (Figure 8).

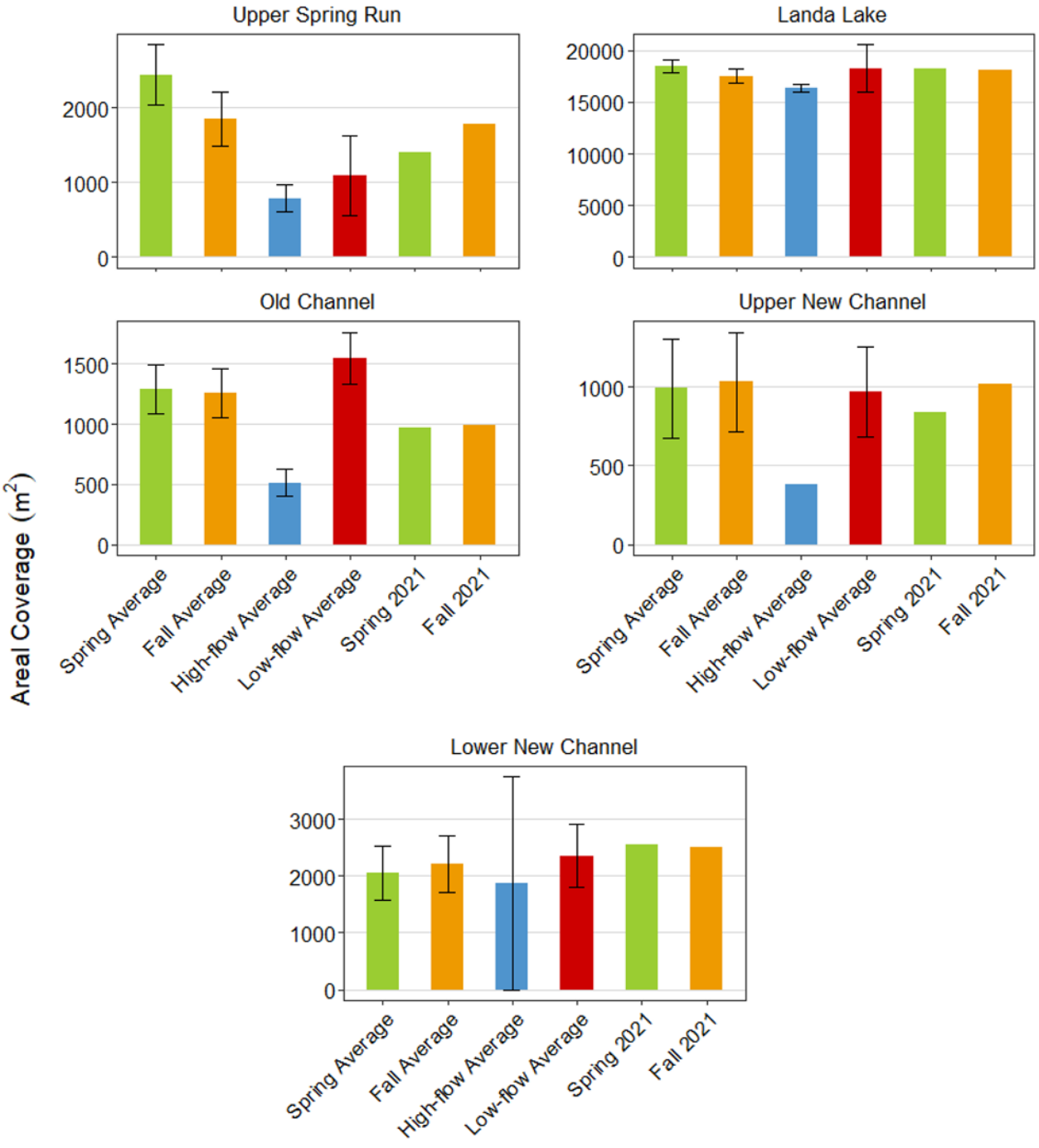

Figure 7. **Areal coverage (m^2) of aquatic vegetation among study reaches in the Comal Springs/River. Long-term (2001–2021) study averages are provided with error bars representing 95% confidence intervals.**

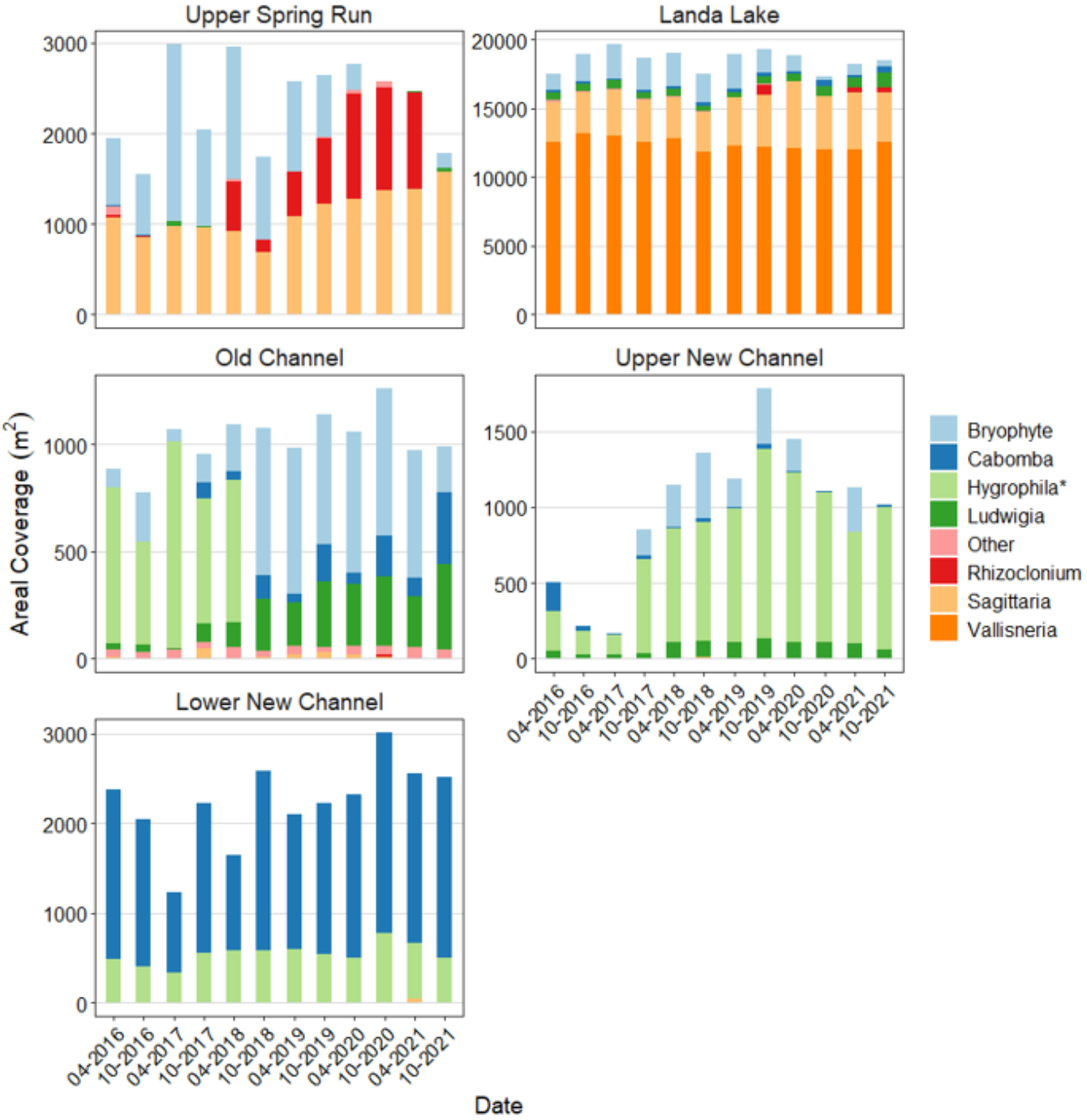

Figure 8. **Aquatic vegetation composition (m^2) among taxa from 2017–2021 in the Comal Springs/River. (*) in the legend denotes non-native taxa.**

Fountain Darter

A total of 1,243 Fountain Darters were observed at 71 drop-net samples in 2021. Drop-net densities ranged from 0.00–86.00 darters/m^2. Community summaries and raw drop-net data are included in appendices D and E, respectively. Habitat conditions observed during drop-netting can be found in Table 3. Timed dip-netting resulted in a total of 1,749 Fountain Darters during 15 person-hours (p-h) of effort. Site CPUE ranged from 1–288 darters/p-h. Fountain Darters were present at 130 out of 270 random-stations and percent occurrence among monitoring events ranged from 20–100%. A summary of occurrences per reach and vegetation taxa can be found in Table 4. Visual surveys in Landa Lake resulted in 56 darters observed. Density was 3.72 darters/m^2 (bryophyte coverage = 25%) in spring and 3.46 darters/m^2 (bryophyte coverage = 65%) in fall (Figure D10).

Table 3. Habitat conditions observed during 2021 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 (65%)	2 (100%)	4 (95%)	0
Cabomba[1]	0	4 (100%)	4 (90%)	0
Hygrophila[1]	0	0	0	4 (100%)
Ludwigia[1]	3 (70%)	4 (100%)	4 (100%)	0
Open	4 (95%)	4 (95%)	4 (100%)	4 (100%)
Rhizoclonium[1]	0	2 (90%)	0	0
Sagittaria[2]	4 (100%)	4 (100%)	0	0
Vallisneria[2]	0	4 (100%)	0	0
Substrate				
Cobble	3	2	0	0
Detritus	0	0	0	1
Gravel	8	6	7	4
Sand	0	3	1	1
Silt	4	13	8	2
Depth-velocity				
Water depth (ft)	3.0 (1.9–4.0)	2.8 (1.0–3.7)	2.4 (0.9–3.4)	2.7 (1.6–3.7)
Mean column velocity (ft/s)	0.0 (0.0–0.13)	0.1 (0.0–0.8)	0.3 (0.0–1.0)	0.4 (0.1–0.8)
15-cm column velocity (ft/s)	0.0 (0.0–0.1)	0.0 (0.0–0.5)	0.2 (0.0–0.8)	0.1 (0.0–0.9)
Water quality				
Water temperature (°C)	23.8 (23.5–24.1)	23.8 (23.4–24.9)	24.8 (24.0–25.4)	23.0 (22.5–23.5)
DO (mg/L)	5.6 (5.1–6.3)	6.6 (5.3–8.7)	8.9 (8.1–10.0)	8.9 (8.8–9.1)
DO % saturation	66.3 (60.6–74.7)	77.7 (61.7–105.0)	107.3 (97.0–121.0)	104.1 (101.0–107.4)
pH	7.3 (6.8–7.4)	7.1 (6.8–7.5)	7.5 (7.3–7.8)	7.8 (7.2–8.1)
Specific conductance (µs/cm)	582 (578–684)	629 (577–686)	623 (576–667)	565 (561–673)

[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 2021 random-station surveys in the Comal Springs/River and the percent occurrence of Fountain Darters in each vegetation type and reach.

VEGETATION TYPE	USR	LL	OC	NC	Total	Occurrence (%)
Bryophyte[1]	0	8	18	0	**26**	**100.00**
Cabomba[1]	0	5	2	15	**22**	**63.64**
Ludwigia[1]	0	8	40	0	**48**	**83.33**
Rhizoclonium[1]	4	2	0	0	**6**	**100.00**
Sagittaria[2]	11	19	0	0	**30**	**33.33**
Vallisneria[2]	0	18	0	0	**18**	**33.33**
Total	**15**	**60**	**60**	**15**	**150**	**68.00**
Occurrence (%)	**33.33**	**60.00**	**90.00**	**46.67**	**-**	**-**

[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 2021 was higher in the spring (1.50 darters/m^2) than fall (0.25 darters/m^2), which is consistent with seasonality of past observations. However, 2021 densities were lower than five-year and long-term trends for both spring (5.75 and 6.00 darters/m^2, respectively) and fall (1.50 and 3.50 darters/m^2, respectively). Mean density was greater than medians for all three timeframes assessed in both seasons, which shows their distributions were positively skewed, meaning that data are clustered near lower values. Consistency across each timeframe supports that positively skewed distributions are typical during drop-net sampling and demonstrates that Fountain Darters still persisted at high densities in 2021. Median CPUE trends in 2021 were similar to historical trends and descended from spring (142 darters/p-h) to fall (46 darters/p-h), displaying higher values than five-year and long-term observations in spring, and more similar values across all timeframes in summer and fall. Percent occurrence among reaches showed medians were lower in the spring (48%) and fall (45%) compared to summer (78%). Spring and fall observations were also lower than five-year trends (Figure 9).

In summary, medians of population metrics in 2021 were consistent with historical observations for summer timed and random dip-netting. For the spring and fall, discrepancies in 2021 median conditions among sampling methods when compared to their respective historical datasets make results less certain, but likely indicate Fountain Darter population conditions in 2021 were not much different than historical observations.

In summary, population trends were somewhat inconsistent across metrics and seasons. Medians of population metrics were consistent with historical observations for summer and fall timed dip-netting and for summer random dip-netting. Inconsistencies in median condition among other metrics/seasons, along with high dispersion as represented by wide interquartile range, leads to some uncertainty in population trajectory. However, lack of consistent patterns across metrics suggests Fountain Darter overall population performance didn't deviate substantially from historical observations.

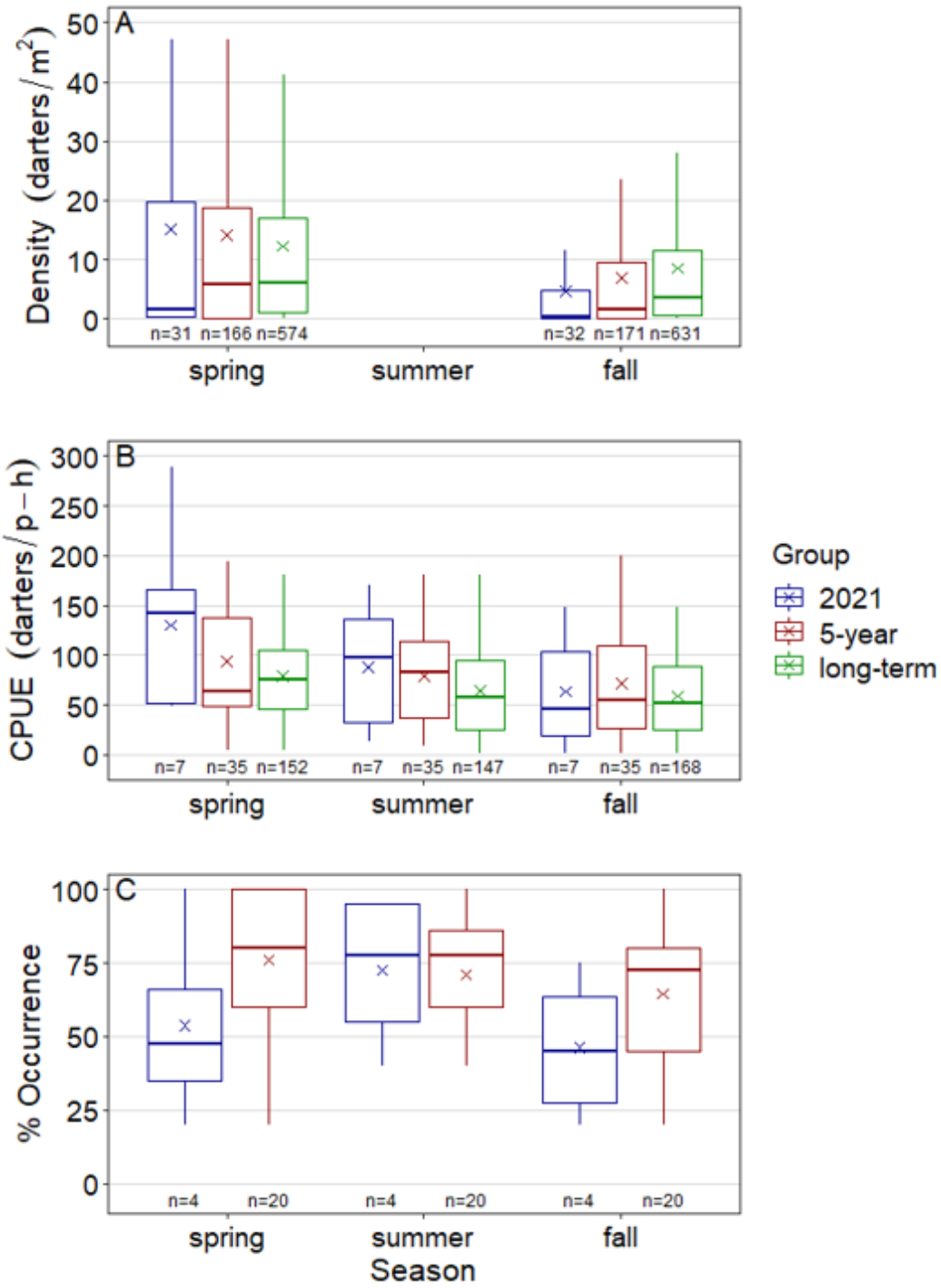

Figure 9. **Boxplots comparing Fountain Darter density from drop-net sampling (A), catch-per-unit-effort (CPUE) from timed dip-netting (B), and proportional occurrence from random station dip-netting (C) among seasons in the Comal Springs/River. Temporal groups include 2021, 5-year (2017–2021), and long-term (2001–2021) 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

Density patterns over the past five years varied among study reaches. At Upper Spring Run, Fountain Darter density in 2021 ranged from 0.00–6.00 darters/m^2. Median density in 2021 was 0.00 darters/m^2 for both events, but did not deviate greatly from the long-term (1.50 darters/m^2). Variability (i.e., interquartile range) has decreased in recent events, as the number of high-density sites has declined. This is likely a result of reduced bryophyte coverage in recent events which impacts habitat suitability in this reach. At Landa Lake, median density displayed a cyclical pattern resulting from typical patterns in Fountain Darter reproduction, recruitment, survivorship, and growth. Compared to the long-term median (10.00 darters/m^2), median density in all years was similar or higher in the spring (11.00–24.50 darters/m^2) and lower in the fall (0.75–5.75 darters/m^2). (Figure 10).

Median density in the Old Channel was greater for all events the last 5 years (4.00–19.00 darters/m^2) compared to the long-term median (3.50 darters/m^2), suggesting an improvement in this reach relative to historical conditions. Similar to Landa Lake, median density trends were also cyclical in recent years, being higher in spring events than fall from 2019–2021 (14.63–23.00 and 2.63–13.86 darters/m^2, respectively). However, the inverse occurred from 2017–2018, with fall median densities being higher (14.63–23.00 darters/m^2) than spring (2.63–9.38 darters/m^2). Differing patterns in density from 2017–2018 may have been influenced by vegetation restoration activities that were ongoing in this time period. Regardless, higher median densities compared to historical data support that restoring native ornate vegetation (e.g., bryophyte, *Cabomba*) has enhanced population performance in this reach over the long-term. At the New Channel, density trends showed less-consistent seasonality. Median density was particularly high in spring 2019 (12.25 darters/m^2) and spring 2020 (3.75 darters/m^2), but was low in both spring 2021 (0.25 darters/m^2) and fall 2021 (0.00 darters/m^2 (Figure 10). Lower densities in 2021 are likely influenced by the habitat conditions present at the time of sampling. High flow pulses resulted in displacement of bryophytes prior to both 2021 monitoring events, making them unavailable for sampling. Bryophytes typically harbor the greatest densities of Fountain Darters (see Habitat Use), and when not present, a decline in median density would be expected as those darters potentially disperse to other available habitats.

A consistent pattern worth noting is that mean density was typically greater than the median, which indicates density distributions for most events were positively skewed. This pattern has been observed for other rare congeners and suggests Fountain Darters are often aggregated within areas where habitat conditions are optimal (see 'Habitat use' for examples) (Henry & Grossman 2008; Davis & Cook 2010; Davis et al. 2011). Evidence of aggregated distributions within suitable habitat supports densities observed at a given event are, at least in part, effected by the vegetation taxa present and available for sampling (e.g., in wadeable areas). For spatially clustered populations, random variation in sampling (e.g., timing, site location) can enhance the error and uncertainty of estimates when sample sizes are small (Davis et al. 2011). Based on this, areas with higher densities of darters may have been missed within a given sampling event if they were clustered within unsampled habitat patches.

Size structure and recruitment trends

Fountain Darter size structure and recruitment displayed consistent differences when comparing temporal trends in spring from summer and fall. In general, smaller darters are more frequently

observed during the spring when peak reproduction occurs as seen by lower median lengths (19–22 mm), violin plots with distributions that are symmetrical or negatively skewed towards smaller size classes, and greater levels of recruitment (42.17–60.43%). In the summer and fall, smaller darters are observed less, which is shown by greater median lengths (24–27 mm), distributions that are more frequently skewed positively towards larger darters, and lower recruitment (15.30–35.52%) (Figure 11).

In 2021, patterns in size class distributions and recruitment were consistent with long-term data except for summer recruitment, which was about 13% higher than the long-term average. In summary, current patterns in size structure were similar to historical patterns and recruitment either closely matched or exceeded past observations, supporting that no specific age classes were underrepresented in 2021 (Figure 11). Based on this, there is little evidence to suggest that any detectable patterns in Fountain Darter populations in the past five years can be attributed to trends within a specific ontogenetic life stage.

Habitat Use and Suitability

Density trends among vegetation taxa

Median densities in 2021 were highest in *Rhizoclonium* (24.00 darters/m^2), bryophyte (18.00 darters/m^2) and *Cabomba* (14.75 darters/m^2). Variability in density was highest within *Cabomba* samples, which exhibited a much greater IQR (30.00) compared to historical, likely due to several high-density samples as high as 86.00 darters/m^2. Bryophyte also showed similar variation, though was dispersed across lower values. The remaining taxa (*Hygrophila*, *Ludwigia*, Open, *Sagittaria*, *Vallisneria*) had much lower medians (0.00–2.50 darters/m^2) and IQRs (0.13–3.75). Median density and IQR was also lower for these taxa in 2021 compared to their five-year and long-term trends (Figure 12). However, this is likely influenced by inherent variability associated with low sample sizes.

Current patterns of vegetation utilization support previous research that observed Fountain Darter densities are highest within ornate vegetation (Schenck and Whiteside 1976; Linam et al. 1993; Alexander and Phillips 2012). This is particularly true for bryophytes, *Cabomba*, and *Rhizoclonium* which provide dense structure at the substrate level. *Hygrophila* and *Ludwigia* represent ornate vegetation types with moderate densities. Lastly, rosette-style vegetation with simple leaf structures, such as *Sagittaria* and *Vallisneria* exhibit lower densities (Figure 12).

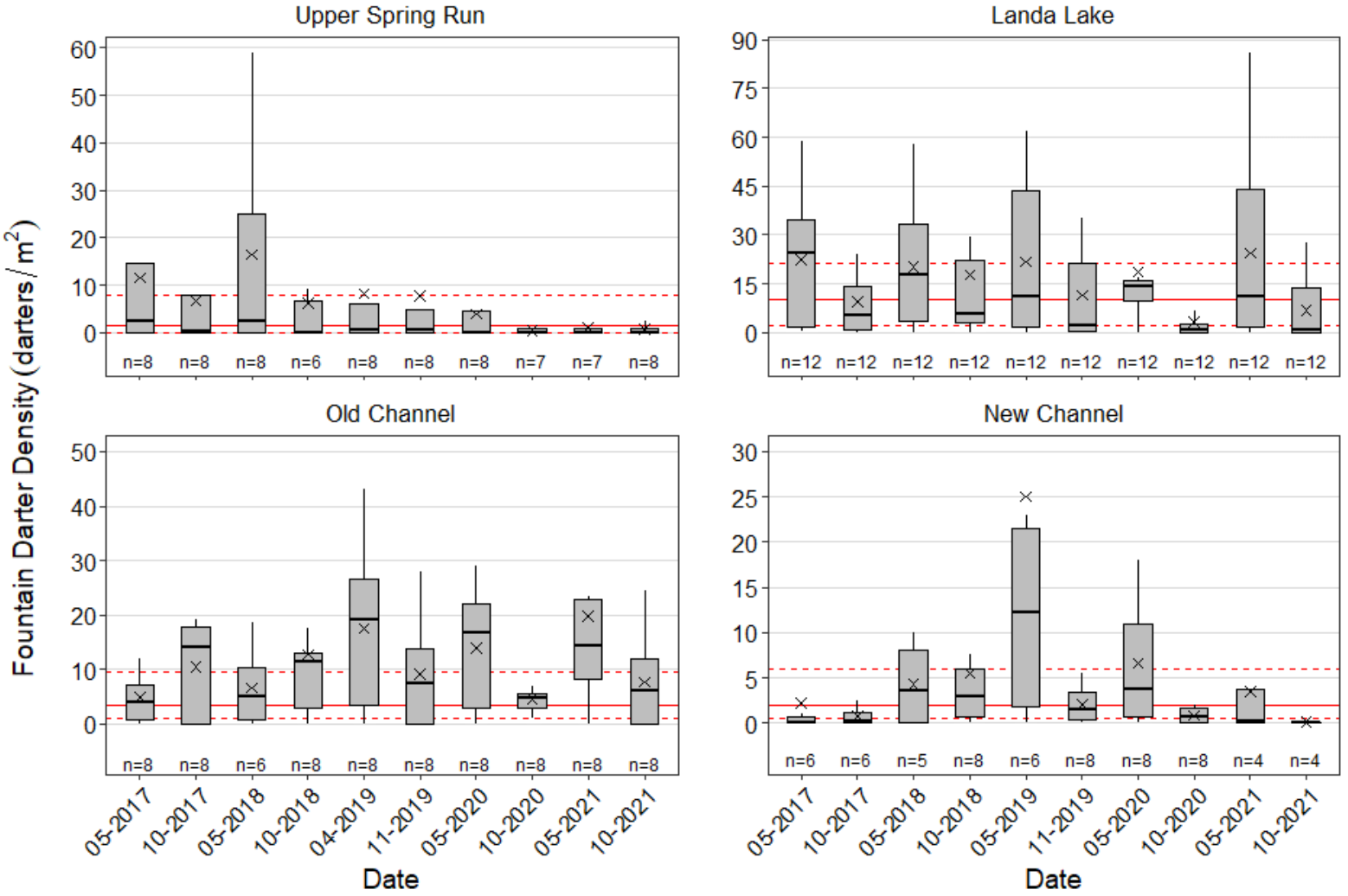

Figure 10. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) among study reaches from 2017–2021 during drop-net sampling in the Comal Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents 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 (2001–2021) medians and interquartile ranges, respectively.**

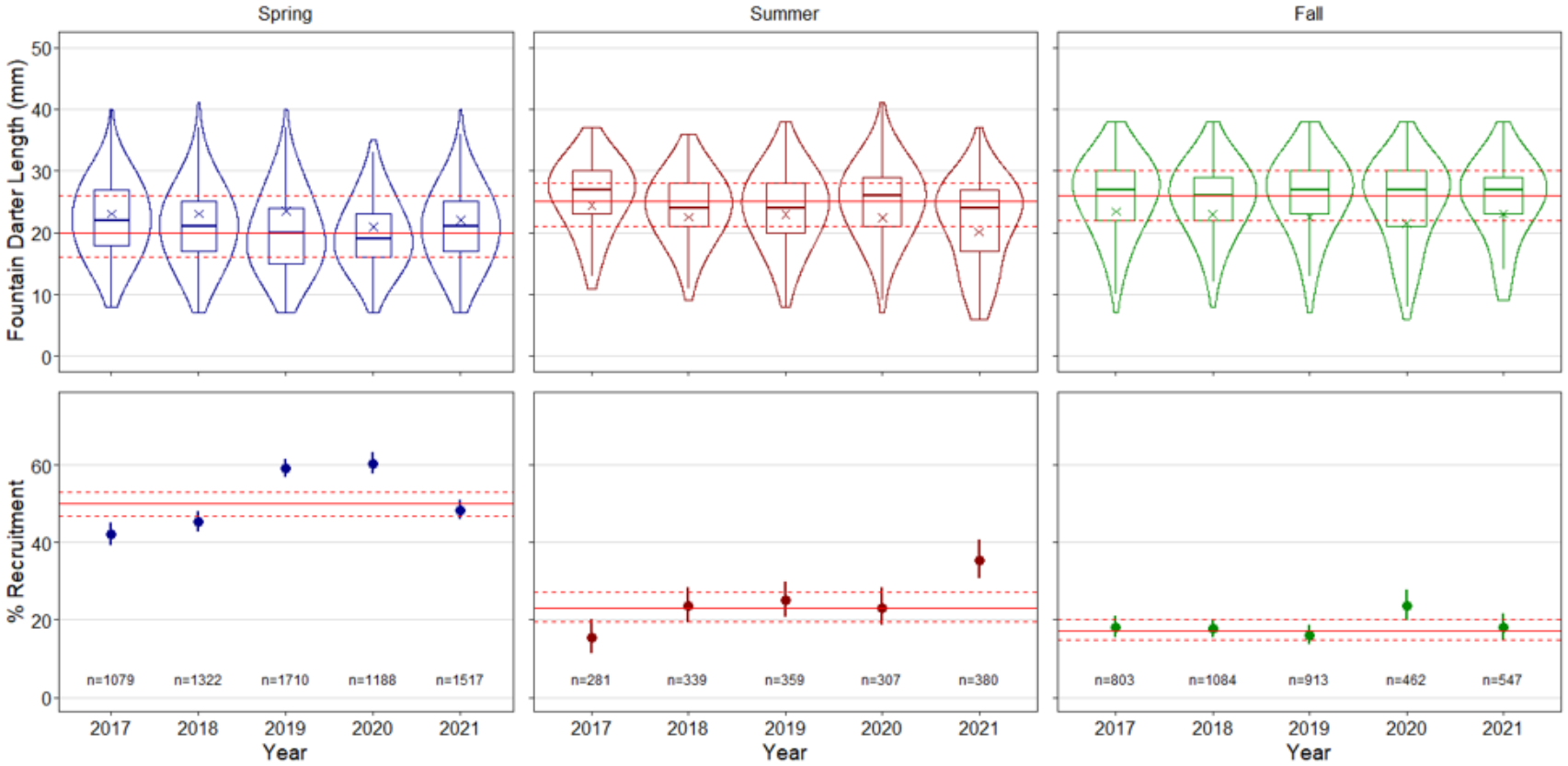

Figure 11. **Seasonal trends of Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the Comal River from 2017–2021. Spring and fall trends are based on drop-net and timed dip-net data in aggregate, whereas summer trends are based on timed dip-net data only. Size structure 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 (2001–2020) 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).**

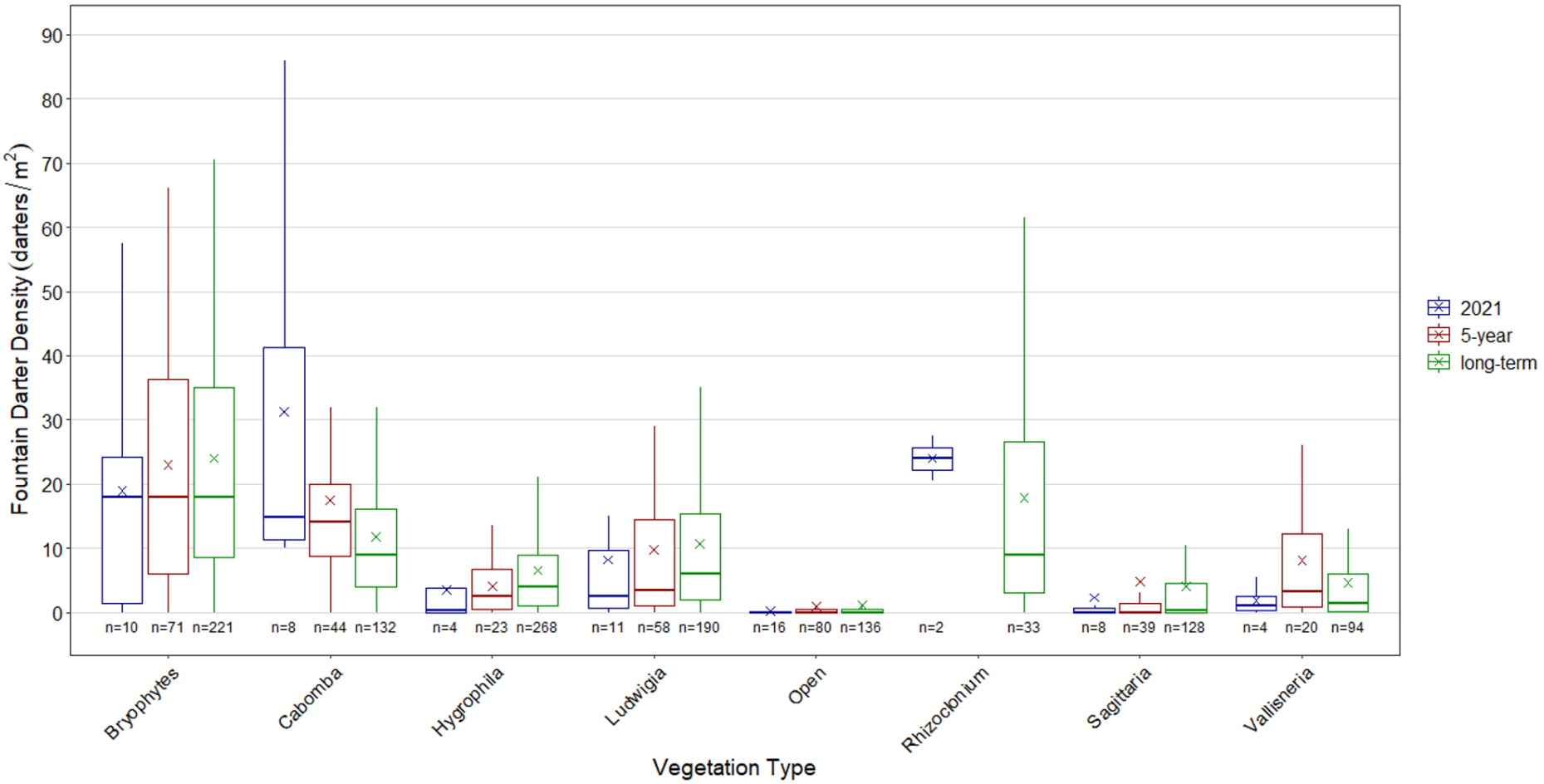

Figure 12. **Boxplots displaying 2021, 5-year (2017–2021), and long-term (2001–2021) drop-net Fountain Darter density (darters/m²) among vegetation types in the Comal Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents 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.**

Size structure among vegetation taxa

Ranges in darter lengths were similar across vegetation types, all of which contained recent recruits and old adults. Lower median lengths (20–21 mm) occurred in bryophyte, *Hygrophila*, *Ludwigia*, open, and *Vallisneria*, whereas median lengths were slightly higher in *Cabomba*, *Rhizoclonium*, and *Sagittaria* (23–24 mm). Size structure distributions varied by taxa and are visualized utilizing violin plots. For all violin plots (i.e., probability density estimate), wider sections denote a greater representation of darters at a given length (Hintze and Nelson 1998). The majority of darters collected (~70%) occurred in bryophyte and *Cabomba*. Lengths were uniformly distributed within bryophyte, supporting that it was an important habitat type across all age classes in 2021. Length distribution in *Cabomba* was positively skewed and harbored a greater proportion of larger adults (~24–28 mm). *Ludwigia* and *Rhizoclonium* also harbored a large portion of the darters collected (~20%). The distribution of lengths in *Ludwigia* was negatively skewed, suggesting it was important habitat for recent recruits. In contrast, *Rhizoclonium* was bimodally distributed, displaying a greater proportion of recent recruits (~9–15 mm) and larger adults (~24–27 mm) (Figure 13). It should also be noted that seasonality could influence these data, as the number of vegetation strata sampled may not be equal across seasons.

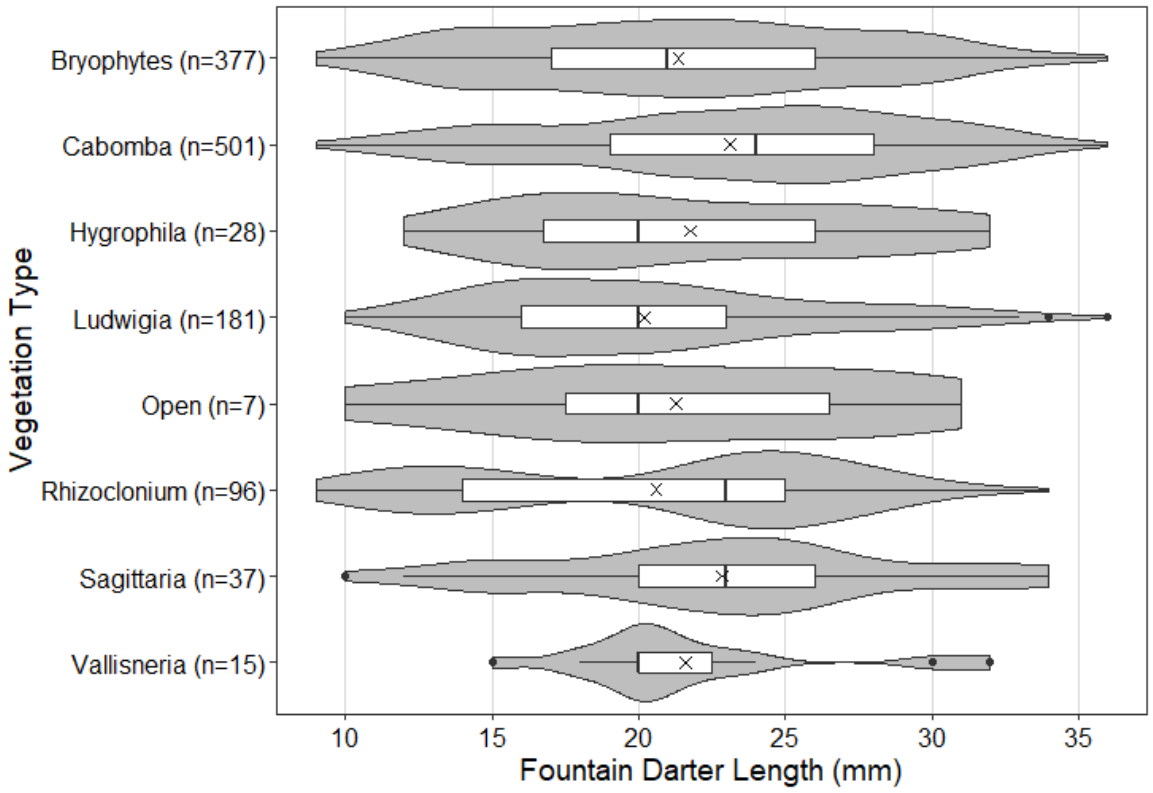

Figure 13. **Boxplots and violin plots (grey polygons) displaying Fountain Darter lengths among dominant vegetation types during 2021 drop-net sampling in the Comal Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents 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

Overall Habitat Suitability Index (OHSI) at Upper Spring Run suggests a decline in habitat suitability within this reach over the last five years. Spring events in 2017 and 2018 did not overlap confidence intervals with the long-term data, suggesting habitat suitability was better during these time periods compared to historical observations. Concurrently, higher densities were noted in these monitoring events (Figure 10). However, OHSI in this reach has generally declined through fall 2021, but is still similar to the historical mean. The mechanism behind this decline is a reduction in bryophyte coverage in recent events. Bryophyte coverage in this reach fluctuates considerably due to a variety of factors and continued monitoring will determine if this trend continues.

OHSI was generally stable at Landa Lake (0.57–0.62), Old Channel (0.47–0.59), Upper New Channel (0.36–0.45), and Lower New Channel (0.46–0.58) relative to their respective long-term trends. Moreover, overlap of CIs for each event with the long-term mean CIs suggests habitat suitability was likely not different from historical trends (Figure 14).

Aquatic vegetation has been identified as a major driver of Fountain Darter population dynamics (BIO-WEST 2001-2020). However, by only using vegetation as criteria for suitable habitat, OHSI should be viewed as a metric that provides evidence on whether changes in vegetation community composition influence population trends. OHSI should not be considered a complete indicator of population performance since other factors influence habitat suitability. For example, higher densities observed when OHSI in Upper Spring Run exceeded 0.60 suggests that increased coverage of more suitable vegetation taxa enhanced population performance during those years. Lack of a strong relationship between density and OHSI within other reaches, however, provides evidence that population density was affected by other environmental factors or random variation in sampling (Figures 10 and 14).

Among all EAHCP methods, random dip-netting is the most suitable for inferring how OHSI may influence Fountain Darters since simple random sampling provides an unbiased estimate of occupancy at the reach-level because vegetation taxa with greater coverage have a higher probability of being selected. In 2021, sites with greater coverage of more suitable vegetation taxa (e.g., bryophyte) had a higher percentage of occupied sites. That being said, occupancy shouldn't be interpreted as a better measurement of population performance compared to other methods. For example, occupancy was higher in the Old Channel (90.00%) than Landa Lake (60.00%), but higher densities above 30 darters/m^2 were more frequently observed within drop-net samples in Landa Lake. These differences in occupancy and density results demonstrate that Fountain Darters can be highly clustered within suitable habitat patches. Based on this, OHSI is a useful tool for examining how habitat suitability may impact population performance, specifically redundancy at the reach-level, but may weakly relate to patterns of population density if most individuals are aggregated within small patches of suitable habitat and should be interpreted with some uncertainty. In summary, results of all sampling methods should be considered when making inferences of casual effects on Fountain Darter population trends.

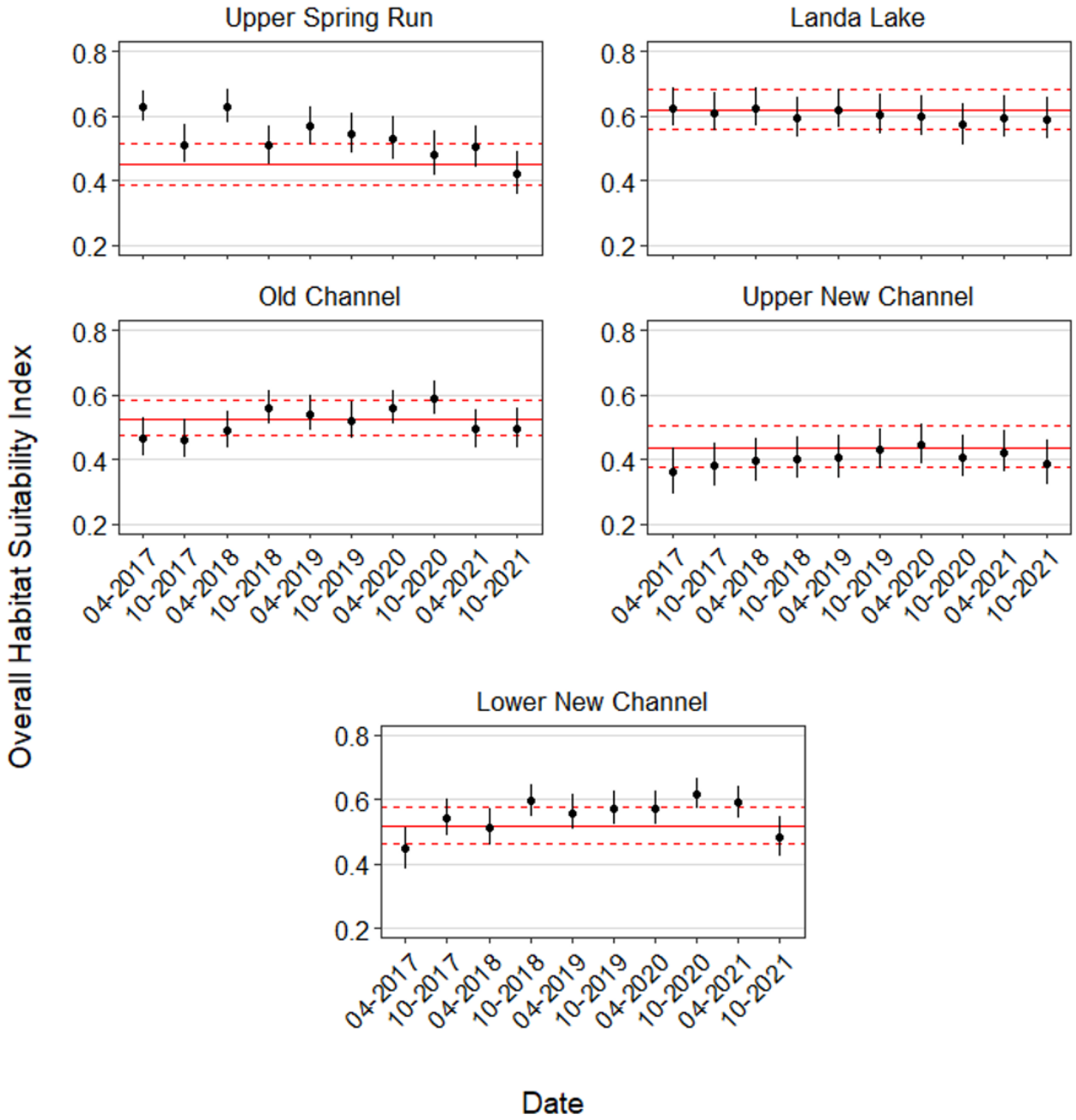

Figure 14. **Overall Habitat Suitability Index (OHSI) (±95% CI) from 2017–2021 among study reaches in the Comal Springs/River. Solid and dashed red lines denote means of long-term (2003–2021) OHSI and 95% CI, respectively.**

Fish Community

A total of 5,809 fishes represented by 8 families and 20 species were observed in the Comal Springs System during 2021 sampling. Overall community summaries can be found in Appendix D.

Evidence of detectable temporal trends based on the fish community metrics used were variable among study segments. Species richness and diversity were generally higher within the Old Channel and New Channel, although Upper Spring Run was similar during several monitoring events. Species richness has decreased in Landa Lake from 10 to 5 species. That being said, diversity has increased from 0.60 to 1.16, suggesting that community composition in Landa Lake has become more heterogenous across the past five years (Figure 15).

Spring fishes richness was generally stable across reaches and fluctuated by one or two species, with the exception being the New Channel that increased and decreased up to three species between events. Relative density of spring fishes greatly fluctuated among study reaches but no obvious patterns emerged (Figure 16).

Temporal trends in Fountain Darter density from 2017–2021 were based on microhabitat sampling data. At the Upper Spring Run, median density (0.00–0.55 darters/m^2) and IQR (0.13–1.05) for the past five years was seasonally cyclical. Median density and IQR were typically greater or similar to long-term observations in the spring and lower in the fall (Figure 17). Median density and IQR at Landa Lake and the Old Channel were at or above long-term medians from 2017–2019 and below long-term medians from 2020–2021. The declining density observed the last two years was not observed in drop-net results for Landa Lake or Old Channel. In contrast, drop-net density patterns showed a decline in Upper Spring Run and microhabitat sampling did not (Figures 10 and 17).

Discrepancies between microhabitat sampling and drop-netting within a study reach suggests density patterns through time displayed by any one method should be interpreted with a level of uncertainty and comparisons between methods should be made with caution. Differences in patterns between these methods are likely associated with observation variance associated with each sampling design (e.g., study area boundaries, sample site location). For example, during microhabitat sampling in 2021, *Rhizoclonium* was the dominant vegetation within all sample sites at Upper Spring Run and over 50% of sample sites at Landa Lake were within areas mostly within *Vallisneria*. Since drop-net sampling effort is equal across vegetation types, differences in observations are likely due to variation in habitat conditions within sample site locations. Additionally, microhabitat sampling in the Old Channel is conducted outside the study area for drop-netting, where restoration has not been implemented and *Hygrophila* is the dominant taxa. Based on these differences, trends between each sampling method should be assessed independently due to observation variance.

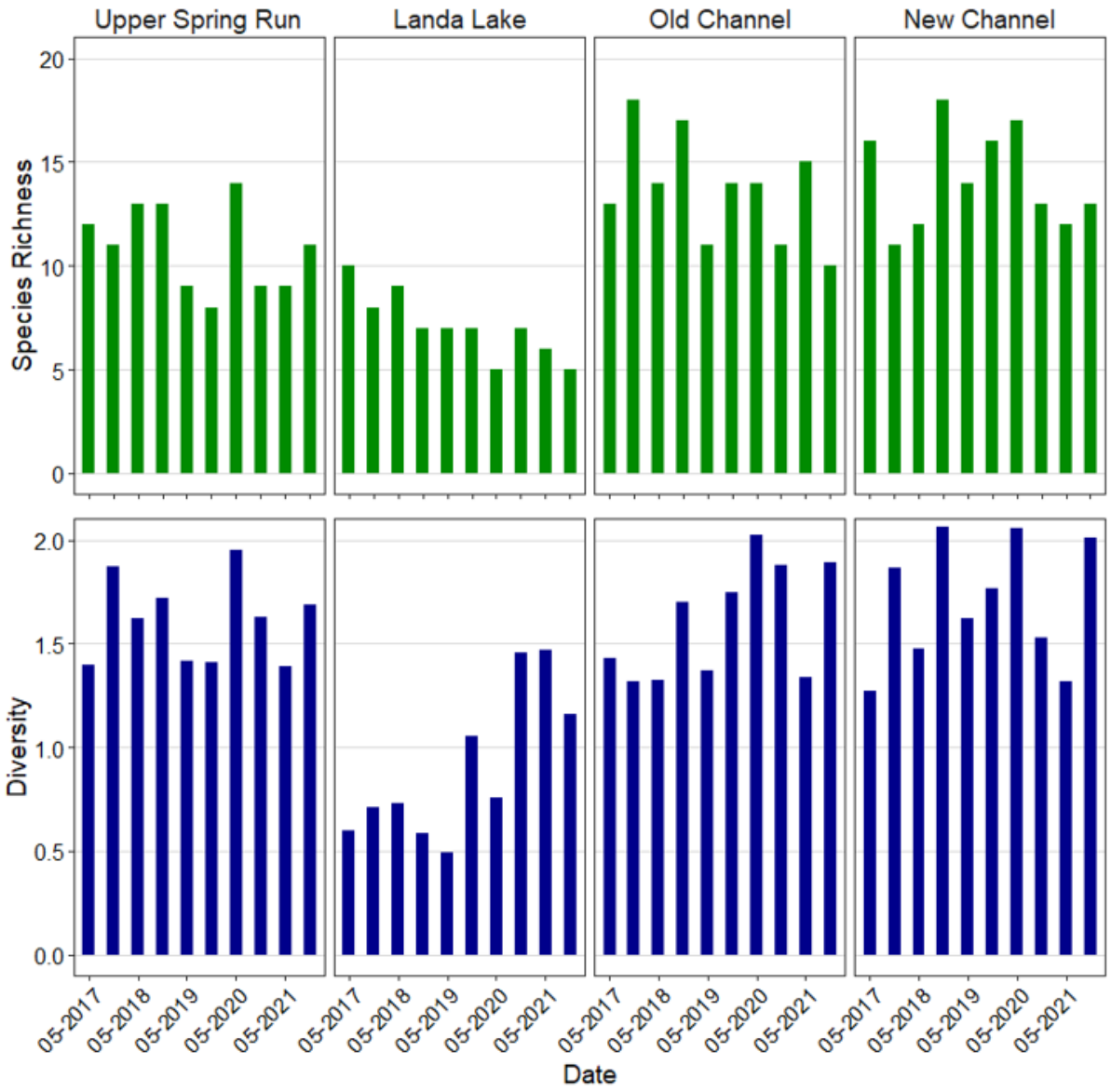

Figure 15. **Bar graphs displaying species richness (top row) and diversity (bottom row) from 2017–2021 based on all three fish community sampling methods in the Comal Springs/River.**

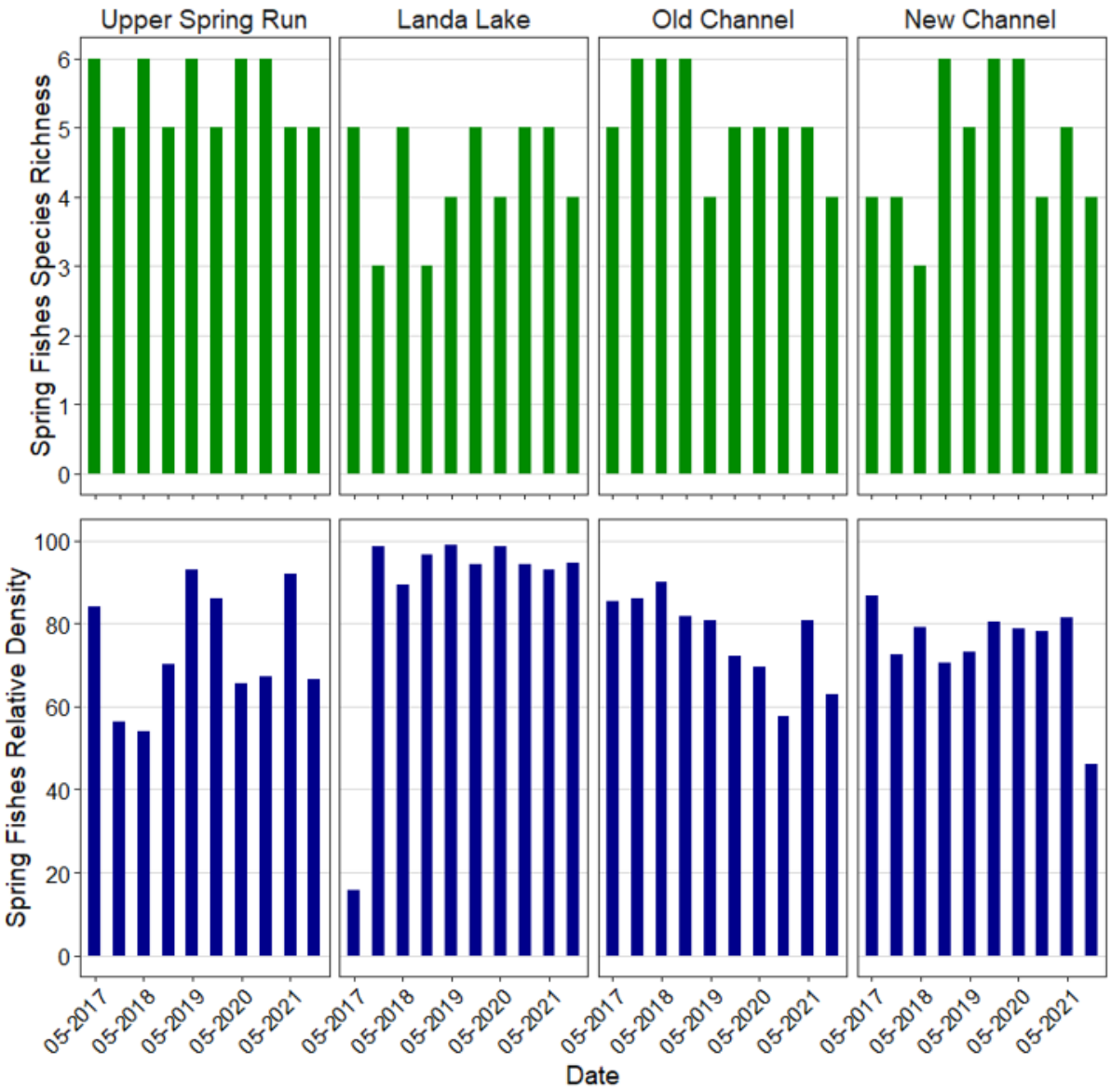

Figure 16. **Bar graphs displaying spring fish richness (top row) and relative density (RD; %) (bottom row) from 2017–2021 based on all three fish community sampling methods in the upper Comal Springs/River.**

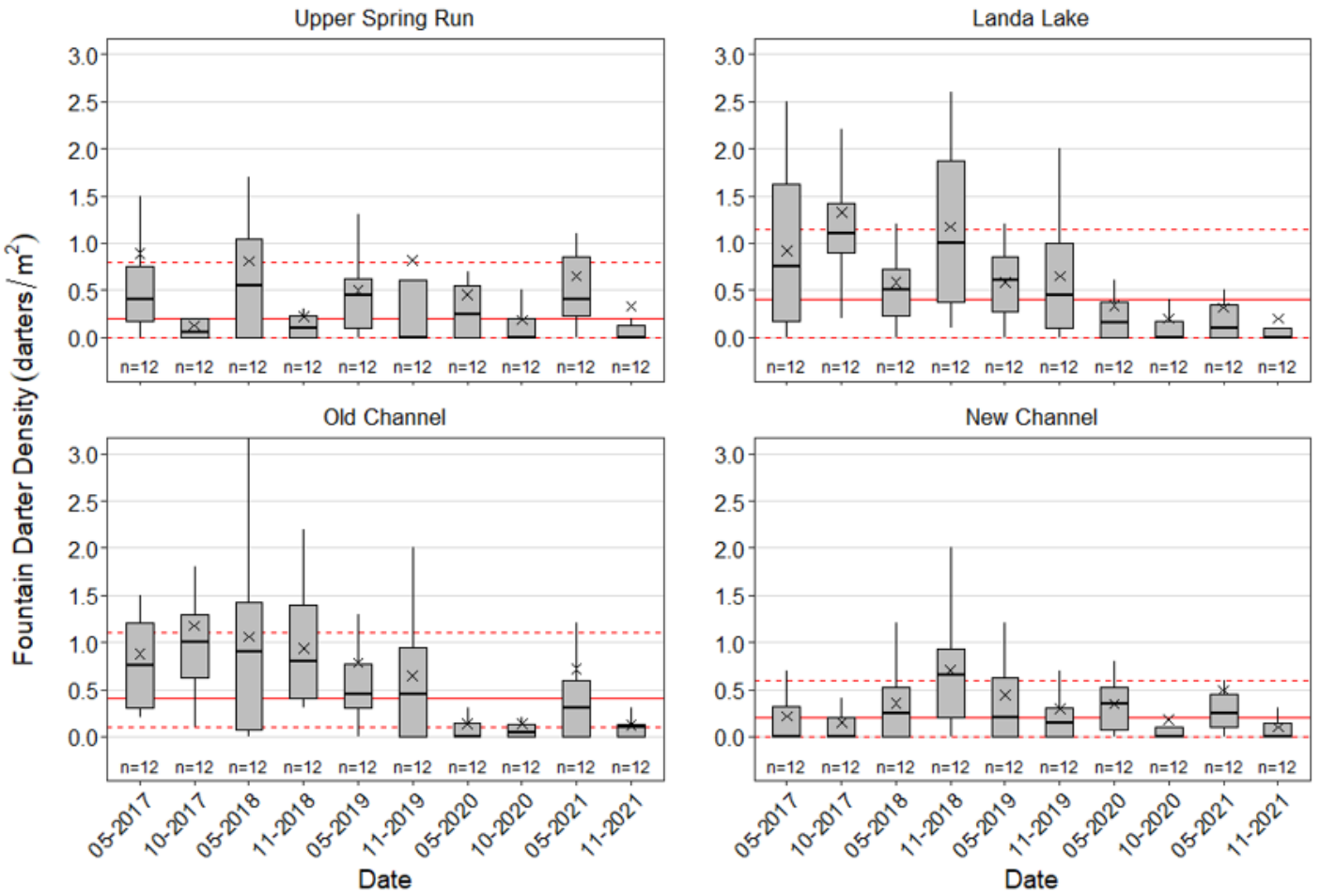

Figure 17. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) among study reaches from 2017–2021 during fish community microhabitat sampling in the Comal Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of 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 (2014–2021) medians and interquartile ranges, respectively.**

Comal Springs Salamander

A total of 547 Comal Springs Salamanders were observed across all four sampling sites during 2021 sampling efforts, with a CPUE of 45.6 salamanders/p-h. This exceeded the 2000–2021 long-term average (n=64.9 salamanders; CPUE=10.8 salamanders/p-h) and also exceeded the previous maximum recorded observations within a single year (2019; n=502 salamanders; CPUE=41.8 salamanders/p-h).

