Final Report

Lavaca Bay Ecosystem Assessment: Gathering Key Baseline Data Among Nursery Habitats Spread Across a Pollution Gradient

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Abstract

Estuaries are transitional zones where freshwater inflow dilutes saltwater, fostering diverse habitats and supporting a variety commercially and recreationally important species. In particular, estuaries support valuable nursery habitat where juvenile fish, shrimp, and crabs (hereinafter nekton) have increased access to food supplies and refuge from predation, with these prey resources fueling the greater coastal-marine food web (e.g., marine mammals, coastal bird populations). The Lavaca Bay System is an important estuarine ecosystem located along the central Texas Gulf Coast that forms part of the Matagorda Bay System and overarching Lavaca-Colorado Estuary. Despite this area's ecological importance, it has been significantly altered due to decades of environmental pollution stemming from coastal development and nearby industrial facilities. While previous studies have conducted extensive open bay sampling, there is limited data for the area's fringe marsh habitats. The primary purpose of this thesis was to gather key baseline data for the abundance and distribution of marsh-dependent nekton and coastal birds in the Lavaca Bay System across a presumed pollution gradient. In addition to gathering baseline data for these two faunal communities, a two-year seasonal ecological assessment of the Lavaca Bay System's marsh habitats determined that relative proximity to areas of historical environmental pollution had minimal to no negative impact on nekton or coastal bird abundance, distribution, and community structure. Nekton samples in this study were dominated by grass shrimp and penaeid shrimp, important prey resources for a variety of organisms including coastal birds and sportfish such as spotted seatrout and red drum. Taken with the frequent finding of seasonal effects on nekton species and little support for decreased abundance or diversity of key bird species, this study suggests that all areas sampled served as important nursery habitat and contributed to the overall productivity of the Lavaca and greater Matagorda Bay System.

Introduction

Estuaries are transitional zones where freshwater inflow dilutes saltwater (Palmer et al. 2011). These areas share common features including a gradient of decreasing salinity from the open sea, into a sheltered estuary, and on to a freshwater source (Elliott and McLusky 2002). Estuarine conditions support diverse habitats, such as tidal marshes, seagrass beds, mangrove forests, and oyster reefs. These habitats serve as feeding and nursery grounds for a variety of ecologically and economically important species and foster highly productive ecosystems defined by high levels of biodiversity (Minello 1999; Beck et al. 2001; Neahr et al. 2010). Within the Gulf of Mexico, 75% of commercially and recreationally important fishes and crustaceans use estuaries as nursery habitats (Chambers 1992).

Estuarine environments and nursery habitats can be particularly susceptible to marine pollution due to their proximity to pollution sources on land and within bays (Sun et al. 2012). This is exacerbated by factors such as population growth and increasing coastal development, factors which continue to impact the Texas Gulf Coast. From 1997 to 2017, there has been a 47% increase in the overall population of Texas coastal counties (Texas A&M Natural Resources Institute 2020). Within these areas, pollutants can accumulate from various sources including stormwater drains, industrial discharges, agricultural runoff, and sewage treatment facilities (Sun et al. 2012).

Marine plastic pollution is a global issue and is readily apparent in estuarine environments, namely due to the fact that 90% of marine plastic waste enters the ocean from land-based sources (Pinheiro et al. 2021). Microplastics, plastics 5 mm in diameter and smaller, are an increasing problem and have been found in the gut content and tissue samples of a variety of marine taxa (Tunnell et al. 2020). Regardless of source, marine pollution can have a detrimental impact on overall ecosystem health.

The Texas Gulf Coast is home to seven major estuaries and five minor estuaries (Bugica et al. 2020). The Lavaca-Colorado Estuary, also known as the Matagorda Bay System, is the second largest, spanning over 244,490 acres and including Lavaca, Matagorda, Carancahua, and Tres-Palacios Bays, as well as several other smaller bays. Major freshwater sources for the Lavaca-Colorado Estuary include the Colorado, Lavaca, and Tres Palacios Rivers (Schoenbaechler et al. 2011).

Within the Lavaca-Colorado Estuary, the Lavaca Bay System encompasses Lavaca, Cox, and Keller Bays and receives freshwater inflow from the Lavaca River and Gracitas, Cox, and Keller creeks. Carancahua Bay, which receives freshwater inflow from Carancahua Creek, is located less than two miles to the east of the Lavaca Bay System and is accessible via Matagorda Bay. The Lavaca Bay System is also home to significant urban and industrial development stemming from the cities of Port Lavaca and Point Comfort, which are connected via the Texas State Highway 35 causeway.

The overarching **goal** of the this study was to gather data to test whether nurdles have or are impacting critical nursery habitats for estuarine nekton and coastal bird populations. Specific objectives for the project included:

1) Complete two years of seasonal ecological data collection for juvenile estuarine-dependent nekton and coastal birds.

2) Sample in both nurdle and non-nurdle reported areas in Lavaca, Cox, and Keller bays with sites spread across a presumed gradient from high to low nurdle loading.

3) Conduct nurdle surveys at every sampling event to verify nurdle density and variability.

4) Comparison of seasonal ecological data from this study and the MBMT Colorado River Delta project.

Methods

Seasonal Nekton Assessment

Sample sites were selected across a presumed pollution gradient, based on proximity to historical nurdle discharge areas (Formosa waste and stormwater outfalls in Lavaca Bay and along Cox Creek). Sample sites 1 and 2 were located near the mouth of the Lavaca River, in the eastern part of Lavaca Bay. They are also in the vicinity of an underwater Formosa wastewater outflow which discharges into Lavaca Bay. Sample sites 3 and 4 were located on either side of the mouth of Cox Creek on the northern edge of Cox Bay. Twelve Formosa stormwater outflows are located along the banks of Cox Creek and Cox Bay (San Antonio Bay Estuarine Waterkeeper 2020). Sample sites 5 and 6 were located on the southern edge of Keller Bay. Sample sites 7 and 8 were located along the southwestern edge of Carancahua Bay and were intended to act as a control since they are not directly connected to the Lavaca Bay System (**Figure 1**).