Spring Run 1 had the highest total number of observations (n=356 salamanders) and highest CPUE (89 salamanders/p-h). Consistent with 2020 observations, CPUE was lower for Spring Island Outfall (CPUE=30.5 salamanders/p-h) than for Spring Run 3 (CPUE=31.0 salamanders/p-h). Six salamanders were observed in Spring Island Run, which is above the long-term average (n=3.0) and represents the highest count since 2017. With the exception of Spring Island Run, salamander CPUE within the surface environments of the Comal Springs system has been steadily increasing since the return of sustained water levels after the 2014 drought. Overall, salamander populations within the study area are persistent and steadily increasing in abundance in recent years (Figures 18 & 19).

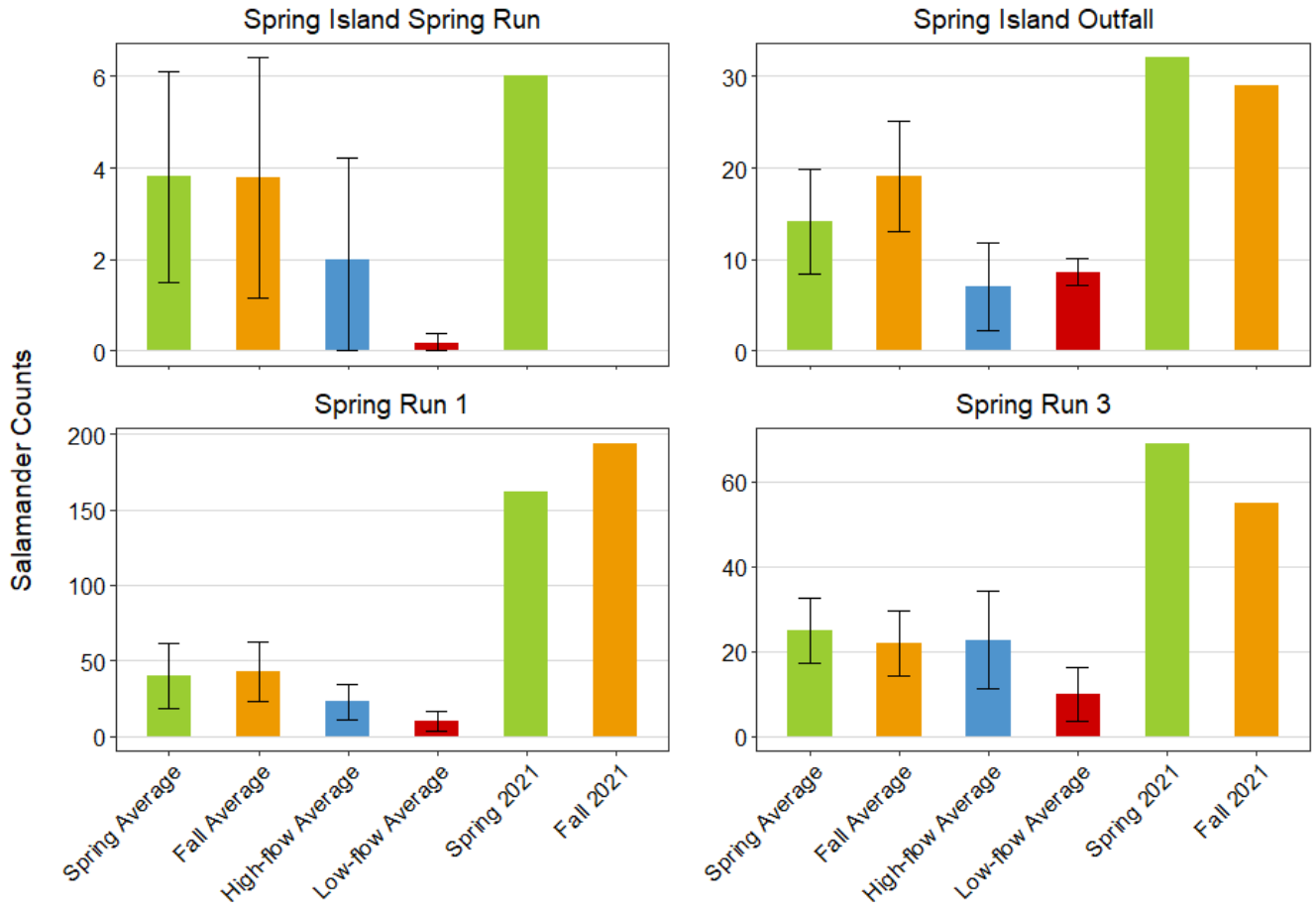

Figure 18. **Comal Springs Salamander counts among Comal Springs survey sites in 2021, with the long-term (2001–2021) average for each sampling event. Error bars for long-term averages represent 95% confidence intervals. No bar within Fall 2021 at Spring Run Island denotes zero salamanders observed.**

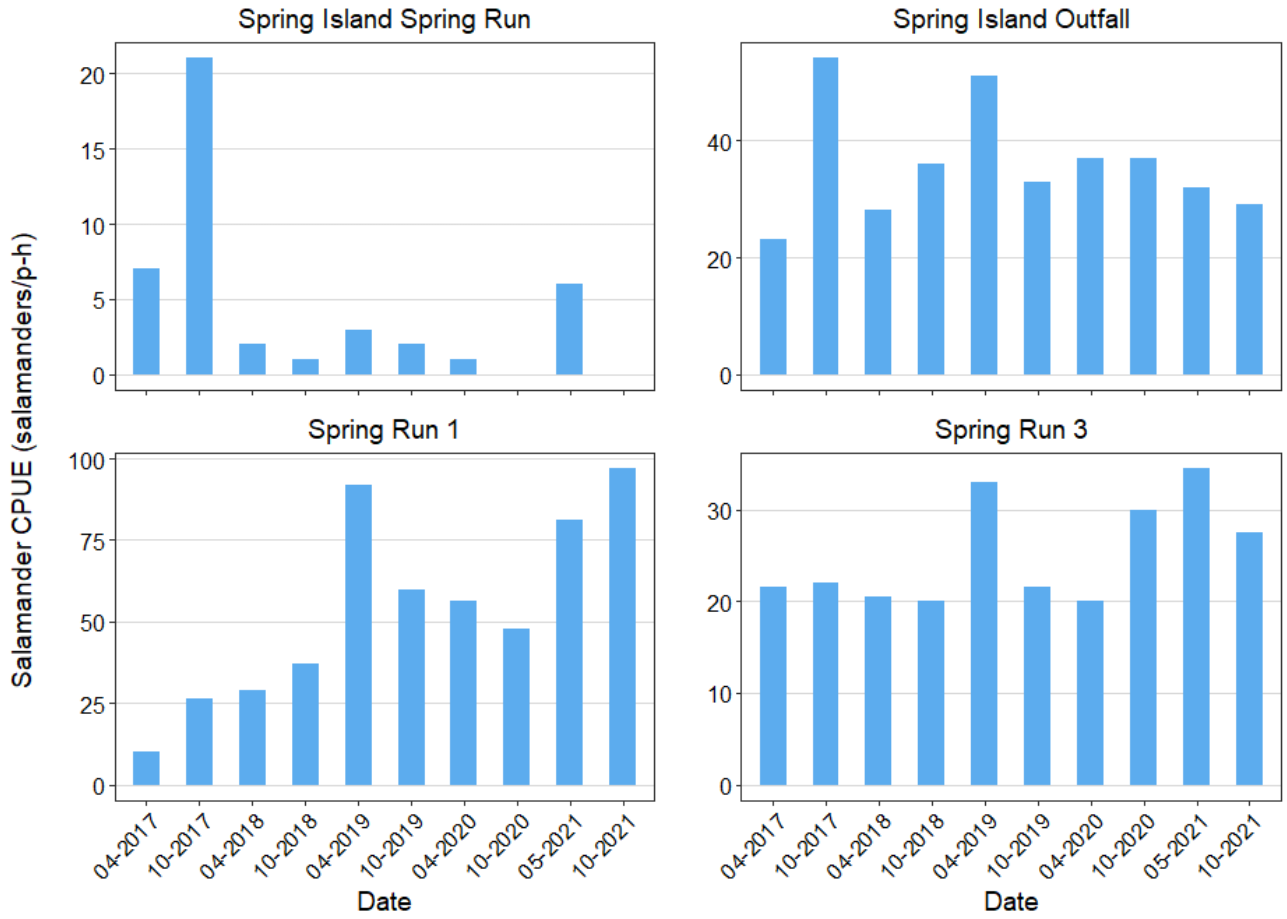

Figure 19. **Comal Springs Salamander catch-per-unit-effort (CPUE; salamanders/person-hr) among sites from 2017–2021 in the Comal Springs. No bar within dates at Spring Island Run denotes zero salamanders observed.**

Macroinvertebrates

Drift-Net Sampling

The drift-net on Spring Run 1 was unfortunately removed off of the spring between 5:00 pm and 12:00 AM by an outside party for both seasons. However, many groundwater macroinvertebrates were collected during the sampling period for which the net was employed. As a result of this unplanned reduction in 2021 sampling effort, four hours of drift sampling was deducted at Spring Run 1 for each season to compensate for the time the net was removed. An undescribed groundwater isopod in the family Micorceberidae was collected for the first time from the western shoreline upwelling at Comal Springs. This taxon has been sampled from other springs in the Edwards Aquifer and is currently being described by Texas State University researchers. The number of *Stygobromus pecki* and *Heterelmis comalensis* recovered from drift samples is given in Table 5. Full drift-net results are presented in Appendix D. The number of *Stygobromus* sp. collected per cubic meter of water filtered during 2021 was slightly below the long-term median in spring and slightly above the long-term median in fall and was also typical for most sampling events from 2017–2021 (Figure 20).

Table 5. **Total numbers of endangered species collected at each site during drift-net sampling in May and November 2021. Life history designations include. A=adult; L=larvae. Full drift-net results are presented in Appendix D.**

	SITE (TOTAL DRIFT-NET HOURS)		
TAXA	**RUN 1 (40)**	**RUN 3 (48)**	**UPWELLING (48)**
Crustaceans			
Amphipoda			
Crangonyctidae			
Stygobromus pecki	9	14	41
Insects			
Coleoptera			
Elmidae			
Heterelmis comalensis	1(A)	1(L)	0

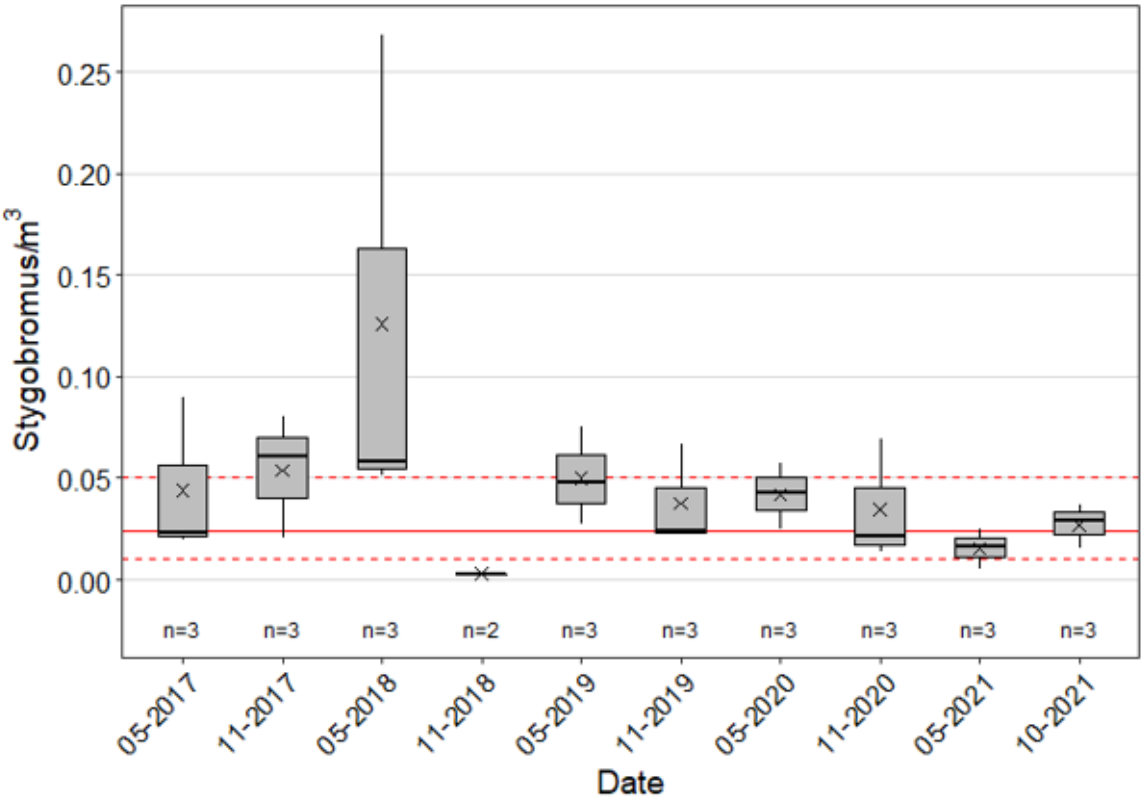

Figure 20. **Boxplots displaying *Stygobromus pecki*/m³ of water at Western Upwelling, Spring Run 1, and Spring Run 3 from 2017–2021. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range. Solid and dashed red lines denote long-term (2003–2021) medians and interquartile ranges, respectively.**

Comal Springs Riffle Beetle

Of the 30 total lures per sampling event, two lures were not recovered from Spring Island in the spring and from the Western Shoreline in the fall. The spring sampling event for Spring Island and Spring Run 3 revealed relatively higher adult abundance/lure compared to previous years, while the Western Shoreline was similar to long-term data (Figures 21 and 22). Abundance/lure during the fall was similar to previous years for Spring Island and Spring Run 3 but lower for the Western Shoreline. There was a considerable amount of erosion from a storm event prior to the recovery of lures in fall 2021 (Figure 23), which could have influenced abundance trends currently observed. It is unclear whether erosion directly caused the decline observed, or instead, lowered the probability of capture. Regardless of the mechanism, data from this event should be interpreted with a level of uncertainty. Lures retrieved from Spring Island collected 0–49 adult beetles in spring and 0–33 in fall. Adult abundance/lure from Spring Run 3 ranged from 0–35 during spring and 0–12 in fall. The number of adult Comal Springs riffle beetle collected on lures at the Western Shoreline ranged from 0–21 in spring and 0–10 in fall.

Spring sampling events had relatively higher abundance/lure at the Spring Island and Spring Run 3 reaches. Moreover, abundance/lure was similar to long-term medians during the fall monitoring event, except at the Western Shoreline, which was lower. As previously noted, substrates at the Western Shoreline reach continue to appear vulnerable to erosion, which may be the mechanism behind reduced abundance at this location. However, due to the nature of the monitoring technique (cotton lures left in the system for long periods) and the extremely clumped distribution of Comal Springs riffle beetle, which are associated with small spring orifices, this data is inherently variable in nature. High flow events, human disturbance, or other stochastic factors can result in loss of cotton lures. Similarly, variation in placement of lures by only a few feet can drastically influence capture rates. To reduce the influence of such factors, efforts are made each sampling event to standardize exact lure placement and minimize lure loss to stochastic events. Continued monitoring is crucial to further evaluate the mechanisms influencing Comal Springs riffle beetle abundance on cotton lures.

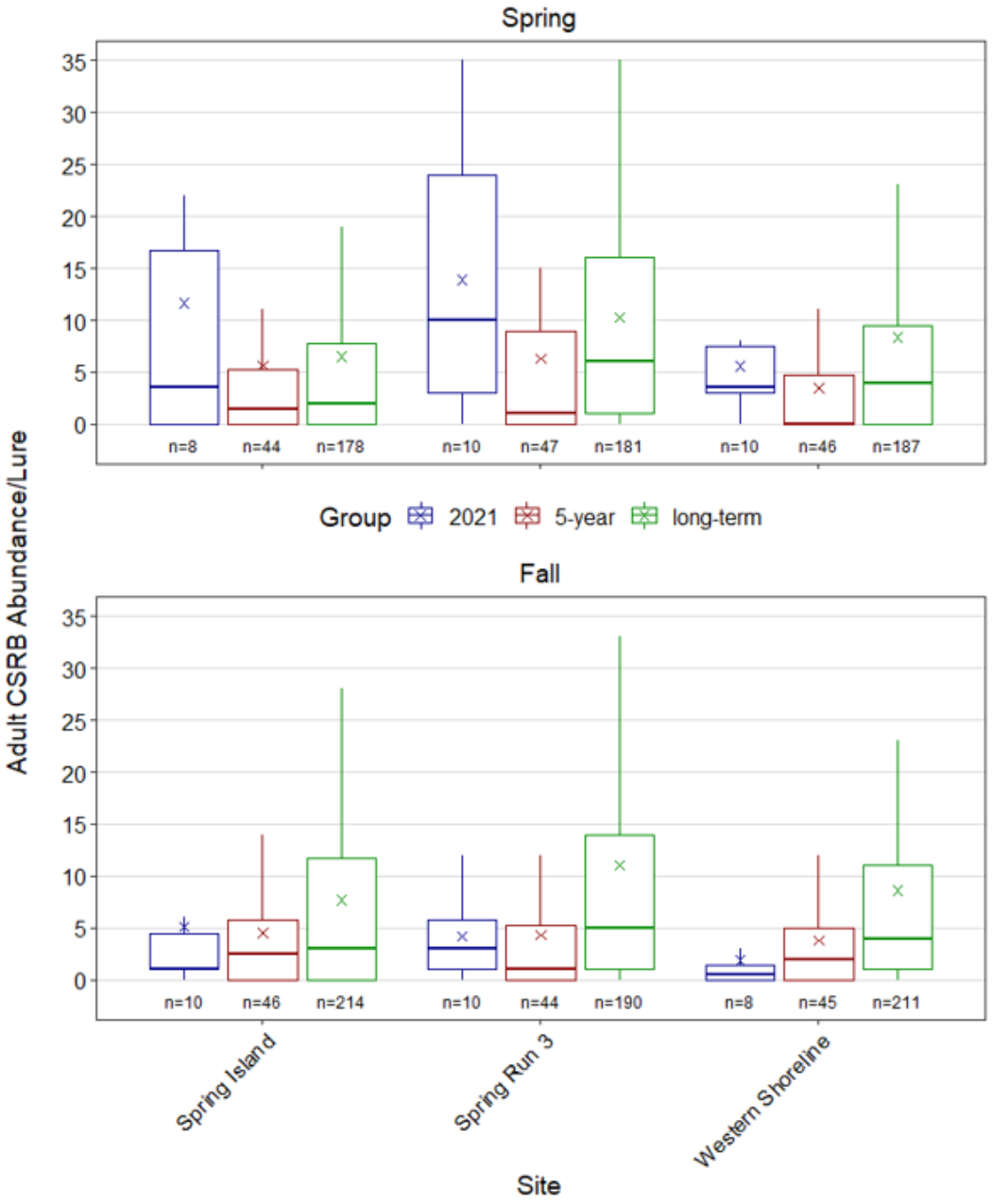

Figure 21. **Boxplots displaying 2020, 5-year (2017–2021), and long-term (2004–2021) trends in Adult Comal Springs Riffle Beetle abundance per retrieved lure by season across sites in the Comal Springs. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds 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.**

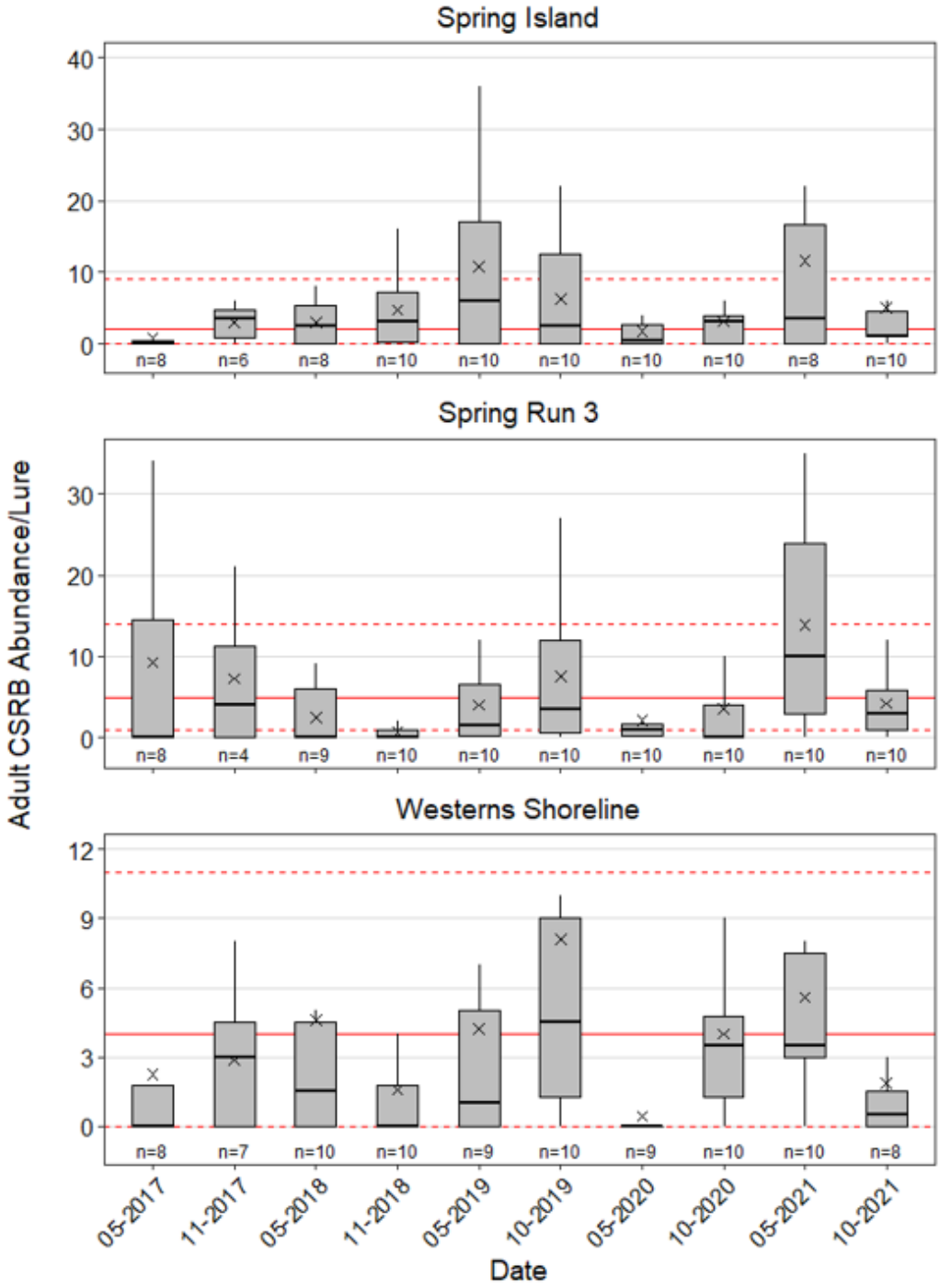

Figure 22. **Boxplots displaying temporal trends in adult CSRB abundance per retrieved lure among study reaches from 2017–2021 during lure sampling in Comal Springs. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile 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 (2004–2021) medians and interquartile ranges, respectively.**

Figure 23. Photos of the Spring Run 3 and Western Shoreline sampling reaches during lure retrieval on 20 – 21 October, 2021. Storm events previous to the recovery of the lures led to shoreline erosion.

Benthic Macroinvertebrate Rapid Bioassessment

Benthic macroinvertebrate rapid bioassessment data was collected during both the spring and fall sampling events in 2021 (raw data presented in Appendix E). A total of 774 and 755 individual macroinvertebrates, representing 40 and 39 unique taxa were sampled in spring and fall, respectively. Altogether, 50 unique taxa were represented among all samples from 2021. Metric scores for calculating the B-IBI can be found in Table 6. All samples in 2021 consisted of kick samples with suitable cobble-gravel habitat with no snag sampling supplements.

The overall results of this metric analysis contribute to the B-IBI scores and assessment of the aquatic-life-use (Figure 24). Landa Lake was described as "Limited" for both seasons while Upper Spring Run was described as "Intermediate" for both seasons. The Old Channel reach was described as "Intermediate" in spring and "High" in the fall. The New Channel reach was described as "High" for both events, while the Lower Comal was described as "Intermediate" in the spring and "High" in the fall.

In summary, areas of more lentic-type habitat (e.g., Landa Lake), scored lower as these communities are naturally different compared to swift flowing "least-disturbed reference streams." Downstream and tailwater areas with more lotic conditions generally scored higher, as habitat is more similar to reference streams. It should also be noted that most reference streams do not exhibit the stenothermal conditions present within the upper Comal River and this may result in differing community composition. As such, the level of score is less important in the Comal system than the consistency or trends in results per reach over time. As evident in Figure 24, there has been an inherent level of consistency in these benthic results over the past five years and no observed trends of concern. Additional monitoring will allow development of a reference dataset, specific to this unique ecosystem.

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

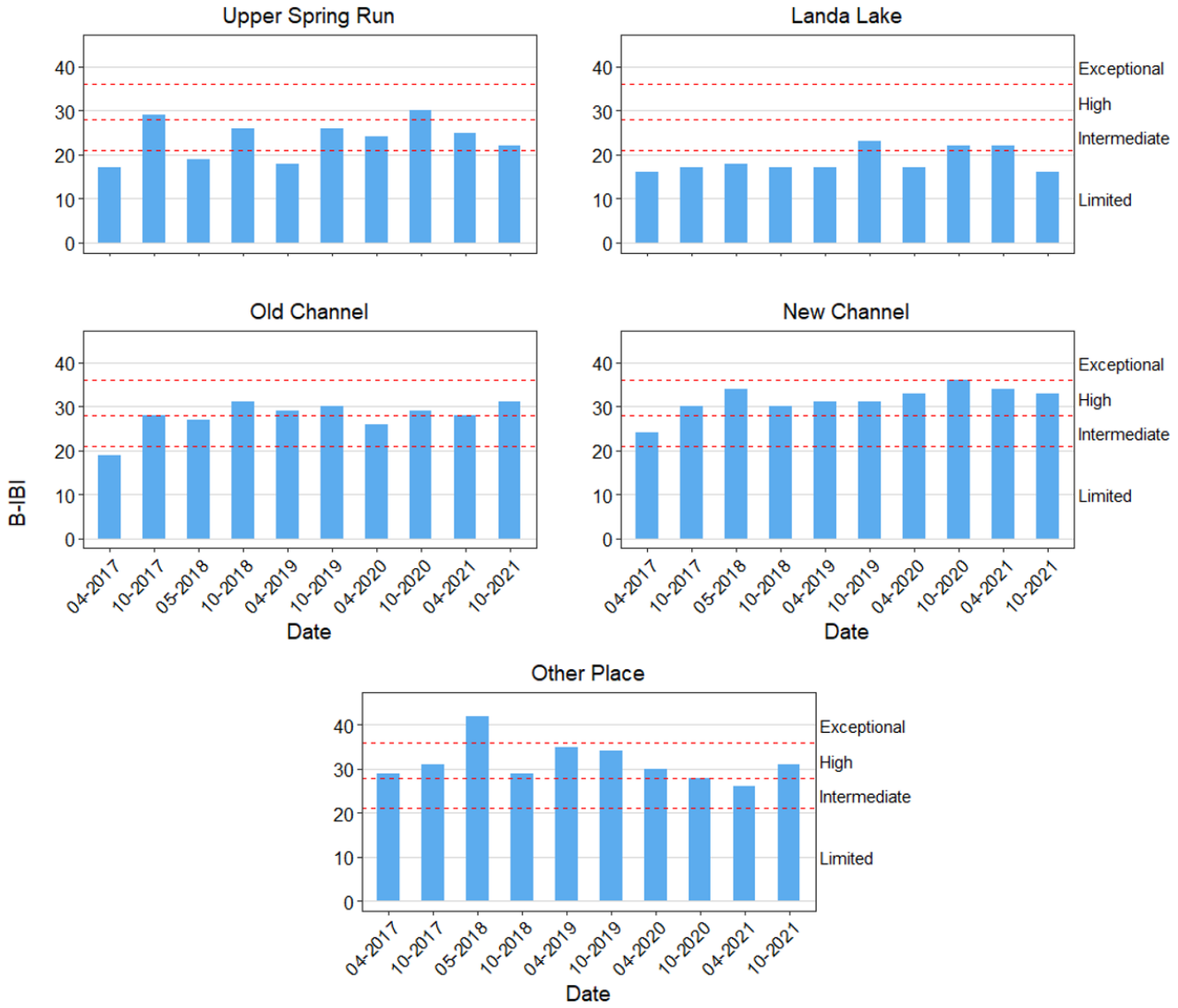

Figure 24. **Benthic macroinvertebrate Index of Biotic Integrity (B-IBI) scores and aquatic-life-use point-score ranges from 2017–2021 in the Comal Springs/River. "Exceptional" indicates highest quality habitats.**

CONCLUSION

Aquatic vegetation coverage in 2021 was similar to long-term seasonal averages at Landa Lake, Upper New Channel, and Lower New Channel. Spring total coverage was lower than the long-term spring average at Upper Spring Run and lower for both seasons at the Old Channel. Decreases in vegetation coverage at Upper Spring Run and Old Channel can be attributed mainly to decreases in bryophyte coverage. The mechanisms that resulted in reduced bryophyte coverage across multiple reaches in 2021 are currently unclear, though in several reaches, may be attributed to high flow pulses that occurred in May and October. Bryophytes are non-rooted plants and their coverage is particularly more susceptible to disturbances compared to rooted plant taxa, but recovery is typically rapid when site conditions improve and growth is expansive under optimal conditions.

Fountain Darter population metrics varied among seasons and reaches across sampling methods used, but demonstrate that population trends are seasonally cyclical in most reaches due to patterns in Fountain Darter reproduction, recruitment, growth, and survivorship. Current patterns in Fountain Darter size structure were similar to historical trends and recruitment either closely matched or exceeded past observations, supporting that no specific age classes were underrepresented in 2021. The highest Fountain Darter densities were observed in bryophytes and *Cabomba*, which aligns with previous data and suggests these taxa continue to be important habitat for adults and juveniles. Habitat suitability changed minimally for the past five years for most reaches. A declining trend in OHSI was noted in the Upper Spring Run due mainly to reductions in bryophyte coverage in recent events and this was reflected in Fountain Darter drop-net density estimates. That being said, for spatially clustered populations, as seen for Fountain Darters, random variation in sampling (e.g., timing, site location) can enhance the error and uncertainty of estimates when sample sizes are small. Continued monitoring will be important to document if bryophytes rebound in this reach.

Overall catch rates of Comal Springs Salamander in 2021 exceeded the long-term average and represent the highest catch rates observed to date. Spring Run 1 had the highest total number of observations and catch rates. Consistent with previous years, catch rates were lower in Spring Island Run, with only six salamanders documented in this area in 2021. With the exception of Spring Island Run, salamander CPUE within the surface environments of the Comal Springs system has been steadily increasing since the return of sustained water levels after the 2014 drought. Overall, salamander populations within the study area are persistent and steadily increasing in abundance in recent years.

During macroinvertebrate drift-net sampling, the number of *Stygobromus* sp. collected per cubic meter of water filtered during 2021 was slightly below or similar to long-term median. Spring sampling of Comal Springs Riffle Beetles had relatively higher abundances/lure at the Spring Island and Spring Run 3 reaches, whereas fall abundances/lure dropped to near long-term medians. Due to the nature of the monitoring technique (cotton lures left in the system for long periods) and the extremely clumped distribution of Comal Springs riffle beetle, which are associated with small spring orifices, this data is inherently variable in nature. B-IBI results showed areas of more lentic-type habitat (e.g., Landa Lake), scored lower as these communities are naturally different compared to swift flowing “least-disturbed reference streams.” Downstream and tailwater areas with more lotic conditions generally scored higher, as habitat is

more similar to reference streams. It should also be noted that most reference streams do not exhibit the stenothermal conditions present within the upper Comal River and this may result in differing community composition. As such, the level of score is less important in the Comal system, than the consistency that has been evident in the benthic community per reach over time. Additional monitoring will allow development of a reference dataset, specific to this unique ecosystem.

In conclusion, the Comal Springs ecosystem continues to provide suitable habitat for the EAHCP Covered Species. However, ongoing monitoring remains critical in tracking habitat and population performance through time.

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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: AQUATIC VEGETATION MAPS

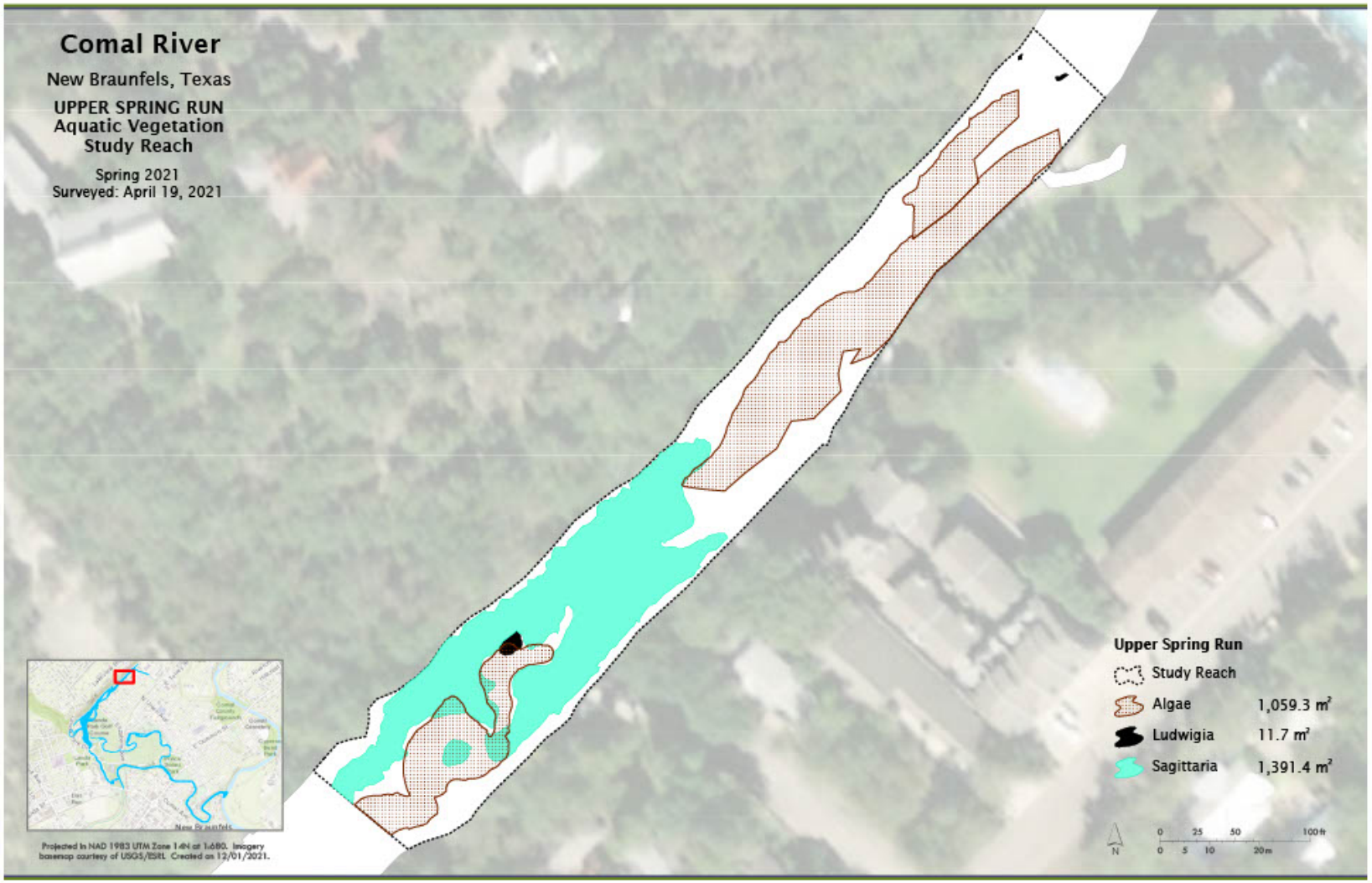

Figure B1. Map of aquatic vegetation coverage at Upper Spring Run Study Reach in spring 2021.

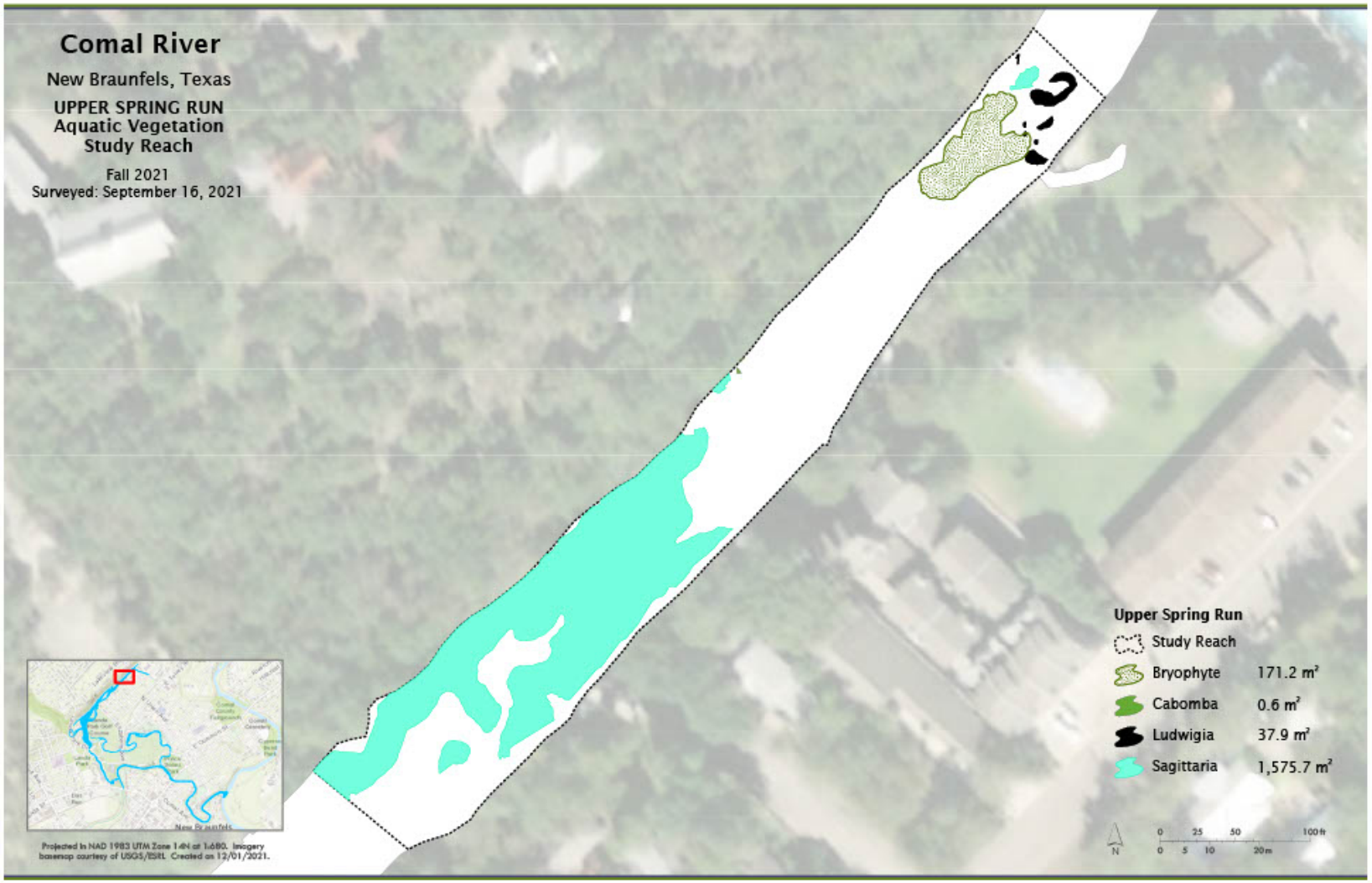

Figure B2. Map of aquatic vegetation coverage at Upper Spring Run Study Reach in fall 2021.

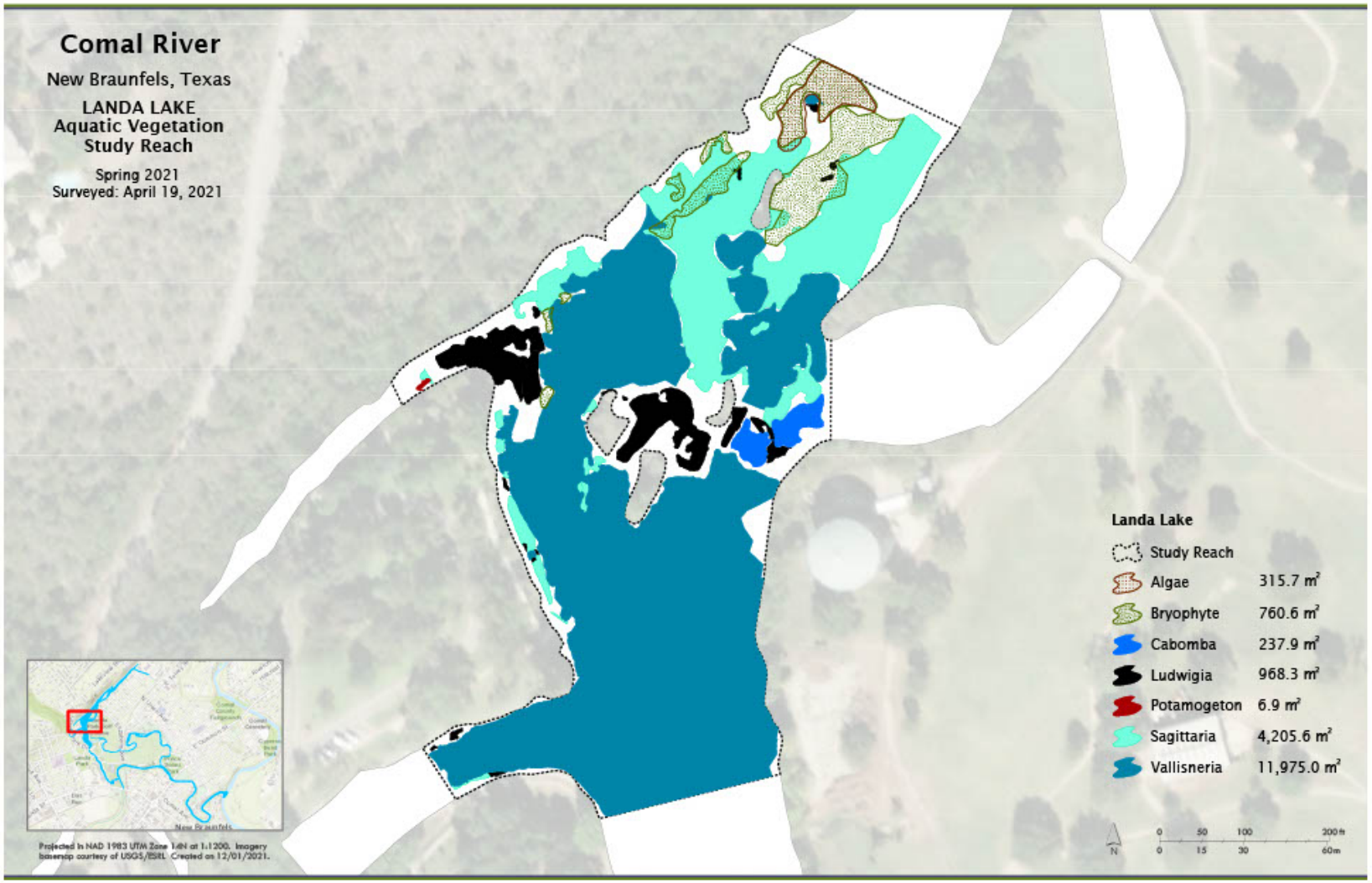

Figure B3. Map of aquatic vegetation coverage at Landa Lake Study Reach in spring 2021.

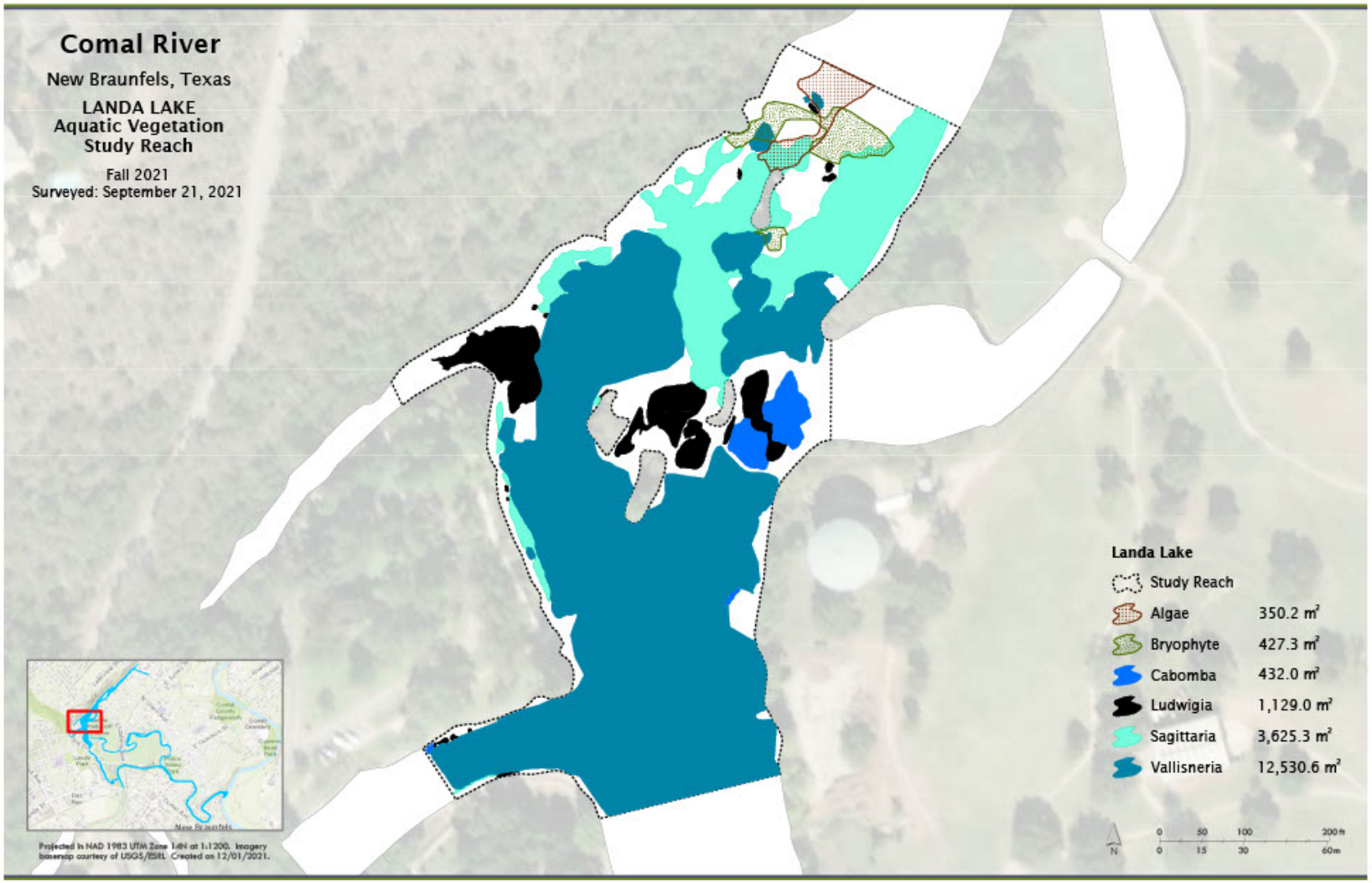

Figure B4. Map of aquatic vegetation coverage at Landa Lake Study Reach in fall 2021.

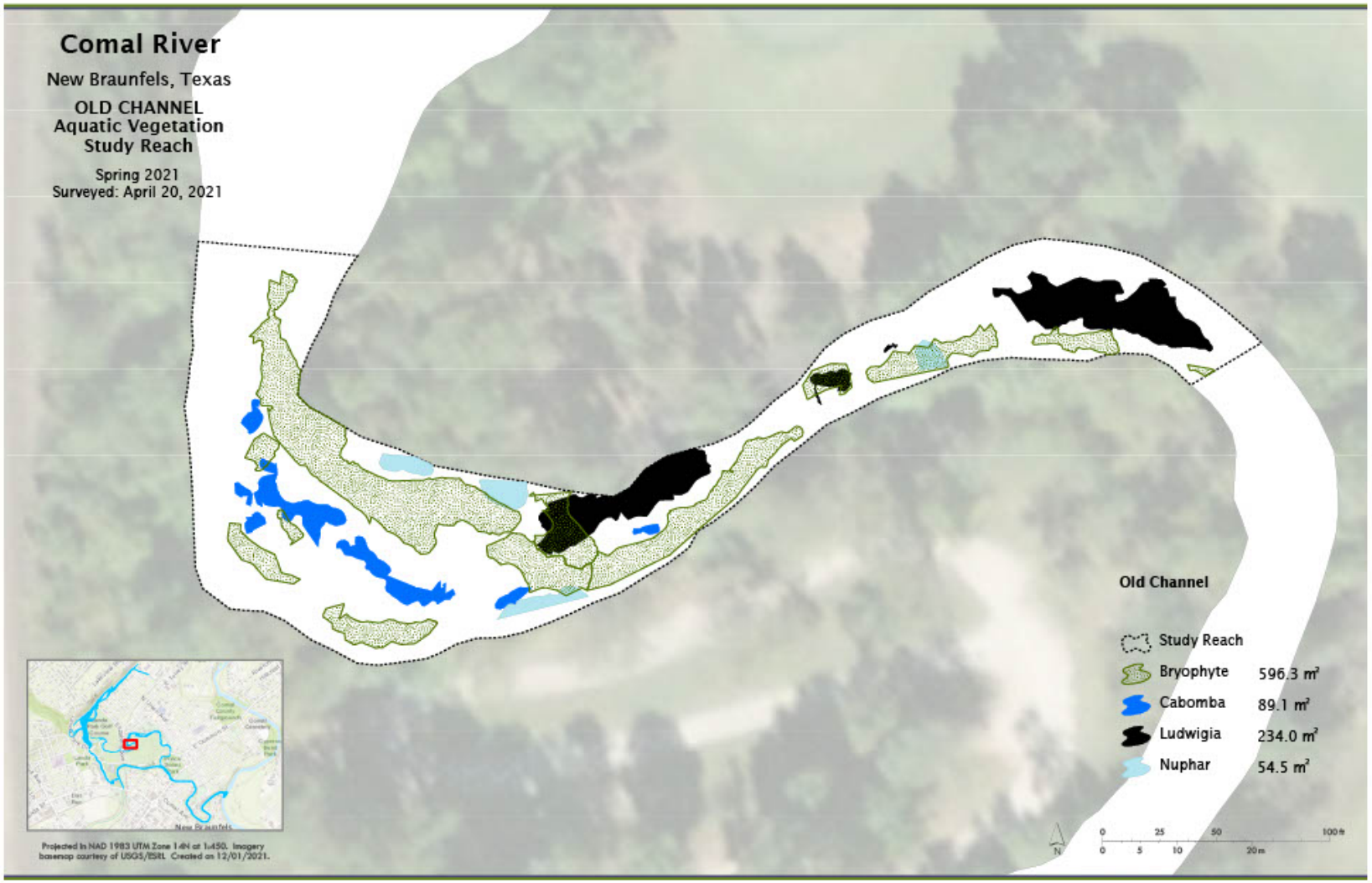

Figure B5. Map of aquatic vegetation coverage at Old Channel Study Reach in spring 2021.