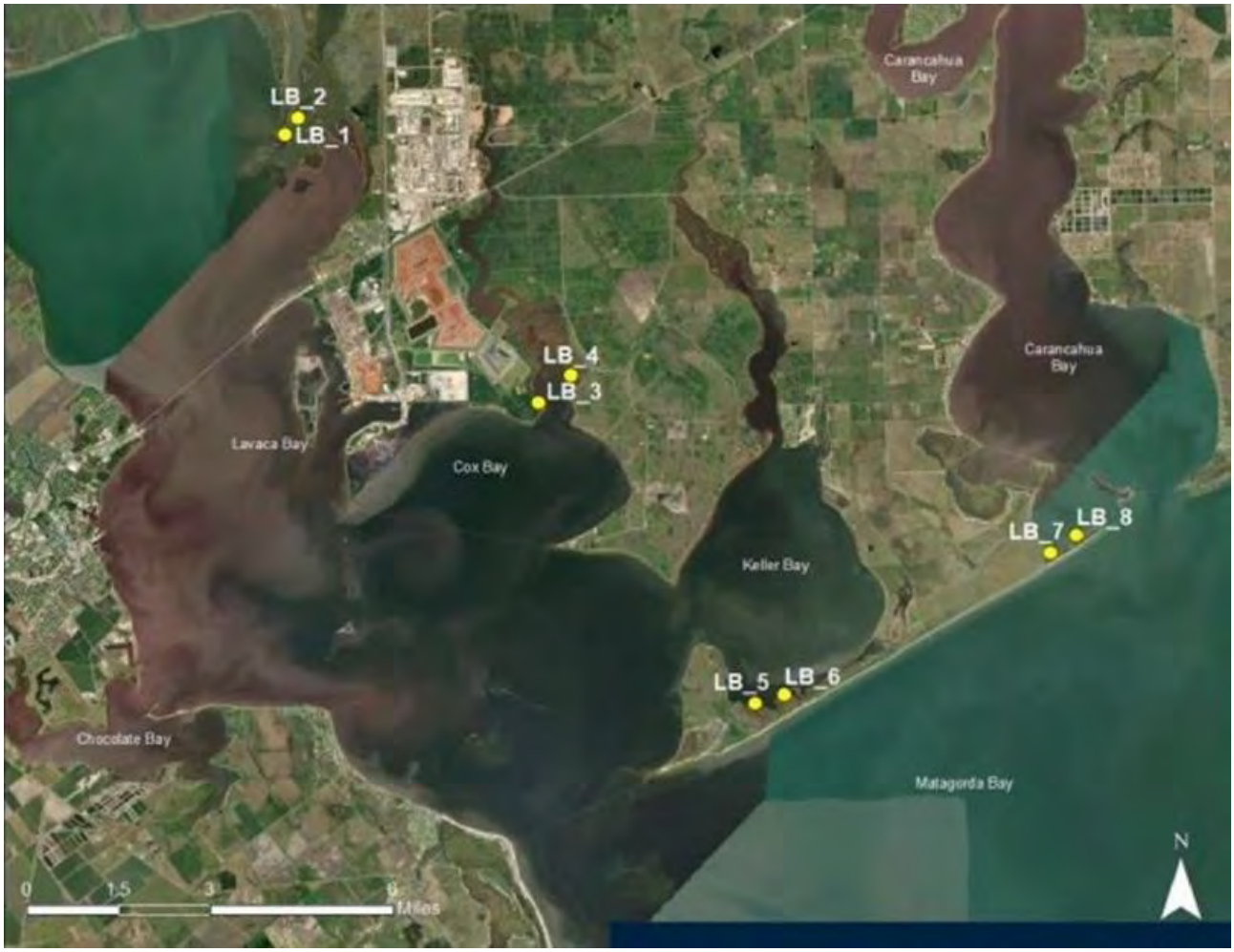


Figure 1. Map of the Lavaca Bay System and the eight seasonal nekton assessment sampling sites (yellow circles).

Between May 2022 and February 2024, nekton samples were collected twice during the spring, summer, and fall from eight locations in Lavaca, Cox, Keller, and Carancahua Bays. Due to weather and tidal conditions, samples were collected once during the winter of 2023 and no samples were collected during the winter of 2024. Samples were collected using an epibenthic sled. The epibenthic sled consists of a metal frame (0.75 m high × 0.6 m wide) with a 1-mm mesh conical plankton net mounted to skids. Each tow consisted of pulling the sled 16.7 m across a 10 m^2 sampling area. Three replicate tows were conducted at each sample site during each sampling trip. One trip consisted of 24 tows across eight sites.

Once collected, all organisms that were too large for sample containers were measured and released and non-faunal debris was rough sorted and removed. The remaining organisms were fixed in 10% buffered formalin, brought back to the laboratory, identified to a practical taxonomic level, and enumerated. Shrimp were measured for total length (TL) between the tip of rostrum and the telson, while crab species were measured using carapace width (CW). If more than 22 individuals of the same species were collected in a single tow, the largest, smallest, and 20 randomly selected individuals were measured. This method assumes that the length measurements of the randomly sampled individuals were representative of the entire size distribution in the tow. Additionally, at

each sample site, water temperature (˚C), pH, dissolved oxygen (mg/L), and salinity (ppt) were measured with a HydroLab water quality sonde and a two-minute nurdle survey following the methods of Tunnell et al. (2020) was conducted.

For statistical analysis, sample sites were grouped by area (Lavaca [1-2], Cox [3-4], Keller [5-6] and Carancahua [7-8]) and analyzed separately. Statistical analyses included comparisons of mean fish and crustacean density, density and length comparisons for genera/species of interest, and community assemblage comparisons.

Overall Fish and Crustacean Mean Density

For each area, overall abundance (n) and mean density (no./m²), were calculated for fish and crustaceans during each season. Overall abundance was calculated as the sum of fish or crustaceans across all samples within an area for each season. Mean density was calculated by taking the average fish or crustacean density for samples within each area for each season. Data were compared using a three-way ANOVA function in R 4.3.2 statistical software. Factors included area, season, and year. Data were log(x+1) transformed when necessary to ensure normality of residuals and minimize heteroscedasticity. When significant interactions among factors were detected, follow up ANOVAs and Tukey's Honestly Significant Difference (Tukey's HSD) were used to determine which levels differed from each other.

Key Taxa Mean Density and Length

Overall abundance (n), relative abundance (RA [%]), mean density (no./m²), and mean length (mm) were calculated for each individual species (or highest taxonomic level) within each area during each season. Overall abundance was calculated as the sum of individuals of a particular species, genus, or family across all samples within an area for each season. Relative abundance (RA [%]) was calculated by dividing the overall abundance of each taxa by the total number of fish or crustaceans for each area during each season. Again, data were compared using ANOVA function in R 4.3.2 statistical software and Tukey's HSD was used to determine which levels differed from each other. To provide a more accurate depiction of trends for selected taxa, all seasons were included in data analyses for resident taxa while only primary recruitment seasons were included for transient taxa.