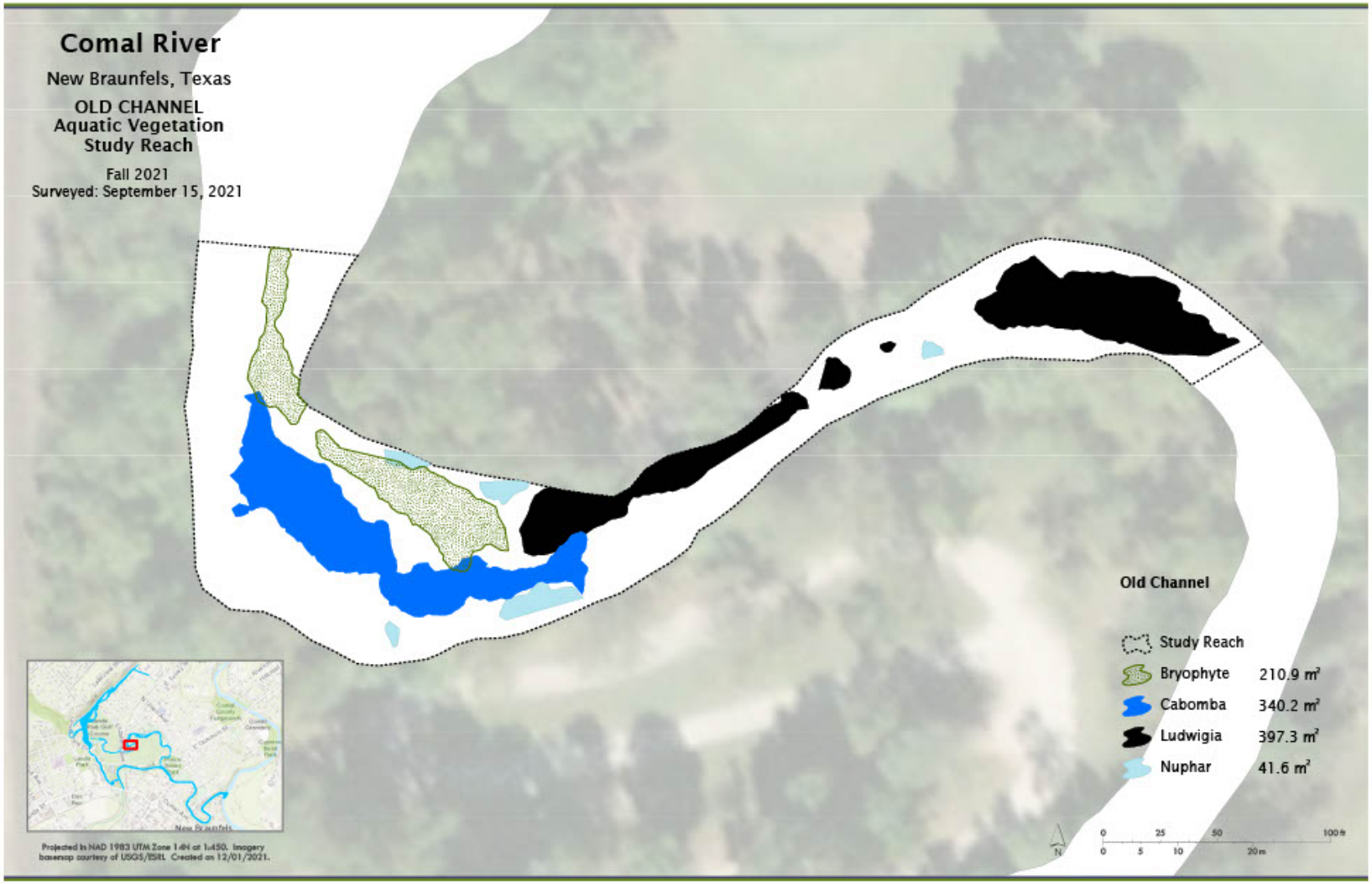

Figure B6. Map of aquatic vegetation coverage at Old Channel Study Reach in fall 2021.

Figure B7. Map of aquatic vegetation coverage at Upper New Channel Study Reach in spring 2021.

Figure B8. Map of aquatic vegetation coverage at Upper New Channel Study Reach in fall 2021.

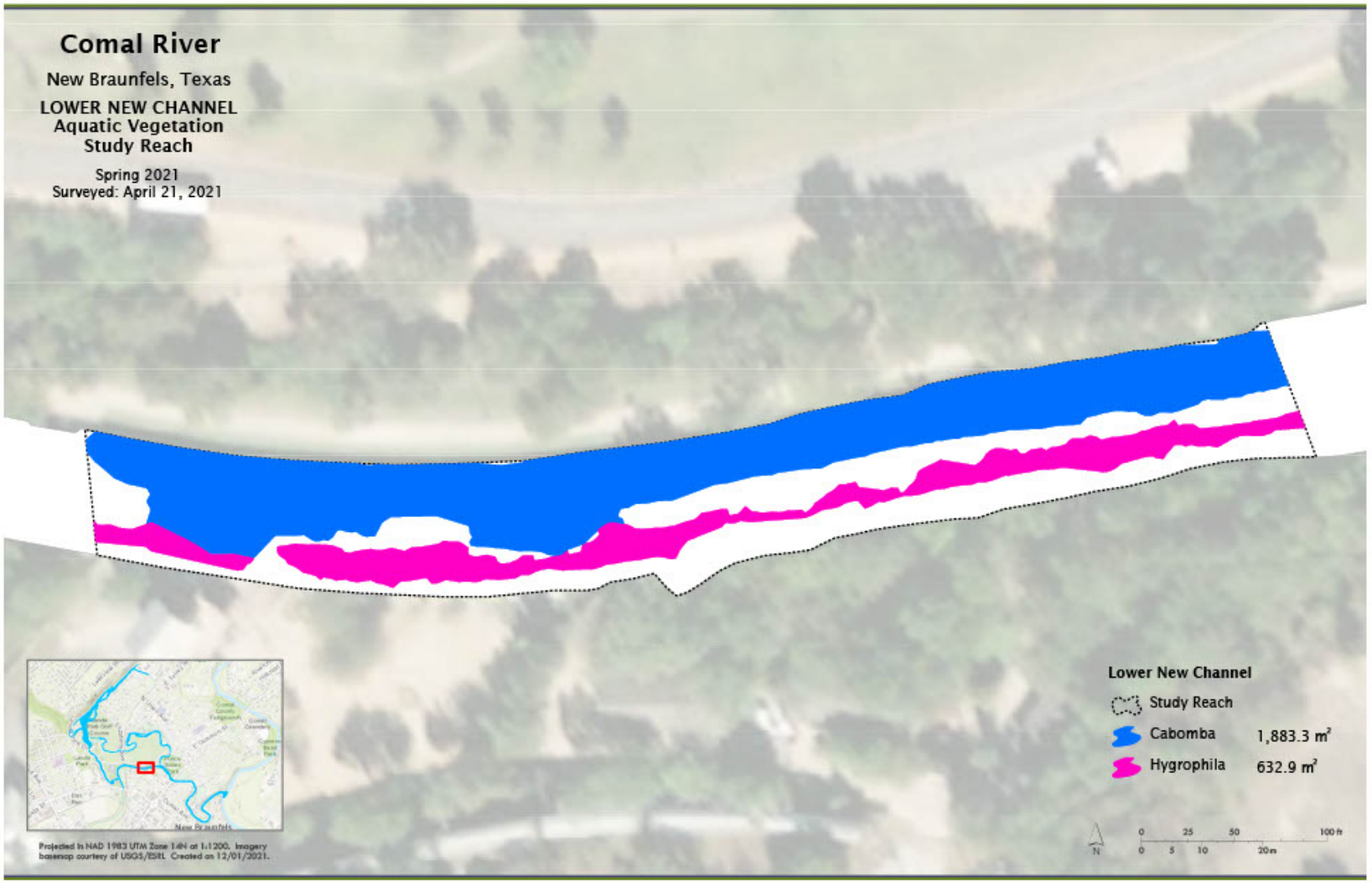

Figure B9. Map of aquatic vegetation coverage at Lower New Channel Study Reach in spring 2021.

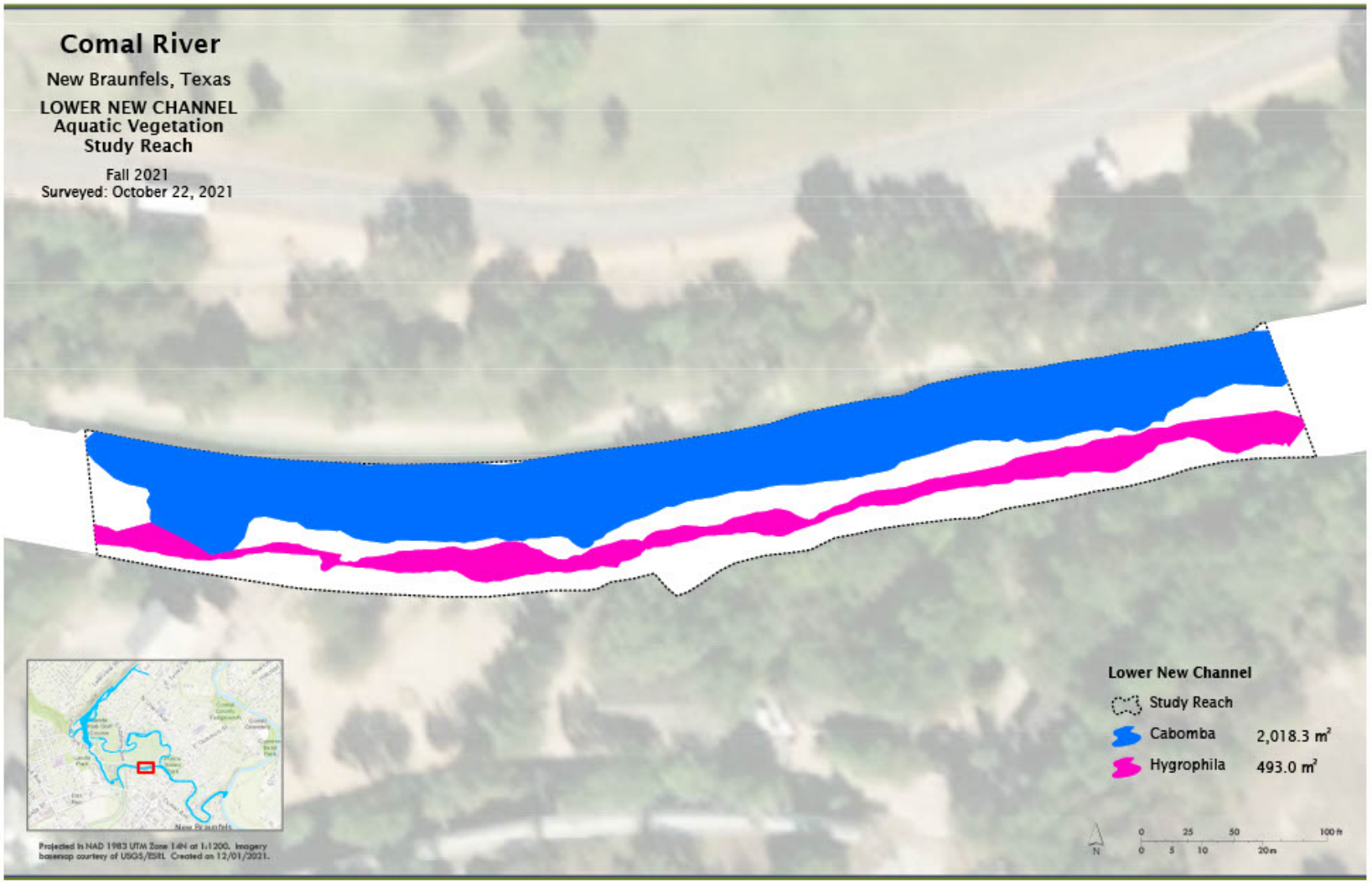

Figure B10. Map of aquatic vegetation coverage at Lower New Channel Reach in fall 2021.

APPENDIX C: 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 2021 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 C1). Also continuing with past trends, pH measurements increased with increased distance from the springs (Figure C2). 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 2021, CO_2 was slightly lower and pH was slightly higher compared to the previous four years (Figures C1 & C2).

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 C3–C7). In 2021, 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 2021. 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 C3–C7).

The New Channel site has received the most recreation pressure throughout the Texas Master Naturalist monitoring (2006–2021). The peak of recreational use is usually during the summer months of June through September (Figure C6). 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. 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 E7) and like the New Channel, experienced increased traffic from 2020 to 2021. 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.

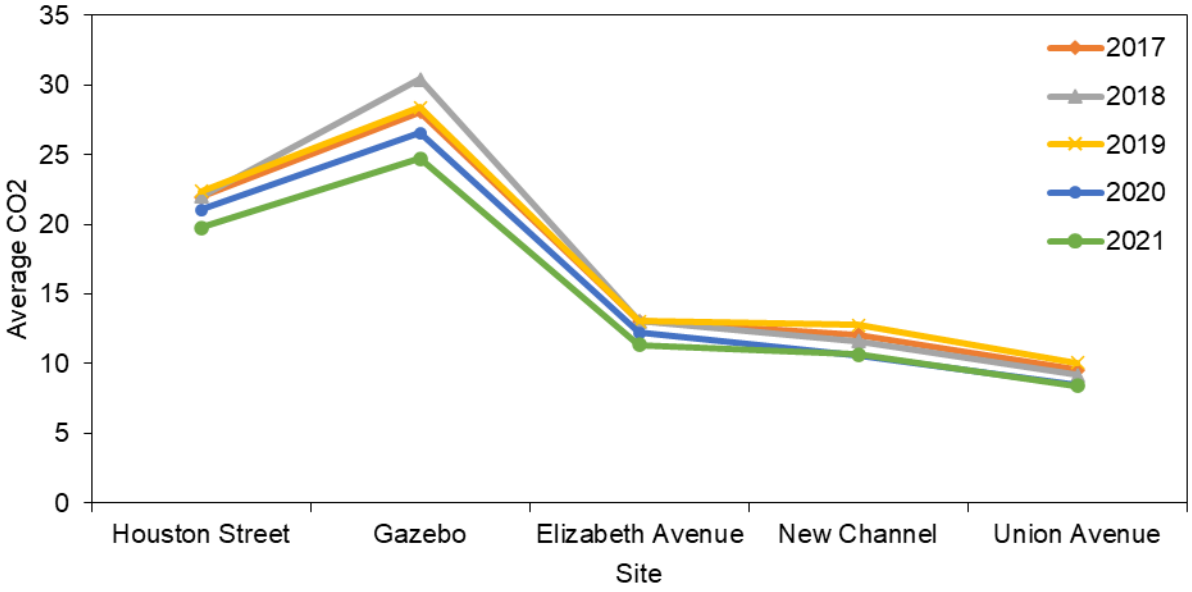

Figure C1. **Annual average dissolved carbon dioxide (CO_2) concentrations at five sites on the Comal River system (2017–2021).**

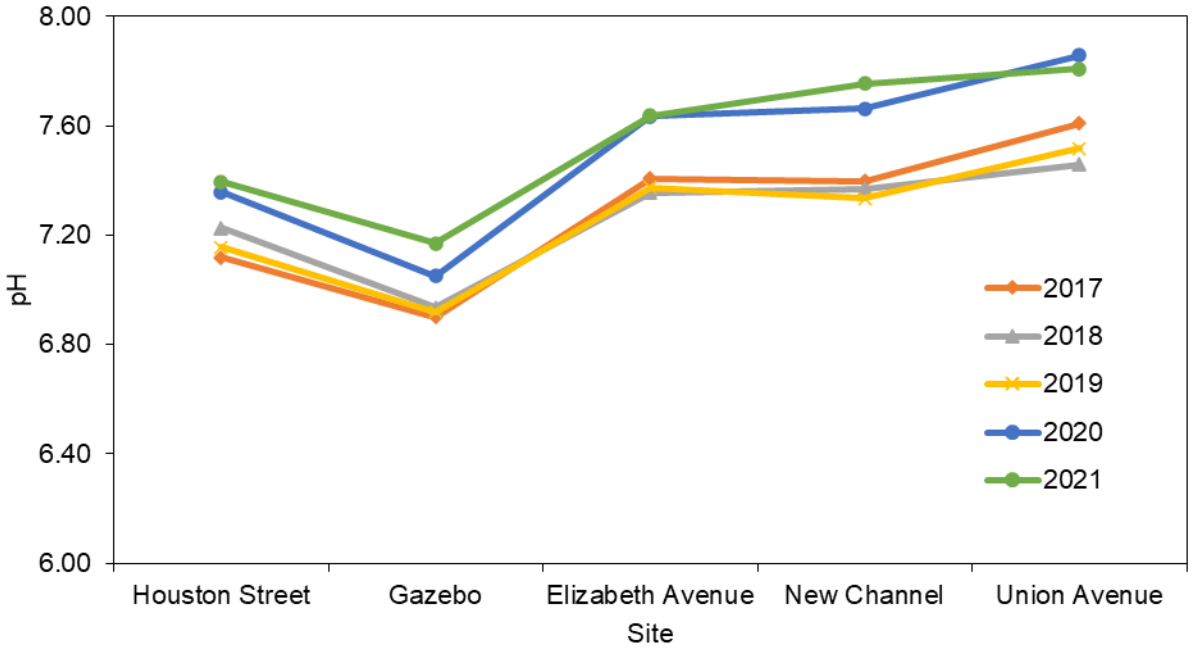

Figure C2. **Annual average pH values at five sites on the Comal River system (2017–2021).**

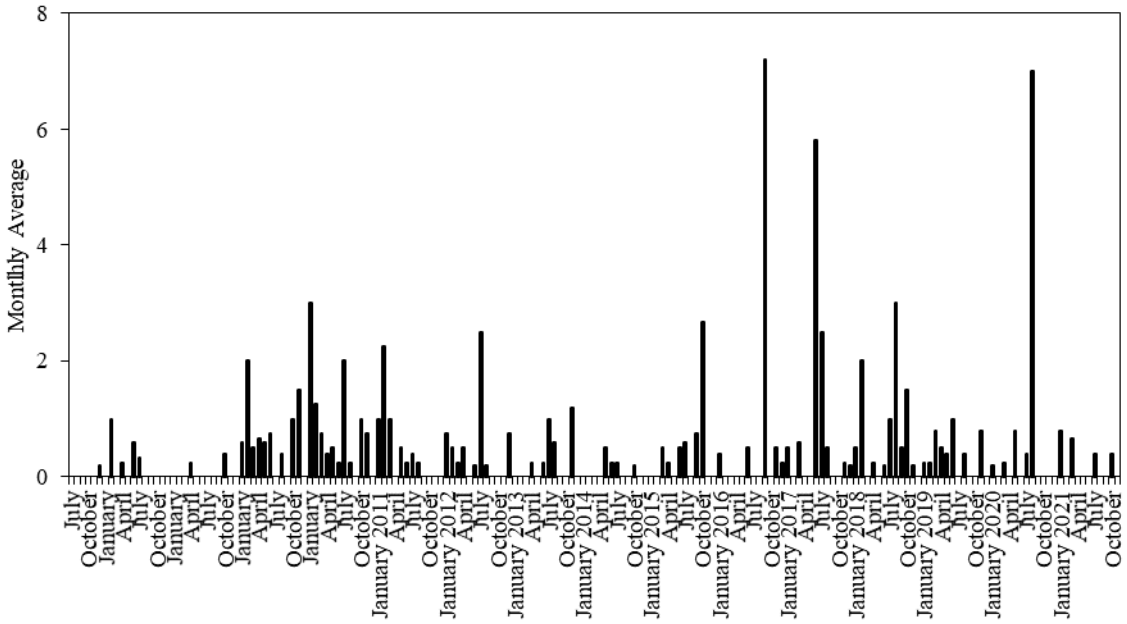

Figure C3. Average daily recreational user counts at the Elizabeth Avenue site (2006–2021).

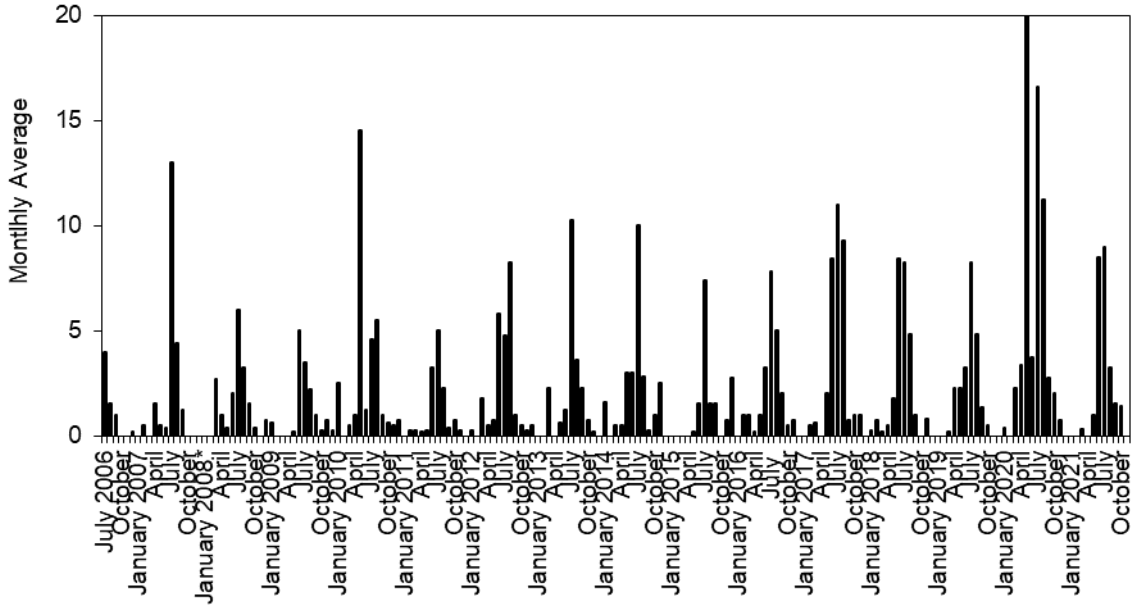

Figure C4. Average daily recreational user counts at the Upper Spring Run site (2006–2021).

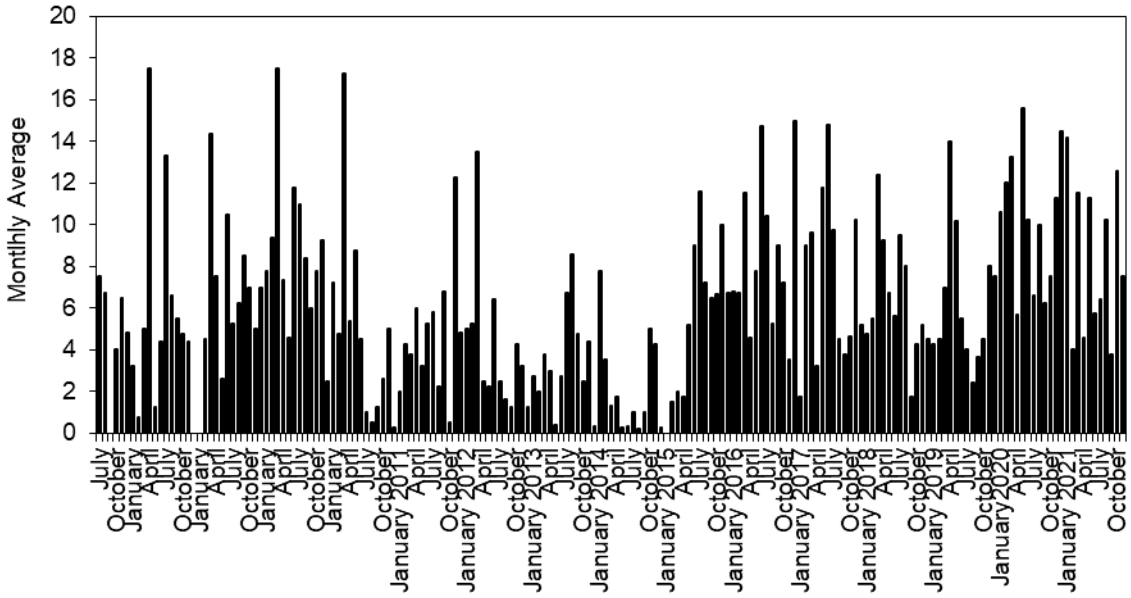

Figure C5. Average daily user counts at the Landa Lake Park Gazebo site (2006–2021).

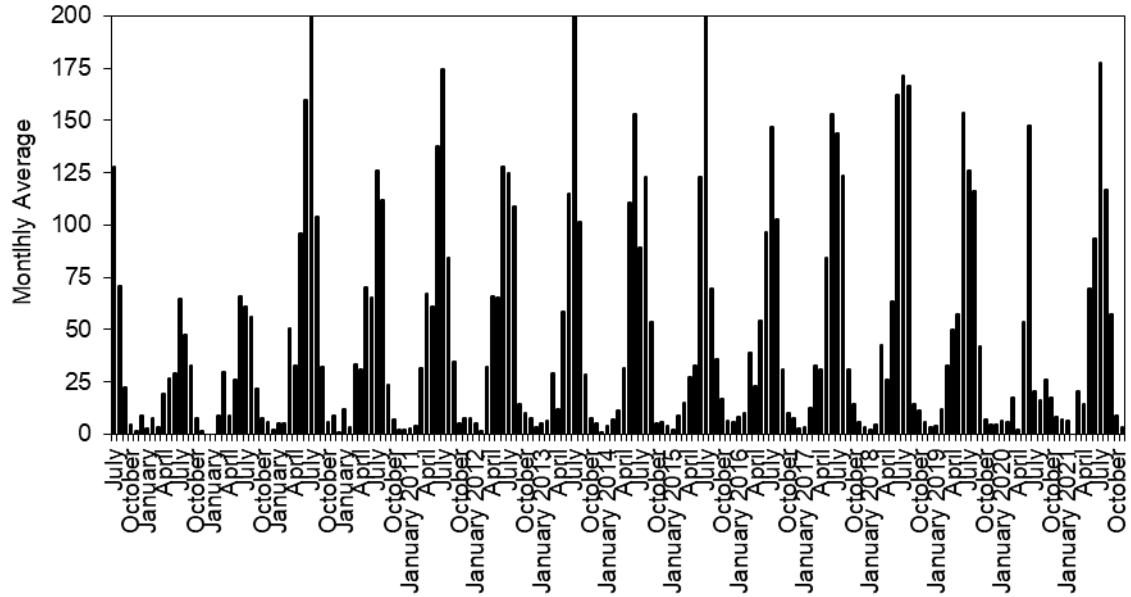

Figure C6. Average daily user counts at the New Channel site (2006-2021).

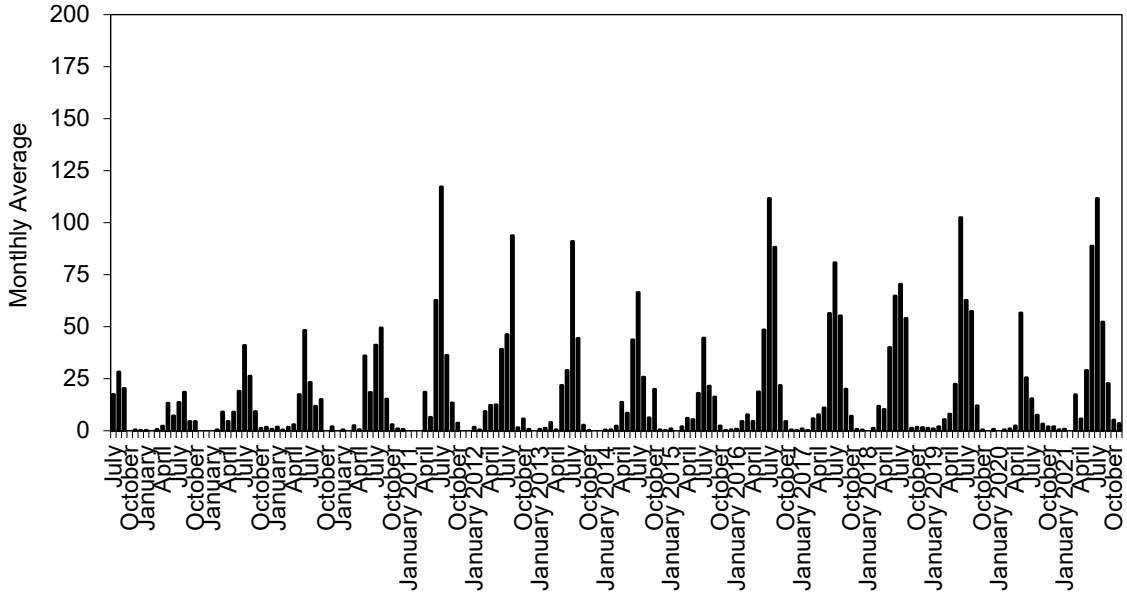

Figure C7. Average daily recreational user counts at the Union Avenue site (2006–2021).

APPENDIX D: TABLES AND FIGURES

TABLES

Fish Assemblage Results:
Drop-Net and Fish Community Sampling

Table D1. Overall number (#) and percent relative abundance (%) of fishes collected from the three long-term biological goals study reaches during drop-net sampling in 2021.

TAXA	UPPER SPRING RUN		LANDA LAKE		OLD CHANNEL		NEW CHANNEL	
	#	%	#	%	#	%	#	%
Cyprinidae								
Dionda nigrotaeniata	97	49.2	12	1.3	6	1.2	1	1.4
Notropis amabilis	0	0.0	0	0.0	3	0.6	0	0.0
Characidae								
*Astyanax mexicanus**	6	3.0	13	1.5	2	0.4	2	2.9
Ictaluridae								
Ameiurus natalis	0	0.0	3	0.3	0	0.0	1	1.4
Poeciliidae								
Gambusia sp.	3	1.5	39	4.4	2	0.4	0	0.0
Centrarchidae								
Lepomis cyanellus	0	0.0	0	0.0	0	0.0	1	1.4
Lepomis gulosus	0	0.0	0	0.0	0	0.0	1	1.4
Lepomis miniatus	24	12.2	47	5.3	13	2.7	26	37.1
Lepomis sp.	13	6.6	23	2.6	5	1.0	0	0.0
Micropterus salmoides	25	12.7	9	1.0	1	0.2	3	4.3
Percidae								
Etheostoma fonticola	27	13.7	748	83.7	439	90.7	29	41.4
Etheostoma lepidum	2	1.0	0	0.0	4	0.8	0	0.0
Cichlidae								
*Herichthys cyanoguttatus**	0	0.0	0	0.0	8	1.7	6	8.6
*Oreochromis aureus**	0	0.0	0	0.0	1	0.2	0	0.0
Total	**197**		**894**		**484**		**70**	

Asterisks (*) denotes introduced species

Table D2. Overall number (#) and percent relative abundance (%) of fishes collected during fish community sampling in 2021.

TAXA	UPPER SPRING RUN		LANDA LAKE		OLD CHANNEL		NEW CHANNEL	
	#	%	#	%	#	%	#	%
Cyprinidae								
Cyprinella venusta	0	0.0	0	0.0	1	0.2	0	0.0
Dionda nigrotaeniata	212	12.3	1586	52.0	14	2.7	21	4.1
Notropis amabilis	0	0.0	2	0.1	0	0.0	0	0.0
Notropis volucellus	0	0.0	0	0.0	0	0.0	20	3.9
Characidae								
*Astyanax mexicanus**	575	33.2	767	25.2	94	18.4	1	0.2
Loricariidae								
Loricariidae sp.	0	0.0	0	0.0	4	0.8	5	1.0
Fundulidae								
Fundulus notatus	0	0.0	0	0.0	0	0.0	2	0.4
Poeciliidae								
Gambusia affinis	1	0.1	0	0.0	17	3.3	7	1.4
Gambusia geiseri	7	0.4	0	0.0	39	7.6	9	1.7
Gambusia sp.	111	6.4	90	3.0	90	17.6	0	0.0
*Poecilia latipinna**	0	0.0	0	0.0	1	0.2	0	0.0
Centrarchidae								
*Ambloplites rupestris**	0	0.0	0	0.0	2	0.4	0	0.0
*Lepomis auritus**	3	0.2	0	0.0	30	5.9	41	7.9
Lepomis cyanellus	0	0.0	0	0.0	0	0.0	3	0.6
Lepomis macrochirus	7	0.4	0	0.0	1	0.2	2	0.4
Lepomis megalotis	5	0.3	0	0.0	1	0.2	8	1.5
Lepomis miniatus	31	1.8	0	0.0	5	1.0	6	1.2
Lepomis sp.	215	12.4	45	1.5	59	11.5	121	23.4
Micropterus dolomieu	0	0.0	0	0.0	1	0.2	0	0.0
Micropterus salmoides	160	9.2	404	13.3	11	2.1	86	16.6
Percidae								
Etheostoma fonticola	127	7.3	62	2.0	105	20.5	111	21.4
Etheostoma lepidum	187	10.8	40	1.3	9	1.8	24	4.6
Etheostoma sp.	67	3.9	53	1.7	9	1.8	31	6.0
Cichlidae								
*Herichthys cyanoguttatus**	22	1.3	0	0.0	19	3.7	20	3.9
Total	**1730**		**3049**		**512**		**518**	

Asterisks (*) denotes introduced species

Table D3. Total numbers of stygobitic and endangered species collected at each site (24 hours per event) during May and October 2021. Federally endangered species are designated with (E). A = adults; L = larvae.

TAXA	RUN 1	RUN 3	UPWELLING	TOTAL
Crustaceans				
Amphipoda				
Crangonyctidae				
Stygobromus pecki (E)	9	14	41	64
Stygobromus russelli	2	1	3	6
Stygobromus bifurcatus				
Stygobromus flagellatus				
Stygobromus spp.	78	166	121	365
All *Stygobromus*	89	181	165	435
Hadziidae				
Mexiweckelia hardeni	32	43	1	76
Sebidae				
Seborgia relicta	5	7		12
Bogidiellidae				
Artesia subterranea	2			2
Parabogidiella americana				0
Ingolfiellidae				
Ingolfiella n. sp	1	1		2
Isopoda				
Asellidae				
Lirceolus spp.	77	174	10	261
Cirolanidae				
Cirolanides texensis			2	2
Cirolanides wassenichae				0
Microceberidae				
undescribed genus			1	1
Ostracoda				
Candonidae				

Comalcandona sp.	65	33		98
Comalcandona gibsoni	8	8		16
Ufocandona hannaleeae	7			7
Thermosbaenacea				
Monodellidae				
Tethysbaena texana				0
Bathynellacea				
Parabathynellidae				
Texanobathynella bowmani				0
Bathynellidae				
Hobbsinella edwardensis	2			2
Turbellaria				
Kenkiidae				
Sphalloplana mohri		1		1
Mollusca				
Gastropda				
Cochliopidae				
Phreatodrobia nugax	1	5		6
Phreatodrobia plana	6	57	6	69
Phreatodrobia rotunda	2	12		14
Phreatodrobia spica		49		49
Stygopyrus sp.?	9	34		43
Annelids				
Lumbriculata				
Lumbriculidae				
Eremidrilus spp.?	4	19		23
Arachnids				
Hydrachnoidea				
Hydryphantidae				
Almuerzothyas comalensis	2			2
Insects				

Coleoptera				
Dytiscidae				
Comaldessus stygius		3(A)		3
Haideoporus texanus		1(L)		1
Dryopidae				
Stygoparnus comalensis (E)	3(L)	1(A)		4
Elmidae				
Heterelmis comalensis (E)	1(A)	1(L)		2

FIGURES

Springflow: M9 Measurements

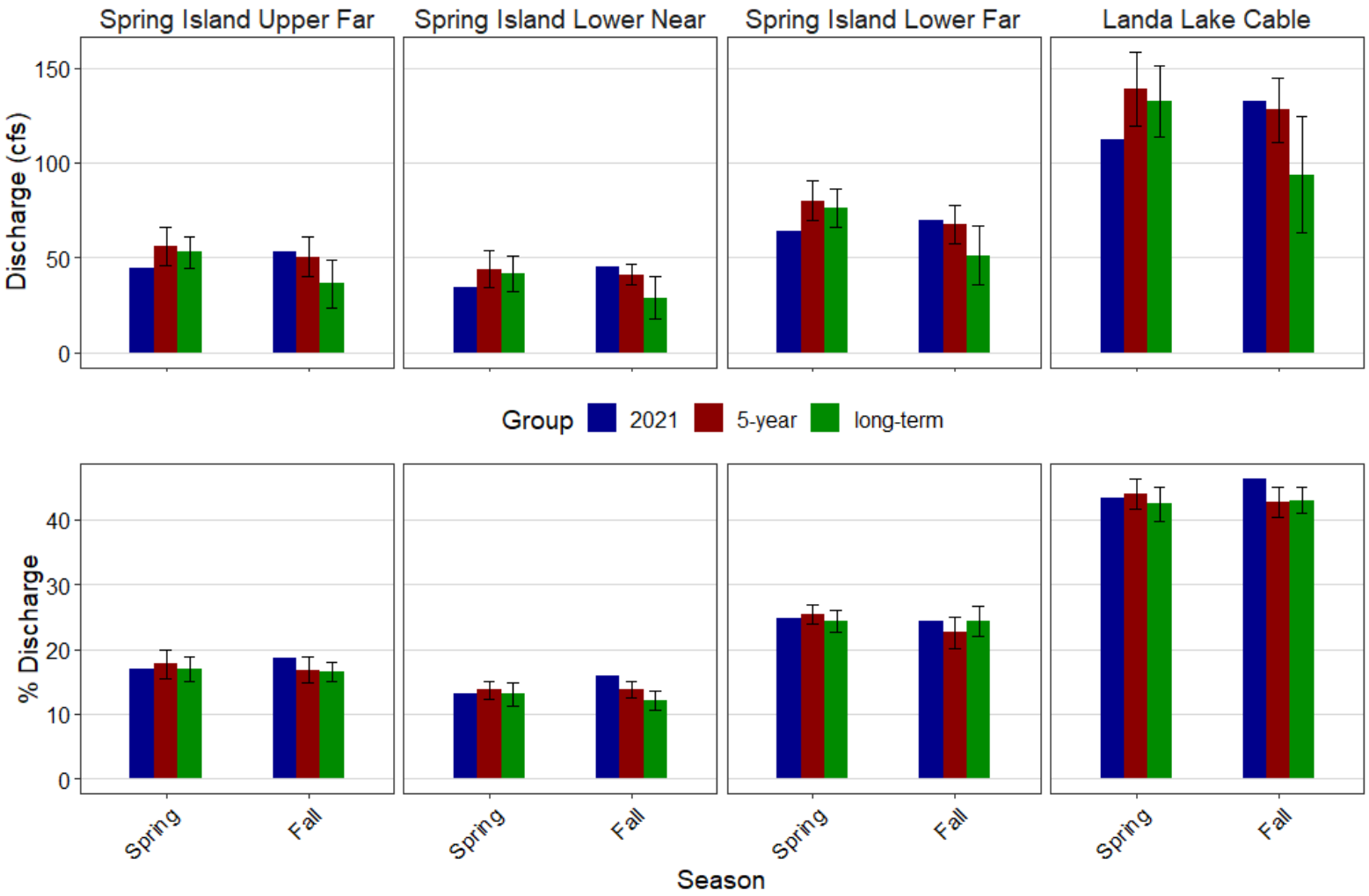

Figure D1. **Current (blue bars), five-year (2017–2021; red bars), and long-term (2014–2021; green bars) discharge and percent total discharge based on spring and fall M9 measurements in the Comal Springs/River. Five-year and long-term values are represented as means and error bars denote 95% confidence intervals.**

Aquatic Vegetation

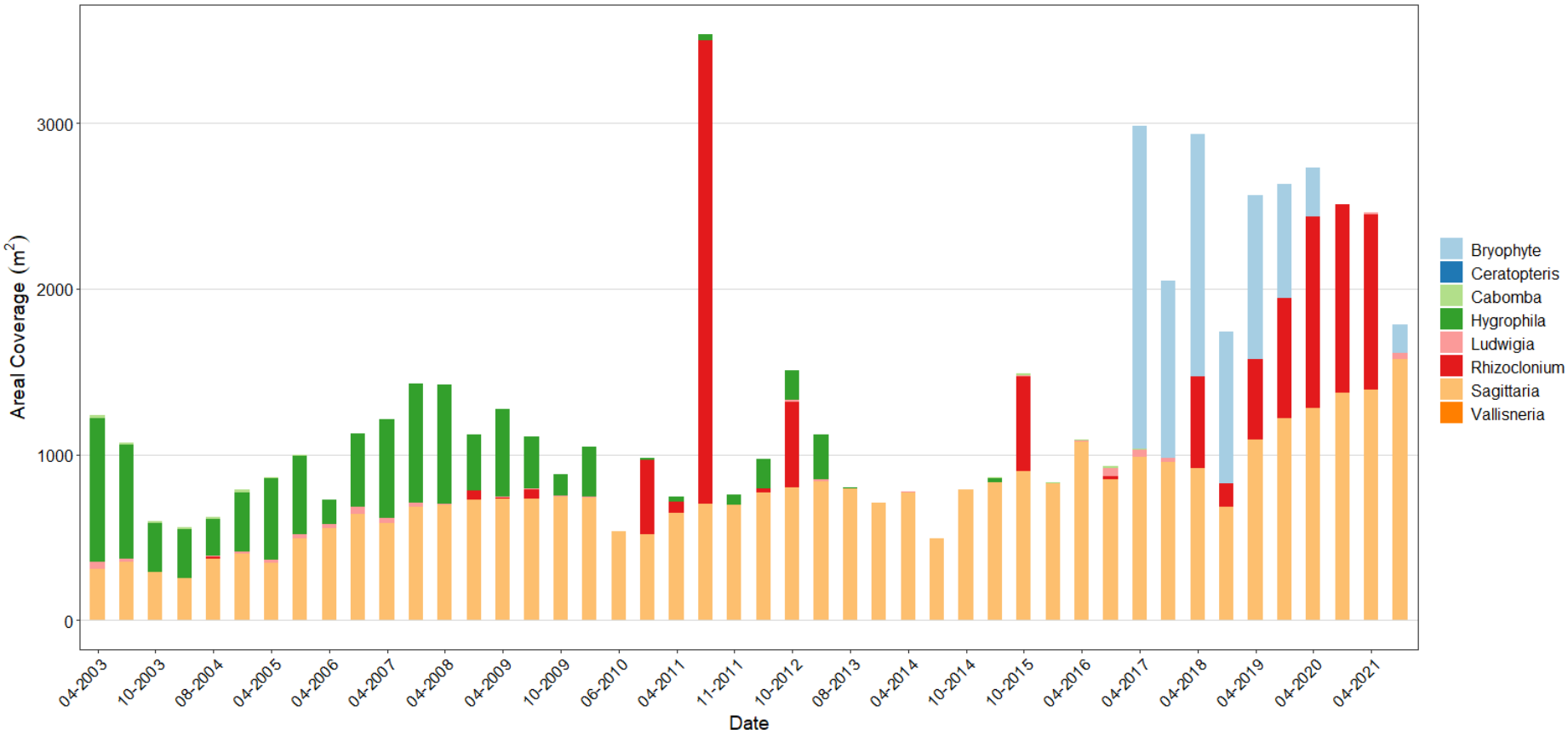

Figure D2. **Aquatic vegetation composition (m^2) among select taxa from 2003–2021 at the Upper Spring Run. Rare vegetation types were excluded; therefore, the sum of areal coverage per event does not represent the total vegetation coverage. Cleaning of historical datasets is currently being conducted and rare taxa will be included in the future.**

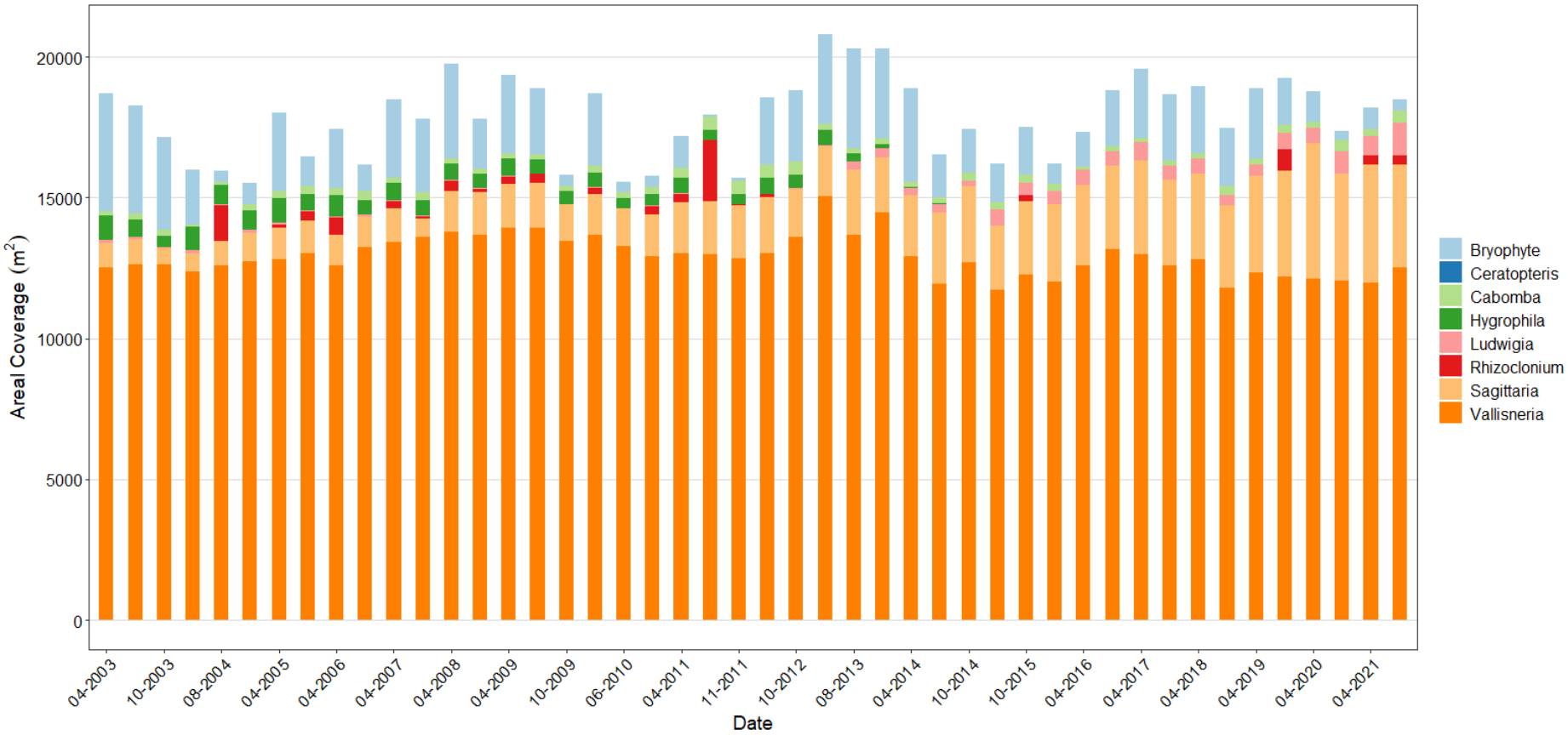

Figure D3. **Aquatic vegetation composition (m^2) among select taxa from 2003–2021 at Landa Lake. Rare vegetation types were excluded; therefore, the sum of areal coverage per event does not represent the total vegetation coverage. Cleaning of historical datasets is currently being conducted and rare taxa will be included in the future.**

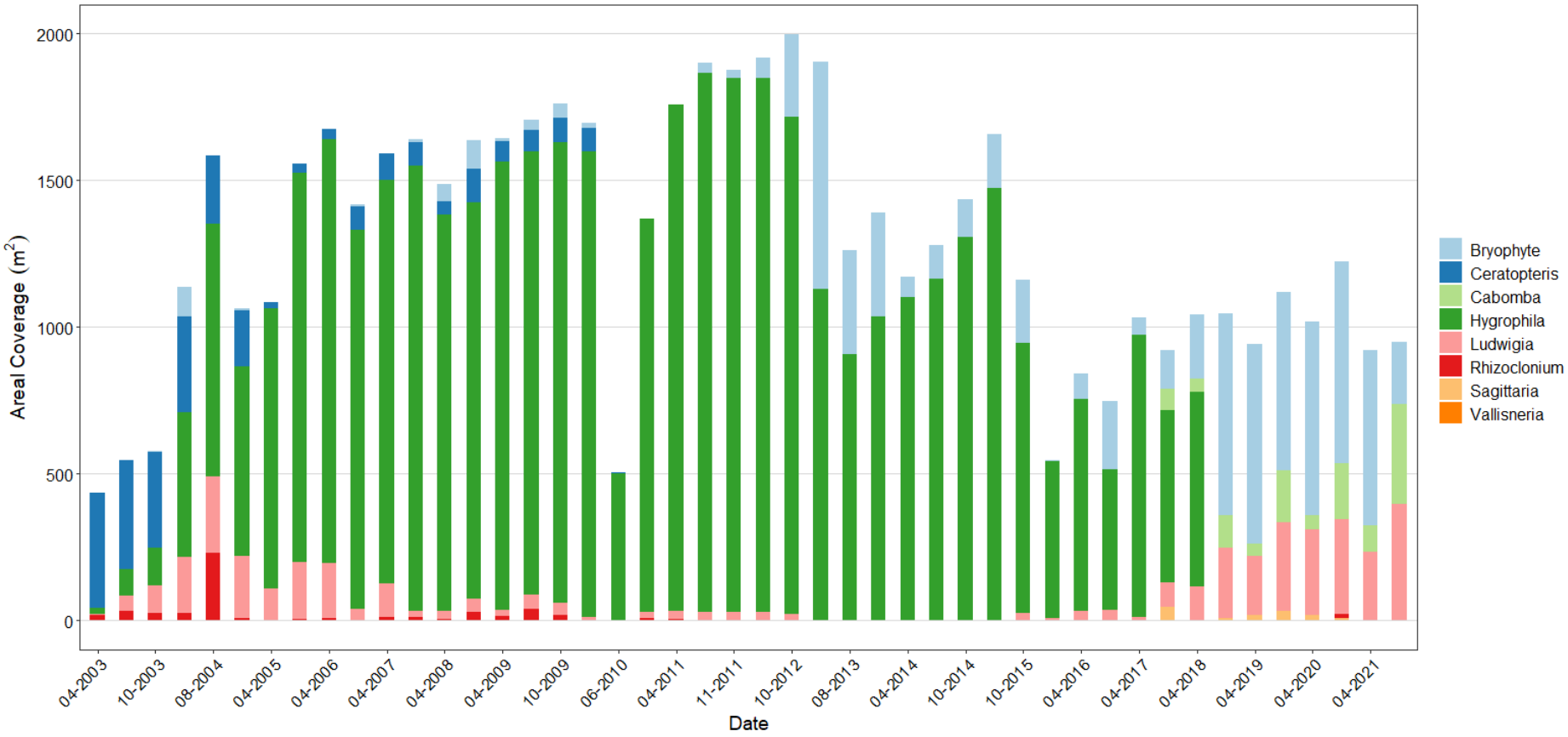

Figure D4. **Aquatic vegetation composition (m^2) among select taxa from 2003–2021 at the Old Channel. Rare vegetation types were excluded; therefore, the sum of areal coverage per event does not represent the total vegetation coverage. Cleaning of historical datasets is currently being conducted and rare taxa will be included in the future.**

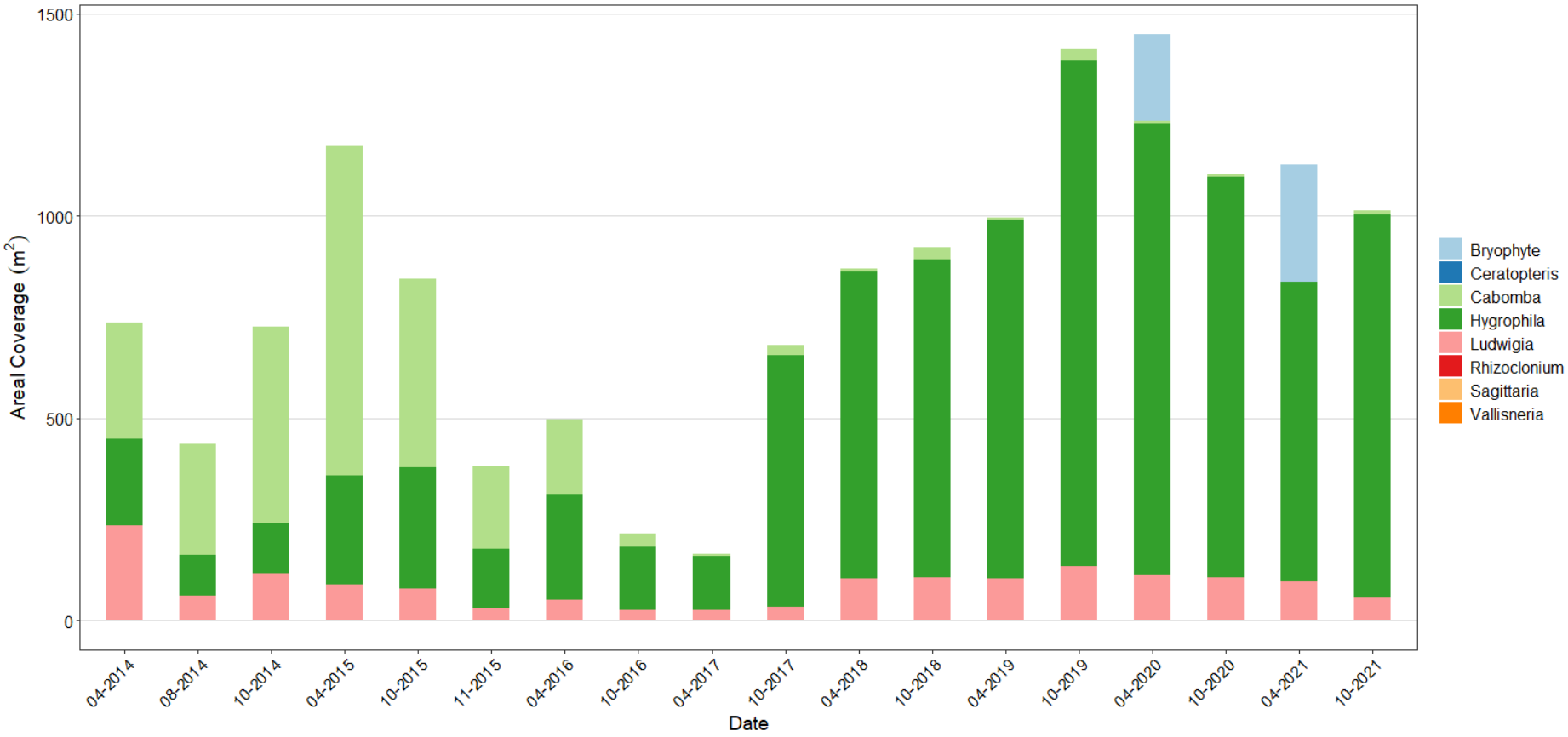

Figure D5. **Aquatic vegetation composition (m^2) among select taxa from 2014–2021 at the Upper New Channel. Rare vegetation types were excluded; therefore, the sum of areal coverage per event does not represent the total vegetation coverage. Cleaning of historical datasets is currently being conducted and rare taxa will be included in the future.**

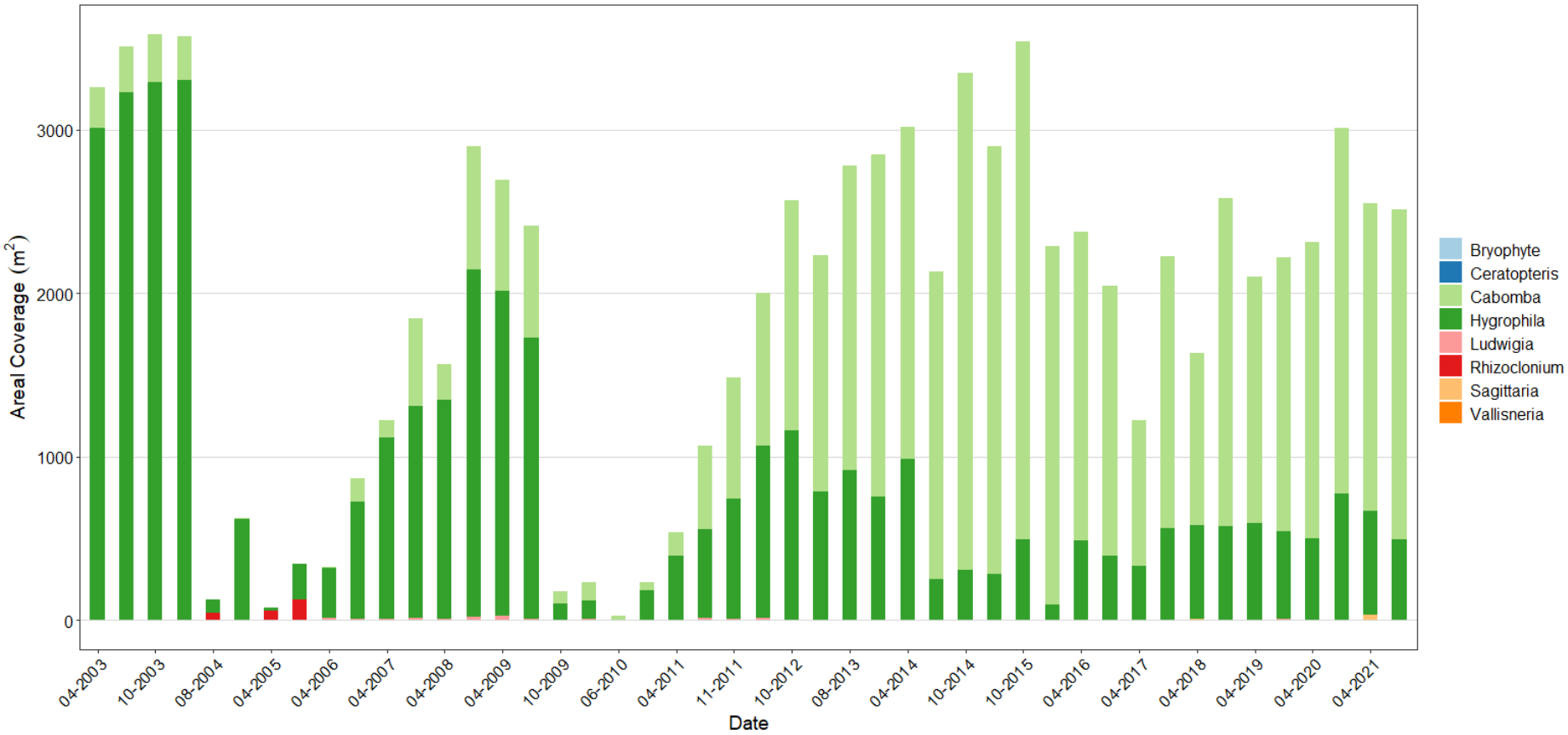

Figure D6. **Aquatic vegetation composition (m^2) among select taxa from 2003–2021 at the Lower New Channel. (*) in the legend denotes non-native taxa. Rare vegetation types were excluded; therefore, the sum of areal coverage per event does not represent the total vegetation coverage. Cleaning of historical datasets is currently being conducted and rare taxa will be included in the future.**

Fountain Darter

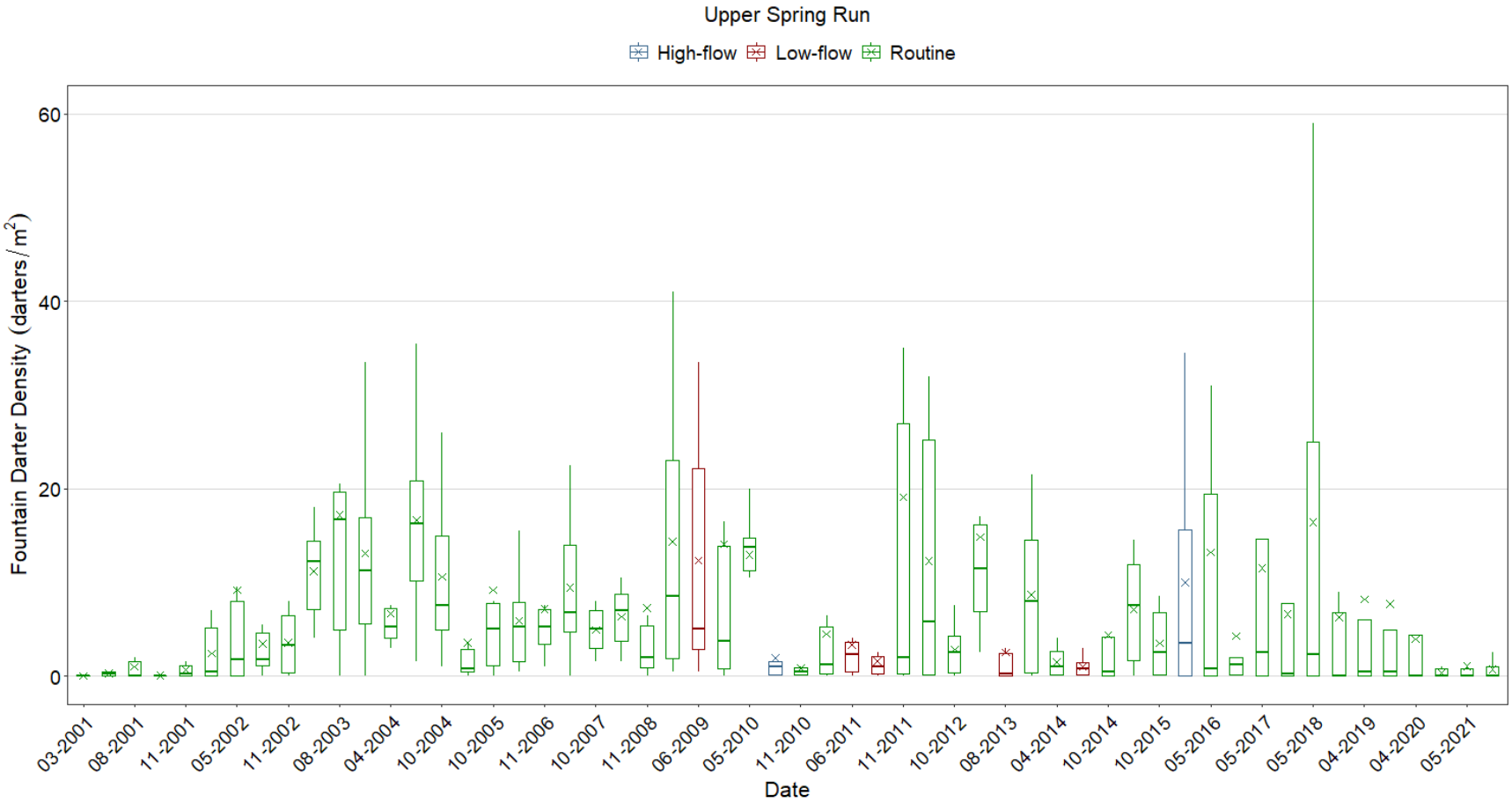

Figure D7. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) from 2001–2021 during drop-net sampling at Upper Spring Run. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

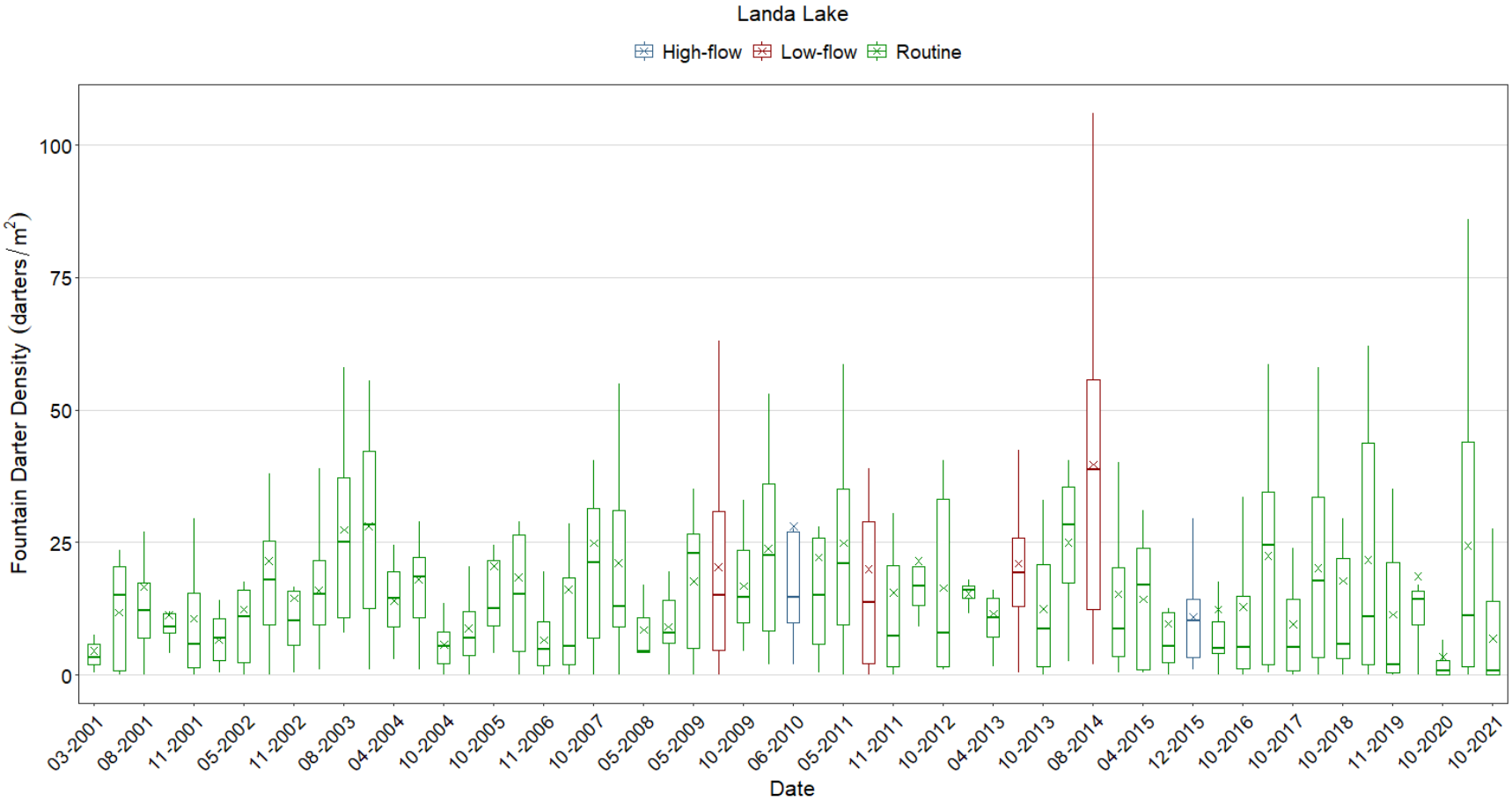

Figure D8. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) from 2001–2021 during drop-net sampling at Landa Lake. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

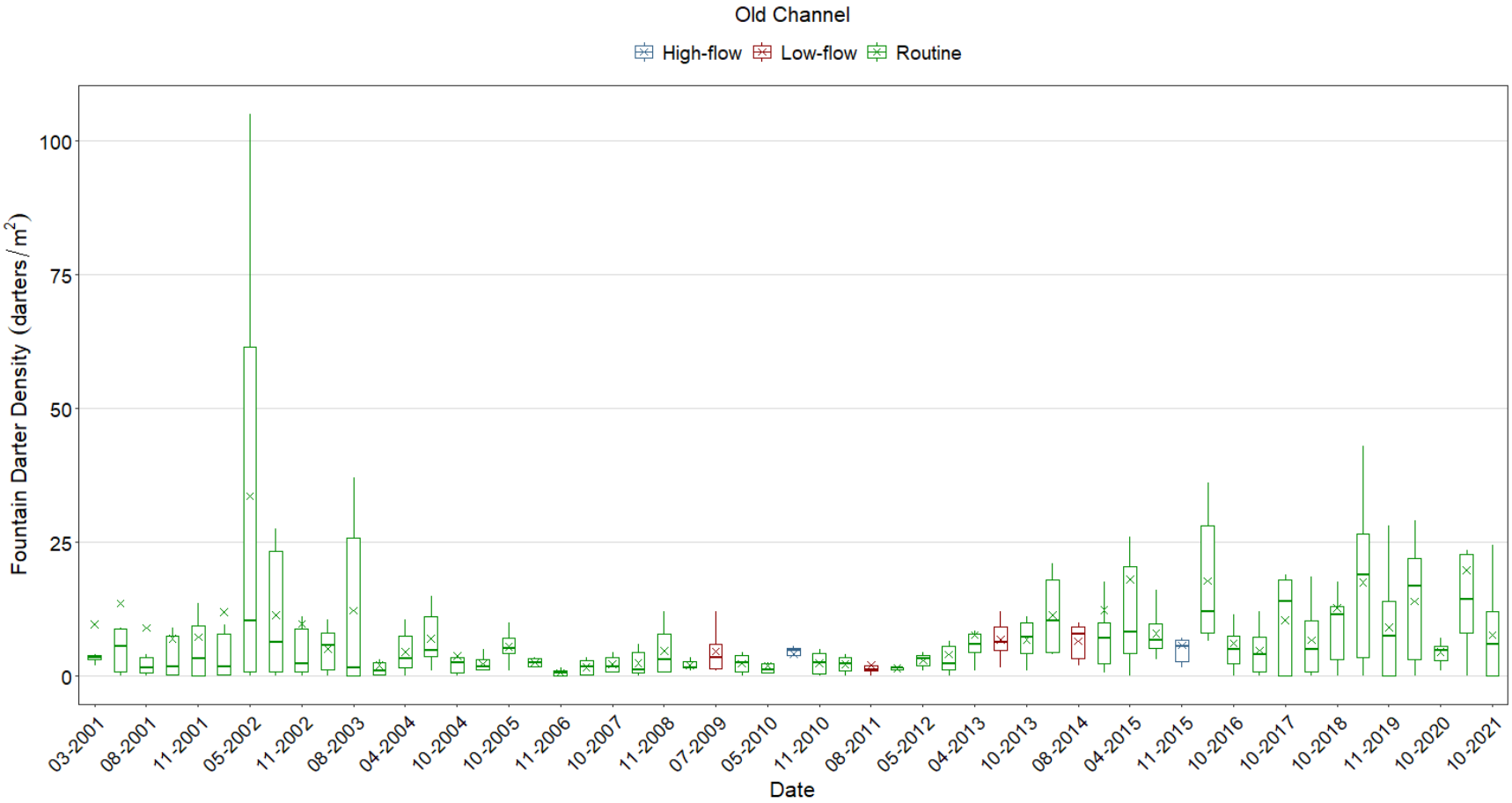

Figure D9. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) from 2001–2021 during drop-net sampling at Old Channel. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

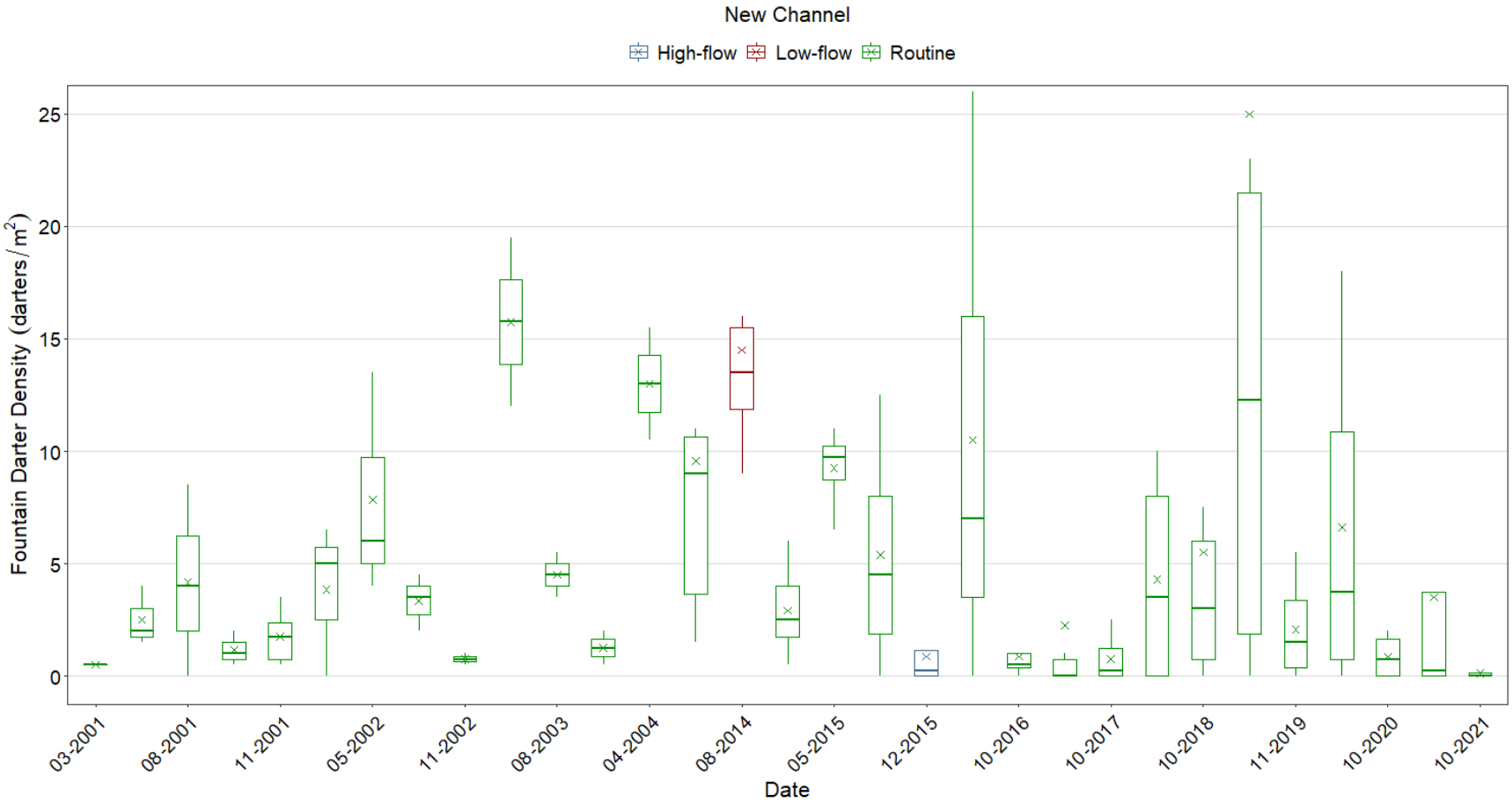

Figure D10. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) from 2001–2004 and 2014–2021 during drop-net sampling at New Channel. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

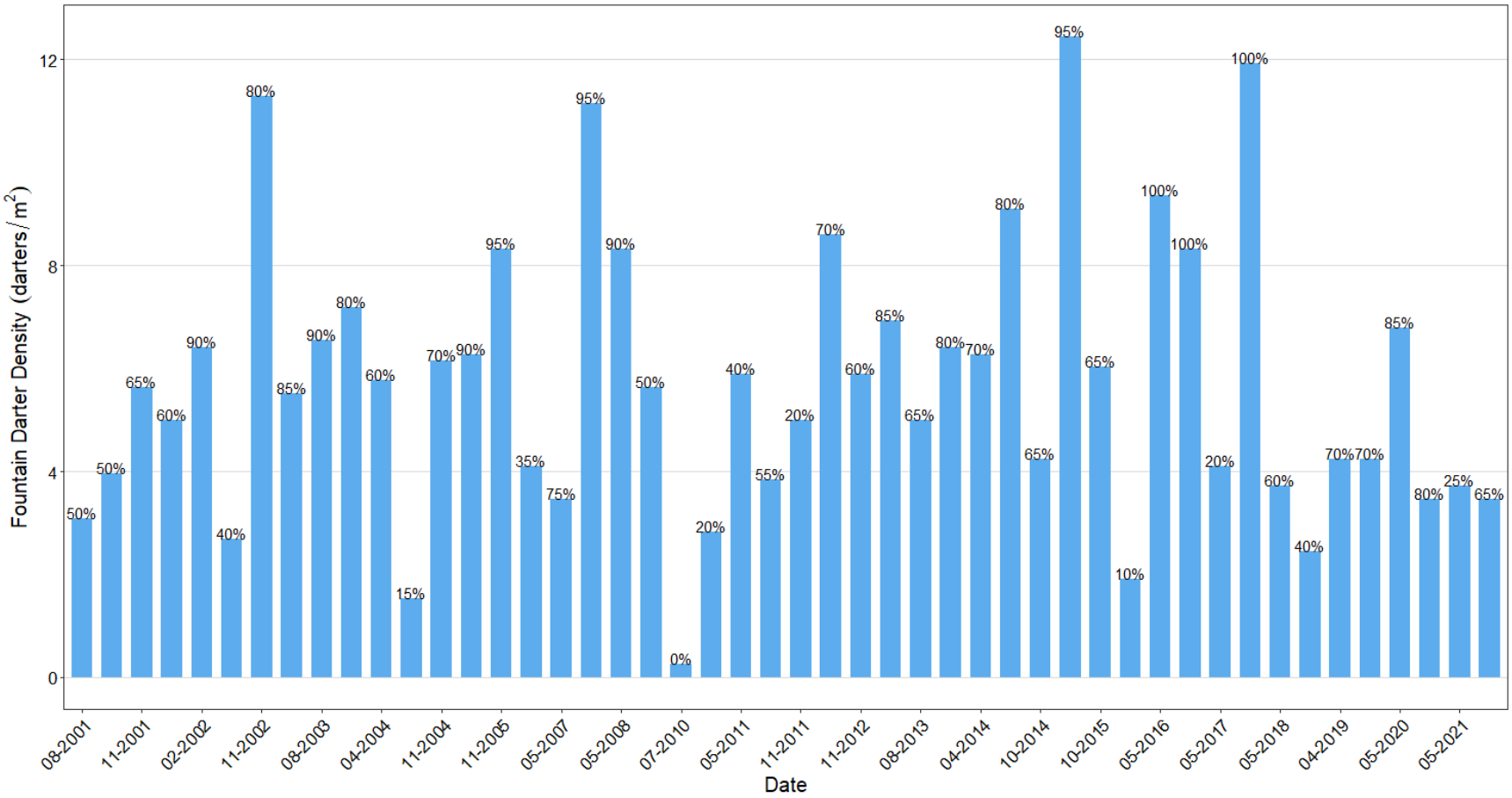

Figure D11. Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) from 2001–2021 during visual surveys at Landa Lake. Percentages above the bars represent bryophyte coverage observed during each survey event.

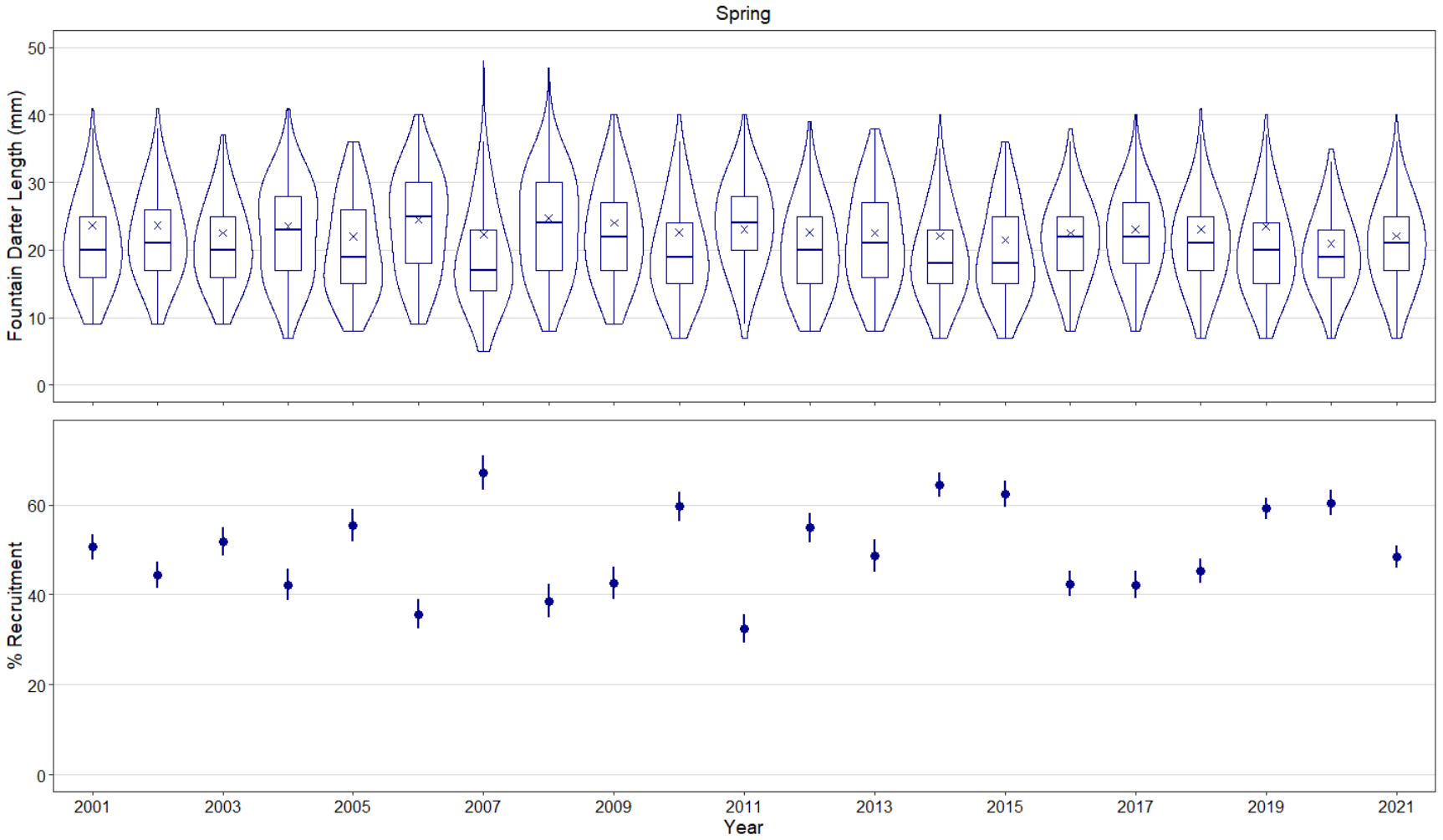

Figure D12. **Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the Comal Springs and River during spring sampling (i.e., drop-net and timed dip-net data) events from 2001–2021. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability 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.**

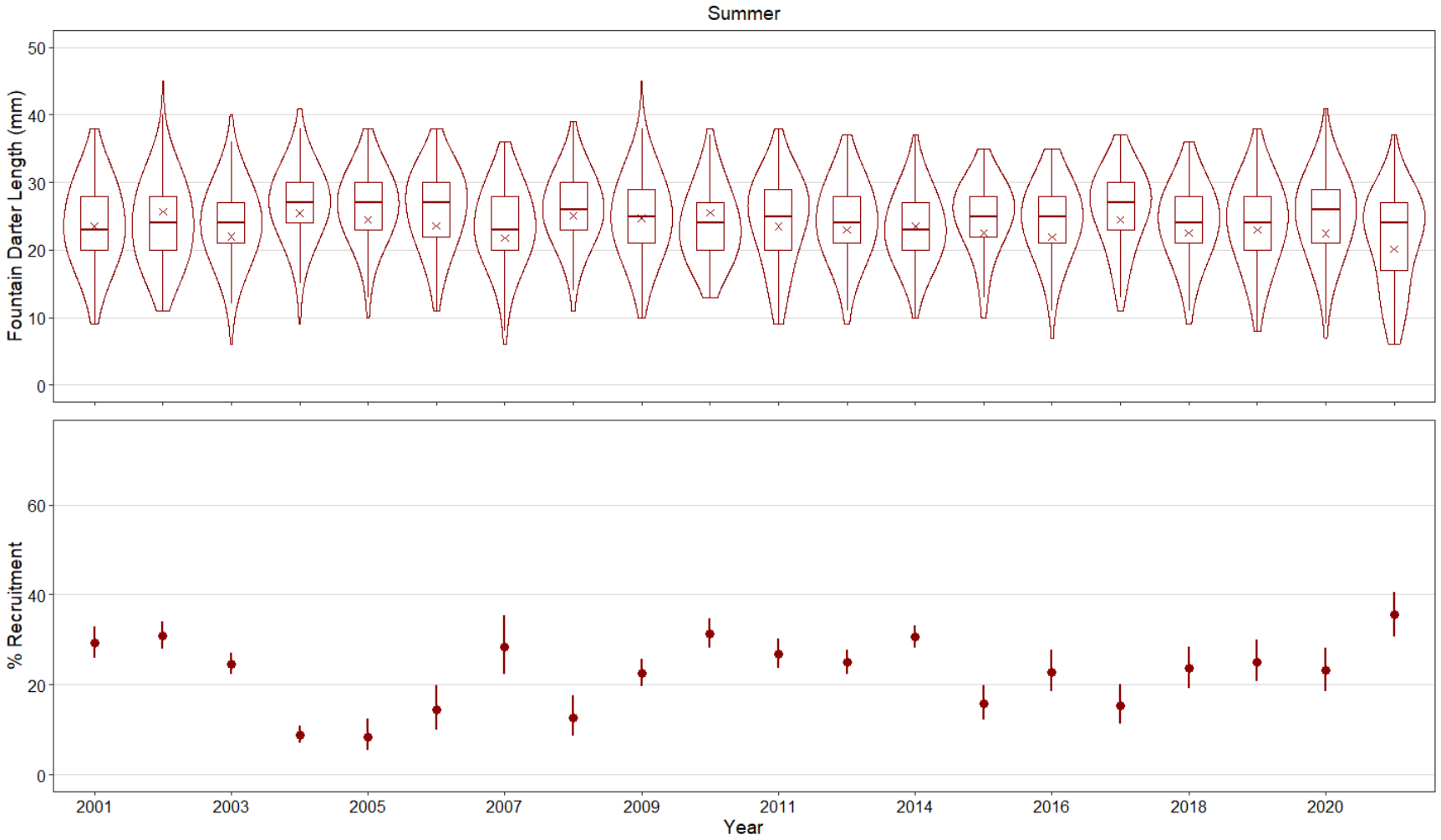

Figure D13. **Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the Comal Springs and River during summer sampling (i.e., drop-net and timed dip-net data) events from 2001–2021. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability 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.**

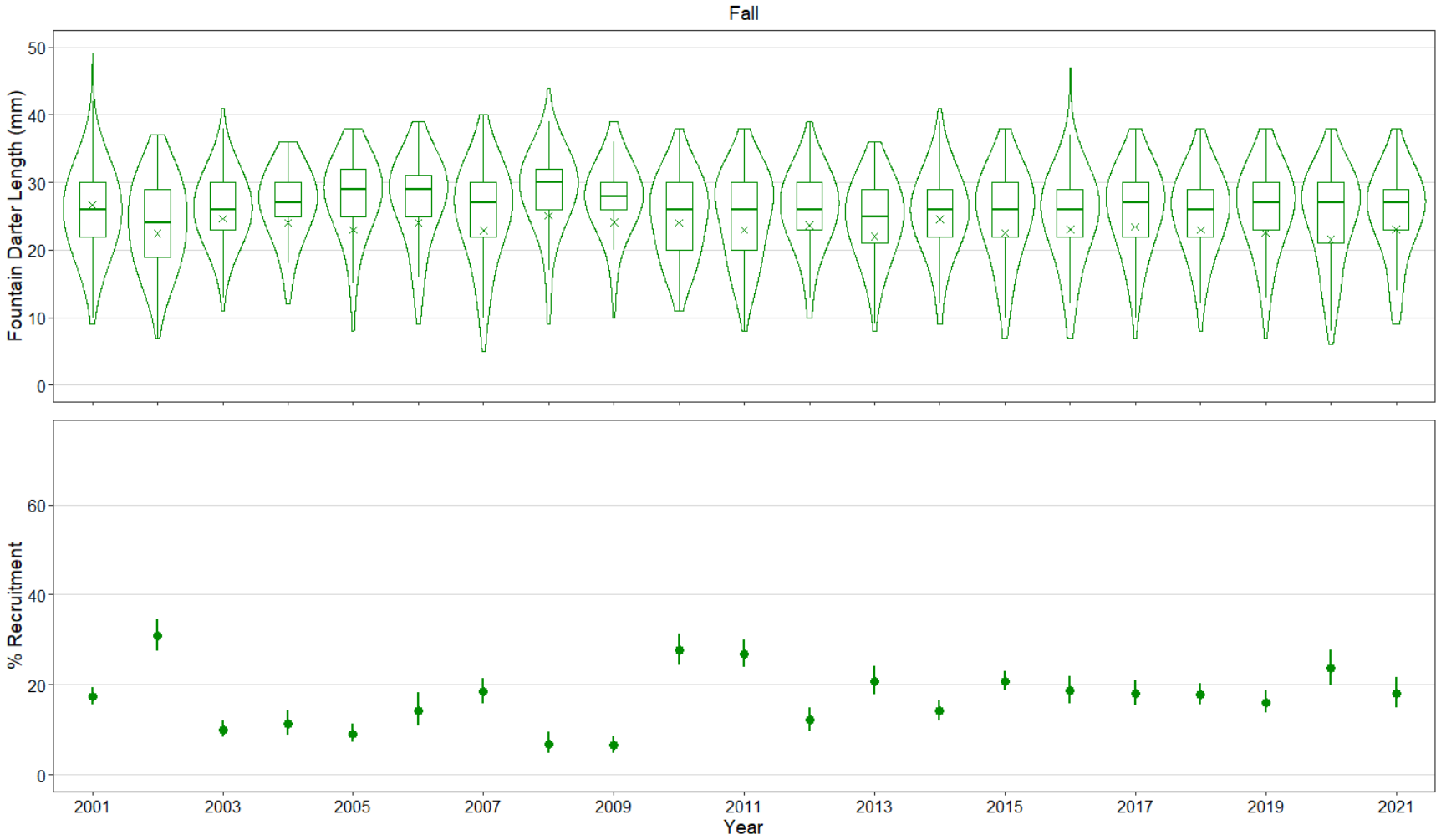

Figure D14. **Fountain Darter size structure (mm; top row) and percent recruitment (bottom row) in the Comal Springs and River during fall sampling (i.e., drop-net and timed dip-net data) events from 2001–2021. Size structure is displayed with boxplots (median, quartiles, range) and violin plots (probability 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.**

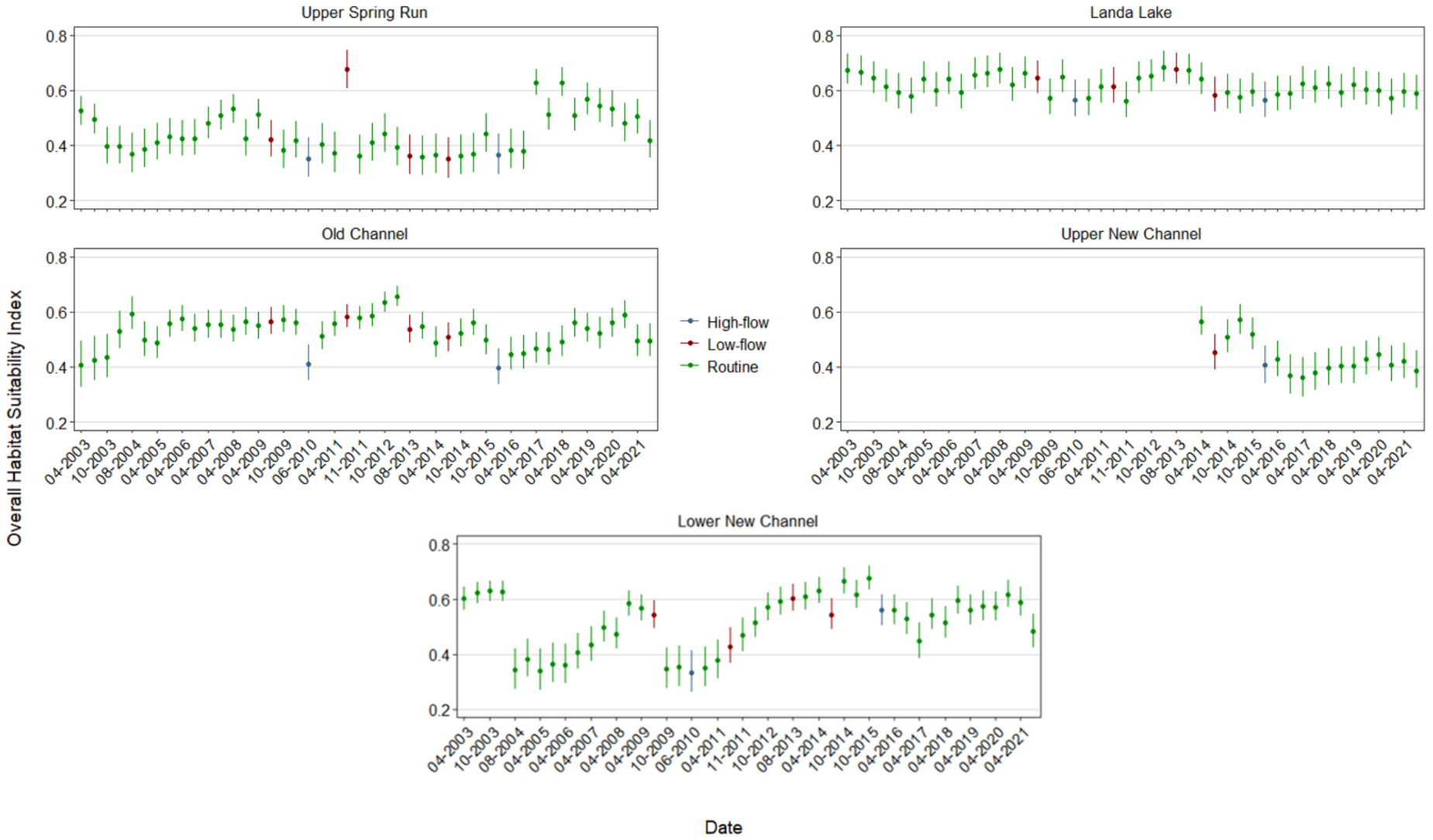

Figure D15. Overall Habitat Suitability Index (OHSI) (±95% CI) from 2003–2021 among study reaches in the Comal Springs/River.

Fish Community

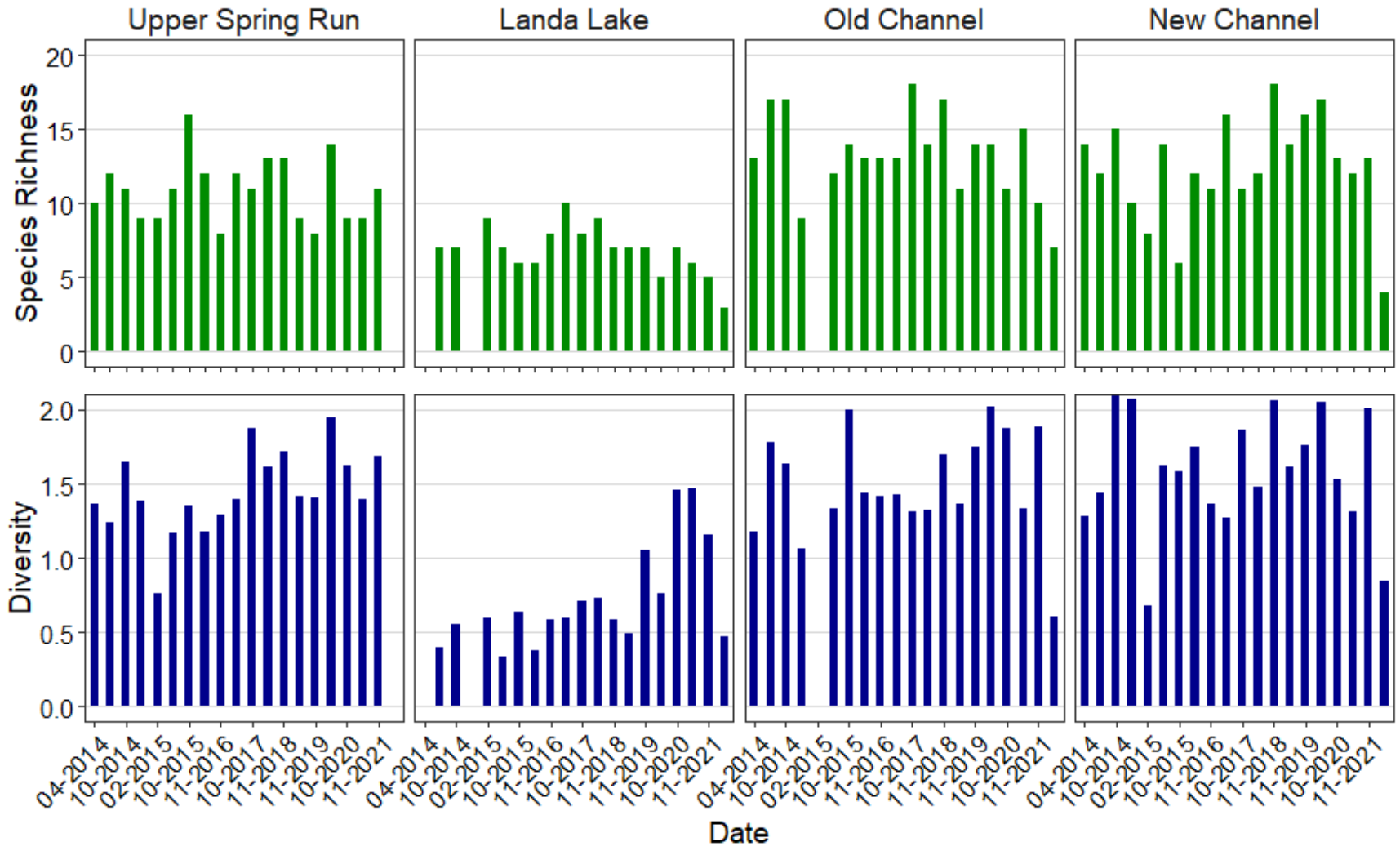

Figure D16. **Bar graphs displaying temporal trends in species richness and diversity among study reaches from 2014–2021 during fish community sampling in the Comal Springs/River.**

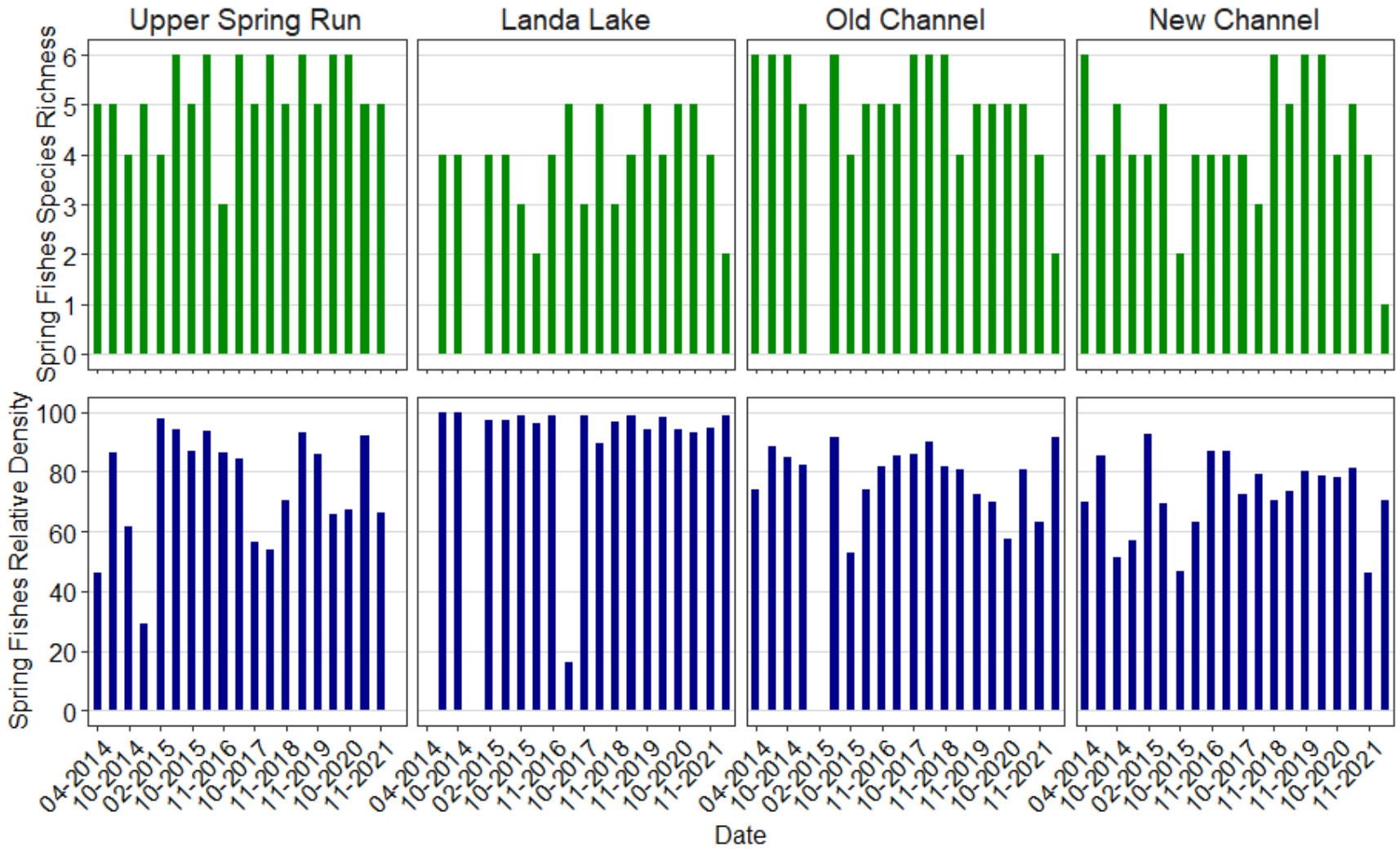

Figure D17. **Bar graphs displaying temporal trends in spring fishes species richness and percent relative density among study reaches from 2014–2021 during fish community sampling in the Comal Springs/River.**

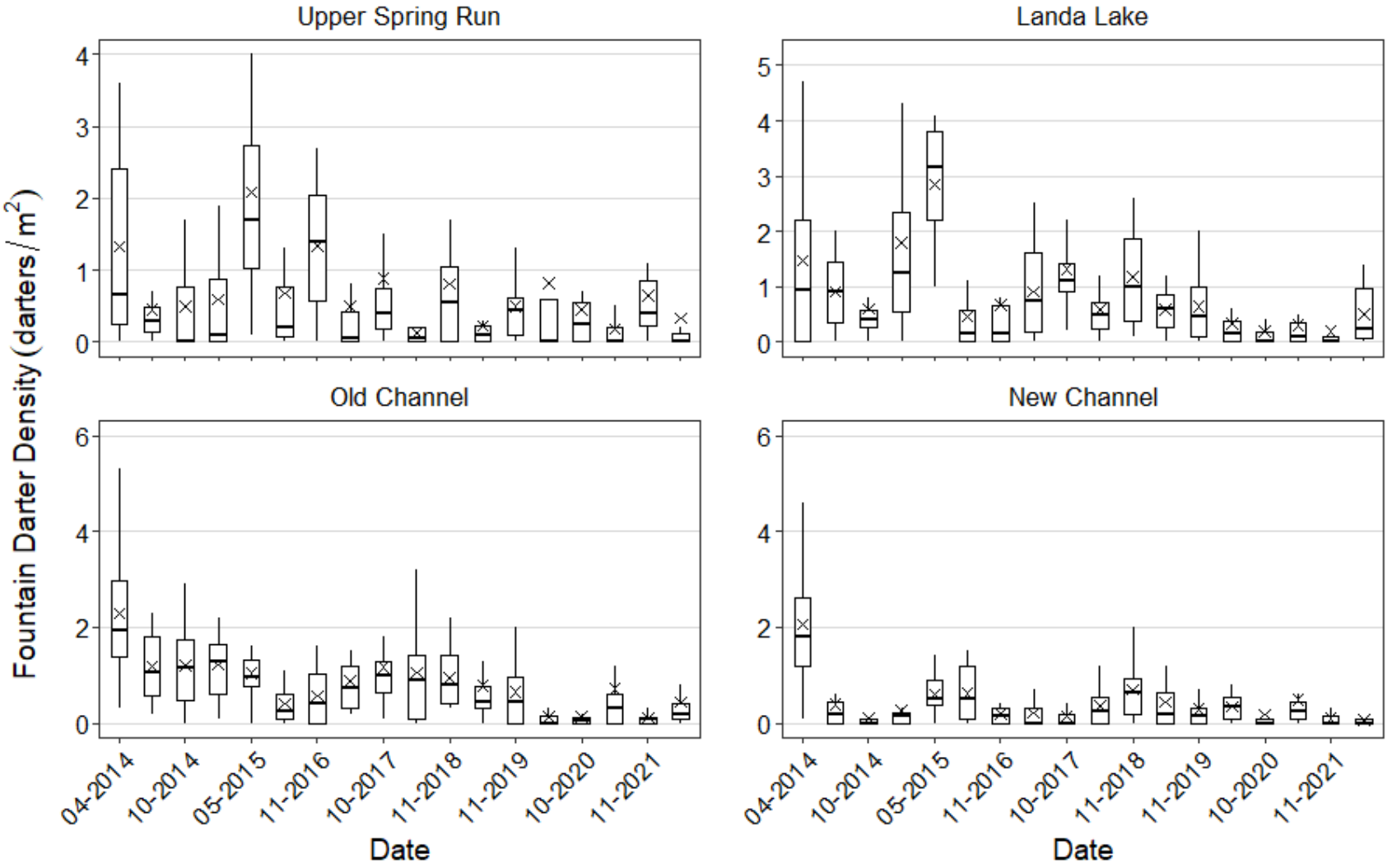

Figure D18. **Boxplots displaying temporal trends in Fountain Darter density (darters/m^2) among study reaches from 2014–2021 during fish community microhabitat sampling in the Comal Springs/River. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.**

Comal Springs Salamander

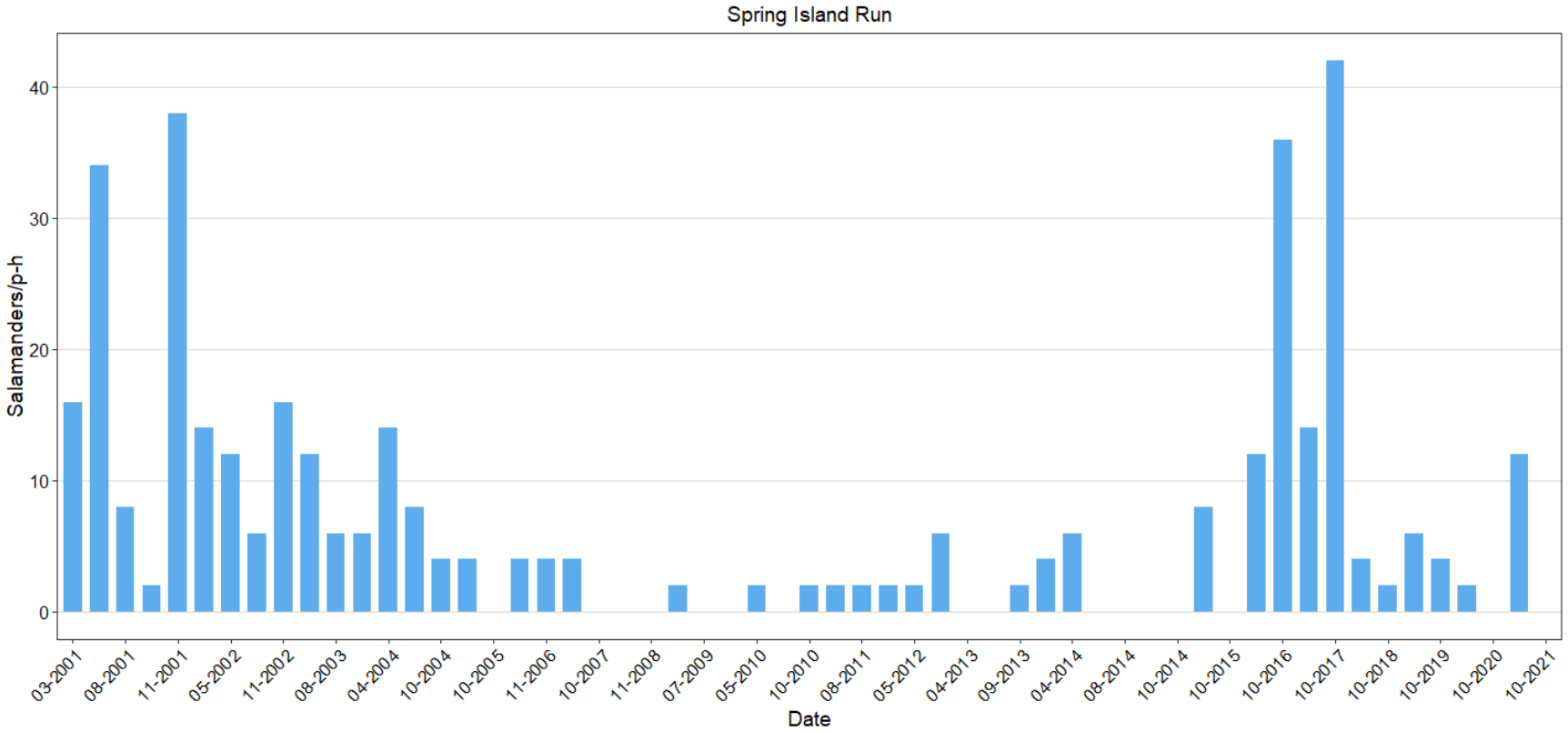

Figure D19. Comal Springs Salamander catch-per-unit-effort (CPUE; salamanders/person-hr) from 2001–2021 at Spring Island Run.