Nekton Community Analysis

A multivariate analysis was conducted using PRIMER v7 statistical software to determine differences in nekton community structure among areas for each season. Data were transformed to down weight contributions from dominant taxa (e.g. Grass shrimp) and to discern differences amongst uncommon taxa. Data were converted into a resemblance matrix using Bray-Curtis similarities and used to generate a non-metric multidimensional scaling (nMDS) plot which allowed for a visual comparison between areas. This was followed by an a permutational multivariate analysis of variance test (PERMANOVA) and similarity percentage (SIMPER) analysis to understand relationships between community assemblages and determine the relative impact of individual taxa on community assemblage.

Coastal Bird Assessment

To establish a comprehensive seasonal avian ecological assessment across Lavaca Bay, four study areas were identified nearby nekton sites. The sites were placed at key regions adjacent to nurdle recovery locations in the Lavaca Bay system. Each study area, or Avian Monitoring Area (**Figure 2**), was roughly split into an eastern and western section. A seasonal survey consisted of four timed point counts conducted per section, for a total of eight point counts per monitoring area. Point count surveys were repeated across seasons between spring, fall, and winter. This occurred from Spring 2022 to Winter 2024 for a total of six avian surveys. Point count sites were selected independently in the field at the time of each survey to represent the variety of dominant habitat types present across Lavaca Bay. This included emergent vegetated marsh edge (EM), open water (OW), shoreline/mud flat (SL), shell hash (SH), woody scrub (ScL), and riparian woodland (WD). Point count site selection was also influenced by seasonal variation in accessibility and availability of habitat types. Each timed point count (**Figure 3**) was conducted for a 10-minute period, and all avian species observed (either visually or aurally) during this interim were recorded. The number of individuals, habitat associations, habitat utilization or activity, distance from observers, and relevant climate parameters was also documented (Verner 1985; USDA 1997).

Direct field observations during point counts were supplemented by passive acoustic surveys, in a technique commonly used in the assessment of avian populations (e.g., Digby et al. 2013; Sanders & Mennill 2014; Towsey et al. 2014). In the spring and summer of 2022, 16 acoustic recording units (ARU's) were strategically deployed across the Lavaca Bay avian monitoring areas, with each site receiving three to five of Wildlife Acoustics Song Meter SM4 Acoustic Recorder and Wildlife Acoustics Song Meter Mini models recording units (**Figure 2**). Recorders were secured to t-posts at each site approximately 0.75 to 1.25 m off the ground or water to minimize the chance of water intrusion in high tide events. Each recorder was set to record at dawn and dusk daily to the point of battery failure or memory card capacity. Recording units were placed on site prior to the onset of spring 2022 avian point counts and retrieved at the end of summer 2022.

After the ARU's were retrieved in August 2022 their memory card data was transferred to backup storage for audio processing. To process the 2,700 hours of acoustic data generated from these passive recording devices over three months of deployment, an established method of processing utilizing species-specific models of automated sound recognition algorithms searched for vocalizations of interest (Acevedo et al. 2009; Brandes 2008; Browning et al. 2017). This method allows for more rapid processing of thousands of field recordings, reducing time expenditures for audio segment identification and extraction from the recordings (Waddle et al. 2009; Willacy et al. 2015).
Two species of interest, the Eastern Black Rail (*Laterallus jamaicensis*) and the Whooping Crane (*Grus americana*) were examined using this technique. The Eastern Black Rail is a secretive marsh bird, well-suited for assessment via passive acoustic surveys as it is notoriously cryptic with lower probabilities of detection as compared to other species when conducting traditional avian surveys given its life history and habitat requirements (Eddleman et al. 1988; Conway et al. 2010). The Whooping Crane is federally listed as an endangered species by the USFWS and has been observed in adjacent Matagorda Bay inland marshes.

The software package Kaleidoscope Pro© (version 5.1.9; Wildlife Acoustics, Inc., Maynard, MA, USA 2018*b*) was used to analyze recorded audio data at each study site. An Eastern Black Rail classifier built using approximately 92 recordings of calling Eastern Black Rails (comprising 1,060 distinct vocalizations used in model development) obtained from the Macaulay Library at the Cornell Lab of Ornithology (Cornell Lab of Ornithology 2018) and from the Xeno-canto Archive (http://www.xeno-canto.org/) refined using binary classifiers to improve its ability to discriminate between Black Rail calls and non-target species (Sokolova et al. 2006) and tested against control data was used for detection of Eastern Black Rail vocalizations. A similar process was completed for the Whooping Crane classifier. Then both Eastern Black Rail and Whooping Crane classifier algorithms were separately run against the entire dataset of field recordings by each study site, and qualified observers manually reviewed every putative Eastern Black Rail and Whooping Crane detection identified by the classifier both aurally and visually (i.e., listening to the detection and inspecting the spectrogram, respectively).

Figure 2. Avian study areas and placement of audio recorder units (ARUs).

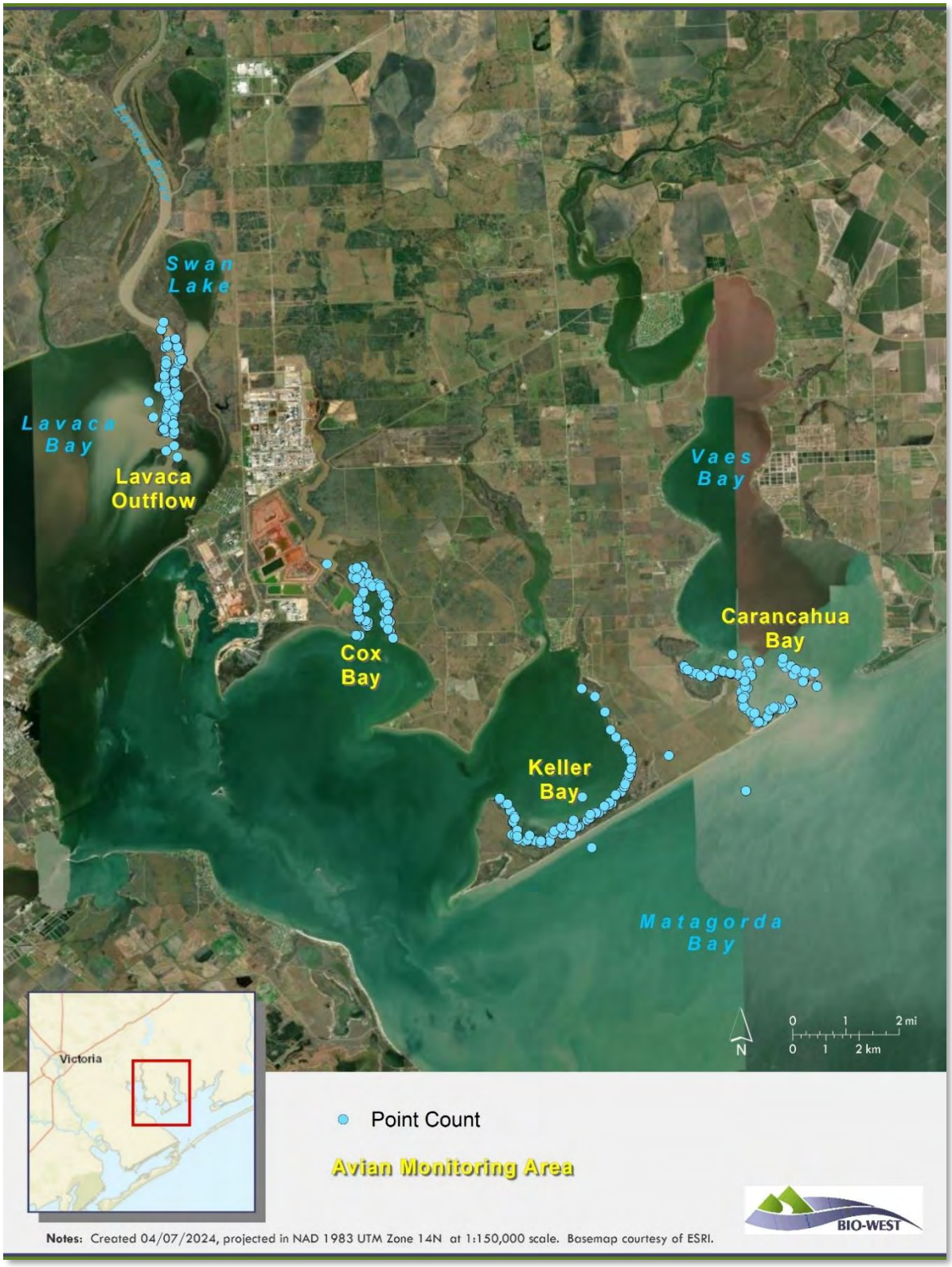


Figure 3. Avian point count locations across the four study areas.

Results

Seasonal Nekton Assessment

From May 2022 to October 2023, 24 total samples were collected in each area during the spring and summer seasons. During the fall of 2022, receded waterlines and reduced marsh edge area limited sampling opportunities for Cox and Carancahua Bays. 24 total fall samples were collected for Lavaca and Keller Bays while 21 total fall samples were collected for Cox Bay and 18 total fall samples were collected for Carancahua Bay. During the winter season, low tides and reduced marsh edge area again limited sampling opportunities and only 6 total winter samples per area were collected. A total of 303 samples were collected over the course of 13 sampling trips.