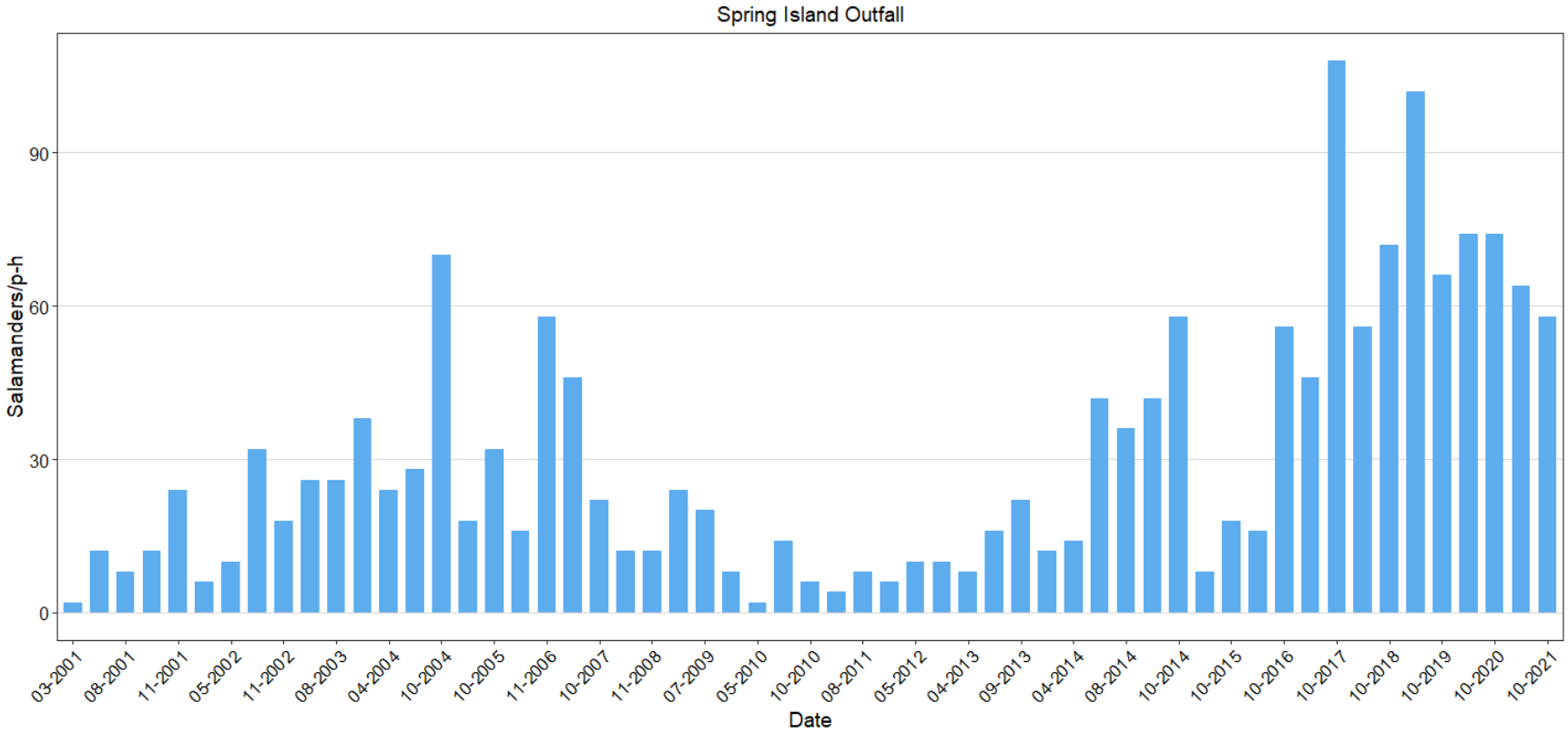

Figure D20. Comal Springs Salamander catch-per-unit-effort (CPUE; salamanders/person-hr) from 2001–2021 at Spring Island Outfall.

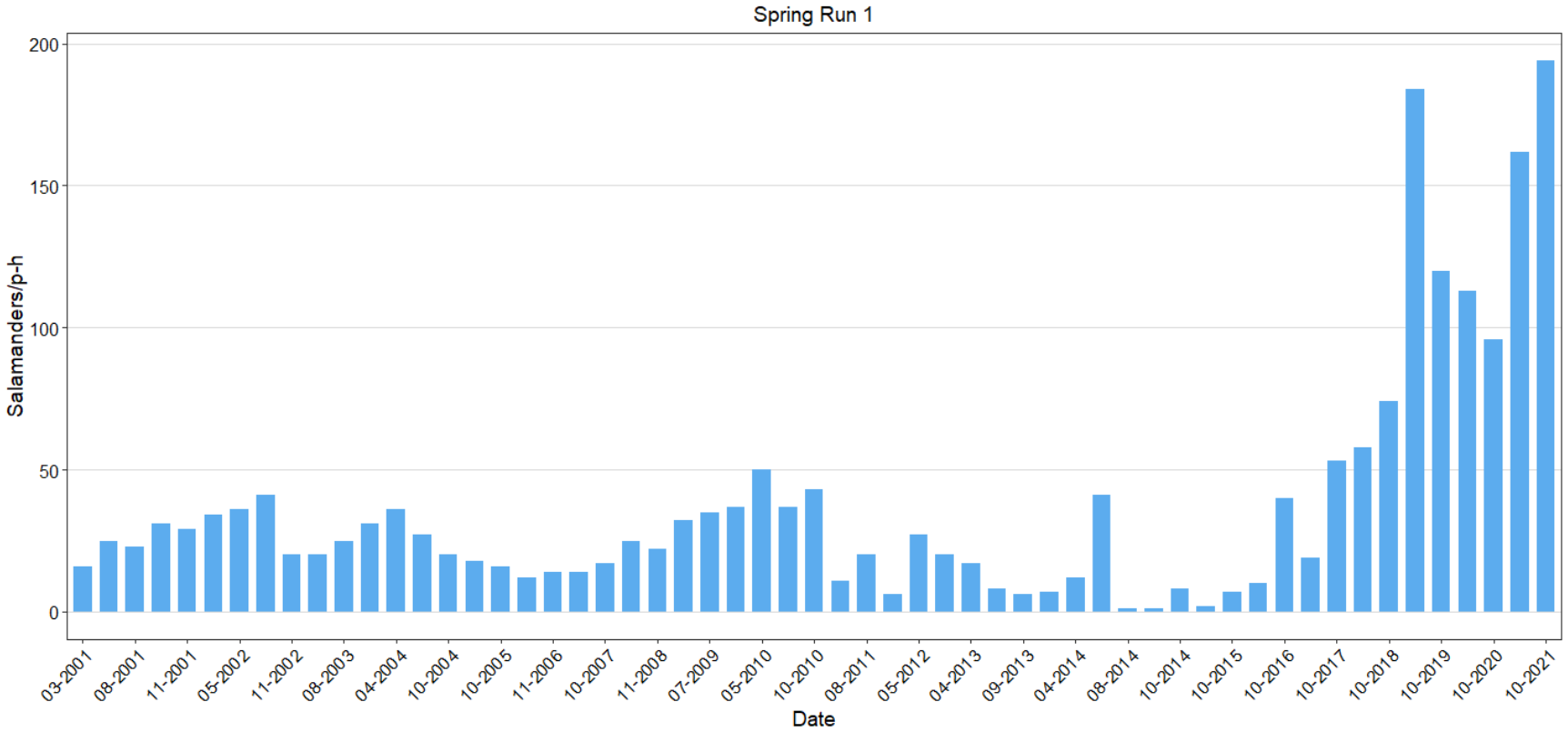

Figure D21. Comal Springs Salamander catch-per-unit-effort (CPUE; salamanders/person-hr) from 2001–2021 at Spring Run 1.

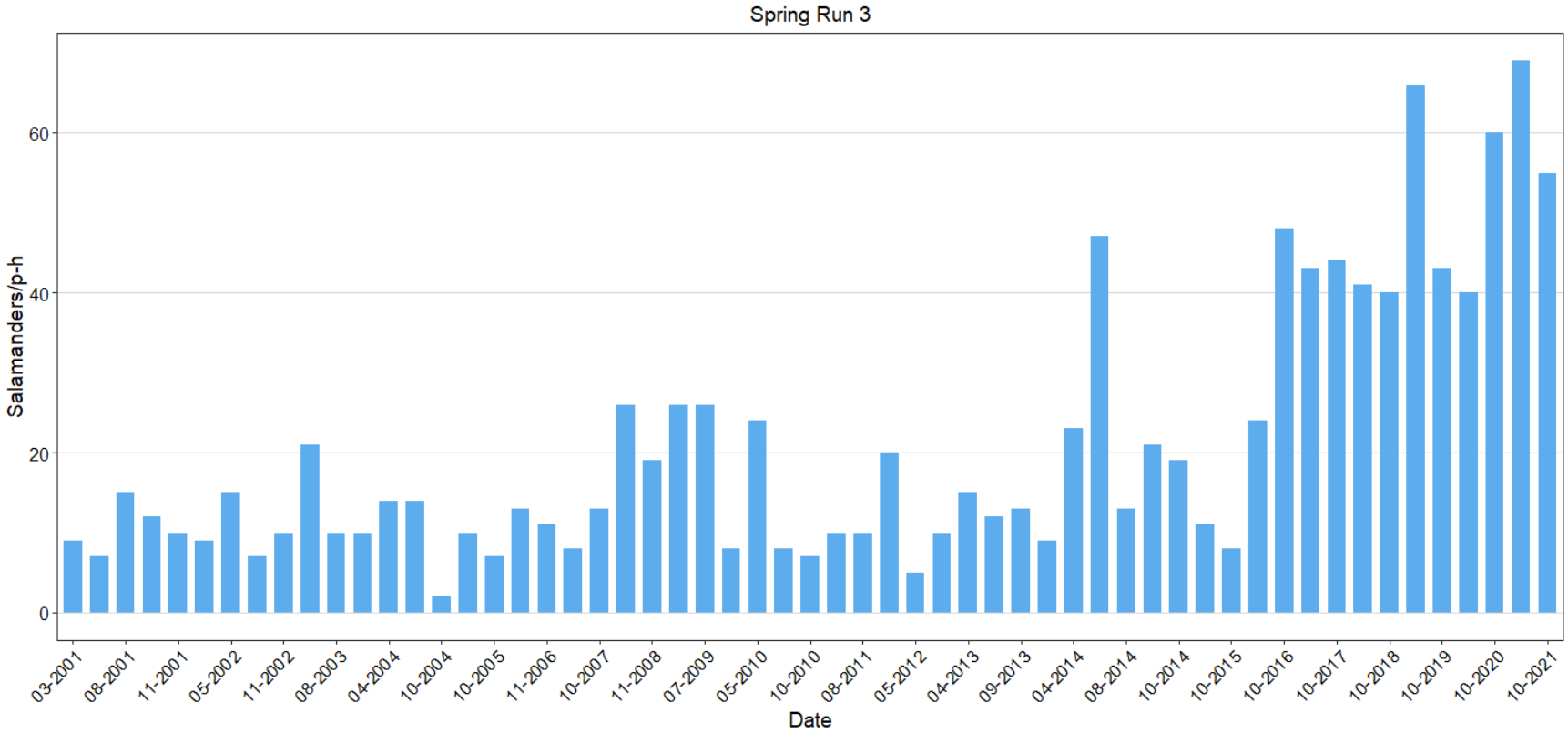

Figure D22. Comal Springs Salamander catch-per-unit-effort (CPUE; salamanders/person-hr) from 2001–2021 at Spring Run 3.

Macroinvertebrates

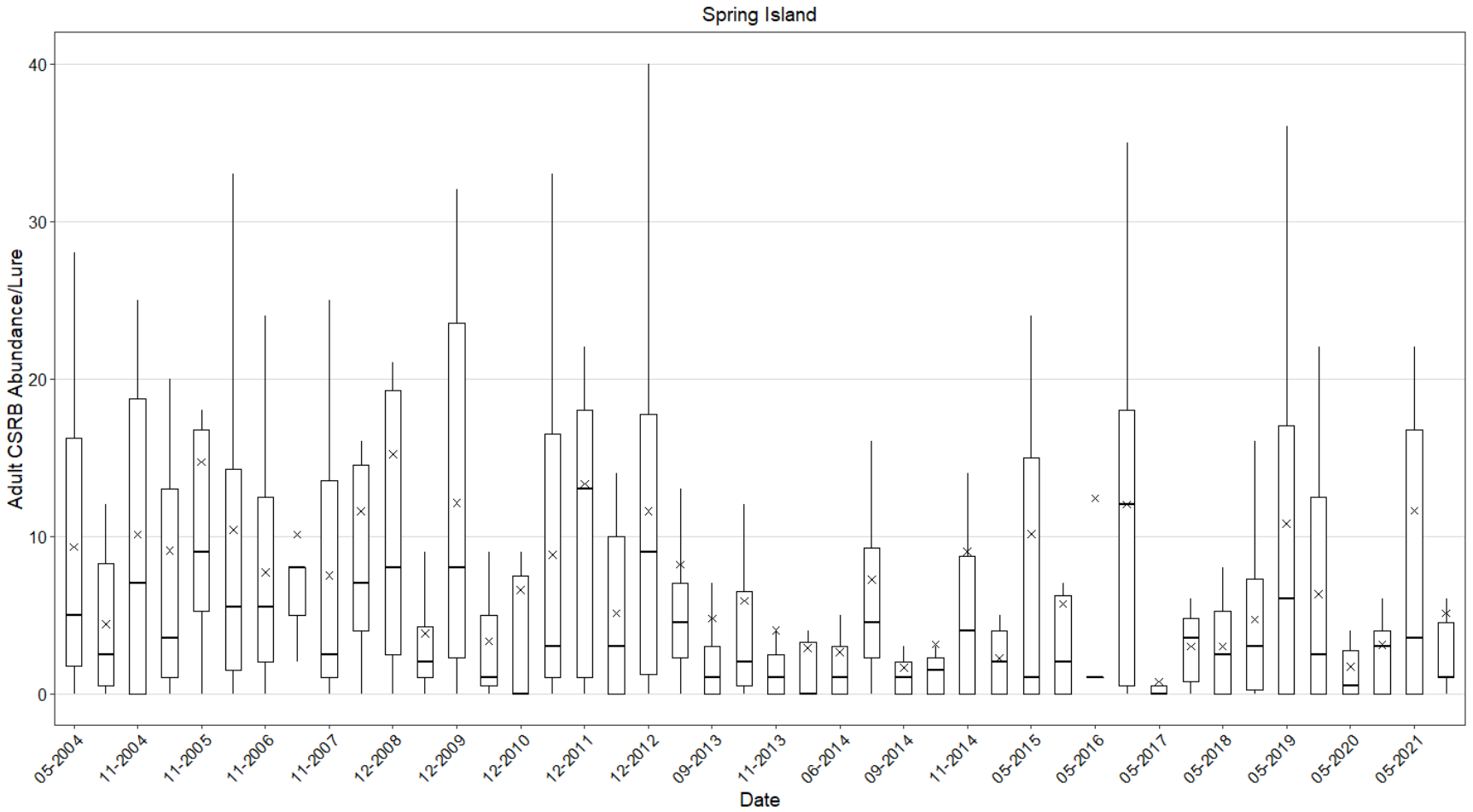

Figure D23. Boxplots displaying temporal trends in adult CSRB abundance per retrieved at Spring Island from 2004–2021 during lure sampling in Comal Springs. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.

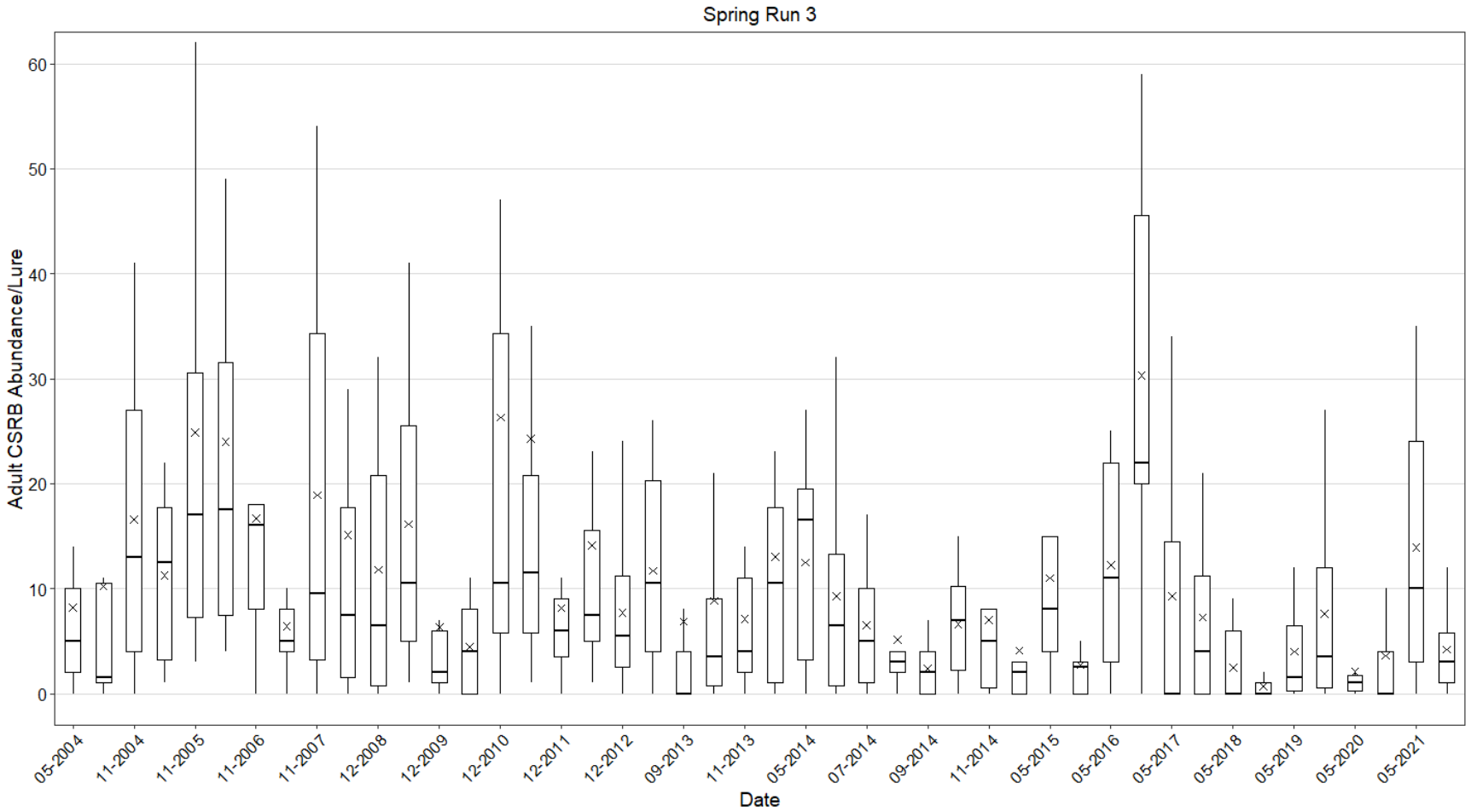

Figure D24. Boxplots displaying temporal trends in adult CSRB abundance per retrieved at Spring Run 3 from 2004–2021 during lure sampling in Comal Springs. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.

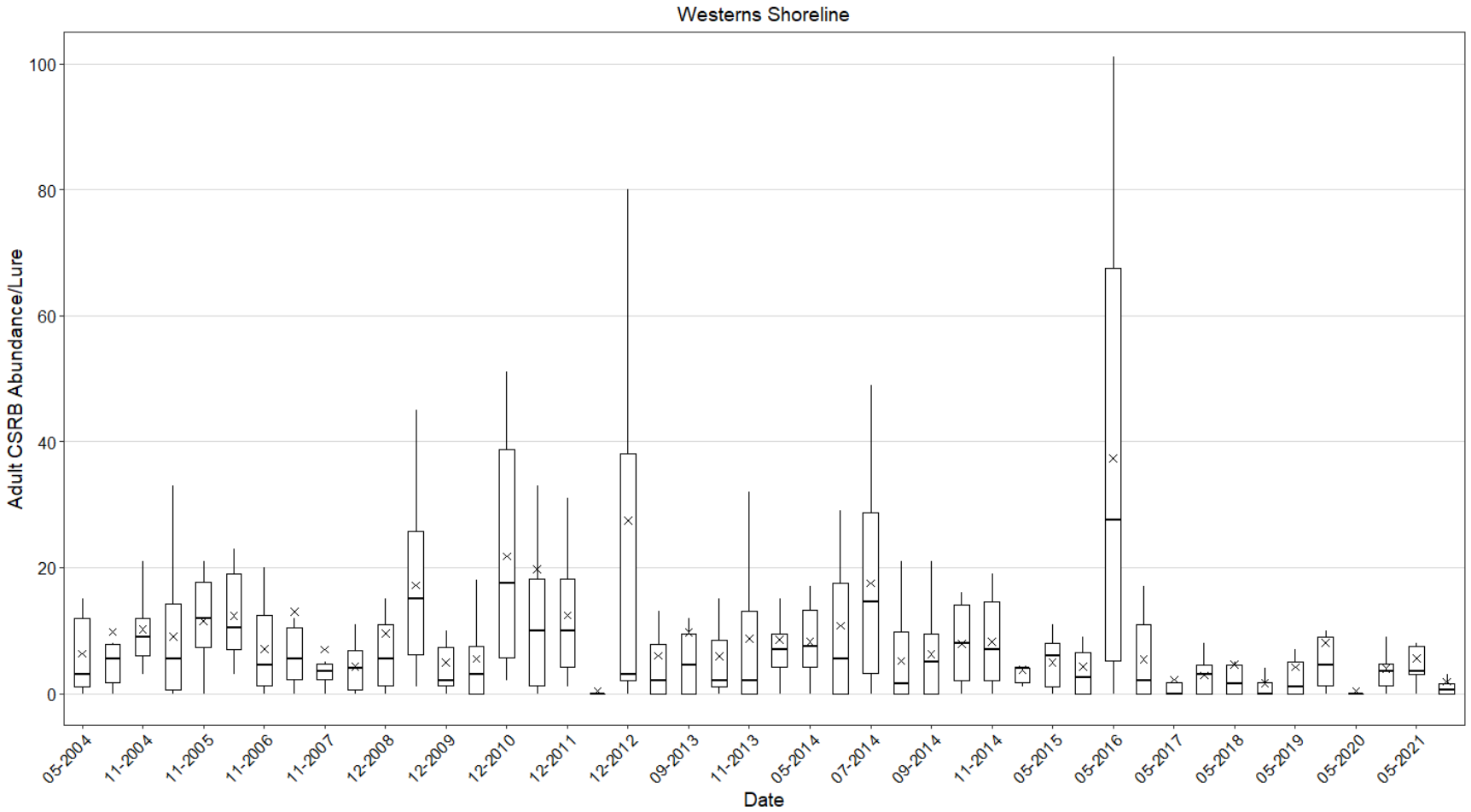

Figure D25. Boxplots displaying temporal trends in adult CSRB abundance per retrieved at the Western Shoreline from 2004–2021 during lure sampling in Comal Springs. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.

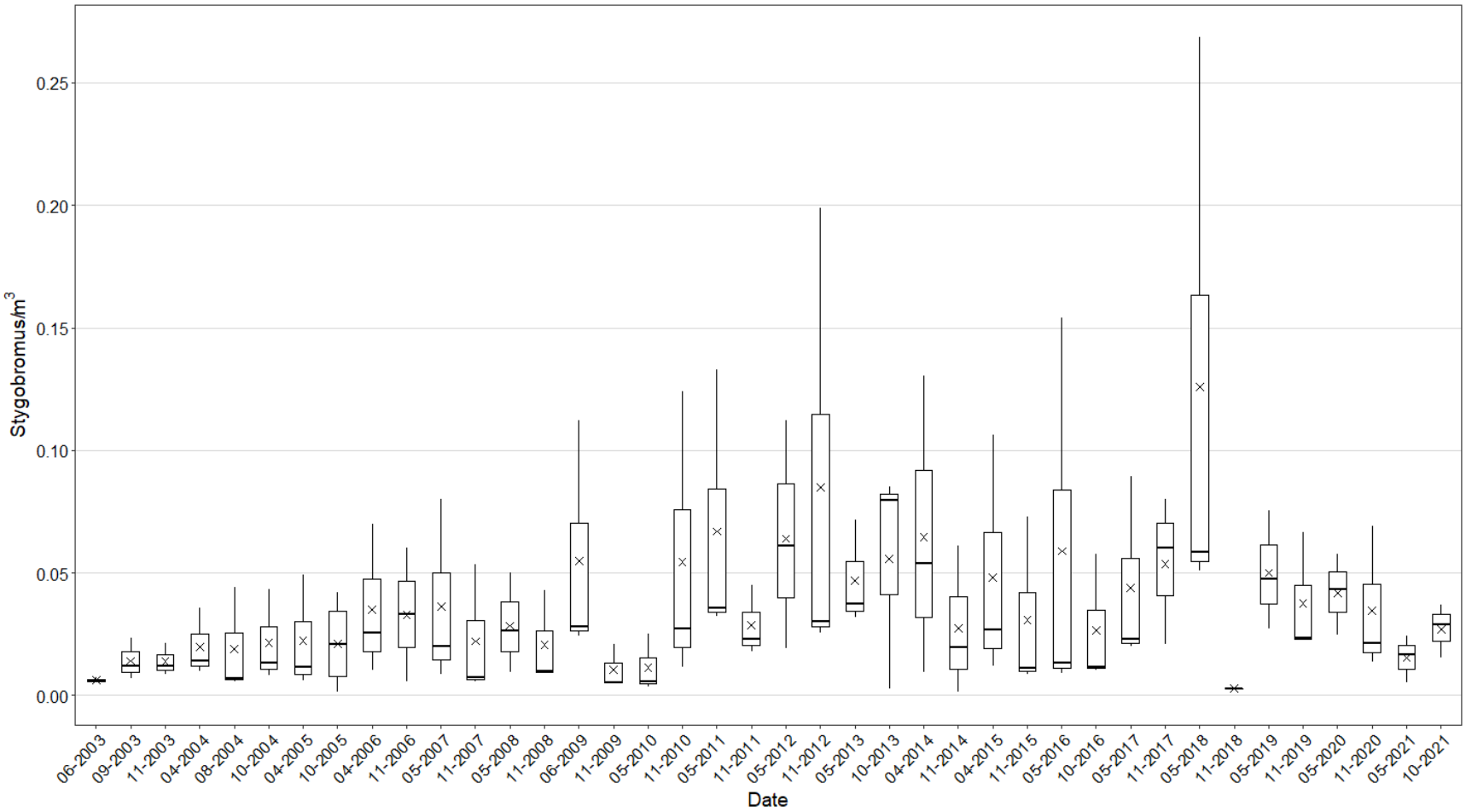

Figure D26. Boxplots displaying *Stygobromus pecki* per cubic meters of water at Western Upwelling, Spring Run 1, and Spring Run 3 from 2003–2021. The thick horizontal line in each box is the median, x represents the mean, and the upper/lower bounds of each box represents the interquartile range. Whiskers represent minimum/maximum values up to 1.5 times the interquartile range.

APPENDIX E: MACROINVERTEBRATE RAW DATA

Site	Location	Date	Class	Order	Family	FinalID	Counts
Landa Lake	Comal	19-Oct-21	Insecta	Odonata	Coenagrionidae	Enallagma	3
Landa Lake	Comal	19-Oct-21	Insecta	Diptera	Chironomidae	Chironomidae	1
Landa Lake	Comal	19-Oct-21	Insecta	Coleoptera	Psephinidae	Psephenus	1
Landa Lake	Comal	19-Oct-21	Malacostraca	Amphipoda	Talitridae	Hyalella	138
Landa Lake	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	1
Landa Lake	Comal	19-Oct-21	Insecta	Ephemeroptera	Caenidae	Caenis	1
Landa Lake	Comal	19-Oct-21	Insecta	Ephemeroptera	Baetidae	Callibaetis	1
Landa Lake	Comal	19-Oct-21	Insecta	Ephemeroptera	Tricorythidae	Tricorythodes	4
Landa Lake	Comal	19-Oct-21	Clitellata			Hirudinea	1
Landa Lake	Comal	19-Oct-21	Clitellata			Oligochaeta	3
Landa Lake	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	1
Landa Lake	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	9
Landa Lake	Comal	27-Apr-21	Insecta	Ephemeroptera	Heptageniidae	Maccaffertium	1
Landa Lake	Comal	27-Apr-21	Insecta	Odonata	Coenagrionidae	Ischnura	1
Landa Lake	Comal	27-Apr-21	Malacostraca	Decapoda	Palaemonidae	Palaemonetes	4
Landa Lake	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Hydrobiidae	Hydrobiidae	2
Landa Lake	Comal	27-Apr-21	Clitellata			Hirudinea	1
Landa Lake	Comal	27-Apr-21	Insecta	Ephemeroptera	Baetidae	Callibaetis	9
Landa Lake	Comal	27-Apr-21	Insecta	Coleoptera	Dytiscidae	Liodessus	2
Landa Lake	Comal	27-Apr-21		Decopoda	Cambaridae	Cambaridae	1
Landa Lake	Comal	27-Apr-21	Insecta	Ephemeroptera	Caenidae	Caenis	1
Landa Lake	Comal	27-Apr-21	Clitellata			Oligochaeta	3
Landa Lake	Comal	27-Apr-21	Insecta	Odonata	Coenagrionidae	Enallagma	6
Landa Lake	Comal	27-Apr-21	Malacostraca	Amphipoda	Talitridae	Hyalella	102
Landa Lake	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	7
Landa Lake	Comal	27-Apr-21	Insecta	Ephemeroptera	Tricorythidae	Tricorythodes	10
New Channel	Comal	19-Oct-21	Clitellata			Hirudinea	1
New Channel	Comal	19-Oct-21	Insecta	Megaloptera	Corydalidae	Corydalus cornutus	1
New Channel	Comal	19-Oct-21	Insecta	Trichoptera	Heliocopyschidae	Helicopsyche	11
New Channel	Comal	19-Oct-21	Insecta	Odonata	Coenagrionidae	Argia	23

New Channel	Comal	19-Oct-21	Turbellaria	Tricladida		Planariidae	7
New Channel	Comal	19-Oct-21	Insecta	Ephemeroptera	Baetidae	Fallceon	7
New Channel	Comal	19-Oct-21	Malacostraca	Amphipoda	Talitridae	Hyalella	24
New Channel	Comal	19-Oct-21	Insecta	Coleoptera	Psephinidae	Psephenus	4
New Channel	Comal	19-Oct-21	Insecta	Trichoptera	Hydropsychidae	Smicridea	6
New Channel	Comal	19-Oct-21	Insecta	Trichoptera	Hydroptilidae	Leucotrichia	1
New Channel	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	7
New Channel	Comal	19-Oct-21	Clitellata			Oligochaeta	4
New Channel	Comal	19-Oct-21	Insecta	Diptera	Stratiomyidae	Odontomyia	1
New Channel	Comal	19-Oct-21	Insecta	Odonata	Libellulidae	Brechmorhoga	3
New Channel	Comal	19-Oct-21	Insecta	Coleoptera	Elmidae	Microcylloepus pusillus	3
New Channel	Comal	19-Oct-21	Insecta	Ephemeroptera	Leptophlebiidae	Thraulodes	2
New Channel	Comal	19-Oct-21	Insecta	Diptera	Chironomidae	Chironomidae	31
New Channel	Comal	19-Oct-21		Decopoda	Cambaridae	Cambaridae	1
New Channel	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	5
New Channel	Comal	19-Oct-21	Insecta	Coleoptera	Elmidae	Macrelmis	25
New Channel	Comal	27-Apr-21	Insecta	Trichoptera	Glossosomatidae	Protoptila	1
New Channel	Comal	27-Apr-21	Gastropoda	Basommatophora	Ancylidae	Ferrissia	1
New Channel	Comal	27-Apr-21	Insecta	Trichoptera	Hydropsychidae	Smicridea	1
New Channel	Comal	27-Apr-21	Insecta	Coleoptera	Elmidae	Macrelmis	42
New Channel	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	3
New Channel	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	11
New Channel	Comal	27-Apr-21	Gastropoda	Basommatophora	Planorbidae	Planorbidae	1
New Channel	Comal	27-Apr-21	Malacostraca	Amphipoda	Talitridae	Hyalella	32
New Channel	Comal	27-Apr-21	Insecta	Trichoptera	Hydrobiosidae	Atopsyche	3
New Channel	Comal	27-Apr-21	Insecta	Coleoptera	Psephinidae	Psephenus	5
New Channel	Comal	27-Apr-21	Insecta	Megaloptera	Corydalidae	Corydalus cornutus	1
New Channel	Comal	27-Apr-21	Insecta	Diptera	Chironomidae	Chironomidae	22
New Channel	Comal	27-Apr-21	Insecta	Ephemeroptera	Baetidae	Fallceon	14
New Channel	Comal	27-Apr-21	Insecta	Trichoptera	Hydroptilidae	Leucotrichia	1
New Channel	Comal	27-Apr-21	Clitellata			Hirudinea	1

New Channel	Comal	27-Apr-21	Insecta	Trichoptera	Leptoceridae	Nectopsyche	1
New Channel	Comal	27-Apr-21	Insecta	Ephemeroptera	Tricorythidae	Tricorythodes	4
New Channel	Comal	27-Apr-21	Turbellaria	Tricladida		Planariidae	7
New Channel	Comal	27-Apr-21	Insecta	Coleoptera	Elmidae	Stenelmis	1
New Channel	Comal	27-Apr-21	Insecta	Coleoptera	Elmidae	Microcylloepus pusillus	8
New Channel	Comal	27-Apr-21	Insecta	Diptera	Empididae	Hemerodromia	2
New Channel	Comal	27-Apr-21	Insecta	Lepidoptera	Crambidae	Crambidae	1
New Channel	Comal	27-Apr-21	Insecta	Trichoptera	Heliocopyschidae	Helicopsyche	10
New Channel	Comal	27-Apr-21	Gastropoda	Basommatophora	Physidae	Physa	1
New Channel	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Hydrobiidae	Hydrobiidae	4
New Channel	Comal	27-Apr-21	Insecta	Odonata	Coenagrionidae	Argia	6
New Channel	Comal	27-Apr-21	Clitellata			Oligochaeta	3
New Channel	Comal	27-Apr-21	Insecta	Trichoptera	Hydroptilidae	Ochrotrichia	2
Old Channel	Comal	19-Oct-21	Insecta	Odonata	Coenagrionidae	Enallagma	2
Old Channel	Comal	19-Oct-21	Insecta	Diptera	Chironomidae	Chironomidae	8
Old Channel	Comal	19-Oct-21	Insecta	Odonata	Coenagrionidae	Argia	13
Old Channel	Comal	19-Oct-21	Insecta	Trichoptera	Leptoceridae	Nectopsyche	3
Old Channel	Comal	19-Oct-21	Clitellata			Oligochaeta	7
Old Channel	Comal	19-Oct-21	Insecta	Trichoptera	Hydropsychidae	Smicridea	1
Old Channel	Comal	19-Oct-21	Insecta	Trichoptera	Philopotamidae	Chimarra	1
Old Channel	Comal	19-Oct-21	Insecta	Odonata	Gomphidae	Gomphidae	1
Old Channel	Comal	19-Oct-21	Insecta	Ephemeroptera	Heptageniidae	Stenacron	6
Old Channel	Comal	19-Oct-21	Malacostraca	Amphipoda	Talitridae	Hyalella	53
Old Channel	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	2
Old Channel	Comal	19-Oct-21	Insecta	Coleoptera	Psephinidae	Psephenus	1
Old Channel	Comal	19-Oct-21	Insecta	Ephemeroptera	Baetidae	Fallceon	5
Old Channel	Comal	19-Oct-21	Insecta	Odonata	Libellulidae	Brechmorhoga	2
Old Channel	Comal	19-Oct-21	Clitellata			Hirudinea	1
Old Channel	Comal	19-Oct-21	Insecta	Diptera	Simuliidae	Simulium	1
Old Channel	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Hydrobiidae	Hydrobiidae	3
Old Channel	Comal	19-Oct-21	Insecta	Coleoptera	Elmidae	Phanocerus clavicornis	1

Old Channel	Comal	19-Oct-21	Insecta	Coleoptera	Elmidae	Hexacylloepus ferrugineus	1
Old Channel	Comal	27-Apr-21	Clitellata			Oligochaeta	7
Old Channel	Comal	27-Apr-21	Insecta	Odonata	Coenagrionidae	Argia	2
Old Channel	Comal	27-Apr-21	Malacostraca	Amphipoda	Talitridae	Hyalella	44
Old Channel	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	2
Old Channel	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	9
Old Channel	Comal	27-Apr-21	Insecta	Coleoptera	Elmidae	Hexacylloepus ferrugineus	1
Old Channel	Comal	27-Apr-21	Turbellaria	Tricladida		Planariidae	1
Old Channel	Comal	27-Apr-21	Insecta	Coleoptera	Psephinidae	Psephenus	5
Old Channel	Comal	27-Apr-21	Insecta	Diptera	Chironomidae	Chironomidae	4
Old Channel	Comal	27-Apr-21	Insecta	Ephemeroptera	Heptageniidae	Stenacron	3
Old Channel	Comal	27-Apr-21	Insecta	Ephemeroptera	Baetidae	Fallceon	6
Old Channel	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	5
Old Channel	Comal	27-Apr-21	Insecta	Coleoptera	Elmidae	Phanocerus clavicornis	1
Old Channel	Comal	27-Apr-21	Insecta	Ephemeroptera	Tricorythidae	Tricorythodes	53
Old Channel	Comal	27-Apr-21	Insecta	Trichoptera	Heliocopyschidae	Helicopsyche	2
Old Channel	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Hydrobiidae	Hydrobiidae	7
Old Channel	Comal	27-Apr-21	Clitellata			Hirudinea	1
Lower Comal	Comal	19-Oct-21	Malacostraca	Decapoda	Palaemonidae	Palaemonetes	1
Lower Comal	Comal	19-Oct-21	Insecta	Ephemeroptera	Baetidae	Fallceon	9
Lower Comal	Comal	19-Oct-21	Insecta	Odonata	Coenagrionidae	Enallagma	3
Lower Comal	Comal	19-Oct-21	Insecta	Odonata	Coenagrionidae	Argia	6
Lower Comal	Comal	19-Oct-21	Insecta	Ephemeroptera	Heptageniidae	Stenacron	2
Lower Comal	Comal	27-Apr-21	Insecta	Odonata	Coenagrionidae	Argia	1
Lower Comal	Comal	19-Oct-21	Clitellata			Oligochaeta	1
Lower Comal	Comal	19-Oct-21	Turbellaria	Tricladida		Planariidae	1
Lower Comal	Comal	19-Oct-21	Insecta	Coleoptera	Elmidae	Hexacylloepus ferrugineus	3
Lower Comal	Comal	19-Oct-21	Insecta	Odonata	Libellulidae	Libellulidae	1
Lower Comal	Comal	19-Oct-21	Insecta	Odonata	Calopterygidae	Hetaerina	1
Lower Comal	Comal	19-Oct-21	Insecta	Trichoptera	Leptoceridae	Nectopsyche	6
Lower Comal	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Thiaridae	Melanoides tuberculata	1

Lower Comal	Comal	19-Oct-21		Decopoda	Cambaridae	Cambaridae	3
Lower Comal	Comal	19-Oct-21	Insecta	Odonata	Gomphidae	Gomphidae	1
Lower Comal	Comal	27-Apr-21	Insecta	Ephemeroptera	Baetidae	Fallceon	6
Lower Comal	Comal	19-Oct-21	Insecta	Hemiptera	Naucoridae	Naucoridae	4
Lower Comal	Comal	19-Oct-21	Insecta	Ephemeroptera	Heptageniidae	Maccaffertium	1
Lower Comal	Comal	27-Apr-21	Turbellaria	Tricladida		Planariidae	5
Lower Comal	Comal	27-Apr-21	Insecta	Coleoptera	Psephinidae	Psephenus	2
Lower Comal	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Hydrobiidae	Hydrobiidae	2
Lower Comal	Comal	19-Oct-21	Insecta	Ephemeroptera	Tricorythidae	Tricorythodes	48
Lower Comal	Comal	19-Oct-21	Insecta	Ephemeroptera	Leptohyphidae	Vacupernius packeri	10
Lower Comal	Comal	27-Apr-21	Insecta	Ephemeroptera	Leptophlebiidae	Thraulodes	2
Lower Comal	Comal	19-Oct-21	Clitellata			Hirudinea	4
Lower Comal	Comal	27-Apr-21	Insecta	Diptera	Chironomidae	Chironomidae	3
Lower Comal	Comal	27-Apr-21	Insecta	Trichoptera	Leptoceridae	Nectopsyche	4
Lower Comal	Comal	27-Apr-21	Clitellata			Oligochaeta	4
Lower Comal	Comal	27-Apr-21	Insecta	Ephemeroptera	Tricorythidae	Tricorythodes	27
Lower Comal	Comal	27-Apr-21	Clitellata			Hirudinea	2
Lower Comal	Comal	27-Apr-21	Malacostraca	Amphipoda	Talitridae	Hyalella	67
Lower Comal	Comal	27-Apr-21	Insecta	Trichoptera	Heliocopyschidae	Helicopsyche	2
Lower Comal	Comal	19-Oct-21	Malacostraca	Amphipoda	Talitridae	Hyalella	45
Lower Comal	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	7
Lower Comal	Comal	19-Oct-21	Insecta	Ephemeroptera	Leptophlebiidae	Thraulodes	2
Lower Comal	Comal	19-Oct-21	Insecta	Trichoptera	Heliocopyschidae	Helicopsyche	5
Lower Comal	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	12
Upper Comal	Comal	27-Apr-21	Malacostraca	Amphipoda	Talitridae	Hyalella	61
Upper Comal	Comal	27-Apr-21	Insecta	Coleoptera	Psephinidae	Psephenus	26
Upper Comal	Comal	27-Apr-21	Insecta	Diptera	Chironomidae	Chironomidae	6
Upper Comal	Comal	27-Apr-21	Insecta	Ephemeroptera	Baetidae	Callibaetis	14
Upper Comal	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	1
Upper Comal	Comal	27-Apr-21	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	2
Upper Comal	Comal	27-Apr-21	Insecta	Odonata	Coenagrionidae	Argia	1

Upper Comal	Comal	27-Apr-21	Clitellata			Oligochaeta	5
Upper Comal	Comal	19-Oct-21	Insecta	Ephemeroptera	Tricorythidae	Tricorythodes	14
Upper Comal	Comal	19-Oct-21	Malacostraca	Amphipoda	Talitridae	Hyalella	58
Upper Comal	Comal	27-Apr-21	Insecta	Coleoptera	Elmidae	Microcylloepus pusillus	6
Upper Comal	Comal	19-Oct-21	Insecta	Ephemeroptera	Caenidae	Caenis	1
Upper Comal	Comal	19-Oct-21	Insecta	Coleoptera	Psephinidae	Psephenus	24
Upper Comal	Comal	19-Oct-21	Insecta	Ephemeroptera	Heptageniidae	Maccaffertium	2
Upper Comal	Comal	19-Oct-21	Insecta	Diptera	Chironomidae	Chironomidae	5
Upper Comal	Comal	19-Oct-21	Insecta	Ephemeroptera	Baetidae	Callibaetis	26
Upper Comal	Comal	19-Oct-21	Insecta	Odonata	Coenagrionidae	Enallagma	1
Upper Comal	Comal	19-Oct-21	Insecta	Trichoptera	Heliocopyschidae	Helicopsyche	1
Upper Comal	Comal	19-Oct-21	Clitellata			Oligochaeta	6
Upper Comal	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Pleuroceridae	Elimia	2
Upper Comal	Comal	19-Oct-21	Gastropoda	Neotaenioglossa	Thiaridae	Tarebia	2
Upper Comal	Comal	27-Apr-21	Insecta	Coleoptera	Dytiscidae	Liodessus	7
Upper Comal	Comal	27-Apr-21	Insecta	Ephemeroptera	Tricorythidae	Tricorythodes	19

APPENDIX F: DROP-NET RAW DATA

SiteCode	Reach	Site_No	Date	Dip_Net	Species	Length	Count
2670	Landa Lake	Lud-1	05-May-21	1	Procambarus sp.		6
2670	Landa Lake	Lud-1	05-May-21	1	Palaemonetes sp.		14
2670	Landa Lake	Lud-1	05-May-21	1	Lepomis miniatus	87	1
2670	Landa Lake	Lud-1	05-May-21	1	Lepomis miniatus	84	1
2670	Landa Lake	Lud-1	05-May-21	1	Lepomis miniatus	34	1
2670	Landa Lake	Lud-1	05-May-21	1	Lepomis sp.	16	1
2670	Landa Lake	Lud-1	05-May-21	1	Ameiurus natalis	18	1
2670	Landa Lake	Lud-1	05-May-21	2	Procambarus sp.		1
2670	Landa Lake	Lud-1	05-May-21	2	Palaemonetes sp.		2
2670	Landa Lake	Lud-1	05-May-21	2	No fish collected		
2670	Landa Lake	Lud-1	05-May-21	3	Procambarus sp.		2
2670	Landa Lake	Lud-1	05-May-21	3	Palaemonetes sp.		3
2670	Landa Lake	Lud-1	05-May-21	3	No fish collected		
2670	Landa Lake	Lud-1	05-May-21	4	Palaemonetes sp.		1
2670	Landa Lake	Lud-1	05-May-21	4	Etheostoma fonticola	22	1
2670	Landa Lake	Lud-1	05-May-21	4	Etheostoma fonticola	16	1
2670	Landa Lake	Lud-1	05-May-21	5	Procambarus sp.		1
2670	Landa Lake	Lud-1	05-May-21	5	No fish collected		
2670	Landa Lake	Lud-1	05-May-21	6	No fish collected		
2670	Landa Lake	Lud-1	05-May-21	7	No fish collected		
2670	Landa Lake	Lud-1	05-May-21	8	Procambarus sp.		1
2670	Landa Lake	Lud-1	05-May-21	8	No fish collected		
2670	Landa Lake	Lud-1	05-May-21	9	No fish collected		
2670	Landa Lake	Lud-1	05-May-21	10	No fish collected		
2670	Landa Lake	Lud-1	05-May-21	11	Ameiurus natalis	20	1
2670	Landa Lake	Lud-1	05-May-21	12	No fish collected		
2670	Landa Lake	Lud-1	05-May-21	13	No fish collected		
2670	Landa Lake	Lud-1	05-May-21	14	Etheostoma fonticola	17	1
2670	Landa Lake	Lud-1	05-May-21	15	No fish collected		
2671	Landa Lake	Lud-2	05-May-21	1	Palaemonetes sp.		53
2671	Landa Lake	Lud-2	05-May-21	1	Procambarus sp.		3
2671	Landa Lake	Lud-2	05-May-21	1	Lepomis sp.	25	1
2671	Landa Lake	Lud-2	05-May-21	1	Lepomis sp.	20	1
2671	Landa Lake	Lud-2	05-May-21	1	Lepomis sp.	17	1
2671	Landa Lake	Lud-2	05-May-21	1	Gambusia sp.	15	1
2671	Landa Lake	Lud-2	05-May-21	1	Dionda nigrotaeniata	18	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	23	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	16	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	25	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	20	1

2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	14	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	23	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	15	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	17	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	14	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	15	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	13	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	17	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	17	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	17	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	26	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	21	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	18	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	18	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	13	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	13	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	14	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	12	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	21	1
2671	Landa Lake	Lud-2	05-May-21	1	Etheostoma fonticola	12	1
2671	Landa Lake	Lud-2	05-May-21	2	Palaemonetes sp.		41
2671	Landa Lake	Lud-2	05-May-21	2	Procambarus sp.		10
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	22	1
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	21	1
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	22	1
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	18	1
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	18	1
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	25	1
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	11	1
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	22	1
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	17	1
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	13	1
2671	Landa Lake	Lud-2	05-May-21	2	Etheostoma fonticola	12	1
2671	Landa Lake	Lud-2	05-May-21	2	Lepomis sp.	16	1
2671	Landa Lake	Lud-2	05-May-21	3	Procambarus sp.		8
2671	Landa Lake	Lud-2	05-May-21	3	Palaemonetes sp.		9
2671	Landa Lake	Lud-2	05-May-21	3	Etheostoma fonticola	27	1
2671	Landa Lake	Lud-2	05-May-21	3	Etheostoma fonticola	29	1
2671	Landa Lake	Lud-2	05-May-21	3	Etheostoma fonticola	24	1

2671	Landa Lake	Lud-2	05-May-21	3	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	3	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	3	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	3	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	3	Etheostoma fonticola	16	1
2671	Landa Lake	Lud-2	05-May-21	4	Procambarus sp.		16
2671	Landa Lake	Lud-2	05-May-21	4	Palaemonetes sp.		9
2671	Landa Lake	Lud-2	05-May-21	4	Etheostoma fonticola	18	1
2671	Landa Lake	Lud-2	05-May-21	4	Etheostoma fonticola	33	1
2671	Landa Lake	Lud-2	05-May-21	4	Etheostoma fonticola	18	1
2671	Landa Lake	Lud-2	05-May-21	4	Etheostoma fonticola	21	1
2671	Landa Lake	Lud-2	05-May-21	4	Etheostoma fonticola	14	1
2671	Landa Lake	Lud-2	05-May-21	4	Etheostoma fonticola	15	1
2671	Landa Lake	Lud-2	05-May-21	4	Etheostoma fonticola	23	1
2671	Landa Lake	Lud-2	05-May-21	4	Etheostoma fonticola	18	1
2671	Landa Lake	Lud-2	05-May-21	4	Etheostoma fonticola	23	1
2671	Landa Lake	Lud-2	05-May-21	4	Etheostoma fonticola	13	1
2671	Landa Lake	Lud-2	05-May-21	5	Procambarus sp.		4
2671	Landa Lake	Lud-2	05-May-21	5	Palaemonetes sp.		1
2671	Landa Lake	Lud-2	05-May-21	5	Etheostoma fonticola	29	1
2671	Landa Lake	Lud-2	05-May-21	5	Etheostoma fonticola	26	1
2671	Landa Lake	Lud-2	05-May-21	5	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	5	Etheostoma fonticola	22	1
2671	Landa Lake	Lud-2	05-May-21	5	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	5	Etheostoma fonticola	23	1
2671	Landa Lake	Lud-2	05-May-21	5	Etheostoma fonticola	22	1
2671	Landa Lake	Lud-2	05-May-21	6	Procambarus sp.		3
2671	Landa Lake	Lud-2	05-May-21	6	Palaemonetes sp.		1
2671	Landa Lake	Lud-2	05-May-21	6	Etheostoma fonticola	16	1
2671	Landa Lake	Lud-2	05-May-21	6	Etheostoma fonticola	14	1
2671	Landa Lake	Lud-2	05-May-21	7	Procambarus sp.		2
2671	Landa Lake	Lud-2	05-May-21	7	Etheostoma fonticola	15	1
2671	Landa Lake	Lud-2	05-May-21	7	Etheostoma fonticola	16	1
2671	Landa Lake	Lud-2	05-May-21	8	Etheostoma fonticola	27	1
2671	Landa Lake	Lud-2	05-May-21	8	Etheostoma fonticola	27	1
2671	Landa Lake	Lud-2	05-May-21	8	Etheostoma fonticola	24	1
2671	Landa Lake	Lud-2	05-May-21	9	Procambarus sp.		4
2671	Landa Lake	Lud-2	05-May-21	9	Palaemonetes sp.		2
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	27	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	26	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	18	1

2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	17	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	29	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	20	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	14	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	14	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	16	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	27	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	11	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	17	1
2671	Landa Lake	Lud-2	05-May-21	9	Etheostoma fonticola	12	1
2671	Landa Lake	Lud-2	05-May-21	10	Procambarus sp.		5
2671	Landa Lake	Lud-2	05-May-21	10	Palaemonetes sp.		4
2671	Landa Lake	Lud-2	05-May-21	10	Etheostoma fonticola	22	1
2671	Landa Lake	Lud-2	05-May-21	10	Etheostoma fonticola	15	1
2671	Landa Lake	Lud-2	05-May-21	10	Etheostoma fonticola	18	1
2671	Landa Lake	Lud-2	05-May-21	11	Procambarus sp.		2
2671	Landa Lake	Lud-2	05-May-21	11	Palaemonetes sp.		1
2671	Landa Lake	Lud-2	05-May-21	11	Etheostoma fonticola	25	1
2671	Landa Lake	Lud-2	05-May-21	11	Etheostoma fonticola	17	1
2671	Landa Lake	Lud-2	05-May-21	12	Procambarus sp.		3
2671	Landa Lake	Lud-2	05-May-21	12	Palaemonetes sp.		2
2671	Landa Lake	Lud-2	05-May-21	12	Etheostoma fonticola	22	1
2671	Landa Lake	Lud-2	05-May-21	12	Etheostoma fonticola	17	1
2671	Landa Lake	Lud-2	05-May-21	12	Etheostoma fonticola	15	1
2671	Landa Lake	Lud-2	05-May-21	12	Etheostoma fonticola	17	1
2671	Landa Lake	Lud-2	05-May-21	12	Etheostoma fonticola	28	1
2671	Landa Lake	Lud-2	05-May-21	13	Palaemonetes sp.		1
2671	Landa Lake	Lud-2	05-May-21	13	No fish collected		
2671	Landa Lake	Lud-2	05-May-21	14	Palaemonetes sp.		1
2671	Landa Lake	Lud-2	05-May-21	14	Procambarus sp.		1
2671	Landa Lake	Lud-2	05-May-21	14	No fish collected		
2671	Landa Lake	Lud-2	05-May-21	15	No fish collected		
2672	Landa Lake	Bry-1	05-May-21	1	Palaemonetes sp.		2
2672	Landa Lake	Bry-1	05-May-21	1	Procambarus sp.		1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	18	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	21	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	25	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	22	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	14	1

2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	18	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	13	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	22	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	18	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	26	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	23	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	29	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	18	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	23	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	23	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	20	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	14	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	23	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	22	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	30	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	19	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	22	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	17	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	19	1
2672	Landa Lake	Bry-1	05-May-21	2	Procambarus sp.		2
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	26	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	23	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	24	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	19	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	24	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	22	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	23	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	15	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	25	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	20	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	13	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	17	1
2672	Landa Lake	Bry-1	05-May-21	2	Etheostoma fonticola	18	1
2672	Landa Lake	Bry-1	05-May-21	3	Procambarus sp.		3
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	35	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	29	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	20	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	20	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	27	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	20	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	22	1

2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	12	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	21	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	19	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	15	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	17	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	24	1
2672	Landa Lake	Bry-1	05-May-21	3	Etheostoma fonticola	22	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	25	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	14	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	25	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	18	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	28	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	28	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	21	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	19	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	14	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	14	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	24	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	20	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	24	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	21	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	19	1
2672	Landa Lake	Bry-1	05-May-21	4	Etheostoma fonticola	13	1
2672	Landa Lake	Bry-1	05-May-21	5	Etheostoma fonticola	19	1
2672	Landa Lake	Bry-1	05-May-21	5	Etheostoma fonticola	20	1
2672	Landa Lake	Bry-1	05-May-21	5	Etheostoma fonticola	17	1
2672	Landa Lake	Bry-1	05-May-21	5	Etheostoma fonticola	14	1
2672	Landa Lake	Bry-1	05-May-21	5	Etheostoma fonticola	15	1
2672	Landa Lake	Bry-1	05-May-21	6	Procambarus sp.		1
2672	Landa Lake	Bry-1	05-May-21	6	Palaemonetes sp.		1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	14	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	13	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	30	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	19	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	19	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	17	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	21	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	23	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	24	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	18	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	13	1