A total of 103,614 organisms were collected throughout this study. Of these, 7,290 fish representing 28 taxonomic groups and 96,324 crustaceans representing 9 taxonomic groups were collected across all sites. The three most abundant fish taxonomic groups overall were Gulf Menhaden (*Brevoortia patronus*) (47.2%), Bay Anchovies (*Anchoa mitchilli*) (13.1%), and Gobies (*Gobiidae sp.*) (7.6%). The three most abundant crustacean taxonomic groups overall were Grass shrimp (*Palaemonetes sp*.) (76.3%), Penaeid shrimp (20.8%), and Blue Crab (1.9%). Taxon abundance and composition demonstrated seasonal variability (**Appendix A & Appendix B**).

Physical Parameters

Water quality parameters within the Lavaca Bay System varied seasonally. Mean temperatures ranged from 12.55° C in Carancahua Bay in the winter of 2023 to 35.16° C in Cox Bay in the summer of 2023. Salinities ranged from 21.29 ppt in Lavaca Bay in summer 2023 to 38.25 ppt in Keller Bay in summer 2022. Measurements for pH ranged from 7.80 in Carancahua Bay in fall 2022 to 8.94 in Lavaca Bay in summer 2023. Dissolved oxygen (DO) ranged from 3.55 mg/L in Keller Bay in summer 2022 to 9.92 mg/L in Lavaca Bay in winter 2023 (**Appendix C**). Although 104 nurdle surveys were conducted throughout the study, zero nurdles were observed.

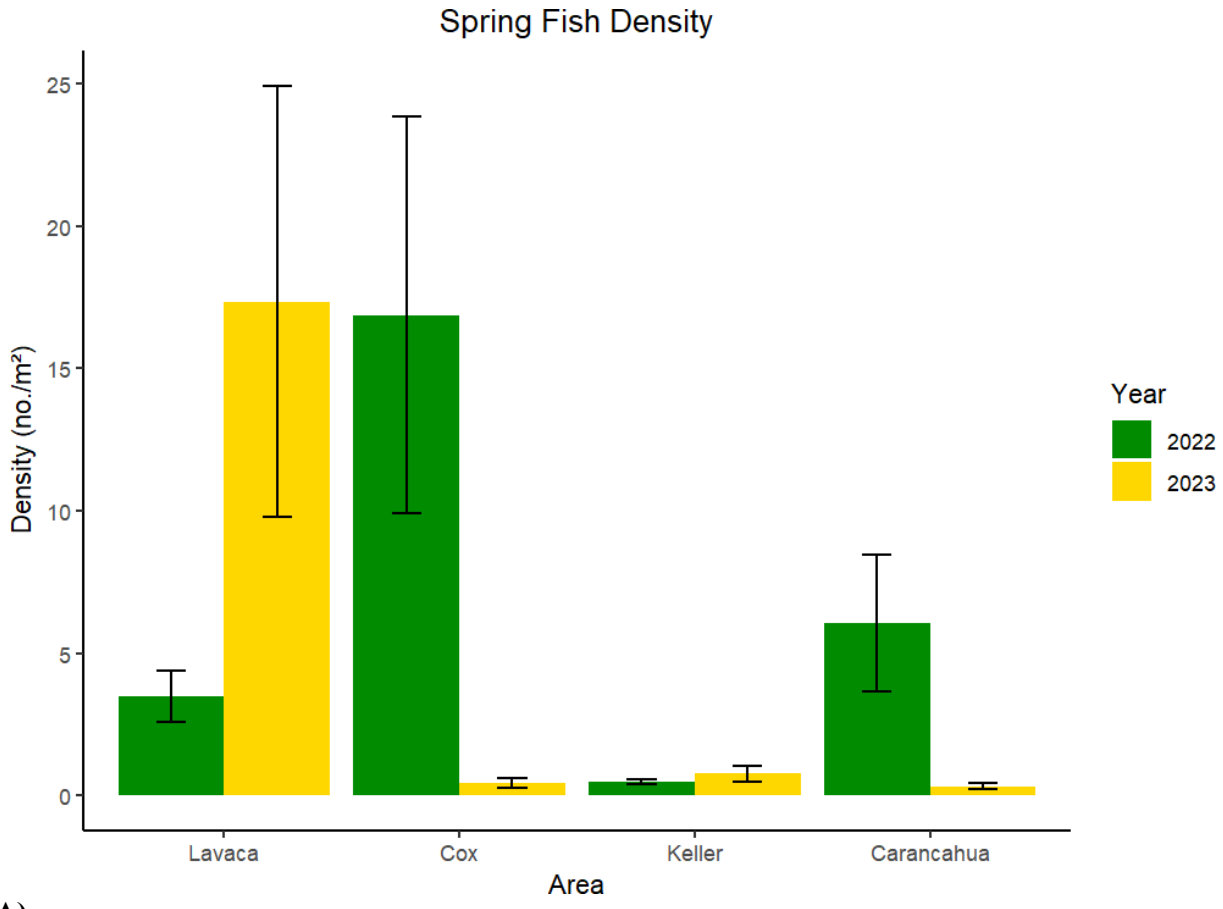
Overall Mean Fish Density

A three-way ANOVA determined that there was a significant interaction between year, season, and area for mean fish density (ANOVA: $F_{6, 275} = 8.20$, $p < 0.001$). A follow-up two-way ANOVA determined that there was a significant interaction between season and area for 2022 and 2023 for mean fish density (2022 ANOVA: $F_{6, 123} = 5.63$, $p < 0.001$; 2023 ANOVA: $F_{9, 152} = 6.47$, $p < 0.001$).

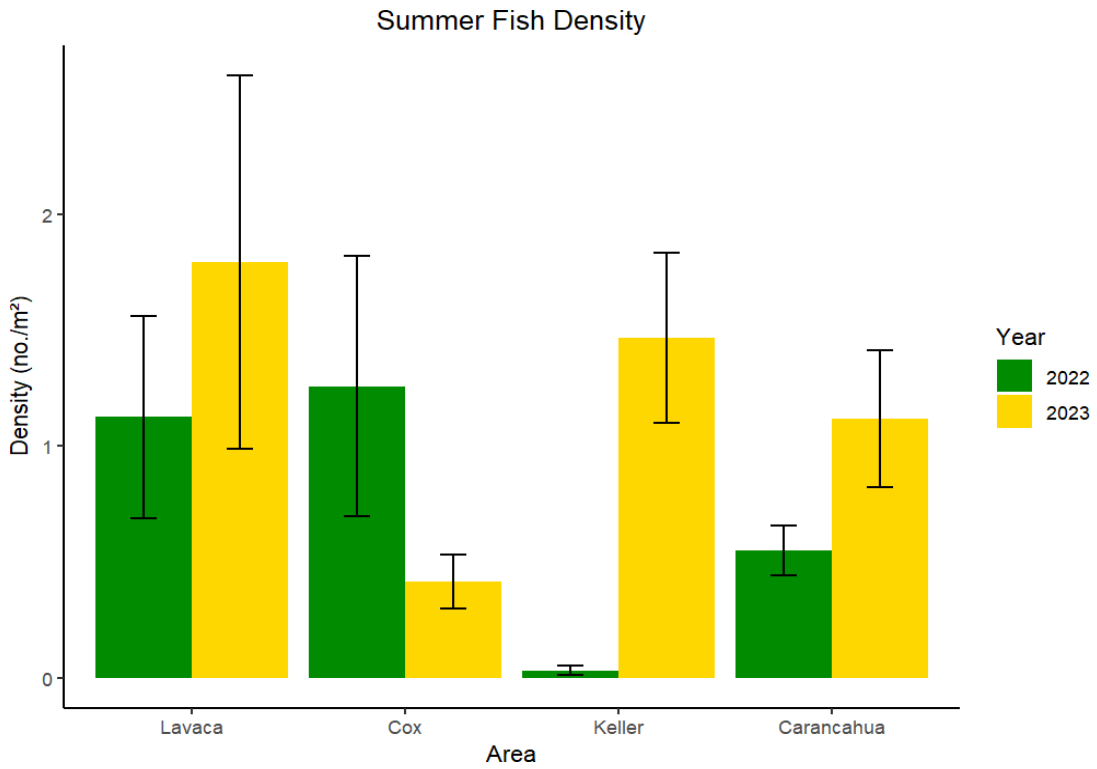
During the spring of 2022, Cox Bay demonstrated significantly greater mean fish density compared to Keller Bay (ANOVA: $F_{3, 44} = 7.38$, $p < 0.001$; Cox = 16.88 no./m² [SE = ± 6.96], Keller = 0.48 no./m² [SE = ± 0.08]) (**Figure 4A**). During the summer of 2022, Lavaca and Cox Bays demonstrated significantly greater mean fish density compared to Keller Bay (ANOVA: $F_{3, 44} = 3.94$, $p < 0.05$; Lavaca = 1.13 no./m² [SE = ± 0.43], Cox = 1.26 no./m² [SE = ± 0.56], Keller = 0.03 no./m² [SE = ± 0.01]) (**Figure 4B**). During the fall of 2022, Lavaca and Keller Bays