2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	12	1
2672	Landa Lake	Bry-1	05-May-21	6	Etheostoma fonticola	10	1
2672	Landa Lake	Bry-1	05-May-21	7	No fish collected		
2672	Landa Lake	Bry-1	05-May-21	8	Etheostoma fonticola	25	1
2672	Landa Lake	Bry-1	05-May-21	8	Etheostoma fonticola	25	1
2672	Landa Lake	Bry-1	05-May-21	8	Etheostoma fonticola	20	1
2672	Landa Lake	Bry-1	05-May-21	8	Etheostoma fonticola	23	1
2672	Landa Lake	Bry-1	05-May-21	8	Etheostoma fonticola	13	1
2672	Landa Lake	Bry-1	05-May-21	8	Etheostoma fonticola	20	1
2672	Landa Lake	Bry-1	05-May-21	8	Etheostoma fonticola	16	1
2672	Landa Lake	Bry-1	05-May-21	8	Etheostoma fonticola	17	1
2672	Landa Lake	Bry-1	05-May-21	8	Etheostoma fonticola	17	1
2672	Landa Lake	Bry-1	05-May-21	8	Etheostoma fonticola	12	1
2672	Landa Lake	Bry-1	05-May-21	9	Etheostoma fonticola	14	1
2672	Landa Lake	Bry-1	05-May-21	9	Etheostoma fonticola	25	1
2672	Landa Lake	Bry-1	05-May-21	10	Procambarus sp.		1
2672	Landa Lake	Bry-1	05-May-21	10	Etheostoma fonticola	22	1
2672	Landa Lake	Bry-1	05-May-21	10	Etheostoma fonticola	23	1
2672	Landa Lake	Bry-1	05-May-21	11	Procambarus sp.		1
2672	Landa Lake	Bry-1	05-May-21	11	No fish collected		
2672	Landa Lake	Bry-1	05-May-21	12	Etheostoma fonticola	24	1
2672	Landa Lake	Bry-1	05-May-21	12	Etheostoma fonticola	23	1
2672	Landa Lake	Bry-1	05-May-21	12	Etheostoma fonticola	14	1
2672	Landa Lake	Bry-1	05-May-21	13	Etheostoma fonticola	27	1
2672	Landa Lake	Bry-1	05-May-21	14	Etheostoma fonticola	14	1
2672	Landa Lake	Bry-1	05-May-21	15	Etheostoma fonticola	10	1
2672	Landa Lake	Bry-1	05-May-21	16	No fish collected		
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	9	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	20	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	18	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	12	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	14	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	15	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	16	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	13	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	12	1
2672	Landa Lake	Bry-1	05-May-21	1	Etheostoma fonticola	11	1
2672	Landa Lake	Bry-1	05-May-21	2	Palaemonetes sp.		1
2673	Landa Lake	Bry-2	05-May-21	1	Palaemonetes sp.		9
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	32	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	15	1

2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	28	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	13	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	13	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	13	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	9	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	13	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	13	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	11	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	10	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	14	1
2673	Landa Lake	Bry-2	05-May-21	1	Etheostoma fonticola	12	1
2673	Landa Lake	Bry-2	05-May-21	1	Dionda nigrotaeniata	16	1
2673	Landa Lake	Bry-2	05-May-21	2	Palaemonetes sp.		2
2673	Landa Lake	Bry-2	05-May-21	2	Lepomis sp.	17	1
2673	Landa Lake	Bry-2	05-May-21	2	Lepomis sp.	16	1
2673	Landa Lake	Bry-2	05-May-21	2	Lepomis sp.	10	1
2673	Landa Lake	Bry-2	05-May-21	2	Etheostoma fonticola	21	1
2673	Landa Lake	Bry-2	05-May-21	2	Etheostoma fonticola	19	1
2673	Landa Lake	Bry-2	05-May-21	2	Etheostoma fonticola	20	1
2673	Landa Lake	Bry-2	05-May-21	3	Etheostoma fonticola	26	1
2673	Landa Lake	Bry-2	05-May-21	3	Etheostoma fonticola	25	1
2673	Landa Lake	Bry-2	05-May-21	3	Etheostoma fonticola	18	1
2673	Landa Lake	Bry-2	05-May-21	3	Etheostoma fonticola	24	1
2673	Landa Lake	Bry-2	05-May-21	3	Etheostoma fonticola	23	1
2673	Landa Lake	Bry-2	05-May-21	3	Etheostoma fonticola	21	1
2673	Landa Lake	Bry-2	05-May-21	3	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	3	Etheostoma fonticola	12	1
2673	Landa Lake	Bry-2	05-May-21	3	Etheostoma fonticola	11	1
2673	Landa Lake	Bry-2	05-May-21	4	Palaemonetes sp.		1
2673	Landa Lake	Bry-2	05-May-21	4	Gambusia sp.	13	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	22	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	17	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	20	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	22	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	30	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	23	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	23	1

2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	16	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	19	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	14	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	10	1
2673	Landa Lake	Bry-2	05-May-21	4	Etheostoma fonticola	17	1
2673	Landa Lake	Bry-2	05-May-21	5	Procambarus sp.		3
2673	Landa Lake	Bry-2	05-May-21	5	Palaemonetes sp.		2
2673	Landa Lake	Bry-2	05-May-21	5	Dionda nigrotaeniata	24	1
2673	Landa Lake	Bry-2	05-May-21	5	Lepomis sp.	11	1
2673	Landa Lake	Bry-2	05-May-21	5	Lepomis sp.	17	1
2673	Landa Lake	Bry-2	05-May-21	5	Gambusia sp.	9	1
2673	Landa Lake	Bry-2	05-May-21	5	Gambusia sp.	19	1
2673	Landa Lake	Bry-2	05-May-21	5	Gambusia sp.	11	1
2673	Landa Lake	Bry-2	05-May-21	5	Etheostoma fonticola	28	1
2673	Landa Lake	Bry-2	05-May-21	5	Etheostoma fonticola	18	1
2673	Landa Lake	Bry-2	05-May-21	5	Etheostoma fonticola	24	1
2673	Landa Lake	Bry-2	05-May-21	5	Etheostoma fonticola	14	1
2673	Landa Lake	Bry-2	05-May-21	5	Etheostoma fonticola	13	1
2673	Landa Lake	Bry-2	05-May-21	5	Etheostoma fonticola	11	1
2673	Landa Lake	Bry-2	05-May-21	5	Etheostoma fonticola	12	1
2673	Landa Lake	Bry-2	05-May-21	5	Etheostoma fonticola	9	1
2673	Landa Lake	Bry-2	05-May-21	6	Dionda nigrotaeniata	24	1
2673	Landa Lake	Bry-2	05-May-21	6	Etheostoma fonticola	16	1
2673	Landa Lake	Bry-2	05-May-21	6	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	6	Etheostoma fonticola	25	1
2673	Landa Lake	Bry-2	05-May-21	7	Gambusia sp.	15	1
2673	Landa Lake	Bry-2	05-May-21	7	Etheostoma fonticola	26	1
2673	Landa Lake	Bry-2	05-May-21	7	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	8	Etheostoma fonticola	16	1
2673	Landa Lake	Bry-2	05-May-21	8	Etheostoma fonticola	18	1
2673	Landa Lake	Bry-2	05-May-21	8	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	9	Etheostoma fonticola	32	1
2673	Landa Lake	Bry-2	05-May-21	9	Etheostoma fonticola	10	1
2673	Landa Lake	Bry-2	05-May-21	9	Etheostoma fonticola	21	1
2673	Landa Lake	Bry-2	05-May-21	9	Etheostoma fonticola	26	1
2673	Landa Lake	Bry-2	05-May-21	9	Etheostoma fonticola	13	1
2673	Landa Lake	Bry-2	05-May-21	9	Etheostoma fonticola		1
2673	Landa Lake	Bry-2	05-May-21	10	No fish collected		
2673	Landa Lake	Bry-2	05-May-21	11	Dionda nigrotaeniata	31	1
2673	Landa Lake	Bry-2	05-May-21	11	Etheostoma fonticola	21	1

2673	Landa Lake	Bry-2	05-May-21	11	Etheostoma fonticola	21	1
2673	Landa Lake	Bry-2	05-May-21	11	Etheostoma fonticola	17	1
2673	Landa Lake	Bry-2	05-May-21	11	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	11	Etheostoma fonticola	13	1
2673	Landa Lake	Bry-2	05-May-21	12	Lepomis miniatus	24	1
2673	Landa Lake	Bry-2	05-May-21	13	Etheostoma fonticola	20	1
2673	Landa Lake	Bry-2	05-May-21	13	Etheostoma fonticola	24	1
2673	Landa Lake	Bry-2	05-May-21	13	Etheostoma fonticola	20	1
2673	Landa Lake	Bry-2	05-May-21	13	Etheostoma fonticola	17	1
2673	Landa Lake	Bry-2	05-May-21	14	Etheostoma fonticola	25	1
2673	Landa Lake	Bry-2	05-May-21	14	Etheostoma fonticola	19	1
2673	Landa Lake	Bry-2	05-May-21	14	Etheostoma fonticola	11	1
2673	Landa Lake	Bry-2	05-May-21	15	Etheostoma fonticola	15	1
2673	Landa Lake	Bry-2	05-May-21	15	Etheostoma fonticola	20	1
2673	Landa Lake	Bry-2	05-May-21	16	Etheostoma fonticola	10	1
2673	Landa Lake	Bry-2	05-May-21	17	No fish collected		
2673	Landa Lake	Bry-2	05-May-21	2	Etheostoma fonticola	14	1
2673	Landa Lake	Bry-2	05-May-21	2	Etheostoma fonticola	20	1
2673	Landa Lake	Bry-2	05-May-21	2	Etheostoma fonticola	13	1
2673	Landa Lake	Bry-2	05-May-21	2	Etheostoma fonticola	14	1
2673	Landa Lake	Bry-2	05-May-21	2	Etheostoma fonticola	13	1
2673	Landa Lake	Bry-2	05-May-21	3	Procambarus sp.		1
2673	Landa Lake	Bry-2	05-May-21	6	Etheostoma fonticola	23	1
2673	Landa Lake	Bry-2	05-May-21	6	Etheostoma fonticola	20	1
2674	Landa Lake	Open-2	05-May-21	1	Gambusia sp.	27	1
2674	Landa Lake	Open-2	05-May-21	1	Gambusia sp.	19	1
2674	Landa Lake	Open-2	05-May-21	1	Astyanax mexicanus	27	1
2674	Landa Lake	Open-2	05-May-21	1	Astyanax mexicanus	27	1
2674	Landa Lake	Open-2	05-May-21	1	Astyanax mexicanus	23	1
2674	Landa Lake	Open-2	05-May-21	1	Astyanax mexicanus	22	1
2674	Landa Lake	Open-2	05-May-21	1	Etheostoma fonticola	18	1
2674	Landa Lake	Open-2	05-May-21	1	Etheostoma fonticola	10	1
2674	Landa Lake	Open-2	05-May-21	2	Gambusia sp.	23	1
2674	Landa Lake	Open-2	05-May-21	2	Gambusia sp.	25	1
2674	Landa Lake	Open-2	05-May-21	2	Palaemonetes sp.		1
2674	Landa Lake	Open-2	05-May-21	3	Gambusia sp.	18	1
2674	Landa Lake	Open-2	05-May-21	3	Gambusia sp.	22	1
2674	Landa Lake	Open-2	05-May-21	4	Etheostoma fonticola	31	1
2674	Landa Lake	Open-2	05-May-21	5	No fish collected		
2674	Landa Lake	Open-2	05-May-21	6	No fish collected		
2674	Landa Lake	Open-2	05-May-21	7	No fish collected		

2674	Landa Lake	Open-2	05-May-21	8	No fish collected		
2674	Landa Lake	Open-2	05-May-21	9	No fish collected		
2674	Landa Lake	Open-2	05-May-21	10	No fish collected		
2674	Landa Lake	Open-2	05-May-21	11	No fish collected		
2674	Landa Lake	Open-2	05-May-21	12	No fish collected		
2674	Landa Lake	Open-2	05-May-21	13	No fish collected		
2674	Landa Lake	Open-2	05-May-21	14	No fish collected		
2674	Landa Lake	Open-2	05-May-21	15	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	8	Procambarus sp.		1
2716	Landa Lake	Sagi-2	25-Oct-21	8	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	9	Ameiurus natalis	73	1
2716	Landa Lake	Sagi-2	25-Oct-21	10	Lepomis miniatus	55	1
2716	Landa Lake	Sagi-2	25-Oct-21	11	Procambarus sp.		1
2716	Landa Lake	Sagi-2	25-Oct-21	11	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	12	Procambarus sp.		1
2716	Landa Lake	Sagi-2	25-Oct-21	12	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	13	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	14	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	15	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	1	Micropterus salmoides	59	1
2716	Landa Lake	Sagi-2	25-Oct-21	1	Lepomis miniatus	32	1
2716	Landa Lake	Sagi-2	25-Oct-21	1	Lepomis miniatus	32	1
2716	Landa Lake	Sagi-2	25-Oct-21	1	Lepomis miniatus	35	1
2716	Landa Lake	Sagi-2	25-Oct-21	1	Lepomis miniatus	50	1
2716	Landa Lake	Sagi-2	25-Oct-21	1	Lepomis miniatus	30	1
2716	Landa Lake	Sagi-2	25-Oct-21	1	Procambarus sp.		2
2716	Landa Lake	Sagi-2	25-Oct-21	2	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	3	Procambarus sp.		1
2716	Landa Lake	Sagi-2	25-Oct-21	3	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	4	Procambarus sp.		1
2716	Landa Lake	Sagi-2	25-Oct-21	4	Lepomis miniatus	60	1
2716	Landa Lake	Sagi-2	25-Oct-21	5	Procambarus sp.		1
2716	Landa Lake	Sagi-2	25-Oct-21	5	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	6	Procambarus sp.		1
2716	Landa Lake	Sagi-2	25-Oct-21	6	No fish collected		
2716	Landa Lake	Sagi-2	25-Oct-21	7	Procambarus sp.		1
2716	Landa Lake	Sagi-2	25-Oct-21	7	No fish collected		
2717	Landa Lake	Open-1	25-Oct-21	1	No fish collected		
2717	Landa Lake	Open-1	25-Oct-21	2	No fish collected		
2717	Landa Lake	Open-1	25-Oct-21	3	No fish collected		
2717	Landa Lake	Open-1	25-Oct-21	4	No fish collected		

2717	Landa Lake	Open-1	25-Oct-21	5	No fish collected		
2717	Landa Lake	Open-1	25-Oct-21	6	No fish collected		
2717	Landa Lake	Open-1	25-Oct-21	7	No fish collected		
2717	Landa Lake	Open-1	25-Oct-21	8	No fish collected		
2717	Landa Lake	Open-1	25-Oct-21	9	No fish collected		
2717	Landa Lake	Open-1	25-Oct-21	10	No fish collected		
2718	Landa Lake	Open-2	25-Oct-21	1	No fish collected		
2718	Landa Lake	Open-2	25-Oct-21	2	No fish collected		
2718	Landa Lake	Open-2	25-Oct-21	3	No fish collected		
2718	Landa Lake	Open-2	25-Oct-21	4	No fish collected		
2718	Landa Lake	Open-2	25-Oct-21	5	No fish collected		
2718	Landa Lake	Open-2	25-Oct-21	6	No fish collected		
2718	Landa Lake	Open-2	25-Oct-21	7	No fish collected		
2718	Landa Lake	Open-2	25-Oct-21	8	No fish collected		
2718	Landa Lake	Open-2	25-Oct-21	9	No fish collected		
2718	Landa Lake	Open-2	25-Oct-21	10	No fish collected		
2719	Landa Lake	Vall-1	25-Oct-21	1	Gambusia sp.	15	1
2719	Landa Lake	Vall-1	25-Oct-21	1	Gambusia sp.	15	1
2719	Landa Lake	Vall-1	25-Oct-21	2	Lepomis miniatus	120	1
2719	Landa Lake	Vall-1	25-Oct-21	2	Gambusia sp.	20	1
2719	Landa Lake	Vall-1	25-Oct-21	2	Gambusia sp.	15	1
2719	Landa Lake	Vall-1	25-Oct-21	2	Gambusia sp.	12	1
2719	Landa Lake	Vall-1	25-Oct-21	2	Gambusia sp.	10	1
2719	Landa Lake	Vall-1	25-Oct-21	2	Gambusia sp.	15	1
2719	Landa Lake	Vall-1	25-Oct-21	2	Gambusia sp.	12	1
2719	Landa Lake	Vall-1	25-Oct-21	2	Gambusia sp.	15	1
2719	Landa Lake	Vall-1	25-Oct-21	2	Palaemonetes sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	3	Lepomis miniatus	124	1
2719	Landa Lake	Vall-1	25-Oct-21	3	Gambusia sp.	21	1
2719	Landa Lake	Vall-1	25-Oct-21	3	Gambusia sp.	30	1
2719	Landa Lake	Vall-1	25-Oct-21	3	Gambusia sp.	15	1
2719	Landa Lake	Vall-1	25-Oct-21	3	Gambusia sp.	15	1
2719	Landa Lake	Vall-1	25-Oct-21	3	Gambusia sp.	10	1
2719	Landa Lake	Vall-1	25-Oct-21	3	Palaemonetes sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	4	Gambusia sp.	20	1
2719	Landa Lake	Vall-1	25-Oct-21	4	Gambusia sp.	21	1
2719	Landa Lake	Vall-1	25-Oct-21	4	Gambusia sp.	21	1
2719	Landa Lake	Vall-1	25-Oct-21	4	Gambusia sp.	15	1
2719	Landa Lake	Vall-1	25-Oct-21	4	Palaemonetes sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	5	Palaemonetes sp.		3
2719	Landa Lake	Vall-1	25-Oct-21	5	No fish collected		

2719	Landa Lake	Vall-1	25-Oct-21	6	Procambarus sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	6	No fish collected		
2719	Landa Lake	Vall-1	25-Oct-21	7	Lepomis miniatus	95	1
2719	Landa Lake	Vall-1	25-Oct-21	7	Gambusia sp.	9	1
2719	Landa Lake	Vall-1	25-Oct-21	7	Palaemonetes sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	8	Palaemonetes sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	8	No fish collected		
2719	Landa Lake	Vall-1	25-Oct-21	9	Lepomis miniatus	113	1
2719	Landa Lake	Vall-1	25-Oct-21	9	Gambusia sp.	31	1
2719	Landa Lake	Vall-1	25-Oct-21	10	Gambusia sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	11	Procambarus sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	11	Palaemonetes sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	11	No fish collected		
2719	Landa Lake	Vall-1	25-Oct-21	12	Procambarus sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	12	Gambusia sp.		1
2719	Landa Lake	Vall-1	25-Oct-21	13	No fish collected		
2719	Landa Lake	Vall-1	25-Oct-21	14	Lepomis miniatus	112	1
2719	Landa Lake	Vall-1	25-Oct-21	15	No fish collected		
2720	Landa Lake	Vall-2	25-Oct-21	1	Lepomis miniatus	25	1
2720	Landa Lake	Vall-2	25-Oct-21	1	Gambusia sp.	47	1
2720	Landa Lake	Vall-2	25-Oct-21	1	Palaemonetes sp.		4
2720	Landa Lake	Vall-2	25-Oct-21	2	Palaemonetes sp.		1
2720	Landa Lake	Vall-2	25-Oct-21	2	Gambusia sp.	40	1
2720	Landa Lake	Vall-2	25-Oct-21	3	Palaemonetes sp.		1
2720	Landa Lake	Vall-2	25-Oct-21	3	No fish collected		
2720	Landa Lake	Vall-2	25-Oct-21	4	Gambusia sp.	18	1
2720	Landa Lake	Vall-2	25-Oct-21	4	Etheostoma fonticola	30	1
2720	Landa Lake	Vall-2	25-Oct-21	5	Gambusia sp.	21	1
2720	Landa Lake	Vall-2	25-Oct-21	5	Gambusia sp.	23	1
2720	Landa Lake	Vall-2	25-Oct-21	5	Palaemonetes sp.		2
2720	Landa Lake	Vall-2	25-Oct-21	6	Palaemonetes sp.		1
2720	Landa Lake	Vall-2	25-Oct-21	6	No fish collected		
2720	Landa Lake	Vall-2	25-Oct-21	7	Palaemonetes sp.		1
2720	Landa Lake	Vall-2	25-Oct-21	7	No fish collected		
2720	Landa Lake	Vall-2	25-Oct-21	8	No fish collected		
2720	Landa Lake	Vall-2	25-Oct-21	9	Procambarus sp.		1
2720	Landa Lake	Vall-2	25-Oct-21	9	No fish collected		
2720	Landa Lake	Vall-2	25-Oct-21	10	Palaemonetes sp.		1
2720	Landa Lake	Vall-2	25-Oct-21	10	No fish collected		
2720	Landa Lake	Vall-2	25-Oct-21	11	Palaemonetes sp.		1
2720	Landa Lake	Vall-2	25-Oct-21	11	No fish collected		

2720	Landa Lake	Vall-2	25-Oct-21	12	No fish collected		
2720	Landa Lake	Vall-2	25-Oct-21	13	No fish collected		
2720	Landa Lake	Vall-2	25-Oct-21	14	No fish collected		
2720	Landa Lake	Vall-2	25-Oct-21	15	No fish collected		
2721	Landa Lake	Bryo-1	26-Oct-21	1	Etheostoma fonticola	22	1
2721	Landa Lake	Bryo-1	26-Oct-21	1	Etheostoma fonticola	30	1
2721	Landa Lake	Bryo-1	26-Oct-21	1	Etheostoma fonticola	20	1
2721	Landa Lake	Bryo-1	26-Oct-21	2	Etheostoma fonticola	17	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	29	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	25	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	23	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	24	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	24	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	22	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	26	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	25	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	28	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	22	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	24	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	23	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	22	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	21	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	23	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	24	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	16	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Etheostoma fonticola	15	1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Palaemonetes sp.		1
2721	Landa Lake	Bryo-1	26-Oct-21	3	Procambarus sp.		1
2721	Landa Lake	Bryo-1	26-Oct-21	4	Etheostoma fonticola	27	1
2721	Landa Lake	Bryo-1	26-Oct-21	4	Etheostoma fonticola	12	1
2721	Landa Lake	Bryo-1	26-Oct-21	4	Etheostoma fonticola	9	1
2721	Landa Lake	Bryo-1	26-Oct-21	4	Etheostoma fonticola	14	1
2721	Landa Lake	Bryo-1	26-Oct-21	4	Etheostoma fonticola	13	1
2721	Landa Lake	Bryo-1	26-Oct-21	4	Procambarus sp.		1
2721	Landa Lake	Bryo-1	26-Oct-21	4	Palaemonetes sp.		1
2721	Landa Lake	Bryo-1	26-Oct-21	5	Etheostoma fonticola	24	1
2721	Landa Lake	Bryo-1	26-Oct-21	5	Etheostoma fonticola	26	1
2721	Landa Lake	Bryo-1	26-Oct-21	5	Etheostoma fonticola	29	1
2721	Landa Lake	Bryo-1	26-Oct-21	5	Procambarus sp.		1
2721	Landa Lake	Bryo-1	26-Oct-21	6	No fish collected		
2721	Landa Lake	Bryo-1	26-Oct-21	7	Etheostoma fonticola	12	1

2721	Landa Lake	Bryo-1	26-Oct-21	7	Etheostoma fonticola	22	1
2721	Landa Lake	Bryo-1	26-Oct-21	7	Etheostoma fonticola	16	1
2721	Landa Lake	Bryo-1	26-Oct-21	7	Etheostoma fonticola	12	1
2721	Landa Lake	Bryo-1	26-Oct-21	7	Procambarus sp.		1
2721	Landa Lake	Bryo-1	26-Oct-21	8	Etheostoma fonticola	15	1
2721	Landa Lake	Bryo-1	26-Oct-21	8	Etheostoma fonticola	13	1
2721	Landa Lake	Bryo-1	26-Oct-21	8	Palaemonetes sp.		1
2721	Landa Lake	Bryo-1	26-Oct-21	9	Etheostoma fonticola	28	1
2721	Landa Lake	Bryo-1	26-Oct-21	10	No fish collected		
2721	Landa Lake	Bryo-1	26-Oct-21	11	Etheostoma fonticola	24	1
2721	Landa Lake	Bryo-1	26-Oct-21	11	Etheostoma fonticola	22	1
2721	Landa Lake	Bryo-1	26-Oct-21	11	Etheostoma fonticola	16	1
2721	Landa Lake	Bryo-1	26-Oct-21	11	Procambarus sp.		1
2721	Landa Lake	Bryo-1	26-Oct-21	12	Etheostoma fonticola	26	1
2721	Landa Lake	Bryo-1	26-Oct-21	12	Etheostoma fonticola	27	1
2721	Landa Lake	Bryo-1	26-Oct-21	12	Etheostoma fonticola	22	1
2721	Landa Lake	Bryo-1	26-Oct-21	12	Procambarus sp.		3
2721	Landa Lake	Bryo-1	26-Oct-21	13	Etheostoma fonticola	23	1
2721	Landa Lake	Bryo-1	26-Oct-21	13	Etheostoma fonticola	15	1
2721	Landa Lake	Bryo-1	26-Oct-21	14	Etheostoma fonticola	25	1
2721	Landa Lake	Bryo-1	26-Oct-21	14	Etheostoma fonticola	23	1
2721	Landa Lake	Bryo-1	26-Oct-21	15	Etheostoma fonticola	28	1
2721	Landa Lake	Bryo-1	26-Oct-21	15	Etheostoma fonticola	29	1
2721	Landa Lake	Bryo-1	26-Oct-21	15	Etheostoma fonticola	26	1
2721	Landa Lake	Bryo-1	26-Oct-21	15	Etheostoma fonticola	22	1
2721	Landa Lake	Bryo-1	26-Oct-21	15	Etheostoma fonticola	27	1
2721	Landa Lake	Bryo-1	26-Oct-21	15	Etheostoma fonticola	24	1
2721	Landa Lake	Bryo-1	26-Oct-21	15	Etheostoma fonticola	14	1
2721	Landa Lake	Bryo-1	26-Oct-21	15	Etheostoma fonticola	14	1
2721	Landa Lake	Bryo-1	26-Oct-21	16	No fish collected		
2644	Upper Spring Run	Open-1	04-May-21	1	Procambarus sp.		1
2644	Upper Spring Run	Open-1	04-May-21	1	No fish collected		
2644	Upper Spring Run	Open-1	04-May-21	2	No fish collected		
2644	Upper Spring Run	Open-1	04-May-21	3	No fish collected		
2644	Upper Spring Run	Open-1	04-May-21	4	No fish collected		
2644	Upper Spring Run	Open-1	04-May-21	5	No fish collected		

2644	Upper Spring Run	Open-1	04-May-21	6	No fish collected		
2644	Upper Spring Run	Open-1	04-May-21	7	No fish collected		
2644	Upper Spring Run	Open-1	04-May-21	8	No fish collected		
2644	Upper Spring Run	Open-1	04-May-21	9	No fish collected		
2644	Upper Spring Run	Open-1	04-May-21	10	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	1	Micropterus salmoides	34	1
2645	Upper Spring Run	Open-2	04-May-21	2	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	3	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	4	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	5	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	6	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	7	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	8	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	9	Micropterus salmoides	26	1
2645	Upper Spring Run	Open-2	04-May-21	10	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	11	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	12	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	13	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	14	No fish collected		
2645	Upper Spring Run	Open-2	04-May-21	15	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	1	Etheostoma fonticola	32	1
2646	Upper Spring Run	Bry-1	04-May-21	2	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	3	Micropterus salmoides	40	1

2646	Upper Spring Run	Bry-1	04-May-21	3	Astyanax mexicanus	30	1
2646	Upper Spring Run	Bry-1	04-May-21	3	Etheostoma fonticola	29	1
2646	Upper Spring Run	Bry-1	04-May-21	4	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	5	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	6	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	7	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	8	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	9	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	10	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	11	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	12	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	13	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	14	No fish collected		
2646	Upper Spring Run	Bry-1	04-May-21	15	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	1	Micropterus salmoides	29	1
2647	Upper Spring Run	Bry-2	04-May-21	2	Palaemonetes sp.		1
2647	Upper Spring Run	Bry-2	04-May-21	2	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	3	Micropterus salmoides	46	1
2647	Upper Spring Run	Bry-2	04-May-21	4	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	5	Procambarus sp.		1
2647	Upper Spring Run	Bry-2	04-May-21	5	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	6	Micropterus salmoides	27	1
2647	Upper Spring Run	Bry-2	04-May-21	7	No fish collected		

2647	Upper Spring Run	Bry-2	04-May-21	8	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	9	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	10	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	10	Palaemonetes sp.		1
2647	Upper Spring Run	Bry-2	04-May-21	11	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	12	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	13	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	14	No fish collected		
2647	Upper Spring Run	Bry-2	04-May-21	15	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	1	Micropterus salmoides	31	1
2648	Upper Spring Run	Sag-1	04-May-21	2	Procambarus sp.		2
2648	Upper Spring Run	Sag-1	04-May-21	2	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	3	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	4	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	5	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	6	Procambarus sp.		1
2648	Upper Spring Run	Sag-1	04-May-21	6	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	7	Procambarus sp.		1
2648	Upper Spring Run	Sag-1	04-May-21	7	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	8	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	9	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	10	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	11	No fish collected		

2648	Upper Spring Run	Sag-1	04-May-21	12	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	13	Procambarus sp.		1
2648	Upper Spring Run	Sag-1	04-May-21	13	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	14	No fish collected		
2648	Upper Spring Run	Sag-1	04-May-21	15	No fish collected		
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	26	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	20	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	26	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	1	Etheostoma fonticola	15	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Micropterus salmoides	27	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Micropterus salmoides	26	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Palaemonetes sp.		1
2649	Upper Spring Run	Lud-1	04-May-21	1	Procambarus sp.		2
2649	Upper Spring Run	Lud-1	04-May-21	2	Etheostoma fonticola	28	1
2649	Upper Spring Run	Lud-1	04-May-21	2	Etheostoma fonticola	26	1

2649	Upper Spring Run	Lud-1	04-May-21	2	Etheostoma fonticola	29	1
2649	Upper Spring Run	Lud-1	04-May-21	2	Micropterus salmoides	33	1
2649	Upper Spring Run	Lud-1	04-May-21	2	Micropterus salmoides	32	1
2649	Upper Spring Run	Lud-1	04-May-21	2	Micropterus salmoides	37	1
2649	Upper Spring Run	Lud-1	04-May-21	2	Micropterus salmoides	32	1
2649	Upper Spring Run	Lud-1	04-May-21	2	Astyanax mexicanus	30	1
2649	Upper Spring Run	Lud-1	04-May-21	2	Astyanax mexicanus	27	1
2649	Upper Spring Run	Lud-1	04-May-21	2	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	2	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	2	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	2	Procambarus sp.		1
2649	Upper Spring Run	Lud-1	04-May-21	2	Palaemonetes sp.		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Micropterus salmoides	30	1
2649	Upper Spring Run	Lud-1	04-May-21	3	Micropterus salmoides	30	1
2649	Upper Spring Run	Lud-1	04-May-21	3	Lepomis sp.	19	1
2649	Upper Spring Run	Lud-1	04-May-21	3	Lepomis sp.	19	1
2649	Upper Spring Run	Lud-1	04-May-21	3	Astyanax mexicanus	21	1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1

2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	3	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	4	Micropterus salmoides	40	1
2649	Upper Spring Run	Lud-1	04-May-21	4	Micropterus salmoides	32	1

2649	Upper Spring Run	Lud-1	04-May-21	4	Etheostoma fonticola	20	1
2649	Upper Spring Run	Lud-1	04-May-21	4	Etheostoma fonticola	22	1
2649	Upper Spring Run	Lud-1	04-May-21	4	Etheostoma fonticola	17	1
2649	Upper Spring Run	Lud-1	04-May-21	4	Procambarus sp.		2
2649	Upper Spring Run	Lud-1	04-May-21	4	Palaemonetes sp.		2
2649	Upper Spring Run	Lud-1	04-May-21	4	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	4	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	4	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	4	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	4	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	5	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	5	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	5	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	5	Procambarus sp.		1
2649	Upper Spring Run	Lud-1	04-May-21	6	Etheostoma fonticola	30	1
2649	Upper Spring Run	Lud-1	04-May-21	6	Etheostoma fonticola	29	1
2649	Upper Spring Run	Lud-1	04-May-21	6	Etheostoma fonticola	21	1
2649	Upper Spring Run	Lud-1	04-May-21	6	Micropterus salmoides	24	1
2649	Upper Spring Run	Lud-1	04-May-21	6	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	6	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	6	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	7	Procambarus sp.		1
2649	Upper Spring Run	Lud-1	04-May-21	7	Micropterus salmoides	25	1

2649	Upper Spring Run	Lud-1	04-May-21	7	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	8	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	9	Etheostoma fonticola	30	1
2649	Upper Spring Run	Lud-1	04-May-21	9	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	9	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	9	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	9	Palaemonetes sp.		1
2649	Upper Spring Run	Lud-1	04-May-21	10	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	10	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	10	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	10	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	10	Procambarus sp.		2
2649	Upper Spring Run	Lud-1	04-May-21	10	Palaemonetes sp.		1
2649	Upper Spring Run	Lud-1	04-May-21	11	Procambarus sp.		1
2649	Upper Spring Run	Lud-1	04-May-21	11	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	11	Etheostoma fonticola	24	1
2649	Upper Spring Run	Lud-1	04-May-21	12	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	12	Dionda nigrotaeniata		1
2649	Upper Spring Run	Lud-1	04-May-21	13	No fish collected		
2649	Upper Spring Run	Lud-1	04-May-21	14	No fish collected		
2649	Upper Spring Run	Lud-1	04-May-21	15	No fish collected		
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	32	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	25	1

2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	21	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	20	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	29	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	25	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	38	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	34	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	18	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	20	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	26	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	24	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	25	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	18	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	22	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	25	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	20	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	33	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	27	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	24	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	32	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	25	1
2649	Upper Spring Run	Lud-1	04-May-21	1	Dionda nigrotaeniata	24	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Lepomis miniatus	20	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Lepomis miniatus	35	1

2650	Upper Spring Run	Sag-2	04-May-21	1	Lepomis sp.	19	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Lepomis sp.	15	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Lepomis sp.	16	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Lepomis sp.	12	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Lepomis sp.	20	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Lepomis sp.	18	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Lepomis sp.	15	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Lepomis sp.	12	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Micropterus salmoides	19	1
2650	Upper Spring Run	Sag-2	04-May-21	1	Procambarus sp.		4
2650	Upper Spring Run	Sag-2	04-May-21	2	Dionda nigrotaeniata	18	1
2650	Upper Spring Run	Sag-2	04-May-21	2	Dionda nigrotaeniata	38	1
2650	Upper Spring Run	Sag-2	04-May-21	2	Micropterus salmoides	34	1
2650	Upper Spring Run	Sag-2	04-May-21	2	Procambarus sp.		1
2650	Upper Spring Run	Sag-2	04-May-21	3	Procambarus sp.		3
2650	Upper Spring Run	Sag-2	04-May-21	3	Dionda nigrotaeniata	24	1
2650	Upper Spring Run	Sag-2	04-May-21	3	Dionda nigrotaeniata	34	1
2650	Upper Spring Run	Sag-2	04-May-21	3	Micropterus salmoides	35	1
2650	Upper Spring Run	Sag-2	04-May-21	4	Procambarus sp.		2
2650	Upper Spring Run	Sag-2	04-May-21	4	No fish collected		
2650	Upper Spring Run	Sag-2	04-May-21	5	Procambarus sp.		2
2650	Upper Spring Run	Sag-2	04-May-21	5	No fish collected		
2650	Upper Spring Run	Sag-2	04-May-21	6	Dionda nigrotaeniata	30	1

2650	Upper Spring Run	Sag-2	04-May-21	6	Dionda nigrotaeniata	32	1
2650	Upper Spring Run	Sag-2	04-May-21	7	Dionda nigrotaeniata	31	1
2650	Upper Spring Run	Sag-2	04-May-21	8	Dionda nigrotaeniata	21	1
2650	Upper Spring Run	Sag-2	04-May-21	9	No fish collected		
2650	Upper Spring Run	Sag-2	04-May-21	10	Procambarus sp.		1
2650	Upper Spring Run	Sag-2	04-May-21	10	No fish collected		
2650	Upper Spring Run	Sag-2	04-May-21	11	No fish collected		
2650	Upper Spring Run	Sag-2	04-May-21	12	Lepomis sp.	17	1
2650	Upper Spring Run	Sag-2	04-May-21	13	Etheostoma fonticola	24	1
2650	Upper Spring Run	Sag-2	04-May-21	13	Dionda nigrotaeniata	25	1
2650	Upper Spring Run	Sag-2	04-May-21	13	Dionda nigrotaeniata	38	1
2650	Upper Spring Run	Sag-2	04-May-21	14	No fish collected		
2650	Upper Spring Run	Sag-2	04-May-21	15	No fish collected		
2651	Upper New Channel Reach	Hyg-1	06-May-21	1	Lepomis miniatus	87	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	1	Ameiurus natalis	141	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	1	Etheostoma fonticola	25	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	1	Etheostoma fonticola	31	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	1	Etheostoma fonticola	12	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	1	Etheostoma fonticola	25	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	1	Etheostoma fonticola	14	1

2651	Upper New Channel Reach	Hyg-1	06-May-21	1	Etheostoma fonticola	17	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	1	Palaemonetes sp.		89
2651	Upper New Channel Reach	Hyg-1	06-May-21	1	Procambarus sp.		9
2651	Upper New Channel Reach	Hyg-1	06-May-21	2	Lepomis miniatus	84	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	2	Lepomis miniatus	30	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	2	Herichthys cyanoguttatus	20	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	2	Etheostoma fonticola	31	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	2	Etheostoma fonticola	23	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	2	Etheostoma fonticola	28	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	2	Etheostoma fonticola	31	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	2	Etheostoma fonticola	15	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	2	Palaemonetes sp.		26
2651	Upper New Channel Reach	Hyg-1	06-May-21	2	Procambarus sp.		6
2651	Upper New Channel Reach	Hyg-1	06-May-21	3	Etheostoma fonticola	20	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	3	Etheostoma fonticola	19	1

2651	Upper New Channel Reach	Hyg-1	06-May-21	3	Palaemonetes sp.		17
2651	Upper New Channel Reach	Hyg-1	06-May-21	3	Procambarus sp.		3
2651	Upper New Channel Reach	Hyg-1	06-May-21	4	Lepomis miniatus	78	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	4	Palaemonetes sp.		15
2651	Upper New Channel Reach	Hyg-1	06-May-21	4	Procambarus sp.		7
2651	Upper New Channel Reach	Hyg-1	06-May-21	5	Etheostoma fonticola	15	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	5	Palaemonetes sp.		10
2651	Upper New Channel Reach	Hyg-1	06-May-21	5	Procambarus sp.		4
2651	Upper New Channel Reach	Hyg-1	06-May-21	6	Procambarus sp.		3
2651	Upper New Channel Reach	Hyg-1	06-May-21	6	No fish collected		
2651	Upper New Channel Reach	Hyg-1	06-May-21	7	No fish collected		
2651	Upper New Channel Reach	Hyg-1	06-May-21	7	Palaemonetes sp.		8
2651	Upper New Channel Reach	Hyg-1	06-May-21	8	Etheostoma fonticola	32	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	8	Etheostoma fonticola	16	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	8	Etheostoma fonticola	26	1

2651	Upper New Channel Reach	Hyg-1	06-May-21	8	Etheostoma fonticola	26	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	8	Procambarus sp.		11
2651	Upper New Channel Reach	Hyg-1	06-May-21	8	Palaemonetes sp.		31
2651	Upper New Channel Reach	Hyg-1	06-May-21	9	No fish collected		
2651	Upper New Channel Reach	Hyg-1	06-May-21	9	Palaemonetes sp.		12
2651	Upper New Channel Reach	Hyg-1	06-May-21	9	Procambarus sp.		2
2651	Upper New Channel Reach	Hyg-1	06-May-21	10	Etheostoma fonticola	18	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	10	Etheostoma fonticola	26	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	10	Palaemonetes sp.		9
2651	Upper New Channel Reach	Hyg-1	06-May-21	10	Procambarus sp.		2
2651	Upper New Channel Reach	Hyg-1	06-May-21	11	Etheostoma fonticola	28	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	11	Etheostoma fonticola	20	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	11	Etheostoma fonticola	18	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	11	Procambarus sp.		1
2651	Upper New Channel Reach	Hyg-1	06-May-21	11	Palaemonetes sp.		7

2651	Upper New Channel Reach	Hyg-1	06-May-21	12	Etheostoma fonticola	16	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	12	Etheostoma fonticola	20	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	12	Etheostoma fonticola	20	1
2651	Upper New Channel Reach	Hyg-1	06-May-21	12	Palaemonetes sp.		7
2651	Upper New Channel Reach	Hyg-1	06-May-21	12	Procambarus sp.		2
2651	Upper New Channel Reach	Hyg-1	06-May-21	13	No fish collected		
2651	Upper New Channel Reach	Hyg-1	06-May-21	13	Procambarus sp.		4
2651	Upper New Channel Reach	Hyg-1	06-May-21	13	Palaemonetes sp.		3
2651	Upper New Channel Reach	Hyg-1	06-May-21	14	Palaemonetes sp.		5
2651	Upper New Channel Reach	Hyg-1	06-May-21	14	Procambarus sp.		2
2651	Upper New Channel Reach	Hyg-1	06-May-21	15	Palaemonetes sp.		5
2651	Upper New Channel Reach	Hyg-1	06-May-21	15	Procambarus sp.		5
2651	Upper New Channel Reach	Hyg-1	06-May-21	11	Etheostoma fonticola	21	1
2652	Upper New Channel Reach	Open-1	06-May-21	1	No fish collected		
2652	Upper New Channel Reach	Open-1	06-May-21	2	No fish collected		

2652	Upper New Channel Reach	Open-1	06-May-21	3	No fish collected		
2652	Upper New Channel Reach	Open-1	06-May-21	4	No fish collected		
2652	Upper New Channel Reach	Open-1	06-May-21	5	No fish collected		
2652	Upper New Channel Reach	Open-1	06-May-21	6	No fish collected		
2652	Upper New Channel Reach	Open-1	06-May-21	7	No fish collected		
2652	Upper New Channel Reach	Open-1	06-May-21	8	No fish collected		
2652	Upper New Channel Reach	Open-1	06-May-21	9	No fish collected		
2652	Upper New Channel Reach	Open-1	06-May-21	10	No fish collected		
2653	Upper New Channel Reach	Open-2	06-May-21	1	No fish collected		
2653	Upper New Channel Reach	Open-2	06-May-21	2	No fish collected		
2653	Upper New Channel Reach	Open-2	06-May-21	3	No fish collected		
2653	Upper New Channel Reach	Open-2	06-May-21	4	No fish collected		
2653	Upper New Channel Reach	Open-2	06-May-21	5	No fish collected		
2653	Upper New Channel Reach	Open-2	06-May-21	6	No fish collected		
2653	Upper New Channel Reach	Open-2	06-May-21	7	No fish collected		

2653	Upper New Channel Reach	Open-2	06-May-21	8	No fish collected		
2653	Upper New Channel Reach	Open-2	06-May-21	9	No fish collected		
2653	Upper New Channel Reach	Open-2	06-May-21	10	No fish collected		
2654	Upper New Channel Reach	Hyg-2	06-May-21	1	Herichthys cyanoguttatus	61	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	1	Herichthys cyanoguttatus	65	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	1	Lepomis miniatus	79	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	1	Lepomis miniatus	52	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	1	Lepomis miniatus	34	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	1	Lepomis miniatus	40	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	1	Astyanax mexicanus	35	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	2	Procambarus sp.		1
2654	Upper New Channel Reach	Hyg-2	06-May-21	2	Palaemonetes sp.		1
2654	Upper New Channel Reach	Hyg-2	06-May-21	2	Micropterus salmoides	31	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	3	Micropterus salmoides	100	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	3	Lepomis miniatus	76	1

2654	Upper New Channel Reach	Hyg-2	06-May-21	3	Procambarus sp.		3
2654	Upper New Channel Reach	Hyg-2	06-May-21	4	Procambarus sp.		1
2654	Upper New Channel Reach	Hyg-2	06-May-21	4	No fish collected		
2654	Upper New Channel Reach	Hyg-2	06-May-21	5	Procambarus sp.		1
2654	Upper New Channel Reach	Hyg-2	06-May-21	5	No fish collected		
2654	Upper New Channel Reach	Hyg-2	06-May-21	6	Micropterus salmoides	54	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	6	Procambarus sp.		1
2654	Upper New Channel Reach	Hyg-2	06-May-21	6	Lepomis miniatus	24	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	6	Etheostoma fonticola	16	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	7	Lepomis miniatus	91	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	7	Procambarus sp.		2
2654	Upper New Channel Reach	Hyg-2	06-May-21	8	Lepomis miniatus	54	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	8	Lepomis miniatus	60	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	9	No fish collected		
2654	Upper New Channel Reach	Hyg-2	06-May-21	10	Procambarus sp.		2

2654	Upper New Channel Reach	Hyg-2	06-May-21	10	Lepomis cyanellus	61	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	11	Lepomis miniatus	54	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	11	Procambarus sp.		1
2654	Upper New Channel Reach	Hyg-2	06-May-21	12	No fish collected		
2654	Upper New Channel Reach	Hyg-2	06-May-21	13	Lepomis miniatus	35	1
2654	Upper New Channel Reach	Hyg-2	06-May-21	13	Procambarus sp.		1
2654	Upper New Channel Reach	Hyg-2	06-May-21	14	No fish collected		
2654	Upper New Channel Reach	Hyg-2	06-May-21	15	No fish collected		
2655	Old Channel Reach	Cab-1	05-May-21	1	Procambarus sp.		4
2655	Old Channel Reach	Cab-1	05-May-21	1	Palaemonetes sp.		12
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	23	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	16	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	16	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	20	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	11	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	15	1

2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	21	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	26	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	24	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	25	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	27	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	28	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	22	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	18	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	27	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	12	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	13	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	25	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	21	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	22	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	26	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	22	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	15	1

2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	22	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	20	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	25	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	22	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	11	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	12	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	12	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	10	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	26	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	19	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	21	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	12	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	10	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	11	1

2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Etheostoma fonticola	12	1
2655	Old Channel Reach	Cab-1	05-May-21	1	Dionda nigrotaeniata	12	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Lepomis miniatus	72	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Palaemonetes sp.		2
2655	Old Channel Reach	Cab-1	05-May-21	2	Procambarus sp.		3
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	25	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	24	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	21	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	18	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	16	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	13	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	11	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Etheostoma fonticola	16	1
2655	Old Channel Reach	Cab-1	05-May-21	2	Notropis amabilis	15	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Procambarus sp.		4
2655	Old Channel Reach	Cab-1	05-May-21	3	Lepomis miniatus	50	1

2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	24	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	26	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	25	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	30	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	12	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	25	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	26	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	26	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	26	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	16	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	13	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	3	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Procambarus sp.		15
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	28	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	25	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	26	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	28	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	16	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	24	1

2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	20	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	23	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	27	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	19	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	13	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	20	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	24	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	25	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	19	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	26	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	21	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	13	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	13	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	4	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	5	Procambarus sp.		5
2655	Old Channel Reach	Cab-1	05-May-21	5	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	5	Etheostoma fonticola	22	1
2655	Old Channel Reach	Cab-1	05-May-21	5	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	5	Etheostoma fonticola	24	1

2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	20	1
2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	28	1
2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	11	1
2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	27	1
2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	20	1
2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	20	1
2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	22	1
2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	18	1
2655	Old Channel Reach	Cab-1	05-May-21	6	Etheostoma fonticola	16	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Procambarus sp.		4
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	26	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	24	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	25	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	13	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	21	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	24	1

2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	12	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	23	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	15	1
2655	Old Channel Reach	Cab-1	05-May-21	7	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	8	Etheostoma fonticola	24	1
2655	Old Channel Reach	Cab-1	05-May-21	8	Etheostoma fonticola	16	1
2655	Old Channel Reach	Cab-1	05-May-21	8	Lepomis miniatus	28	1
2655	Old Channel Reach	Cab-1	05-May-21	9	Etheostoma fonticola	17	1
2655	Old Channel Reach	Cab-1	05-May-21	9	Etheostoma fonticola	12	1
2655	Old Channel Reach	Cab-1	05-May-21	9	Etheostoma fonticola	14	1
2655	Old Channel Reach	Cab-1	05-May-21	9	Notropis amabilis	11	1
2655	Old Channel Reach	Cab-1	05-May-21	9	Notropis amabilis	14	1
2655	Old Channel Reach	Cab-1	05-May-21	9	Procambarus sp.		1
2655	Old Channel Reach	Cab-1	05-May-21	10	Etheostoma fonticola	19	1
2655	Old Channel Reach	Cab-1	05-May-21	10	Etheostoma fonticola	20	1
2655	Old Channel Reach	Cab-1	05-May-21	11	Etheostoma fonticola	21	1
2655	Old Channel Reach	Cab-1	05-May-21	11	Etheostoma fonticola	12	1
2655	Old Channel Reach	Cab-1	05-May-21	11	Etheostoma fonticola	27	1
2655	Old Channel Reach	Cab-1	05-May-21	11	Procambarus sp.		2
2655	Old Channel Reach	Cab-1	05-May-21	12	No fish collected		

2655	Old Channel Reach	Cab-1	05-May-21	13	Etheostoma fonticola	30	1
2655	Old Channel Reach	Cab-1	05-May-21	14	No fish collected		
2655	Old Channel Reach	Cab-1	05-May-21	15	Procambarus sp.		1
2655	Old Channel Reach	Cab-1	05-May-21	15	Etheostoma fonticola	24	1
2655	Old Channel Reach	Cab-1	05-May-21	15	Etheostoma fonticola	11	1
2655	Old Channel Reach	Cab-1	05-May-21	16	Procambarus sp.		1
2655	Old Channel Reach	Cab-1	05-May-21	16	Etheostoma fonticola	23	1
2655	Old Channel Reach	Cab-1	05-May-21	17	No fish collected		
2655	Old Channel Reach	Cab-1	05-May-21	4	Lepomis miniatus	60	1
2655	Old Channel Reach	Cab-1	05-May-21	5	Etheostoma fonticola	29	1
2656	Old Channel Reach	Cab-2	05-May-21	1	No fish collected		
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	21	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	24	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	20	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	20	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	12	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	22	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	14	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	16	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	17	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	11	1

2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	19	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	13	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Etheostoma fonticola	11	1
2656	Old Channel Reach	Cab-2	05-May-21	2	Procambarus sp.		2
2656	Old Channel Reach	Cab-2	05-May-21	3	Procambarus sp.		5
2656	Old Channel Reach	Cab-2	05-May-21	3	Etheostoma fonticola	21	1
2656	Old Channel Reach	Cab-2	05-May-21	3	Etheostoma fonticola	23	1
2656	Old Channel Reach	Cab-2	05-May-21	4	Procambarus sp.		1
2656	Old Channel Reach	Cab-2	05-May-21	4	Etheostoma fonticola	19	1
2656	Old Channel Reach	Cab-2	05-May-21	4	Etheostoma fonticola	20	1
2656	Old Channel Reach	Cab-2	05-May-21	5	Etheostoma fonticola	18	1
2656	Old Channel Reach	Cab-2	05-May-21	6	Etheostoma fonticola	15	1
2656	Old Channel Reach	Cab-2	05-May-21	7	No fish collected		
2656	Old Channel Reach	Cab-2	05-May-21	8	Etheostoma fonticola	15	1
2656	Old Channel Reach	Cab-2	05-May-21	9	No fish collected		
2656	Old Channel Reach	Cab-2	05-May-21	10	No fish collected		
2656	Old Channel Reach	Cab-2	05-May-21	11	No fish collected		
2656	Old Channel Reach	Cab-2	05-May-21	12	No fish collected		
2656	Old Channel Reach	Cab-2	05-May-21	13	No fish collected		
2656	Old Channel Reach	Cab-2	05-May-21	14	No fish collected		
2656	Old Channel Reach	Cab-2	05-May-21	15	No fish collected		

2656	Old Channel Reach	Cab-2	05-May-21	5	Etheostoma fonticola	18	1
2657	Old Channel Reach	Bry-1	05-May-21	1	Palaemonetes sp.		3
2657	Old Channel Reach	Bry-1	05-May-21	1	Procambarus sp.		16
2657	Old Channel Reach	Bry-1	05-May-21	1	Etheostoma fonticola	30	1
2657	Old Channel Reach	Bry-1	05-May-21	1	Etheostoma fonticola	21	1
2657	Old Channel Reach	Bry-1	05-May-21	2	Palaemonetes sp.		1
2657	Old Channel Reach	Bry-1	05-May-21	2	Procambarus sp.		13
2657	Old Channel Reach	Bry-1	05-May-21	2	No fish collected		
2657	Old Channel Reach	Bry-1	05-May-21	3	Procambarus sp.		3
2657	Old Channel Reach	Bry-1	05-May-21	3	Oreochromis aureus	15	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Herichthys cyanoguttatus	53	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Astyanax mexicanus	15	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Etheostoma lepidum	45	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Etheostoma fonticola	24	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Etheostoma fonticola	25	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Etheostoma fonticola	21	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Etheostoma fonticola	23	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Etheostoma fonticola	16	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Etheostoma fonticola	24	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Etheostoma fonticola	21	1
2657	Old Channel Reach	Bry-1	05-May-21	3	Etheostoma fonticola	18	1

2657	Old Channel Reach	Bry-1	05-May-21	3	Etheostoma fonticola	14	1
2657	Old Channel Reach	Bry-1	05-May-21	4	Procambarus sp.		12
2657	Old Channel Reach	Bry-1	05-May-21	4	Palaemonetes sp.		3
2657	Old Channel Reach	Bry-1	05-May-21	4	Etheostoma fonticola	20	1
2657	Old Channel Reach	Bry-1	05-May-21	4	Etheostoma fonticola	22	1
2657	Old Channel Reach	Bry-1	05-May-21	4	Etheostoma fonticola	20	1
2657	Old Channel Reach	Bry-1	05-May-21	4	Etheostoma fonticola	24	1
2657	Old Channel Reach	Bry-1	05-May-21	4	Etheostoma fonticola	23	1
2657	Old Channel Reach	Bry-1	05-May-21	4	Etheostoma fonticola	12	1
2657	Old Channel Reach	Bry-1	05-May-21	4	Etheostoma fonticola	15	1
2657	Old Channel Reach	Bry-1	05-May-21	4	Etheostoma fonticola	22	1
2657	Old Channel Reach	Bry-1	05-May-21	4	Etheostoma fonticola	18	1
2657	Old Channel Reach	Bry-1	05-May-21	5	Procambarus sp.		5
2657	Old Channel Reach	Bry-1	05-May-21	5	Palaemonetes sp.		1
2657	Old Channel Reach	Bry-1	05-May-21	5	Lepomis miniatus	35	1
2657	Old Channel Reach	Bry-1	05-May-21	5	Etheostoma fonticola	18	1
2657	Old Channel Reach	Bry-1	05-May-21	5	Etheostoma fonticola	21	1
2657	Old Channel Reach	Bry-1	05-May-21	5	Etheostoma fonticola	26	1
2657	Old Channel Reach	Bry-1	05-May-21	5	Etheostoma fonticola	13	1
2657	Old Channel Reach	Bry-1	05-May-21	5	Etheostoma fonticola	20	1
2657	Old Channel Reach	Bry-1	05-May-21	5	Etheostoma fonticola	23	1

2657	Old Channel Reach	Bry-1	05-May-21	5	Etheostoma fonticola	12	1
2657	Old Channel Reach	Bry-1	05-May-21	6	Procambarus sp.		1
2657	Old Channel Reach	Bry-1	05-May-21	6	Etheostoma fonticola	24	1
2657	Old Channel Reach	Bry-1	05-May-21	6	Etheostoma fonticola	17	1
2657	Old Channel Reach	Bry-1	05-May-21	7	Procambarus sp.		2
2657	Old Channel Reach	Bry-1	05-May-21	7	Palaemonetes sp.		3
2657	Old Channel Reach	Bry-1	05-May-21	7	Etheostoma fonticola	30	1
2657	Old Channel Reach	Bry-1	05-May-21	7	Etheostoma fonticola	36	1
2657	Old Channel Reach	Bry-1	05-May-21	7	Etheostoma fonticola	24	1
2657	Old Channel Reach	Bry-1	05-May-21	7	Etheostoma fonticola	25	1
2657	Old Channel Reach	Bry-1	05-May-21	7	Etheostoma fonticola	22	1
2657	Old Channel Reach	Bry-1	05-May-21	8	No fish collected		
2657	Old Channel Reach	Bry-1	05-May-21	9	Palaemonetes sp.		1
2657	Old Channel Reach	Bry-1	05-May-21	9	Etheostoma fonticola	18	1
2657	Old Channel Reach	Bry-1	05-May-21	9	Etheostoma fonticola	15	1
2657	Old Channel Reach	Bry-1	05-May-21	9	Etheostoma fonticola	17	1
2657	Old Channel Reach	Bry-1	05-May-21	10	Astyanax mexicanus	23	1
2657	Old Channel Reach	Bry-1	05-May-21	10	Lepomis miniatus	13	1
2657	Old Channel Reach	Bry-1	05-May-21	10	Etheostoma fonticola	21	1
2657	Old Channel Reach	Bry-1	05-May-21	10	Etheostoma fonticola	25	1
2657	Old Channel Reach	Bry-1	05-May-21	11	Etheostoma fonticola	21	1

2657	Old Channel Reach	Bry-1	05-May-21	11	Etheostoma fonticola	18	1
2657	Old Channel Reach	Bry-1	05-May-21	11	Etheostoma fonticola	18	1
2657	Old Channel Reach	Bry-1	05-May-21	12	No fish collected		
2657	Old Channel Reach	Bry-1	05-May-21	13	Etheostoma fonticola	26	1
2657	Old Channel Reach	Bry-1	05-May-21	14	Etheostoma fonticola	22	1
2657	Old Channel Reach	Bry-1	05-May-21	15	Procambarus sp.		2
2657	Old Channel Reach	Bry-1	05-May-21	15	No fish collected		
2657	Old Channel Reach	Bry-1	05-May-21	11	Etheostoma fonticola	20	1
2658	Old Channel Reach	Open-1	05-May-21	1	Etheostoma fonticola	27	1
2658	Old Channel Reach	Open-1	05-May-21	2	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	3	Etheostoma fonticola	17	1
2658	Old Channel Reach	Open-1	05-May-21	4	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	5	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	6	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	7	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	8	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	9	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	10	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	11	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	12	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	13	No fish collected		

2658	Old Channel Reach	Open-1	05-May-21	14	No fish collected		
2658	Old Channel Reach	Open-1	05-May-21	15	No fish collected		
2659	Old Channel Reach	Bry-2	05-May-21	1	Procambarus sp.		7
2659	Old Channel Reach	Bry-2	05-May-21	1	Herichthys cyanoguttatus	25	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Lepomis sp.	22	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Dionda nigrotaeniata	20	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Dionda nigrotaeniata	13	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Dionda nigrotaeniata	19	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	26	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	14	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	21	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	30	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	23	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	30	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	22	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	20	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	19	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	18	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	23	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	15	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	10	1

2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	15	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	22	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	25	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	17	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	18	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	17	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	14	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	17	1
2659	Old Channel Reach	Bry-2	05-May-21	1	Etheostoma fonticola	12	1
2659	Old Channel Reach	Bry-2	05-May-21	2	Procambarus sp.		7
2659	Old Channel Reach	Bry-2	05-May-21	2	Palaemonetes sp.		1
2659	Old Channel Reach	Bry-2	05-May-21	2	Etheostoma lepidum	45	1
2659	Old Channel Reach	Bry-2	05-May-21	2	Etheostoma lepidum	35	1
2659	Old Channel Reach	Bry-2	05-May-21	2	Etheostoma fonticola	23	1
2659	Old Channel Reach	Bry-2	05-May-21	2	Etheostoma fonticola	21	1
2659	Old Channel Reach	Bry-2	05-May-21	2	Etheostoma fonticola	19	1
2659	Old Channel Reach	Bry-2	05-May-21	2	Etheostoma fonticola	21	1
2659	Old Channel Reach	Bry-2	05-May-21	2	Etheostoma fonticola	23	1
2659	Old Channel Reach	Bry-2	05-May-21	2	Etheostoma fonticola	22	1
2659	Old Channel Reach	Bry-2	05-May-21	2	Etheostoma fonticola	14	1
2659	Old Channel Reach	Bry-2	05-May-21	2	Etheostoma fonticola	14	1

2659	Old Channel Reach	Bry-2	05-May-21	3	Procambarus sp.		1
2659	Old Channel Reach	Bry-2	05-May-21	3	Etheostoma fonticola	22	1
2659	Old Channel Reach	Bry-2	05-May-21	3	Etheostoma fonticola	24	1
2659	Old Channel Reach	Bry-2	05-May-21	3	Etheostoma fonticola	27	1
2659	Old Channel Reach	Bry-2	05-May-21	3	Etheostoma fonticola	22	1
2659	Old Channel Reach	Bry-2	05-May-21	3	Etheostoma fonticola	15	1
2659	Old Channel Reach	Bry-2	05-May-21	3	Etheostoma fonticola	23	1
2659	Old Channel Reach	Bry-2	05-May-21	3	Etheostoma fonticola	31	1
2659	Old Channel Reach	Bry-2	05-May-21	4	Procambarus sp.		3
2659	Old Channel Reach	Bry-2	05-May-21	4	Etheostoma fonticola	25	1
2659	Old Channel Reach	Bry-2	05-May-21	5	Etheostoma fonticola	25	1
2659	Old Channel Reach	Bry-2	05-May-21	5	Herichthys cyanoguttatus	23	1
2659	Old Channel Reach	Bry-2	05-May-21	6	Etheostoma fonticola	17	1
2659	Old Channel Reach	Bry-2	05-May-21	7	Procambarus sp.		1
2659	Old Channel Reach	Bry-2	05-May-21	7	Lepomis sp.	16	1
2659	Old Channel Reach	Bry-2	05-May-21	7	Etheostoma fonticola	26	1
2659	Old Channel Reach	Bry-2	05-May-21	7	Etheostoma fonticola	27	1
2659	Old Channel Reach	Bry-2	05-May-21	7	Etheostoma fonticola	17	1
2659	Old Channel Reach	Bry-2	05-May-21	8	Micropterus salmoides	35	1
2659	Old Channel Reach	Bry-2	05-May-21	8	Procambarus sp.		1
2659	Old Channel Reach	Bry-2	05-May-21	8	Etheostoma fonticola	15	1

2659	Old Channel Reach	Bry-2	05-May-21	9	Procambarus sp.		1
2659	Old Channel Reach	Bry-2	05-May-21	9	No fish collected		
2659	Old Channel Reach	Bry-2	05-May-21	10	Procambarus sp.		1
2659	Old Channel Reach	Bry-2	05-May-21	10	No fish collected		
2659	Old Channel Reach	Bry-2	05-May-21	11	Procambarus sp.		2
2659	Old Channel Reach	Bry-2	05-May-21	11	Lepomis sp.	15	1
2659	Old Channel Reach	Bry-2	05-May-21	12	No fish collected		
2659	Old Channel Reach	Bry-2	05-May-21	13	Etheostoma fonticola	32	1
2659	Old Channel Reach	Bry-2	05-May-21	13	Etheostoma fonticola	19	1
2659	Old Channel Reach	Bry-2	05-May-21	13	Etheostoma fonticola	22	1
2659	Old Channel Reach	Bry-2	05-May-21	14	Procambarus sp.		1
2659	Old Channel Reach	Bry-2	05-May-21	14	No fish collected		
2659	Old Channel Reach	Bry-2	05-May-21	15	No fish collected		
2660	Old Channel Reach	Lud-1	05-May-21	1	Palaemonetes sp.		4
2660	Old Channel Reach	Lud-1	05-May-21	1	Procambarus sp.		1
2660	Old Channel Reach	Lud-1	05-May-21	1	Etheostoma fonticola	22	1
2660	Old Channel Reach	Lud-1	05-May-21	1	Etheostoma fonticola	21	1
2660	Old Channel Reach	Lud-1	05-May-21	1	Etheostoma fonticola	15	1
2660	Old Channel Reach	Lud-1	05-May-21	1	Etheostoma fonticola	20	1
2660	Old Channel Reach	Lud-1	05-May-21	1	Etheostoma fonticola	16	1
2660	Old Channel Reach	Lud-1	05-May-21	1	Etheostoma fonticola	18	1

2660	Old Channel Reach	Lud-1	05-May-21	1	Etheostoma fonticola	20	1
2660	Old Channel Reach	Lud-1	05-May-21	1	Etheostoma fonticola	18	1
2660	Old Channel Reach	Lud-1	05-May-21	1	Etheostoma fonticola	19	1
2660	Old Channel Reach	Lud-1	05-May-21	1	Etheostoma fonticola	16	1
2660	Old Channel Reach	Lud-1	05-May-21	1	Lepomis sp.	15	1
2660	Old Channel Reach	Lud-1	05-May-21	1	Herichthys cyanoguttatus	19	1
2660	Old Channel Reach	Lud-1	05-May-21	2	Procambarus sp.		2
2660	Old Channel Reach	Lud-1	05-May-21	2	Dionda nigrotaeniata	24	1
2660	Old Channel Reach	Lud-1	05-May-21	2	Etheostoma fonticola	23	1
2660	Old Channel Reach	Lud-1	05-May-21	2	Etheostoma fonticola	31	1
2660	Old Channel Reach	Lud-1	05-May-21	2	Etheostoma fonticola	15	1
2660	Old Channel Reach	Lud-1	05-May-21	3	Etheostoma fonticola	21	1
2660	Old Channel Reach	Lud-1	05-May-21	3	Etheostoma fonticola	25	1
2660	Old Channel Reach	Lud-1	05-May-21	3	Etheostoma fonticola	22	1
2660	Old Channel Reach	Lud-1	05-May-21	3	Etheostoma fonticola	20	1
2660	Old Channel Reach	Lud-1	05-May-21	3	Etheostoma fonticola	20	1
2660	Old Channel Reach	Lud-1	05-May-21	3	Etheostoma fonticola	20	1
2660	Old Channel Reach	Lud-1	05-May-21	3	Etheostoma fonticola	16	1
2660	Old Channel Reach	Lud-1	05-May-21	3	Etheostoma fonticola	11	1
2660	Old Channel Reach	Lud-1	05-May-21	3	Etheostoma fonticola	17	1
2660	Old Channel Reach	Lud-1	05-May-21	4	Procambarus sp.		1

2660	Old Channel Reach	Lud-1	05-May-21	4	Palaemonetes sp.		1
2660	Old Channel Reach	Lud-1	05-May-21	4	Etheostoma fonticola	24	1
2660	Old Channel Reach	Lud-1	05-May-21	4	Etheostoma fonticola	24	1
2660	Old Channel Reach	Lud-1	05-May-21	4	Etheostoma fonticola	23	1
2660	Old Channel Reach	Lud-1	05-May-21	5	Etheostoma fonticola	16	1
2660	Old Channel Reach	Lud-1	05-May-21	5	Procambarus sp.		2
2660	Old Channel Reach	Lud-1	05-May-21	6	Procambarus sp.		1
2660	Old Channel Reach	Lud-1	05-May-21	6	Etheostoma fonticola	19	1
2660	Old Channel Reach	Lud-1	05-May-21	7	Lepomis sp.	20	1
2660	Old Channel Reach	Lud-1	05-May-21	8	Procambarus sp.		2
2660	Old Channel Reach	Lud-1	05-May-21	8	No fish collected		
2660	Old Channel Reach	Lud-1	05-May-21	9	Procambarus sp.		1
2660	Old Channel Reach	Lud-1	05-May-21	9	No fish collected		
2660	Old Channel Reach	Lud-1	05-May-21	10	Procambarus sp.		2
2660	Old Channel Reach	Lud-1	05-May-21	10	No fish collected		
2660	Old Channel Reach	Lud-1	05-May-21	11	Etheostoma fonticola	17	1
2660	Old Channel Reach	Lud-1	05-May-21	12	Etheostoma fonticola	20	1
2660	Old Channel Reach	Lud-1	05-May-21	13	No fish collected		
2660	Old Channel Reach	Lud-1	05-May-21	14	Etheostoma fonticola	24	1
2660	Old Channel Reach	Lud-1	05-May-21	14	Procambarus sp.		1
2660	Old Channel Reach	Lud-1	05-May-21	15	Procambarus sp.		1

2660	Old Channel Reach	Lud-1	05-May-21	15	No fish collected		
2661	Old Channel Reach	Lud-2	05-May-21	1	Procambarus sp.		4
2661	Old Channel Reach	Lud-2	05-May-21	1	Palaemonetes sp.		3
2661	Old Channel Reach	Lud-2	05-May-21	1	Dionda nigrotaeniata	17	1
2661	Old Channel Reach	Lud-2	05-May-21	1	Etheostoma fonticola	18	1
2661	Old Channel Reach	Lud-2	05-May-21	1	Etheostoma fonticola	15	1
2661	Old Channel Reach	Lud-2	05-May-21	1	Etheostoma fonticola	15	1
2661	Old Channel Reach	Lud-2	05-May-21	1	Etheostoma fonticola	14	1
2661	Old Channel Reach	Lud-2	05-May-21	1	Etheostoma fonticola	13	1
2661	Old Channel Reach	Lud-2	05-May-21	1	Etheostoma fonticola	15	1
2661	Old Channel Reach	Lud-2	05-May-21	1	Etheostoma fonticola	20	1
2661	Old Channel Reach	Lud-2	05-May-21	1	Etheostoma fonticola	10	1
2661	Old Channel Reach	Lud-2	05-May-21	1	Etheostoma fonticola	15	1
2661	Old Channel Reach	Lud-2	05-May-21	1	Etheostoma fonticola	12	1
2661	Old Channel Reach	Lud-2	05-May-21	2	Herichthys cyanoguttatus	60	1
2661	Old Channel Reach	Lud-2	05-May-21	2	Lepomis miniatus	27	1
2661	Old Channel Reach	Lud-2	05-May-21	2	Etheostoma fonticola	22	1
2661	Old Channel Reach	Lud-2	05-May-21	2	Procambarus sp.		4
2661	Old Channel Reach	Lud-2	05-May-21	2	Palaemonetes sp.		2
2661	Old Channel Reach	Lud-2	05-May-21	3	Procambarus sp.		3
2661	Old Channel Reach	Lud-2	05-May-21	3	Etheostoma fonticola	23	1

2661	Old Channel Reach	Lud-2	05-May-21	4	Palaemonetes sp.		1
2661	Old Channel Reach	Lud-2	05-May-21	4	Procambarus sp.		2
2661	Old Channel Reach	Lud-2	05-May-21	4	Etheostoma fonticola	15	1
2661	Old Channel Reach	Lud-2	05-May-21	4	Etheostoma fonticola	17	1
2661	Old Channel Reach	Lud-2	05-May-21	5	Procambarus sp.		1
2661	Old Channel Reach	Lud-2	05-May-21	5	Etheostoma fonticola	20	1
2661	Old Channel Reach	Lud-2	05-May-21	5	Etheostoma fonticola	19	1
2661	Old Channel Reach	Lud-2	05-May-21	5	Etheostoma fonticola	32	1
2661	Old Channel Reach	Lud-2	05-May-21	5	Etheostoma fonticola	17	1
2661	Old Channel Reach	Lud-2	05-May-21	6	Etheostoma fonticola	25	1
2661	Old Channel Reach	Lud-2	05-May-21	6	Etheostoma fonticola	22	1
2661	Old Channel Reach	Lud-2	05-May-21	6	Etheostoma fonticola	18	1
2661	Old Channel Reach	Lud-2	05-May-21	6	Etheostoma fonticola	13	1
2661	Old Channel Reach	Lud-2	05-May-21	7	Procambarus sp.		1
2661	Old Channel Reach	Lud-2	05-May-21	7	Lepomis miniatus	58	1
2661	Old Channel Reach	Lud-2	05-May-21	7	Etheostoma fonticola	13	1
2661	Old Channel Reach	Lud-2	05-May-21	7	Etheostoma fonticola	20	1
2661	Old Channel Reach	Lud-2	05-May-21	8	Procambarus sp.		1
2661	Old Channel Reach	Lud-2	05-May-21	8	No fish collected		
2661	Old Channel Reach	Lud-2	05-May-21	9	Procambarus sp.		2
2661	Old Channel Reach	Lud-2	05-May-21	9	No fish collected		

2661	Old Channel Reach	Lud-2	05-May-21	10	No fish collected		
2661	Old Channel Reach	Lud-2	05-May-21	11	Etheostoma fonticola	16	1
2661	Old Channel Reach	Lud-2	05-May-21	11	Lepomis miniatus	60	1
2661	Old Channel Reach	Lud-2	05-May-21	12	Etheostoma fonticola	15	1
2661	Old Channel Reach	Lud-2	05-May-21	13	Etheostoma fonticola	19	1
2661	Old Channel Reach	Lud-2	05-May-21	14	No fish collected		
2661	Old Channel Reach	Lud-2	05-May-21	15	No fish collected		
2662	Old Channel Reach	Open-2	05-May-21	1	No fish collected		
2662	Old Channel Reach	Open-2	05-May-21	2	No fish collected		
2662	Old Channel Reach	Open-2	05-May-21	3	No fish collected		
2662	Old Channel Reach	Open-2	05-May-21	4	No fish collected		
2662	Old Channel Reach	Open-2	05-May-21	5	No fish collected		
2662	Old Channel Reach	Open-2	05-May-21	6	No fish collected		
2662	Old Channel Reach	Open-2	05-May-21	7	No fish collected		
2662	Old Channel Reach	Open-2	05-May-21	8	No fish collected		
2662	Old Channel Reach	Open-2	05-May-21	9	No fish collected		
2662	Old Channel Reach	Open-2	05-May-21	10	No fish collected		
2663	Landa Lake	Val-1	04-May-21	2	Etheostoma fonticola	21	1
2663	Landa Lake	Val-1	04-May-21	2	Etheostoma fonticola	20	1
2663	Landa Lake	Val-1	04-May-21	2	Etheostoma fonticola	20	1
2663	Landa Lake	Val-1	04-May-21	2	Etheostoma fonticola	21	1
2663	Landa Lake	Val-1	04-May-21	2	Etheostoma fonticola	20	1
2663	Landa Lake	Val-1	04-May-21	2	Etheostoma fonticola	24	1
2663	Landa Lake	Val-1	04-May-21	2	Etheostoma fonticola	22	1
2663	Landa Lake	Val-1	04-May-21	2	Micropterus salmoides	34	1

2663	Landa Lake	Val-1	04-May-21	2	Procambarus sp.		1
2663	Landa Lake	Val-1	04-May-21	3	No fish collected		
2663	Landa Lake	Val-1	04-May-21	4	Procambarus sp.		1
2663	Landa Lake	Val-1	04-May-21	4	No fish collected		
2663	Landa Lake	Val-1	04-May-21	5	Etheostoma fonticola	20	1
2663	Landa Lake	Val-1	04-May-21	6	Lepomis miniatus	90	1
2663	Landa Lake	Val-1	04-May-21	7	Lepomis sp.	18	1
2663	Landa Lake	Val-1	04-May-21	7	Procambarus sp.		1
2663	Landa Lake	Val-1	04-May-21	7	Etheostoma fonticola	23	1
2663	Landa Lake	Val-1	04-May-21	8	No fish collected		
2663	Landa Lake	Val-1	04-May-21	9	Procambarus sp.		1
2663	Landa Lake	Val-1	04-May-21	9	Dionda nigrotaeniata	18	1
2663	Landa Lake	Val-1	04-May-21	10	No fish collected		
2663	Landa Lake	Val-1	04-May-21	11	No fish collected		
2663	Landa Lake	Val-1	04-May-21	12	No fish collected		
2663	Landa Lake	Val-1	04-May-21	13	No fish collected		
2663	Landa Lake	Val-1	04-May-21	14	Procambarus sp.		1
2663	Landa Lake	Val-1	04-May-21	14	No fish collected		
2663	Landa Lake	Val-1	04-May-21	15	No fish collected		
2663	Landa Lake	Val-1	04-May-21	1	Micropterus salmoides	31	1
2663	Landa Lake	Val-1	04-May-21	1	Micropterus salmoides	35	1
2663	Landa Lake	Val-1	04-May-21	1	Etheostoma fonticola	18	1
2663	Landa Lake	Val-1	04-May-21	1	Etheostoma fonticola	18	1
2663	Landa Lake	Val-1	04-May-21	1	Dionda nigrotaeniata	24	1
2663	Landa Lake	Val-1	04-May-21	1	Dionda nigrotaeniata	24	1
2663	Landa Lake	Val-1	04-May-21	1	Dionda nigrotaeniata	18	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	32	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	24	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	32	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	24	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	30	1

2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	24	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	31	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	31	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	23	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	24	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	24	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	17	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	14	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	21	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	15	1
2664	Landa Lake	Cab-1	04-May-21	1	Etheostoma fonticola	18	1
2664	Landa Lake	Cab-1	04-May-21	1	Palaemonetes sp.		34
2664	Landa Lake	Cab-1	04-May-21	1	Procambarus sp.		30
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	35	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	34	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	31	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	27	1

2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	19	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	24	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	10	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	18	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	15	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	10	1
2664	Landa Lake	Cab-1	04-May-21	2	Etheostoma fonticola	14	1
2664	Landa Lake	Cab-1	04-May-21	2	Palaemonetes sp.		7
2664	Landa Lake	Cab-1	04-May-21	2	Procambarus sp.		11
2664	Landa Lake	Cab-1	04-May-21	3	Palaemonetes sp.		9
2664	Landa Lake	Cab-1	04-May-21	3	Procambarus sp.		21
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	31	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	29	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	31	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	34	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	31	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	6	Palaemonetes sp.		5
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	31	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	30	1

2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	14	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	18	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	16	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	15	1
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	15	1
2664	Landa Lake	Cab-1	04-May-21	7	Palaemonetes sp.		1
2664	Landa Lake	Cab-1	04-May-21	7	Procambarus sp.		2
2664	Landa Lake	Cab-1	04-May-21	7	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	7	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	7	Etheostoma fonticola	29	1
2664	Landa Lake	Cab-1	04-May-21	8	Procambarus sp.		5
2664	Landa Lake	Cab-1	04-May-21	8	Palaemonetes sp.		3
2664	Landa Lake	Cab-1	04-May-21	8	Etheostoma fonticola	24	1
2664	Landa Lake	Cab-1	04-May-21	8	Etheostoma fonticola	34	1
2664	Landa Lake	Cab-1	04-May-21	8	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	8	Etheostoma fonticola	18	1
2664	Landa Lake	Cab-1	04-May-21	8	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	8	Etheostoma fonticola	16	1
2664	Landa Lake	Cab-1	04-May-21	9	Procambarus sp.		3
2664	Landa Lake	Cab-1	04-May-21	9	Etheostoma fonticola	23	1
2664	Landa Lake	Cab-1	04-May-21	9	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	9	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	9	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	10	Procambarus sp.		3
2664	Landa Lake	Cab-1	04-May-21	10	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	10	Etheostoma fonticola	29	1
2664	Landa Lake	Cab-1	04-May-21	10	Etheostoma fonticola	21	1
2664	Landa Lake	Cab-1	04-May-21	10	Etheostoma fonticola	21	1
2664	Landa Lake	Cab-1	04-May-21	11	Procambarus sp.		11
2664	Landa Lake	Cab-1	04-May-21	11	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	11	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	11	Etheostoma fonticola	23	1
2664	Landa Lake	Cab-1	04-May-21	12	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	13	Procambarus sp.		3

2664	Landa Lake	Cab-1	04-May-21	13	No fish collected		
2664	Landa Lake	Cab-1	04-May-21	14	No fish collected		
2664	Landa Lake	Cab-1	04-May-21	15	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	15	Procambarus sp.		3
2664	Landa Lake	Cab-1	04-May-21	16	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	17	No fish collected		
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	24	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	3	Etheostoma fonticola	14	1
2664	Landa Lake	Cab-1	04-May-21	4	Palaemonetes sp.		6
2664	Landa Lake	Cab-1	04-May-21	4	Procambarus sp.		23
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	32	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	32	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	29	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	23	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	32	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	23	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	24	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	23	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	22	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	30	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	12	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	29	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	17	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	19	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	18	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	17	1

2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	23	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	15	1
2664	Landa Lake	Cab-1	04-May-21	4	Etheostoma fonticola	9	1
2664	Landa Lake	Cab-1	04-May-21	5	Palaemonetes sp.		5
2664	Landa Lake	Cab-1	04-May-21	5	Procambarus sp.		3
2664	Landa Lake	Cab-1	04-May-21	5	Etheostoma fonticola	26	1
2664	Landa Lake	Cab-1	04-May-21	5	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	5	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	5	Etheostoma fonticola	28	1
2664	Landa Lake	Cab-1	04-May-21	5	Etheostoma fonticola	24	1
2664	Landa Lake	Cab-1	04-May-21	5	Etheostoma fonticola	31	1
2664	Landa Lake	Cab-1	04-May-21	5	Etheostoma fonticola	20	1
2664	Landa Lake	Cab-1	04-May-21	5	Etheostoma fonticola	27	1
2664	Landa Lake	Cab-1	04-May-21	5	Etheostoma fonticola	25	1
2664	Landa Lake	Cab-1	04-May-21	5	Etheostoma fonticola	32	1
2664	Landa Lake	Cab-1	04-May-21	6	Procambarus sp.		9
2664	Landa Lake	Cab-1	04-May-21	6	Etheostoma fonticola	20	1
2665	Landa Lake	Cabo-2	04-May-21	1	Procambarus sp.		3
2665	Landa Lake	Cabo-2	04-May-21	1	Palaemonetes sp.		37
2665	Landa Lake	Cabo-2	04-May-21	1	Lepomis miniatus	26	1
2665	Landa Lake	Cabo-2	04-May-21	1	Lepomis sp.	17	1
2665	Landa Lake	Cabo-2	04-May-21	1	Lepomis sp.	17	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	32	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	29	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	20	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	22	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	13	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	20	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	28	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	21	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	22	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	28	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	21	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	18	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	18	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	23	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	20	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	29	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	25	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	27	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	22	1

2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	20	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	21	1
2665	Landa Lake	Cabo-2	04-May-21	1	Etheostoma fonticola	17	1
2665	Landa Lake	Cabo-2	04-May-21	2	Lepomis miniatus	32	1
2665	Landa Lake	Cabo-2	04-May-21	2	Palaemonetes sp.		26
2665	Landa Lake	Cabo-2	04-May-21	2	Procambarus sp.		5
2665	Landa Lake	Cabo-2	04-May-21	2	Lepomis sp.	17	1
2665	Landa Lake	Cabo-2	04-May-21	2	Etheostoma fonticola	30	1
2665	Landa Lake	Cabo-2	04-May-21	3	Palaemonetes sp.		17
2665	Landa Lake	Cabo-2	04-May-21	3	Procambarus sp.		2
2665	Landa Lake	Cabo-2	04-May-21	3	Etheostoma fonticola	20	1
2665	Landa Lake	Cabo-2	04-May-21	3	Etheostoma fonticola	25	1
2665	Landa Lake	Cabo-2	04-May-21	3	Etheostoma fonticola	17	1
2665	Landa Lake	Cabo-2	04-May-21	3	Etheostoma fonticola	22	1
2665	Landa Lake	Cabo-2	04-May-21	3	Etheostoma fonticola	30	1
2665	Landa Lake	Cabo-2	04-May-21	3	Etheostoma fonticola	15	1
2665	Landa Lake	Cabo-2	04-May-21	3	Etheostoma fonticola	26	1
2665	Landa Lake	Cabo-2	04-May-21	3	Etheostoma fonticola	25	1
2665	Landa Lake	Cabo-2	04-May-21	3	Etheostoma fonticola	21	1
2665	Landa Lake	Cabo-2	04-May-21	3	Etheostoma fonticola	24	1
2665	Landa Lake	Cabo-2	04-May-21	4	Palaemonetes sp.		2
2665	Landa Lake	Cabo-2	04-May-21	4	Procambarus sp.		1
2665	Landa Lake	Cabo-2	04-May-21	4	Astyanax mexicanus	25	1
2665	Landa Lake	Cabo-2	04-May-21	4	Etheostoma fonticola	22	1
2665	Landa Lake	Cabo-2	04-May-21	4	Etheostoma fonticola	33	1
2665	Landa Lake	Cabo-2	04-May-21	4	Etheostoma fonticola	14	1
2665	Landa Lake	Cabo-2	04-May-21	5	Procambarus sp.		2
2665	Landa Lake	Cabo-2	04-May-21	5	Palaemonetes sp.		4
2665	Landa Lake	Cabo-2	04-May-21	5	Micropterus salmoides	40	1
2665	Landa Lake	Cabo-2	04-May-21	5	Etheostoma fonticola	28	1
2665	Landa Lake	Cabo-2	04-May-21	5	Etheostoma fonticola	19	1
2665	Landa Lake	Cabo-2	04-May-21	5	Etheostoma fonticola	22	1
2665	Landa Lake	Cabo-2	04-May-21	5	Etheostoma fonticola	25	1
2665	Landa Lake	Cabo-2	04-May-21	5	Etheostoma fonticola	26	1
2665	Landa Lake	Cabo-2	04-May-21	5	Etheostoma fonticola	22	1
2665	Landa Lake	Cabo-2	04-May-21	6	Procambarus sp.		6
2665	Landa Lake	Cabo-2	04-May-21	6	Palaemonetes sp.		2
2665	Landa Lake	Cabo-2	04-May-21	10	Etheostoma fonticola	27	1
2665	Landa Lake	Cabo-2	04-May-21	10	Procambarus sp.		4
2665	Landa Lake	Cabo-2	04-May-21	10	Palaemonetes sp.		1
2665	Landa Lake	Cabo-2	04-May-21	11	Procambarus sp.		3

2665	Landa Lake	Cabo-2	04-May-21	11	Palaemonetes sp.		1
2665	Landa Lake	Cabo-2	04-May-21	11	No fish collected		
2665	Landa Lake	Cabo-2	04-May-21	12	Procambarus sp.		2
2665	Landa Lake	Cabo-2	04-May-21	12	Palaemonetes sp.		1
2665	Landa Lake	Cabo-2	04-May-21	12	No fish collected		
2665	Landa Lake	Cabo-2	04-May-21	13	Etheostoma fonticola	30	1
2665	Landa Lake	Cabo-2	04-May-21	13	Etheostoma fonticola	18	1
2665	Landa Lake	Cabo-2	04-May-21	14	Lepomis miniatus	60	1
2665	Landa Lake	Cabo-2	04-May-21	14	Palaemonetes sp.		1
2665	Landa Lake	Cabo-2	04-May-21	15	Palaemonetes sp.		2
2665	Landa Lake	Cabo-2	04-May-21	15	Procambarus sp.		2
2665	Landa Lake	Cabo-2	04-May-21	15	Etheostoma fonticola	23	1
2665	Landa Lake	Cabo-2	04-May-21	15	Etheostoma fonticola	23	1
2665	Landa Lake	Cabo-2	04-May-21	15	Etheostoma fonticola	26	1
2665	Landa Lake	Cabo-2	04-May-21	16	Procambarus sp.		1
2665	Landa Lake	Cabo-2	04-May-21	16	Etheostoma fonticola	25	1
2665	Landa Lake	Cabo-2	04-May-21	16	Etheostoma fonticola	21	1
2665	Landa Lake	Cabo-2	04-May-21	16	Etheostoma fonticola	26	1
2665	Landa Lake	Cabo-2	04-May-21	17	No fish collected		
2665	Landa Lake	Cabo-2	04-May-21	6	Lepomis miniatus	45	1
2665	Landa Lake	Cabo-2	04-May-21	6	Lepomis miniatus	42	1
2665	Landa Lake	Cabo-2	04-May-21	6	Etheostoma fonticola	33	1
2665	Landa Lake	Cabo-2	04-May-21	6	Etheostoma fonticola	25	1
2665	Landa Lake	Cabo-2	04-May-21	6	Etheostoma fonticola	31	1
2665	Landa Lake	Cabo-2	04-May-21	6	Etheostoma fonticola	30	1
2665	Landa Lake	Cabo-2	04-May-21	6	Etheostoma fonticola	21	1
2665	Landa Lake	Cabo-2	04-May-21	6	Etheostoma fonticola	32	1
2665	Landa Lake	Cabo-2	04-May-21	6	Etheostoma fonticola	23	1
2665	Landa Lake	Cabo-2	04-May-21	7	Procambarus sp.		3
2665	Landa Lake	Cabo-2	04-May-21	7	No fish collected		
2665	Landa Lake	Cabo-2	04-May-21	8	Procambarus sp.		9
2665	Landa Lake	Cabo-2	04-May-21	8	Palaemonetes sp.		4
2665	Landa Lake	Cabo-2	04-May-21	8	Etheostoma fonticola	23	1
2665	Landa Lake	Cabo-2	04-May-21	8	Etheostoma fonticola	25	1
2665	Landa Lake	Cabo-2	04-May-21	8	Etheostoma fonticola	22	1
2665	Landa Lake	Cabo-2	04-May-21	9	Palaemonetes sp.		3
2665	Landa Lake	Cabo-2	04-May-21	9	Procambarus sp.		1
2665	Landa Lake	Cabo-2	04-May-21	9	Etheostoma fonticola	19	1
2666	Landa Lake	Val-2	04-May-21	1	Procambarus sp.		4
2666	Landa Lake	Val-2	04-May-21	1	Palaemonetes sp.		6
2666	Landa Lake	Val-2	04-May-21	1	Micropterus salmoides	35	1

2666	Landa Lake	Val-2	04-May-21	1	Lepomis miniatus	25	1
2666	Landa Lake	Val-2	04-May-21	1	Etheostoma fonticola	32	1
2666	Landa Lake	Val-2	04-May-21	1	Etheostoma fonticola	15	1
2666	Landa Lake	Val-2	04-May-21	2	Astyanax mexicanus	50	1
2666	Landa Lake	Val-2	04-May-21	2	Lepomis sp.	18	1
2666	Landa Lake	Val-2	04-May-21	2	Palaemonetes sp.		1
2666	Landa Lake	Val-2	04-May-21	3	Palaemonetes sp.		1
2666	Landa Lake	Val-2	04-May-21	3	Procambarus sp.		1
2666	Landa Lake	Val-2	04-May-21	3	Astyanax mexicanus	45	1
2666	Landa Lake	Val-2	04-May-21	3	Lepomis sp.	17	1
2666	Landa Lake	Val-2	04-May-21	3	Etheostoma fonticola	20	1
2666	Landa Lake	Val-2	04-May-21	4	Astyanax mexicanus	52	1
2666	Landa Lake	Val-2	04-May-21	4	Procambarus sp.		1
2666	Landa Lake	Val-2	04-May-21	5	Procambarus sp.		1
2666	Landa Lake	Val-2	04-May-21	5	Astyanax mexicanus	52	1
2666	Landa Lake	Val-2	04-May-21	5	Astyanax mexicanus	42	1
2666	Landa Lake	Val-2	04-May-21	5	Astyanax mexicanus	50	1
2666	Landa Lake	Val-2	04-May-21	6	Procambarus sp.		1
2666	Landa Lake	Val-2	04-May-21	6	Astyanax mexicanus	39	1
2666	Landa Lake	Val-2	04-May-21	7	Procambarus sp.		1
2666	Landa Lake	Val-2	04-May-21	7	No fish collected		
2666	Landa Lake	Val-2	04-May-21	8	No fish collected		
2666	Landa Lake	Val-2	04-May-21	9	No fish collected		
2666	Landa Lake	Val-2	04-May-21	10	Procambarus sp.		2
2666	Landa Lake	Val-2	04-May-21	10	No fish collected		
2666	Landa Lake	Val-2	04-May-21	11	Procambarus sp.		3
2666	Landa Lake	Val-2	04-May-21	11	Lepomis miniatus	38	1
2666	Landa Lake	Val-2	04-May-21	12	Procambarus sp.		1
2666	Landa Lake	Val-2	04-May-21	12	No fish collected		
2666	Landa Lake	Val-2	04-May-21	13	No fish collected		
2666	Landa Lake	Val-2	04-May-21	14	No fish collected		
2666	Landa Lake	Val-2	04-May-21	15	Lepomis miniatus		1
2667	Landa Lake	Sag-1	04-May-21	1	Procambarus sp.		2
2667	Landa Lake	Sag-1	04-May-21	1	Palaemonetes sp.		57
2667	Landa Lake	Sag-1	04-May-21	1	Lepomis miniatus	40	1
2667	Landa Lake	Sag-1	04-May-21	1	Lepomis sp.	15	1
2667	Landa Lake	Sag-1	04-May-21	1	Lepomis sp.	17	1
2667	Landa Lake	Sag-1	04-May-21	1	Etheostoma fonticola	22	1
2667	Landa Lake	Sag-1	04-May-21	1	Etheostoma fonticola	20	1
2667	Landa Lake	Sag-1	04-May-21	1	Etheostoma fonticola	20	1
2667	Landa Lake	Sag-1	04-May-21	1	Etheostoma fonticola	15	1

2667	Landa Lake	Sag-1	04-May-21	1	Etheostoma fonticola	15	1
2667	Landa Lake	Sag-1	04-May-21	2	Lepomis sp.	15	1
2667	Landa Lake	Sag-1	04-May-21	2	Procambarus sp.		5
2667	Landa Lake	Sag-1	04-May-21	2	Palaemonetes sp.		22
2667	Landa Lake	Sag-1	04-May-21	2	Etheostoma fonticola	28	1
2667	Landa Lake	Sag-1	04-May-21	2	Etheostoma fonticola	21	1
2667	Landa Lake	Sag-1	04-May-21	2	Etheostoma fonticola	18	1
2667	Landa Lake	Sag-1	04-May-21	2	Etheostoma fonticola	22	1
2667	Landa Lake	Sag-1	04-May-21	2	Etheostoma fonticola	23	1
2667	Landa Lake	Sag-1	04-May-21	2	Etheostoma fonticola	30	1
2667	Landa Lake	Sag-1	04-May-21	2	Etheostoma fonticola	10	1
2667	Landa Lake	Sag-1	04-May-21	2	Etheostoma fonticola	15	1
2667	Landa Lake	Sag-1	04-May-21	3	Procambarus sp.		13
2667	Landa Lake	Sag-1	04-May-21	3	Palaemonetes sp.		10
2667	Landa Lake	Sag-1	04-May-21	3	Lepomis sp.	24	1
2667	Landa Lake	Sag-1	04-May-21	3	Lepomis sp.	15	1
2667	Landa Lake	Sag-1	04-May-21	3	Etheostoma fonticola	15	1
2667	Landa Lake	Sag-1	04-May-21	3	Etheostoma fonticola	25	1
2667	Landa Lake	Sag-1	04-May-21	4	Procambarus sp.		5
2667	Landa Lake	Sag-1	04-May-21	4	Palaemonetes sp.		3
2667	Landa Lake	Sag-1	04-May-21	4	Lepomis miniatus	60	1
2667	Landa Lake	Sag-1	04-May-21	4	Micropterus salmoides	37	1
2667	Landa Lake	Sag-1	04-May-21	4	Etheostoma fonticola	25	1
2667	Landa Lake	Sag-1	04-May-21	4	Etheostoma fonticola	25	1
2667	Landa Lake	Sag-1	04-May-21	4	Etheostoma fonticola	21	1
2667	Landa Lake	Sag-1	04-May-21	5	Procambarus sp.		5
2667	Landa Lake	Sag-1	04-May-21	5	Palaemonetes sp.		2
2667	Landa Lake	Sag-1	04-May-21	5	Etheostoma fonticola	24	1
2667	Landa Lake	Sag-1	04-May-21	5	Etheostoma fonticola	34	1
2667	Landa Lake	Sag-1	04-May-21	6	Procambarus sp.		8
2667	Landa Lake	Sag-1	04-May-21	6	Palaemonetes sp.		1
2667	Landa Lake	Sag-1	04-May-21	6	Lepomis miniatus	81	1
2667	Landa Lake	Sag-1	04-May-21	6	Etheostoma fonticola	23	1
2667	Landa Lake	Sag-1	04-May-21	7	Procambarus sp.		2
2667	Landa Lake	Sag-1	04-May-21	7	Palaemonetes sp.		4
2667	Landa Lake	Sag-1	04-May-21	7	Etheostoma fonticola	23	1
2667	Landa Lake	Sag-1	04-May-21	7	Etheostoma fonticola	26	1
2667	Landa Lake	Sag-1	04-May-21	8	Procambarus sp.		6
2667	Landa Lake	Sag-1	04-May-21	8	Palaemonetes sp.		2
2667	Landa Lake	Sag-1	04-May-21	8	Lepomis miniatus	90	1
2667	Landa Lake	Sag-1	04-May-21	8	Etheostoma fonticola	20	1

2667	Landa Lake	Sag-1	04-May-21	9	Palaemonetes sp.		4
2667	Landa Lake	Sag-1	04-May-21	9	Etheostoma fonticola	30	1
2667	Landa Lake	Sag-1	04-May-21	9	Etheostoma fonticola	26	1
2667	Landa Lake	Sag-1	04-May-21	9	Etheostoma fonticola	19	1
2667	Landa Lake	Sag-1	04-May-21	9	Etheostoma fonticola	26	1
2667	Landa Lake	Sag-1	04-May-21	9	Etheostoma fonticola	12	1
2667	Landa Lake	Sag-1	04-May-21	10	Procambarus sp.		5
2667	Landa Lake	Sag-1	04-May-21	10	Palaemonetes sp.		5
2667	Landa Lake	Sag-1	04-May-21	10	No fish collected		
2667	Landa Lake	Sag-1	04-May-21	11	Procambarus sp.		3
2667	Landa Lake	Sag-1	04-May-21	11	Palaemonetes sp.		1
2667	Landa Lake	Sag-1	04-May-21	11	Etheostoma fonticola	23	1
2667	Landa Lake	Sag-1	04-May-21	12	Procambarus sp.		1
2667	Landa Lake	Sag-1	04-May-21	12	Etheostoma fonticola	26	1
2667	Landa Lake	Sag-1	04-May-21	13	No fish collected		
2667	Landa Lake	Sag-1	04-May-21	14	Procambarus sp.		4
2667	Landa Lake	Sag-1	04-May-21	14	Palaemonetes sp.		2
2667	Landa Lake	Sag-1	04-May-21	14	Etheostoma fonticola	15	1
2667	Landa Lake	Sag-1	04-May-21	15	Etheostoma fonticola	33	1
2667	Landa Lake	Sag-1	04-May-21	15	Etheostoma fonticola	25	1
2667	Landa Lake	Sag-1	04-May-21	16	No fish collected		
2668	Landa Lake	Sag-2	04-May-21	1	Lepomis miniatus	69	1
2668	Landa Lake	Sag-2	04-May-21	1	Astyanax mexicanus	33	1
2668	Landa Lake	Sag-2	04-May-21	1	Micropterus salmoides	27	1
2668	Landa Lake	Sag-2	04-May-21	2	Procambarus sp.		3
2668	Landa Lake	Sag-2	04-May-21	2	Dionda nigrotaeniata	22	1
2668	Landa Lake	Sag-2	04-May-21	3	Lepomis sp.	23	1
2668	Landa Lake	Sag-2	04-May-21	4	Procambarus sp.		1
2668	Landa Lake	Sag-2	04-May-21	4	No fish collected		
2668	Landa Lake	Sag-2	04-May-21	5	Dionda nigrotaeniata	42	1
2668	Landa Lake	Sag-2	04-May-21	6	Lepomis miniatus	31	1
2668	Landa Lake	Sag-2	04-May-21	7	No fish collected		
2668	Landa Lake	Sag-2	04-May-21	8	Procambarus sp.		1
2668	Landa Lake	Sag-2	04-May-21	8	No fish collected		
2668	Landa Lake	Sag-2	04-May-21	9	Procambarus sp.		1
2668	Landa Lake	Sag-2	04-May-21	9	No fish collected		
2668	Landa Lake	Sag-2	04-May-21	10	No fish collected		
2668	Landa Lake	Sag-2	04-May-21	11	No fish collected		
2668	Landa Lake	Sag-2	04-May-21	12	Procambarus sp.		2
2668	Landa Lake	Sag-2	04-May-21	12	No fish collected		
2668	Landa Lake	Sag-2	04-May-21	13	No fish collected		

2668	Landa Lake	Sag-2	04-May-21	14	No fish collected		
2668	Landa Lake	Sag-2	04-May-21	15	Lepomis sp.	22	1
2669	Landa Lake	Open-1	05-May-21	1	No fish collected		
2669	Landa Lake	Open-1	05-May-21	2	No fish collected		
2669	Landa Lake	Open-1	05-May-21	3	No fish collected		
2669	Landa Lake	Open-1	05-May-21	4	No fish collected		
2669	Landa Lake	Open-1	05-May-21	5	No fish collected		
2669	Landa Lake	Open-1	05-May-21	6	No fish collected		
2669	Landa Lake	Open-1	05-May-21	7	Etheostoma fonticola	20	1
2669	Landa Lake	Open-1	05-May-21	8	No fish collected		
2669	Landa Lake	Open-1	05-May-21	9	No fish collected		
2669	Landa Lake	Open-1	05-May-21	10	No fish collected		
2669	Landa Lake	Open-1	05-May-21	11	No fish collected		
2669	Landa Lake	Open-1	05-May-21	12	No fish collected		
2669	Landa Lake	Open-1	05-May-21	13	No fish collected		
2669	Landa Lake	Open-1	05-May-21	14	No fish collected		
2669	Landa Lake	Open-1	05-May-21	15	No fish collected		
2707	Upper Spring Run	Ludw-1	25-Oct-21	1	Lepomis miniatus	38	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	1	Gambusia sp.	15	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	1	Palaemonetes sp.		4
2707	Upper Spring Run	Ludw-1	25-Oct-21	2	Micropterus salmoides	67	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	2	Lepomis miniatus	42	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	2	Palaemonetes sp.		1
2707	Upper Spring Run	Ludw-1	25-Oct-21	3	Lepomis miniatus	120	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	3	Lepomis miniatus	65	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	3	Lepomis miniatus	32	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	4	Procambarus sp.		1
2707	Upper Spring Run	Ludw-1	25-Oct-21	4	Palaemonetes sp.		1
2707	Upper Spring Run	Ludw-1	25-Oct-21	4	No fish collected		
2707	Upper Spring Run	Ludw-1	25-Oct-21	5	Lepomis miniatus	35	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	5	Procambarus sp.		1

2707	Upper Spring Run	Ludw-1	25-Oct-21	6	No fish collected		
2707	Upper Spring Run	Ludw-1	25-Oct-21	7	No fish collected		
2707	Upper Spring Run	Ludw-1	25-Oct-21	8	Lepomis miniatus	32	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	8	Lepomis miniatus	37	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	8	Palaemonetes sp.		2
2707	Upper Spring Run	Ludw-1	25-Oct-21	9	Lepomis miniatus	51	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	10	No fish collected		
2707	Upper Spring Run	Ludw-1	25-Oct-21	11	No fish collected		
2707	Upper Spring Run	Ludw-1	25-Oct-21	12	No fish collected		
2707	Upper Spring Run	Ludw-1	25-Oct-21	13	No fish collected		
2707	Upper Spring Run	Ludw-1	25-Oct-21	14	Lepomis miniatus	45	1
2707	Upper Spring Run	Ludw-1	25-Oct-21	14	Palaemonetes sp.		1
2707	Upper Spring Run	Ludw-1	25-Oct-21	15	No fish collected		
2708	Upper Spring Run	Ludw-2	25-Oct-21	1	Lepomis sp.	15	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	1	Lepomis miniatus	38	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	1	Palaemonetes sp.		13
2708	Upper Spring Run	Ludw-2	25-Oct-21	2	Lepomis miniatus	32	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	2	Lepomis miniatus	38	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	2	Procambarus sp.		4
2708	Upper Spring Run	Ludw-2	25-Oct-21	2	Palaemonetes sp.		5
2708	Upper Spring Run	Ludw-2	25-Oct-21	3	Lepomis miniatus	105	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	3	Lepomis miniatus	85	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	3	Lepomis miniatus	52	1

2708	Upper Spring Run	Ludw-2	25-Oct-21	3	Lepomis sp.	15	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	3	Palaemonetes sp.		12
2708	Upper Spring Run	Ludw-2	25-Oct-21	3	Procambarus sp.		3
2708	Upper Spring Run	Ludw-2	25-Oct-21	4	Etheostoma fonticola	30	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	4	Procambarus sp.		4
2708	Upper Spring Run	Ludw-2	25-Oct-21	4	Palaemonetes sp.		3
2708	Upper Spring Run	Ludw-2	25-Oct-21	5	Etheostoma fonticola	25	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	5	Lepomis miniatus	38	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	5	Palaemonetes sp.		3
2708	Upper Spring Run	Ludw-2	25-Oct-21	5	Procambarus sp.		2
2708	Upper Spring Run	Ludw-2	25-Oct-21	6	Palaemonetes sp.		4
2708	Upper Spring Run	Ludw-2	25-Oct-21	6	No fish collected		
2708	Upper Spring Run	Ludw-2	25-Oct-21	7	Palaemonetes sp.		1
2708	Upper Spring Run	Ludw-2	25-Oct-21	7	Procambarus sp.		2
2708	Upper Spring Run	Ludw-2	25-Oct-21	7	No fish collected		
2708	Upper Spring Run	Ludw-2	25-Oct-21	8	Procambarus sp.		1
2708	Upper Spring Run	Ludw-2	25-Oct-21	8	Palaemonetes sp.		1
2708	Upper Spring Run	Ludw-2	25-Oct-21	8	No fish collected		
2708	Upper Spring Run	Ludw-2	25-Oct-21	9	No fish collected		
2708	Upper Spring Run	Ludw-2	25-Oct-21	10	Procambarus sp.		1
2708	Upper Spring Run	Ludw-2	25-Oct-21	10	No fish collected		
2708	Upper Spring Run	Ludw-2	25-Oct-21	11	Etheostoma fonticola	32	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	11	Palaemonetes sp.		1

2708	Upper Spring Run	Ludw-2	25-Oct-21	11	Procambarus sp.		1
2708	Upper Spring Run	Ludw-2	25-Oct-21	12	Procambarus sp.		1
2708	Upper Spring Run	Ludw-2	25-Oct-21	12	No fish collected		
2708	Upper Spring Run	Ludw-2	25-Oct-21	13	Palaemonetes sp.		2
2708	Upper Spring Run	Ludw-2	25-Oct-21	13	No fish collected		
2708	Upper Spring Run	Ludw-2	25-Oct-21	14	No fish collected		
2708	Upper Spring Run	Ludw-2	25-Oct-21	15	Palaemonetes sp.		1
2708	Upper Spring Run	Ludw-2	25-Oct-21	15	No fish collected		
2708	Upper Spring Run	Ludw-2	25-Oct-21	2	Lepomis miniatus	80	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	4	Etheostoma fonticola	29	1
2708	Upper Spring Run	Ludw-2	25-Oct-21	4	Etheostoma fonticola	29	1
2709	Upper Spring Run	Bryo-1	25-Oct-21	1	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	2	Procambarus sp.		1
2709	Upper Spring Run	Bryo-1	25-Oct-21	2	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	3	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	4	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	5	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	6	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	7	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	8	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	9	Procambarus sp.		1
2709	Upper Spring Run	Bryo-1	25-Oct-21	9	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	10	No fish collected		

2709	Upper Spring Run	Bryo-1	25-Oct-21	11	Etheostoma fonticola	20	1
2709	Upper Spring Run	Bryo-1	25-Oct-21	12	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	13	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	14	No fish collected		
2709	Upper Spring Run	Bryo-1	25-Oct-21	15	No fish collected		
2710	Upper Spring Run	Bryo-2	25-Oct-21	1	Gambusia sp.	10	1
2710	Upper Spring Run	Bryo-2	25-Oct-21	2	Etheostoma fonticola	30	1
2710	Upper Spring Run	Bryo-2	25-Oct-21	2	Procambarus sp.		1
2710	Upper Spring Run	Bryo-2	25-Oct-21	3	Etheostoma fonticola	28	1
2710	Upper Spring Run	Bryo-2	25-Oct-21	3	Etheostoma fonticola	27	1
2710	Upper Spring Run	Bryo-2	25-Oct-21	3	Procambarus sp.		1
2710	Upper Spring Run	Bryo-2	25-Oct-21	4	Etheostoma fonticola	28	1
2710	Upper Spring Run	Bryo-2	25-Oct-21	5	Procambarus sp.		2
2710	Upper Spring Run	Bryo-2	25-Oct-21	5	No fish collected		
2710	Upper Spring Run	Bryo-2	25-Oct-21	6	Etheostoma fonticola	31	1
2710	Upper Spring Run	Bryo-2	25-Oct-21	6	Etheostoma fonticola	26	1
2710	Upper Spring Run	Bryo-2	25-Oct-21	6	Procambarus sp.		3
2710	Upper Spring Run	Bryo-2	25-Oct-21	7	No fish collected		
2710	Upper Spring Run	Bryo-2	25-Oct-21	8	No fish collected		
2710	Upper Spring Run	Bryo-2	25-Oct-21	9	No fish collected		
2710	Upper Spring Run	Bryo-2	25-Oct-21	10	Etheostoma lepidum	36	1
2710	Upper Spring Run	Bryo-2	25-Oct-21	11	No fish collected		
2710	Upper Spring Run	Bryo-2	25-Oct-21	12	Procambarus sp.		1

2710	Upper Spring Run	Bryo-2	25-Oct-21	12	No fish collected		
2710	Upper Spring Run	Bryo-2	25-Oct-21	13	No fish collected		
2710	Upper Spring Run	Bryo-2	25-Oct-21	14	No fish collected		
2710	Upper Spring Run	Bryo-2	25-Oct-21	15	No fish collected		
2711	Upper Spring Run	Open-1	25-Oct-21	1	No fish collected		
2711	Upper Spring Run	Open-1	25-Oct-21	2	No fish collected		
2711	Upper Spring Run	Open-1	25-Oct-21	3	No fish collected		
2711	Upper Spring Run	Open-1	25-Oct-21	4	No fish collected		
2711	Upper Spring Run	Open-1	25-Oct-21	5	No fish collected		
2711	Upper Spring Run	Open-1	25-Oct-21	6	No fish collected		
2711	Upper Spring Run	Open-1	25-Oct-21	7	No fish collected		
2711	Upper Spring Run	Open-1	25-Oct-21	8	No fish collected		
2711	Upper Spring Run	Open-1	25-Oct-21	9	No fish collected		
2711	Upper Spring Run	Open-1	25-Oct-21	10	No fish collected		
2712	Upper Spring Run	Open-2	25-Oct-21	1	No fish collected		
2712	Upper Spring Run	Open-2	25-Oct-21	2	No fish collected		
2712	Upper Spring Run	Open-2	25-Oct-21	3	No fish collected		
2712	Upper Spring Run	Open-2	25-Oct-21	4	No fish collected		
2712	Upper Spring Run	Open-2	25-Oct-21	5	No fish collected		
2712	Upper Spring Run	Open-2	25-Oct-21	6	No fish collected		
2712	Upper Spring Run	Open-2	25-Oct-21	7	No fish collected		
2712	Upper Spring Run	Open-2	25-Oct-21	8	No fish collected		
2712	Upper Spring Run	Open-2	25-Oct-21	9	No fish collected		

2712	Upper Spring Run	Open-2	25-Oct-21	10	No fish collected		
2713	Upper Spring Run	Sagi-1	25-Oct-21	1	No fish collected		
2713	Upper Spring Run	Sagi-1	25-Oct-21	2	Micropterus salmoides	62	1
2713	Upper Spring Run	Sagi-1	25-Oct-21	2	Micropterus salmoides	58	1
2713	Upper Spring Run	Sagi-1	25-Oct-21	2	Lepomis miniatus	38	1
2713	Upper Spring Run	Sagi-1	25-Oct-21	3	Lepomis miniatus	70	1
2713	Upper Spring Run	Sagi-1	25-Oct-21	3	Lepomis miniatus	95	1
2713	Upper Spring Run	Sagi-1	25-Oct-21	3	Procambarus sp.		2
2713	Upper Spring Run	Sagi-1	25-Oct-21	4	Astyanax mexicanus	70	1
2713	Upper Spring Run	Sagi-1	25-Oct-21	4	Procambarus sp.		1
2713	Upper Spring Run	Sagi-1	25-Oct-21	5	Astyanax mexicanus	60	1
2713	Upper Spring Run	Sagi-1	25-Oct-21	6	Procambarus sp.		2
2713	Upper Spring Run	Sagi-1	25-Oct-21	6	No fish collected		
2713	Upper Spring Run	Sagi-1	25-Oct-21	7	Etheostoma lepidum	45	1
2713	Upper Spring Run	Sagi-1	25-Oct-21	7	Procambarus sp.		1
2713	Upper Spring Run	Sagi-1	25-Oct-21	8	Procambarus sp.		1
2713	Upper Spring Run	Sagi-1	25-Oct-21	8	No fish collected		
2713	Upper Spring Run	Sagi-1	25-Oct-21	9	Procambarus sp.		1
2713	Upper Spring Run	Sagi-1	25-Oct-21	9	No fish collected		
2713	Upper Spring Run	Sagi-1	25-Oct-21	10	Procambarus sp.		1
2713	Upper Spring Run	Sagi-1	25-Oct-21	10	Lepomis miniatus	55	1
2713	Upper Spring Run	Sagi-1	25-Oct-21	11	Procambarus sp.		1
2713	Upper Spring Run	Sagi-1	25-Oct-21	11	No fish collected		

2713	Upper Spring Run	Sagi-1	25-Oct-21	12	No fish collected		
2713	Upper Spring Run	Sagi-1	25-Oct-21	13	Procambarus sp.		1
2713	Upper Spring Run	Sagi-1	25-Oct-21	13	No fish collected		
2713	Upper Spring Run	Sagi-1	25-Oct-21	14	Procambarus sp.		2
2713	Upper Spring Run	Sagi-1	25-Oct-21	14	No fish collected		
2713	Upper Spring Run	Sagi-1	25-Oct-21	15	Procambarus sp.		2
2713	Upper Spring Run	Sagi-1	25-Oct-21	15	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	1	Gambusia sp.	28	1
2714	Upper Spring Run	Sagi-2	25-Oct-21	2	Procambarus sp.		1
2714	Upper Spring Run	Sagi-2	25-Oct-21	2	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	3	Procambarus sp.		2
2714	Upper Spring Run	Sagi-2	25-Oct-21	3	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	4	Procambarus sp.		1
2714	Upper Spring Run	Sagi-2	25-Oct-21	4	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	5	Procambarus sp.		3
2714	Upper Spring Run	Sagi-2	25-Oct-21	5	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	5	Palaemonetes sp.		1
2714	Upper Spring Run	Sagi-2	25-Oct-21	6	Procambarus sp.		2
2714	Upper Spring Run	Sagi-2	25-Oct-21	6	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	7	Procambarus sp.		1
2714	Upper Spring Run	Sagi-2	25-Oct-21	7	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	8	Procambarus sp.		1
2714	Upper Spring Run	Sagi-2	25-Oct-21	8	No fish collected		

2714	Upper Spring Run	Sagi-2	25-Oct-21	9	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	10	Procambarus sp.		1
2714	Upper Spring Run	Sagi-2	25-Oct-21	10	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	11	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	12	Procambarus sp.		1
2714	Upper Spring Run	Sagi-2	25-Oct-21	12	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	13	Procambarus sp.		2
2714	Upper Spring Run	Sagi-2	25-Oct-21	13	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	14	No fish collected		
2714	Upper Spring Run	Sagi-2	25-Oct-21	15	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	1	Lepomis miniatus	45	1
2715	Landa Lake	Sagi-1	25-Oct-21	1	Lepomis miniatus	40	1
2715	Landa Lake	Sagi-1	25-Oct-21	1	Etheostoma fonticola	32	1
2715	Landa Lake	Sagi-1	25-Oct-21	1	Palaemonetes sp.		11
2715	Landa Lake	Sagi-1	25-Oct-21	1	Procambarus sp.		3
2715	Landa Lake	Sagi-1	25-Oct-21	2	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	3	Palaemonetes sp.		1
2715	Landa Lake	Sagi-1	25-Oct-21	3	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	4	Procambarus sp.		1
2715	Landa Lake	Sagi-1	25-Oct-21	4	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	5	Etheostoma fonticola	34	1
2715	Landa Lake	Sagi-1	25-Oct-21	6	Procambarus sp.		1
2715	Landa Lake	Sagi-1	25-Oct-21	6	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	7	Procambarus sp.		4
2715	Landa Lake	Sagi-1	25-Oct-21	7	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	8	Procambarus sp.		1
2715	Landa Lake	Sagi-1	25-Oct-21	8	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	9	Procambarus sp.		1
2715	Landa Lake	Sagi-1	25-Oct-21	9	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	10	Lepomis miniatus	34	1
2715	Landa Lake	Sagi-1	25-Oct-21	11	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	12	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	13	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	14	No fish collected		

2715	Landa Lake	Sagi-1	25-Oct-21	15	No fish collected		
2715	Landa Lake	Sagi-1	25-Oct-21	15	Procambarus sp.		1
2722	Landa Lake	Bryo-2	26-Oct-21	1	Etheostoma fonticola	18	1
2722	Landa Lake	Bryo-2	26-Oct-21	1	Etheostoma fonticola	16	1
2722	Landa Lake	Bryo-2	26-Oct-21	1	Etheostoma fonticola	15	1
2722	Landa Lake	Bryo-2	26-Oct-21	1	Etheostoma fonticola	11	1
2722	Landa Lake	Bryo-2	26-Oct-21	1	Etheostoma fonticola	14	1
2722	Landa Lake	Bryo-2	26-Oct-21	1	Dionda nigrotaeniata	9	1
2722	Landa Lake	Bryo-2	26-Oct-21	1	Palaemonetes sp.		1
2722	Landa Lake	Bryo-2	26-Oct-21	1	Etheostoma fonticola	10	1
2722	Landa Lake	Bryo-2	26-Oct-21	2	Etheostoma fonticola	24	1
2722	Landa Lake	Bryo-2	26-Oct-21	3	Etheostoma fonticola	11	1
2722	Landa Lake	Bryo-2	26-Oct-21	3	Palaemonetes sp.		1
2722	Landa Lake	Bryo-2	26-Oct-21	3	Etheostoma fonticola	25	1
2722	Landa Lake	Bryo-2	26-Oct-21	3	Etheostoma fonticola	24	1
2722	Landa Lake	Bryo-2	26-Oct-21	3	Etheostoma fonticola	24	1
2722	Landa Lake	Bryo-2	26-Oct-21	3	Procambarus sp.		2
2722	Landa Lake	Bryo-2	26-Oct-21	4	Etheostoma fonticola	24	1
2722	Landa Lake	Bryo-2	26-Oct-21	4	Etheostoma fonticola	25	1
2722	Landa Lake	Bryo-2	26-Oct-21	4	Etheostoma fonticola	24	1
2722	Landa Lake	Bryo-2	26-Oct-21	4	Etheostoma fonticola	12	1
2722	Landa Lake	Bryo-2	26-Oct-21	4	Etheostoma fonticola	12	1
2722	Landa Lake	Bryo-2	26-Oct-21	4	Etheostoma fonticola	15	1
2722	Landa Lake	Bryo-2	26-Oct-21	4	Etheostoma fonticola	11	1
2722	Landa Lake	Bryo-2	26-Oct-21	5	Etheostoma fonticola	27	1
2722	Landa Lake	Bryo-2	26-Oct-21	5	Etheostoma fonticola	28	1
2722	Landa Lake	Bryo-2	26-Oct-21	5	Etheostoma fonticola	26	1
2722	Landa Lake	Bryo-2	26-Oct-21	5	Etheostoma fonticola	34	1
2722	Landa Lake	Bryo-2	26-Oct-21	5	Etheostoma fonticola	10	1
2722	Landa Lake	Bryo-2	26-Oct-21	5	Etheostoma fonticola	27	1
2722	Landa Lake	Bryo-2	26-Oct-21	6	Etheostoma fonticola	24	1
2722	Landa Lake	Bryo-2	26-Oct-21	6	Etheostoma fonticola	24	1
2722	Landa Lake	Bryo-2	26-Oct-21	6	Etheostoma fonticola	24	1
2722	Landa Lake	Bryo-2	26-Oct-21	6	Etheostoma fonticola	13	1
2722	Landa Lake	Bryo-2	26-Oct-21	6	Palaemonetes sp.		2
2722	Landa Lake	Bryo-2	26-Oct-21	7	Etheostoma fonticola	26	1
2722	Landa Lake	Bryo-2	26-Oct-21	7	Etheostoma fonticola	14	1
2722	Landa Lake	Bryo-2	26-Oct-21	7	Etheostoma fonticola	11	1
2722	Landa Lake	Bryo-2	26-Oct-21	7	Etheostoma fonticola	10	1
2722	Landa Lake	Bryo-2	26-Oct-21	8	Procambarus sp.		1
2722	Landa Lake	Bryo-2	26-Oct-21	8	Etheostoma fonticola	12	1

2722	Landa Lake	Bryo-2	26-Oct-21	9	Etheostoma fonticola	24	1
2722	Landa Lake	Bryo-2	26-Oct-21	9	Etheostoma fonticola	12	1
2722	Landa Lake	Bryo-2	26-Oct-21	9	Etheostoma fonticola	25	1
2722	Landa Lake	Bryo-2	26-Oct-21	10	No fish collected		
2722	Landa Lake	Bryo-2	26-Oct-21	10	Procambarus sp.		2
2722	Landa Lake	Bryo-2	26-Oct-21	11	Etheostoma fonticola	13	1
2722	Landa Lake	Bryo-2	26-Oct-21	12	Etheostoma fonticola	26	1
2722	Landa Lake	Bryo-2	26-Oct-21	12	Etheostoma fonticola	27	1
2722	Landa Lake	Bryo-2	26-Oct-21	12	Procambarus sp.		1
2722	Landa Lake	Bryo-2	26-Oct-21	13	Etheostoma fonticola	11	1
2722	Landa Lake	Bryo-2	26-Oct-21	13	Etheostoma fonticola	30	1
2722	Landa Lake	Bryo-2	26-Oct-21	14	No fish collected		
2722	Landa Lake	Bryo-2	26-Oct-21	15	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	12	Palaemonetes sp.		12
2723	Landa Lake	Ludw-1	26-Oct-21	12	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	13	Palaemonetes sp.		6
2723	Landa Lake	Ludw-1	26-Oct-21	13	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	14	Palaemonetes sp.		1
2723	Landa Lake	Ludw-1	26-Oct-21	14	Procambarus sp.		1
2723	Landa Lake	Ludw-1	26-Oct-21	14	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	15	Etheostoma fonticola	31	1
2723	Landa Lake	Ludw-1	26-Oct-21	16	Palaemonetes sp.		3
2723	Landa Lake	Ludw-1	26-Oct-21	16	Etheostoma fonticola	18	1
2723	Landa Lake	Ludw-1	26-Oct-21	17	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	17	Palaemonetes sp.		1
2723	Landa Lake	Ludw-1	26-Oct-21	1	Procambarus sp.		1
2723	Landa Lake	Ludw-1	26-Oct-21	1	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	1	Palaemonetes sp.		16
2723	Landa Lake	Ludw-1	26-Oct-21	2	Lepomis miniatus	29	1
2723	Landa Lake	Ludw-1	26-Oct-21	2	Lepomis miniatus	23	1
2723	Landa Lake	Ludw-1	26-Oct-21	2	Etheostoma fonticola	28	1
2723	Landa Lake	Ludw-1	26-Oct-21	2	Procambarus sp.		3
2723	Landa Lake	Ludw-1	26-Oct-21	2	Palaemonetes sp.		15
2723	Landa Lake	Ludw-1	26-Oct-21	3	Procambarus sp.		1
2723	Landa Lake	Ludw-1	26-Oct-21	3	Palaemonetes sp.		8
2723	Landa Lake	Ludw-1	26-Oct-21	3	Etheostoma fonticola	34	1
2723	Landa Lake	Ludw-1	26-Oct-21	3	Etheostoma fonticola	31	1
2723	Landa Lake	Ludw-1	26-Oct-21	4	Etheostoma fonticola	25	1
2723	Landa Lake	Ludw-1	26-Oct-21	4	Palaemonetes sp.		4
2723	Landa Lake	Ludw-1	26-Oct-21	4	Lepomis miniatus	151	1
2723	Landa Lake	Ludw-1	26-Oct-21	5	Lepomis miniatus	34	1

2723	Landa Lake	Ludw-1	26-Oct-21	5	Palaemonetes sp.		7
2723	Landa Lake	Ludw-1	26-Oct-21	5	Procambarus sp.		3
2723	Landa Lake	Ludw-1	26-Oct-21	6	Palaemonetes sp.		10
2723	Landa Lake	Ludw-1	26-Oct-21	6	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	7	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	7	Palaemonetes sp.		7
2723	Landa Lake	Ludw-1	26-Oct-21	7	Procambarus sp.		4
2723	Landa Lake	Ludw-1	26-Oct-21	8	Palaemonetes sp.		9
2723	Landa Lake	Ludw-1	26-Oct-21	8	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	9	Palaemonetes sp.		2
2723	Landa Lake	Ludw-1	26-Oct-21	9	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	10	Palaemonetes sp.		3
2723	Landa Lake	Ludw-1	26-Oct-21	10	Procambarus sp.		1
2723	Landa Lake	Ludw-1	26-Oct-21	10	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	11	No fish collected		
2723	Landa Lake	Ludw-1	26-Oct-21	11	Palaemonetes sp.		3
2723	Landa Lake	Ludw-1	26-Oct-21	11	Procambarus sp.		2
2724	Landa Lake	Cabo-1	26-Oct-21	1	Procambarus sp.		4
2724	Landa Lake	Cabo-1	26-Oct-21	1	Etheostoma fonticola	32	1
2724	Landa Lake	Cabo-1	26-Oct-21	2	Etheostoma fonticola	32	1
2724	Landa Lake	Cabo-1	26-Oct-21	2	Etheostoma fonticola	29	1
2724	Landa Lake	Cabo-1	26-Oct-21	2	Etheostoma fonticola	9	1
2724	Landa Lake	Cabo-1	26-Oct-21	2	Procambarus sp.		1
2724	Landa Lake	Cabo-1	26-Oct-21	3	No fish collected		
2724	Landa Lake	Cabo-1	26-Oct-21	4	No fish collected		
2724	Landa Lake	Cabo-1	26-Oct-21	5	Etheostoma fonticola	29	1
2724	Landa Lake	Cabo-1	26-Oct-21	5	Etheostoma fonticola	20	1
2724	Landa Lake	Cabo-1	26-Oct-21	5	Etheostoma fonticola	32	1
2724	Landa Lake	Cabo-1	26-Oct-21	5	Etheostoma fonticola	20	1
2724	Landa Lake	Cabo-1	26-Oct-21	6	Etheostoma fonticola	28	1
2724	Landa Lake	Cabo-1	26-Oct-21	6	Etheostoma fonticola	27	1
2724	Landa Lake	Cabo-1	26-Oct-21	6	Etheostoma fonticola	28	1
2724	Landa Lake	Cabo-1	26-Oct-21	6	Etheostoma fonticola	24	1
2724	Landa Lake	Cabo-1	26-Oct-21	6	Etheostoma fonticola	25	1
2724	Landa Lake	Cabo-1	26-Oct-21	7	Etheostoma fonticola	34	1
2724	Landa Lake	Cabo-1	26-Oct-21	7	Etheostoma fonticola	26	1
2724	Landa Lake	Cabo-1	26-Oct-21	7	Etheostoma fonticola	21	1
2724	Landa Lake	Cabo-1	26-Oct-21	7	Etheostoma fonticola	22	1
2724	Landa Lake	Cabo-1	26-Oct-21	7	Procambarus sp.		2
2724	Landa Lake	Cabo-1	26-Oct-21	7	Etheostoma fonticola	15	1
2724	Landa Lake	Cabo-1	26-Oct-21	7	Etheostoma fonticola	32	1

2724	Landa Lake	Cabo-1	26-Oct-21	8	Etheostoma fonticola	32	1
2724	Landa Lake	Cabo-1	26-Oct-21	9	Etheostoma fonticola	27	1
2724	Landa Lake	Cabo-1	26-Oct-21	9	Procambarus sp.		5
2724	Landa Lake	Cabo-1	26-Oct-21	10	Palaemonetes sp.		1
2724	Landa Lake	Cabo-1	26-Oct-21	10	Lepomis miniatus	32	1
2724	Landa Lake	Cabo-1	26-Oct-21	10	Etheostoma fonticola	28	1
2724	Landa Lake	Cabo-1	26-Oct-21	10	Etheostoma fonticola	27	1
2724	Landa Lake	Cabo-1	26-Oct-21	10	Procambarus sp.		2
2724	Landa Lake	Cabo-1	26-Oct-21	11	Procambarus sp.		1
2724	Landa Lake	Cabo-1	26-Oct-21	11	Etheostoma fonticola	30	1
2724	Landa Lake	Cabo-1	26-Oct-21	11	Lepomis miniatus	70	1
2724	Landa Lake	Cabo-1	26-Oct-21	11	Micropterus salmoides	54	1
2724	Landa Lake	Cabo-1	26-Oct-21	12	Etheostoma fonticola	30	1
2724	Landa Lake	Cabo-1	26-Oct-21	13	No fish collected		
2724	Landa Lake	Cabo-1	26-Oct-21	14	No fish collected		
2724	Landa Lake	Cabo-1	26-Oct-21	15	Etheostoma fonticola	28	1
2724	Landa Lake	Cabo-1	26-Oct-21	15	Procambarus sp.		1
2724	Landa Lake	Cabo-1	26-Oct-21	16	No fish collected		
2724	Landa Lake	Cabo-1	26-Oct-21	16	Palaemonetes sp.		1
2725	Landa Lake	Cabo-2	26-Oct-21	1	Etheostoma fonticola	33	1
2725	Landa Lake	Cabo-2	26-Oct-21	1	Etheostoma fonticola	27	1
2725	Landa Lake	Cabo-2	26-Oct-21	1	Etheostoma fonticola	32	1
2725	Landa Lake	Cabo-2	26-Oct-21	1	Etheostoma fonticola	31	1
2725	Landa Lake	Cabo-2	26-Oct-21	1	Etheostoma fonticola	32	1
2725	Landa Lake	Cabo-2	26-Oct-21	1	Etheostoma fonticola	27	1
2725	Landa Lake	Cabo-2	26-Oct-21	1	Palaemonetes sp.		6
2725	Landa Lake	Cabo-2	26-Oct-21	1	Procambarus sp.		2
2725	Landa Lake	Cabo-2	26-Oct-21	1	Etheostoma fonticola	26	1
2725	Landa Lake	Cabo-2	26-Oct-21	2	Etheostoma fonticola	25	1
2725	Landa Lake	Cabo-2	26-Oct-21	2	Procambarus sp.		5
2725	Landa Lake	Cabo-2	26-Oct-21	2	Palaemonetes sp.		2
2725	Landa Lake	Cabo-2	26-Oct-21	3	Etheostoma fonticola	27	1
2725	Landa Lake	Cabo-2	26-Oct-21	3	Etheostoma fonticola	20	1
2725	Landa Lake	Cabo-2	26-Oct-21	3	Procambarus sp.		1
2725	Landa Lake	Cabo-2	26-Oct-21	4	Etheostoma fonticola	33	1
2725	Landa Lake	Cabo-2	26-Oct-21	4	Etheostoma fonticola	32	1
2725	Landa Lake	Cabo-2	26-Oct-21	4	Etheostoma fonticola	32	1
2725	Landa Lake	Cabo-2	26-Oct-21	4	Etheostoma fonticola	33	1
2725	Landa Lake	Cabo-2	26-Oct-21	4	Etheostoma fonticola	24	1
2725	Landa Lake	Cabo-2	26-Oct-21	4	Etheostoma fonticola	30	1
2725	Landa Lake	Cabo-2	26-Oct-21	4	Etheostoma fonticola	25	1

2725	Landa Lake	Cabo-2	26-Oct-21	4	Etheostoma fonticola	27	1
2725	Landa Lake	Cabo-2	26-Oct-21	5	Palaemonetes sp.		3
2725	Landa Lake	Cabo-2	26-Oct-21	5	Procambarus sp.		4
2725	Landa Lake	Cabo-2	26-Oct-21	5	No fish collected		
2725	Landa Lake	Cabo-2	26-Oct-21	6	Procambarus sp.		2
2725	Landa Lake	Cabo-2	26-Oct-21	6	Etheostoma fonticola	34	1
2725	Landa Lake	Cabo-2	26-Oct-21	7	Etheostoma fonticola	27	1
2725	Landa Lake	Cabo-2	26-Oct-21	7	Procambarus sp.		2
2725	Landa Lake	Cabo-2	26-Oct-21	8	Etheostoma fonticola	22	1
2725	Landa Lake	Cabo-2	26-Oct-21	8	Procambarus sp.		2
2725	Landa Lake	Cabo-2	26-Oct-21	9	Etheostoma fonticola	28	1
2725	Landa Lake	Cabo-2	26-Oct-21	9	Etheostoma fonticola	25	1
2725	Landa Lake	Cabo-2	26-Oct-21	10	Lepomis miniatus	61	1
2725	Landa Lake	Cabo-2	26-Oct-21	10	Lepomis miniatus	27	1
2725	Landa Lake	Cabo-2	26-Oct-21	10	Etheostoma fonticola	30	1
2725	Landa Lake	Cabo-2	26-Oct-21	11	Procambarus sp.		1
2725	Landa Lake	Cabo-2	26-Oct-21	11	No fish collected		
2725	Landa Lake	Cabo-2	26-Oct-21	12	Etheostoma fonticola	29	1
2725	Landa Lake	Cabo-2	26-Oct-21	12	Etheostoma fonticola	32	1
2725	Landa Lake	Cabo-2	26-Oct-21	13	Etheostoma fonticola	27	1
2725	Landa Lake	Cabo-2	26-Oct-21	13	Etheostoma fonticola	27	1
2725	Landa Lake	Cabo-2	26-Oct-21	13	Procambarus sp.		1
2725	Landa Lake	Cabo-2	26-Oct-21	14	Etheostoma fonticola	32	1
2725	Landa Lake	Cabo-2	26-Oct-21	14	Etheostoma fonticola	21	1
2725	Landa Lake	Cabo-2	26-Oct-21	14	Procambarus sp.		4
2725	Landa Lake	Cabo-2	26-Oct-21	15	Etheostoma fonticola	29	1
2725	Landa Lake	Cabo-2	26-Oct-21	15	Etheostoma fonticola	33	1
2725	Landa Lake	Cabo-2	26-Oct-21	15	Etheostoma fonticola	31	1
2725	Landa Lake	Cabo-2	26-Oct-21	15	Procambarus sp.		1
2725	Landa Lake	Cabo-2	26-Oct-21	16	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	1	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	2	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	2	Palaemonetes sp.		1
2726	Landa Lake	Ludw-2	26-Oct-21	3	Lepomis miniatus	85	1
2726	Landa Lake	Ludw-2	26-Oct-21	3	Lepomis miniatus	49	1
2726	Landa Lake	Ludw-2	26-Oct-21	3	Lepomis miniatus	52	1
2726	Landa Lake	Ludw-2	26-Oct-21	3	Procambarus sp.		1
2726	Landa Lake	Ludw-2	26-Oct-21	4	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	5	Lepomis miniatus	28	1
2726	Landa Lake	Ludw-2	26-Oct-21	6	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	7	No fish collected		

2726	Landa Lake	Ludw-2	26-Oct-21	8	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	9	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	10	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	11	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	12	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	13	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	14	No fish collected		
2726	Landa Lake	Ludw-2	26-Oct-21	15	No fish collected		
2727	Old Channel Reach	Bryo-1	26-Oct-21	9	Etheostoma fonticola	31	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	9	Etheostoma fonticola	30	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	9	Etheostoma fonticola	30	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	9	Etheostoma fonticola	32	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	9	Etheostoma fonticola	17	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	9	Procambarus sp.		1
2727	Old Channel Reach	Bryo-1	26-Oct-21	10	Etheostoma fonticola	29	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	10	Procambarus sp.		1
2727	Old Channel Reach	Bryo-1	26-Oct-21	11	Etheostoma fonticola	27	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	11	Etheostoma fonticola	30	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	11	Etheostoma fonticola	27	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	11	Palaemonetes sp.		3
2727	Old Channel Reach	Bryo-1	26-Oct-21	12	Etheostoma fonticola	30	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	13	Etheostoma fonticola	34	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	13	Etheostoma fonticola	27	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	13	Etheostoma fonticola	29	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	13	Etheostoma fonticola	30	1

2727	Old Channel Reach	Bryo-1	26-Oct-21	14	Etheostoma fonticola	34	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	14	Procambarus sp.		1
2727	Old Channel Reach	Bryo-1	26-Oct-21	15	Etheostoma fonticola	29	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	16	Etheostoma fonticola	25	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	17	Etheostoma fonticola	29	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	18	No fish collected		
2727	Old Channel Reach	Bryo-1	26-Oct-21	1	Etheostoma fonticola	28	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	1	Etheostoma fonticola	29	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	1	Procambarus sp.		5
2727	Old Channel Reach	Bryo-1	26-Oct-21	1	Palaemonetes sp.		6
2727	Old Channel Reach	Bryo-1	26-Oct-21	2	Etheostoma fonticola	25	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	2	Etheostoma fonticola	34	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	2	Etheostoma fonticola	29	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	2	Etheostoma fonticola	27	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	2	Palaemonetes sp.		1
2727	Old Channel Reach	Bryo-1	26-Oct-21	2	Procambarus sp.		1
2727	Old Channel Reach	Bryo-1	26-Oct-21	3	Etheostoma fonticola	24	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	3	Procambarus sp.		5
2727	Old Channel Reach	Bryo-1	26-Oct-21	3	Palaemonetes sp.		2
2727	Old Channel Reach	Bryo-1	26-Oct-21	4	Etheostoma fonticola	29	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	4	Etheostoma fonticola	27	1

2727	Old Channel Reach	Bryo-1	26-Oct-21	4	Etheostoma fonticola	18	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	4	Etheostoma fonticola	28	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	4	Etheostoma fonticola	28	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	4	Etheostoma fonticola	24	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	4	Etheostoma fonticola	30	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	4	Palaemonetes sp.		4
2727	Old Channel Reach	Bryo-1	26-Oct-21	4	Procambarus sp.		1
2727	Old Channel Reach	Bryo-1	26-Oct-21	5	Etheostoma fonticola	28	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	5	Etheostoma fonticola	28	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	5	Etheostoma fonticola	30	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	5	Etheostoma fonticola	27	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	5	Etheostoma fonticola	20	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	5	Etheostoma fonticola	31	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	5	Etheostoma fonticola	27	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	5	Etheostoma fonticola	30	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	5	Palaemonetes sp.		3
2727	Old Channel Reach	Bryo-1	26-Oct-21	6	Etheostoma fonticola	30	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	6	Etheostoma fonticola	30	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	6	Etheostoma fonticola	31	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	6	Etheostoma fonticola	34	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	6	Etheostoma fonticola	27	1

2727	Old Channel Reach	Bryo-1	26-Oct-21	6	Etheostoma fonticola	27	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	6	Procambarus sp.		2
2727	Old Channel Reach	Bryo-1	26-Oct-21	7	Etheostoma fonticola	26	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	7	Etheostoma fonticola	29	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	7	Etheostoma fonticola	28	1
2727	Old Channel Reach	Bryo-1	26-Oct-21	7	Procambarus sp.		1
2727	Old Channel Reach	Bryo-1	26-Oct-21	7	Palaemonetes sp.		1
2727	Old Channel Reach	Bryo-1	26-Oct-21	8	Procambarus sp.		1
2727	Old Channel Reach	Bryo-1	26-Oct-21	8	No fish collected		
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	31	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	24	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	32	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	29	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	31	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	31	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	28	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	28	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	27	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	28	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	30	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Gambusia sp.	8	1

2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Herichthys cyanoguttatus	19	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Procambarus sp.		2
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Palaemonetes sp.		15
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	24	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	21	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	1	Etheostoma fonticola	25	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	2	Etheostoma fonticola	29	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	2	Etheostoma fonticola	30	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	2	Etheostoma fonticola	19	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	2	Etheostoma fonticola	30	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	2	Etheostoma fonticola	24	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	2	Palaemonetes sp.		11
2728	Old Channel Reach	Bryo-2	26-Oct-21	3	Etheostoma fonticola	35	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	3	Etheostoma fonticola	34	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	3	Etheostoma fonticola	26	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	3	Etheostoma fonticola	23	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	3	Palaemonetes sp.		10
2728	Old Channel Reach	Bryo-2	26-Oct-21	3	Procambarus sp.		1
2728	Old Channel Reach	Bryo-2	26-Oct-21	4	Etheostoma fonticola	25	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	5	Palaemonetes sp.		1
2728	Old Channel Reach	Bryo-2	26-Oct-21	5	No fish collected		

2728	Old Channel Reach	Bryo-2	26-Oct-21	6	No fish collected		
2728	Old Channel Reach	Bryo-2	26-Oct-21	7	Etheostoma fonticola	35	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	7	Palaemonetes sp.		1
2728	Old Channel Reach	Bryo-2	26-Oct-21	8	No fish collected		
2728	Old Channel Reach	Bryo-2	26-Oct-21	9	Etheostoma fonticola	29	1
2728	Old Channel Reach	Bryo-2	26-Oct-21	10	Palaemonetes sp.		1
2728	Old Channel Reach	Bryo-2	26-Oct-21	10	No fish collected		
2728	Old Channel Reach	Bryo-2	26-Oct-21	11	No fish collected		
2728	Old Channel Reach	Bryo-2	26-Oct-21	12	Palaemonetes sp.		2
2728	Old Channel Reach	Bryo-2	26-Oct-21	12	No fish collected		
2728	Old Channel Reach	Bryo-2	26-Oct-21	13	No fish collected		
2728	Old Channel Reach	Bryo-2	26-Oct-21	14	Palaemonetes sp.		2
2728	Old Channel Reach	Bryo-2	26-Oct-21	14	No fish collected		
2728	Old Channel Reach	Bryo-2	26-Oct-21	15	Palaemonetes sp.		1
2728	Old Channel Reach	Bryo-2	26-Oct-21	15	No fish collected		
2728	Old Channel Reach	Bryo-2	26-Oct-21	2	Etheostoma fonticola	30	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	1	Etheostoma fonticola	28	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	1	Etheostoma fonticola	31	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	1	Procambarus sp.		2
2729	Old Channel Reach	Cabo-1	26-Oct-21	1	Palaemonetes sp.		3
2729	Old Channel Reach	Cabo-1	26-Oct-21	2	Etheostoma fonticola	27	1

2729	Old Channel Reach	Cabo-1	26-Oct-21	2	Etheostoma fonticola	24	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	2	Etheostoma fonticola	32	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	2	Procambarus sp.		2
2729	Old Channel Reach	Cabo-1	26-Oct-21	3	Etheostoma fonticola	23	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	3	Etheostoma fonticola	27	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	3	Etheostoma fonticola	29	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	3	Etheostoma fonticola	28	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	3	Etheostoma fonticola	26	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	3	Etheostoma fonticola	34	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	3	Etheostoma fonticola	34	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	3	Procambarus sp.		2
2729	Old Channel Reach	Cabo-1	26-Oct-21	3	Palaemonetes sp.		1
2729	Old Channel Reach	Cabo-1	26-Oct-21	4	Etheostoma fonticola	31	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	4	Etheostoma fonticola	30	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	4	Etheostoma fonticola	31	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	4	Procambarus sp.		1
2729	Old Channel Reach	Cabo-1	26-Oct-21	4	Palaemonetes sp.		1
2729	Old Channel Reach	Cabo-1	26-Oct-21	5	Procambarus sp.		1
2729	Old Channel Reach	Cabo-1	26-Oct-21	5	Gambusia sp.	23	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	6	Procambarus sp.		1
2729	Old Channel Reach	Cabo-1	26-Oct-21	6	No fish collected		

2729	Old Channel Reach	Cabo-1	26-Oct-21	7	No fish collected		
2729	Old Channel Reach	Cabo-1	26-Oct-21	8	Lepomis miniatus	75	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	8	Procambarus sp.		1
2729	Old Channel Reach	Cabo-1	26-Oct-21	9	Etheostoma fonticola	24	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	9	Etheostoma fonticola	28	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	9	Etheostoma fonticola	15	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	10	Procambarus sp.		2
2729	Old Channel Reach	Cabo-1	26-Oct-21	10	No fish collected		
2729	Old Channel Reach	Cabo-1	26-Oct-21	11	No fish collected		
2729	Old Channel Reach	Cabo-1	26-Oct-21	12	No fish collected		
2729	Old Channel Reach	Cabo-1	26-Oct-21	13	Etheostoma fonticola	22	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	13	Procambarus sp.		1
2729	Old Channel Reach	Cabo-1	26-Oct-21	14	Etheostoma fonticola	31	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	14	Etheostoma fonticola	24	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	15	Etheostoma fonticola	33	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	16	Etheostoma fonticola	36	1
2729	Old Channel Reach	Cabo-1	26-Oct-21	17	Procambarus sp.		1
2729	Old Channel Reach	Cabo-1	26-Oct-21	17	No fish collected		
2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Etheostoma fonticola	26	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Etheostoma fonticola	25	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Etheostoma fonticola	28	1

2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Etheostoma fonticola	23	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Etheostoma fonticola	25	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Etheostoma fonticola	28	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Etheostoma fonticola	28	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Etheostoma fonticola	28	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Etheostoma lepidum	54	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Procambarus sp.		2
2730	Old Channel Reach	Cabo-2	26-Oct-21	1	Palaemonetes sp.		18
2730	Old Channel Reach	Cabo-2	26-Oct-21	2	Palaemonetes sp.		2
2730	Old Channel Reach	Cabo-2	26-Oct-21	2	No fish collected		
2730	Old Channel Reach	Cabo-2	26-Oct-21	3	Etheostoma fonticola	32	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	3	Etheostoma fonticola	24	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	3	Procambarus sp.		1
2730	Old Channel Reach	Cabo-2	26-Oct-21	3	Palaemonetes sp.		4
2730	Old Channel Reach	Cabo-2	26-Oct-21	4	Palaemonetes sp.		4
2730	Old Channel Reach	Cabo-2	26-Oct-21	4	No fish collected		
2730	Old Channel Reach	Cabo-2	26-Oct-21	5	Herichthys cyanoguttatus	43	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	5	Palaemonetes sp.		7
2730	Old Channel Reach	Cabo-2	26-Oct-21	6	Etheostoma fonticola	29	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	6	Procambarus sp.		1
2730	Old Channel Reach	Cabo-2	26-Oct-21	6	Palaemonetes sp.		3

2730	Old Channel Reach	Cabo-2	26-Oct-21	7	Etheostoma fonticola	22	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	8	Procambarus sp.		2
2730	Old Channel Reach	Cabo-2	26-Oct-21	8	Palaemonetes sp.		1
2730	Old Channel Reach	Cabo-2	26-Oct-21	8	No fish collected		
2730	Old Channel Reach	Cabo-2	26-Oct-21	9	No fish collected		
2730	Old Channel Reach	Cabo-2	26-Oct-21	10	Etheostoma fonticola	23	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	11	No fish collected		
2730	Old Channel Reach	Cabo-2	26-Oct-21	12	Palaemonetes sp.		8
2730	Old Channel Reach	Cabo-2	26-Oct-21	12	Etheostoma fonticola	26	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	13	Palaemonetes sp.		3
2730	Old Channel Reach	Cabo-2	26-Oct-21	13	No fish collected		
2730	Old Channel Reach	Cabo-2	26-Oct-21	14	Etheostoma fonticola	13	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	14	Palaemonetes sp.		1
2730	Old Channel Reach	Cabo-2	26-Oct-21	15	Etheostoma fonticola	26	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	15	Etheostoma fonticola	27	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	16	Etheostoma fonticola	36	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	16	Procambarus sp.		2
2730	Old Channel Reach	Cabo-2	26-Oct-21	17	Etheostoma fonticola	32	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	17	Etheostoma fonticola	28	1
2730	Old Channel Reach	Cabo-2	26-Oct-21	18	Procambarus sp.		1
2730	Old Channel Reach	Cabo-2	26-Oct-21	18	No fish collected		

2731	Old Channel Reach	Open-1	26-Oct-21	1	No fish collected		
2731	Old Channel Reach	Open-1	26-Oct-21	2	No fish collected		
2731	Old Channel Reach	Open-1	26-Oct-21	3	No fish collected		
2731	Old Channel Reach	Open-1	26-Oct-21	4	No fish collected		
2731	Old Channel Reach	Open-1	26-Oct-21	5	No fish collected		
2731	Old Channel Reach	Open-1	26-Oct-21	6	No fish collected		
2731	Old Channel Reach	Open-1	26-Oct-21	7	No fish collected		
2731	Old Channel Reach	Open-1	26-Oct-21	8	No fish collected		
2731	Old Channel Reach	Open-1	26-Oct-21	9	No fish collected		
2731	Old Channel Reach	Open-1	26-Oct-21	10	No fish collected		
2732	Old Channel Reach	Open-2	26-Oct-21	1	No fish collected		
2732	Old Channel Reach	Open-2	26-Oct-21	2	No fish collected		
2732	Old Channel Reach	Open-2	26-Oct-21	3	No fish collected		
2732	Old Channel Reach	Open-2	26-Oct-21	4	No fish collected		
2732	Old Channel Reach	Open-2	26-Oct-21	5	No fish collected		
2732	Old Channel Reach	Open-2	26-Oct-21	6	No fish collected		
2732	Old Channel Reach	Open-2	26-Oct-21	7	No fish collected		
2732	Old Channel Reach	Open-2	26-Oct-21	8	No fish collected		
2732	Old Channel Reach	Open-2	26-Oct-21	9	No fish collected		
2732	Old Channel Reach	Open-2	26-Oct-21	10	No fish collected		
2733	Old Channel Reach	Ludw-1	26-Oct-21	1	No fish collected		

2733	Old Channel Reach	Ludw-1	26-Oct-21	2	No fish collected		
2733	Old Channel Reach	Ludw-1	26-Oct-21	3	No fish collected		
2733	Old Channel Reach	Ludw-1	26-Oct-21	4	No fish collected		
2733	Old Channel Reach	Ludw-1	26-Oct-21	5	No fish collected		
2733	Old Channel Reach	Ludw-1	26-Oct-21	6	No fish collected		
2733	Old Channel Reach	Ludw-1	26-Oct-21	7	No fish collected		
2733	Old Channel Reach	Ludw-1	26-Oct-21	8	No fish collected		
2733	Old Channel Reach	Ludw-1	26-Oct-21	9	No fish collected		
2733	Old Channel Reach	Ludw-1	26-Oct-21	10	No fish collected		
2734	Old Channel Reach	Ludw-2	26-Oct-21	1	No fish collected		
2734	Old Channel Reach	Ludw-2	26-Oct-21	2	Herichthys cyanoguttatus	45	1
2734	Old Channel Reach	Ludw-2	26-Oct-21	2	Lepomis miniatus	66	1
2734	Old Channel Reach	Ludw-2	26-Oct-21	3	Palaemonetes sp.		1
2734	Old Channel Reach	Ludw-2	26-Oct-21	3	No fish collected		
2734	Old Channel Reach	Ludw-2	26-Oct-21	4	Procambarus sp.		1
2734	Old Channel Reach	Ludw-2	26-Oct-21	4	Palaemonetes sp.		1
2734	Old Channel Reach	Ludw-2	26-Oct-21	4	No fish collected		
2734	Old Channel Reach	Ludw-2	26-Oct-21	5	Procambarus sp.		1
2734	Old Channel Reach	Ludw-2	26-Oct-21	5	No fish collected		
2734	Old Channel Reach	Ludw-2	26-Oct-21	6	Procambarus sp.		2
2734	Old Channel Reach	Ludw-2	26-Oct-21	6	No fish collected		

2734	Old Channel Reach	Ludw-2	26-Oct-21	7	Etheostoma fonticola	33	1
2734	Old Channel Reach	Ludw-2	26-Oct-21	7	Lepomis miniatus	70	1
2734	Old Channel Reach	Ludw-2	26-Oct-21	8	No fish collected		
2734	Old Channel Reach	Ludw-2	26-Oct-21	9	Etheostoma fonticola	16	1
2734	Old Channel Reach	Ludw-2	26-Oct-21	10	No fish collected		
2734	Old Channel Reach	Ludw-2	26-Oct-21	11	Etheostoma fonticola	32	1
2734	Old Channel Reach	Ludw-2	26-Oct-21	11	Procambarus sp.		1
2734	Old Channel Reach	Ludw-2	26-Oct-21	12	No fish collected		
2734	Old Channel Reach	Ludw-2	26-Oct-21	13	Etheostoma fonticola	36	1
2734	Old Channel Reach	Ludw-2	26-Oct-21	14	Lepomis miniatus	72	1
2734	Old Channel Reach	Ludw-2	26-Oct-21	15	No fish collected		
2735	Upper New Channel Reach	Open-1	28-Oct-21	1	No fish collected		
2735	Upper New Channel Reach	Open-1	28-Oct-21	2	Procambarus sp.		4
2735	Upper New Channel Reach	Open-1	28-Oct-21	2	Etheostoma fonticola	26	1
2735	Upper New Channel Reach	Open-1	28-Oct-21	3	No fish collected		
2735	Upper New Channel Reach	Open-1	28-Oct-21	4	Procambarus sp.		2
2735	Upper New Channel Reach	Open-1	28-Oct-21	4	No fish collected		
2735	Upper New Channel Reach	Open-1	28-Oct-21	5	No fish collected		

2735	Upper New Channel Reach	Open-1	28-Oct-21	6	Procambarus sp.		1
2735	Upper New Channel Reach	Open-1	28-Oct-21	6	No fish collected		
2735	Upper New Channel Reach	Open-1	28-Oct-21	7	No fish collected		
2735	Upper New Channel Reach	Open-1	28-Oct-21	8	Palaemonetes sp.		1
2735	Upper New Channel Reach	Open-1	28-Oct-21	8	No fish collected		
2735	Upper New Channel Reach	Open-1	28-Oct-21	9	No fish collected		
2735	Upper New Channel Reach	Open-1	28-Oct-21	10	No fish collected		
2735	Upper New Channel Reach	Open-1	28-Oct-21	11	No fish collected		
2735	Upper New Channel Reach	Open-1	28-Oct-21	12	No fish collected		
2736	Upper New Channel Reach	Open-2	28-Oct-21	1	No fish collected		
2736	Upper New Channel Reach	Open-2	28-Oct-21	2	No fish collected		
2736	Upper New Channel Reach	Open-2	28-Oct-21	3	No fish collected		
2736	Upper New Channel Reach	Open-2	28-Oct-21	4	No fish collected		
2736	Upper New Channel Reach	Open-2	28-Oct-21	5	No fish collected		
2736	Upper New Channel Reach	Open-2	28-Oct-21	6	No fish collected		

2736	Upper New Channel Reach	Open-2	28-Oct-21	7	No fish collected		
2736	Upper New Channel Reach	Open-2	28-Oct-21	8	No fish collected		
2736	Upper New Channel Reach	Open-2	28-Oct-21	9	No fish collected		
2736	Upper New Channel Reach	Open-2	28-Oct-21	10	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	1	Lepomis miniatus	82	1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	1	Palaemonetes sp.		3
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	1	Procambarus sp.		1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	2	Procambarus sp.		1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	2	Lepomis miniatus	82	1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	2	Herichthys cyanoguttatus	20	1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	3	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	4	Lepomis miniatus	62	1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	4	Lepomis miniatus	56	1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	4	Lepomis miniatus	57	1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	4	Lepomis miniatus	34	1

2737	Upper New Channel Reach	Hygr-1	28-Oct-21	4	Procambarus sp.		1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	5	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	6	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	7	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	8	Procambarus sp.		1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	8	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	9	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	10	Procambarus sp.		1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	10	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	11	Procambarus sp.		1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	11	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	12	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	13	No fish collected		
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	14	Lepomis miniatus	62	1
2737	Upper New Channel Reach	Hygr-1	28-Oct-21	15	Procambarus sp.		1

2737	Upper New Channel Reach	Hygr-1	28-Oct-21	15	No fish collected		
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	10	Procambarus sp.		1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	11	No fish collected		
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	12	Lepomis miniatus	43	1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	13	No fish collected		
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	14	No fish collected		
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	15	Lepomis gulosus	90	1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	15	Lepomis miniatus	30	1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	1	Palaemonetes sp.		1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	1	No fish collected		
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	2	Procambarus sp.		1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	2	Lepomis miniatus	24	1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	3	Procambarus sp.		1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	3	Astyanax mexicanus	31	1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	3	Herichthys cyanoguttatus	30	1

2738	Upper New Channel Reach	Hygr-2	28-Oct-21	4	Dionda nigrotaeniata	32	1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	4	Lepomis miniatus	70	1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	5	Procambarus sp.		2
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	5	No fish collected		
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	6	Herichthys cyanoguttatus	52	1
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	7	No fish collected		
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	8	No fish collected		
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	9	No fish collected		
2738	Upper New Channel Reach	Hygr-2	28-Oct-21	10	No fish collected		

APPENDIX G: 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.

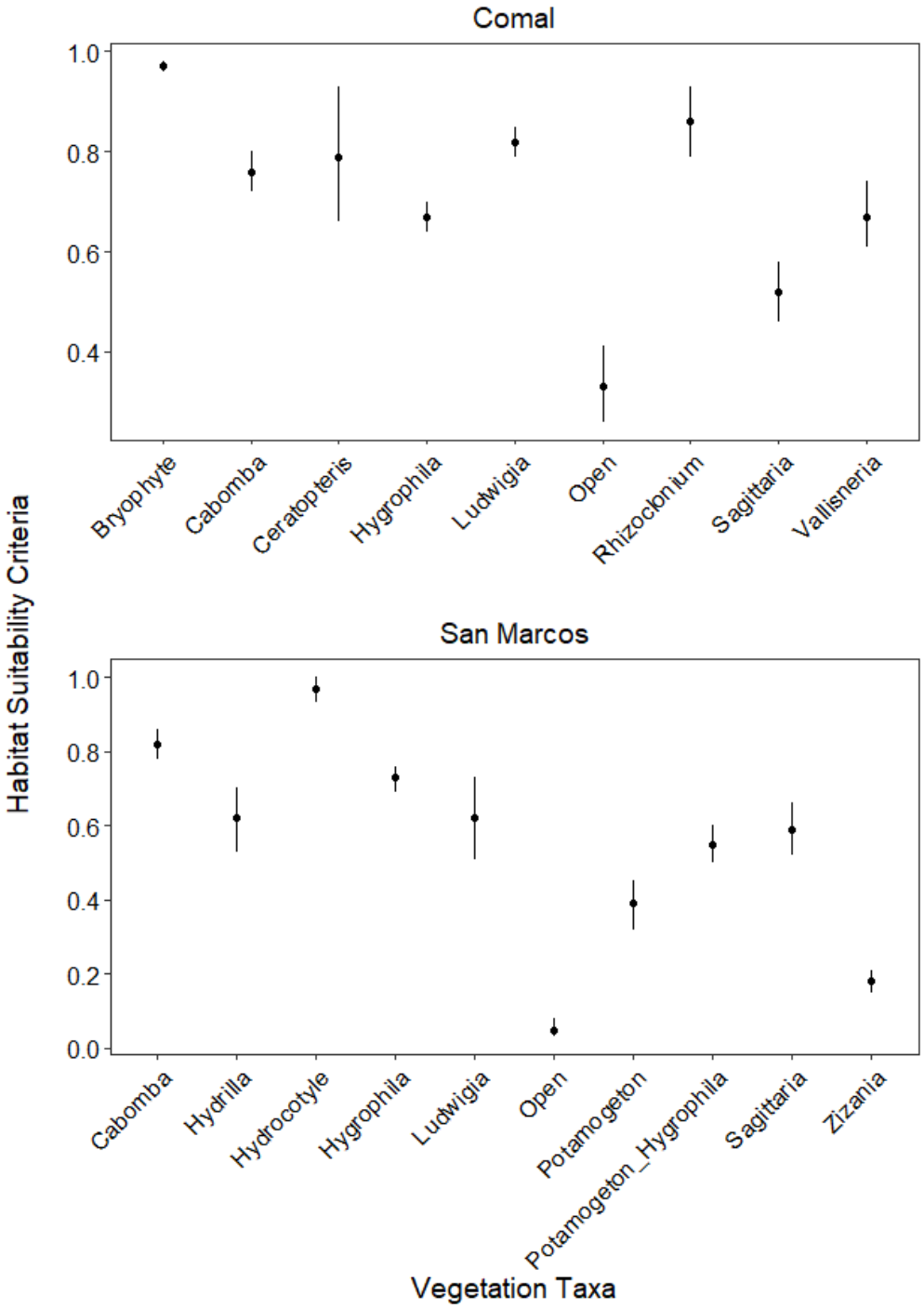

Figure G1. Aquatic vegetation habitat suitability criteria (±95% CI) built with drop-net and random dip-net datasets using logistic regression.

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 G1. 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)

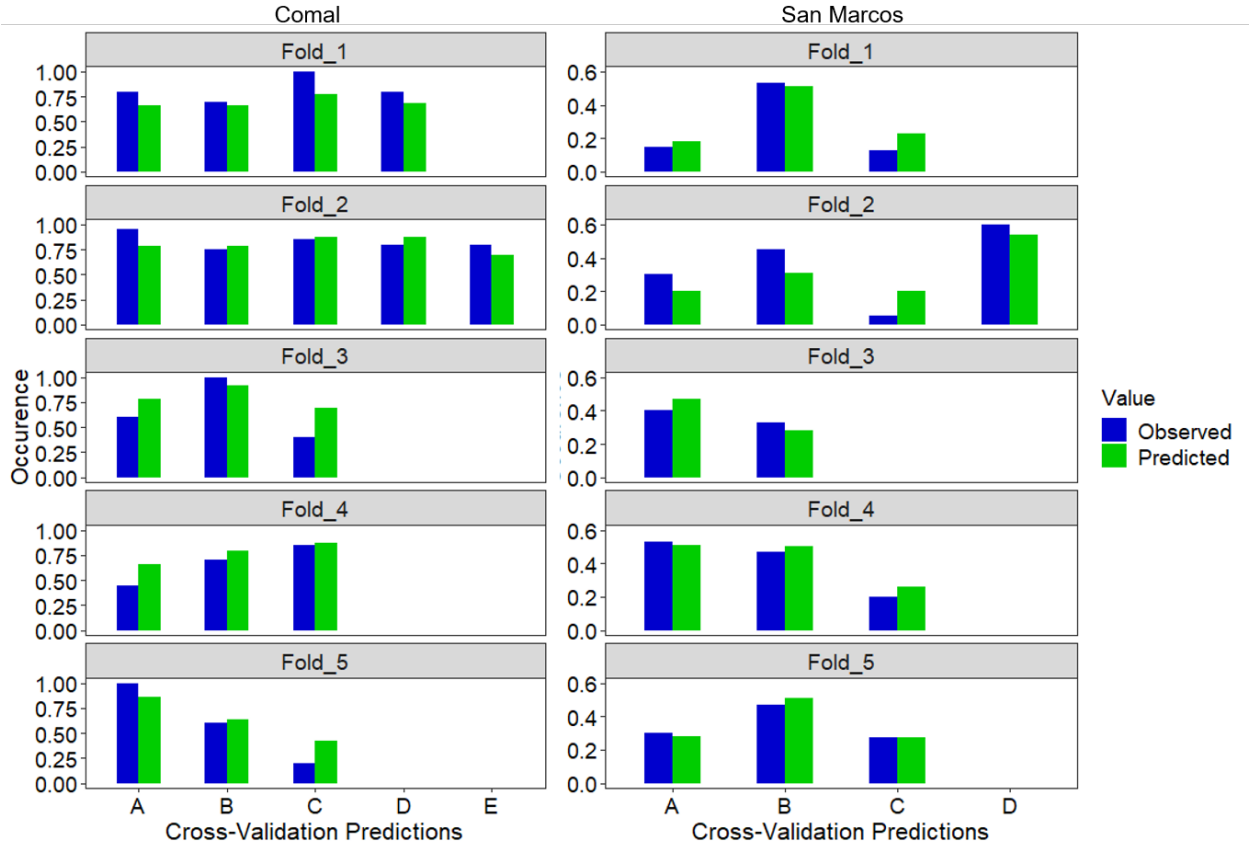

Figure G2. Observed vs. predicted Fountain Darter occurrence in relationship to OHSI from Random Forest 5-fold cross-validation.

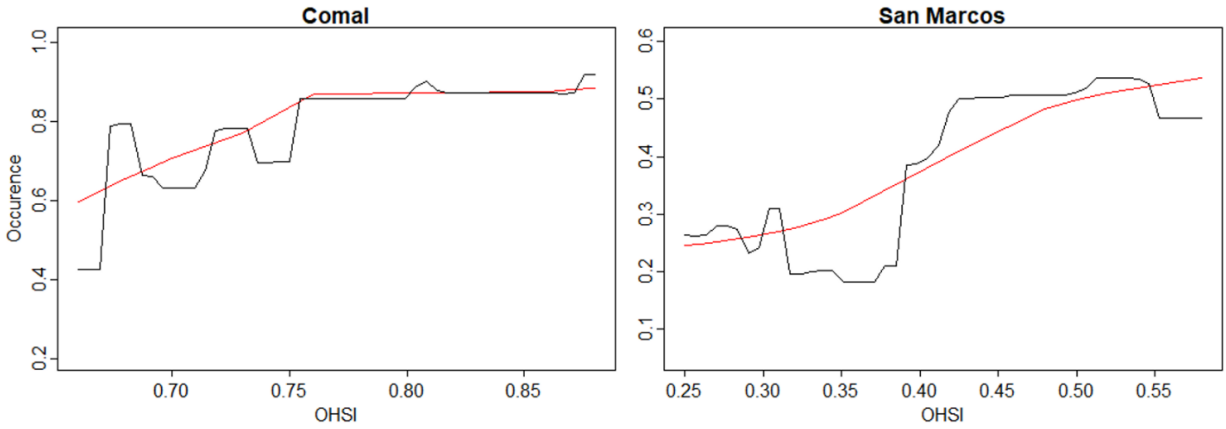

Figure G3. Fitted occurrence predictions for OHSI in the Comal Springs/River and San Marcos River. The red lines are LOWESS smoothed fitted predictions used to visualize nonlinear trends.

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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