demonstrated significantly greater mean fish density compared to Carancahua Bay (ANOVA: $F_{3, 35} = 5.25$, $p < 0.01$; Lavaca = 1.43 no./m² [SE = ± 0.29], Keller = 1.33 no./m² [SE = ± 0.22], Carancahua = 0.55 no./m² [SE = ± 0.11]) (**Figure 4C**). No other significant interactions were observed for 2022.

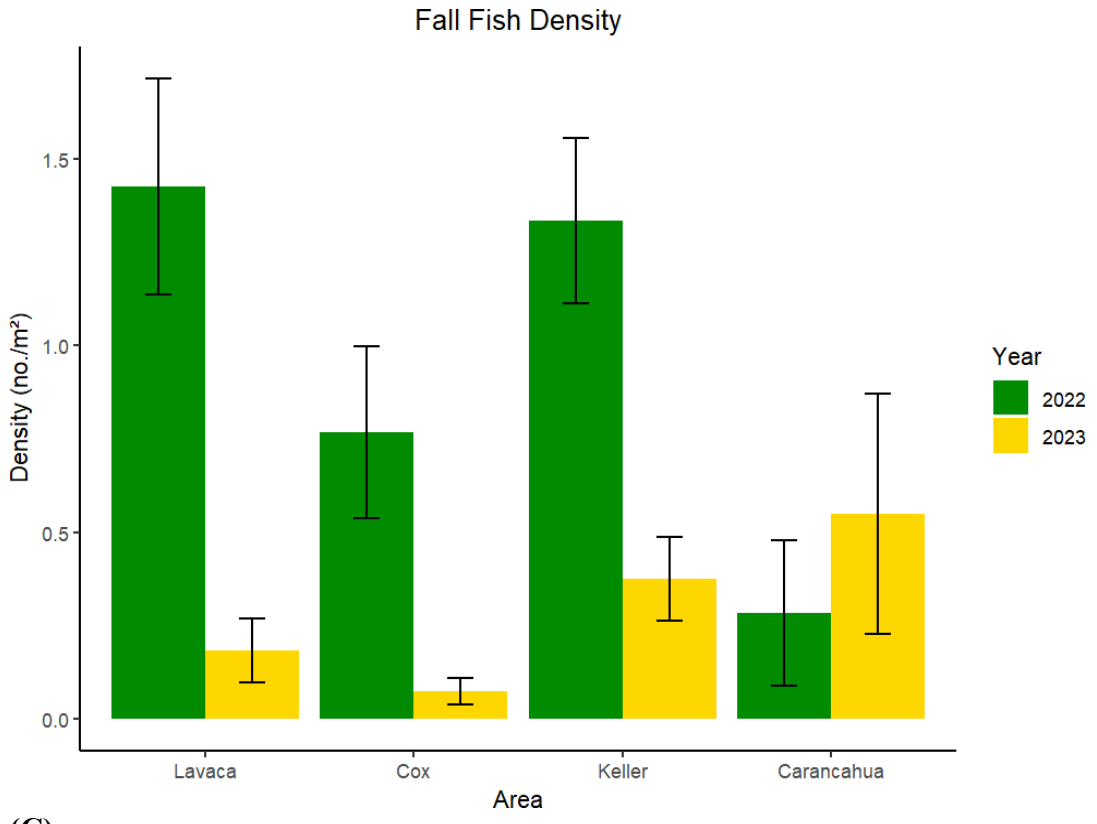
During the spring of 2023, Lavaca Bay demonstrated significantly greater mean fish density compared to Cox, Keller, and Carancahua Bays (ANOVA: $F_{3, 44} = 12.49$, $p < 0.001$; Lavaca = 17.35 no./m² [SE = ± 7.56], Cox = 0.44 no./m² [SE = ± 0.17], Keller = 0.76 no./m² [SE = ± 0.27], Carancahua = 0.33 no./m² [SE = ± 0.09]) (Figure 1.2C). No other significant interactions were observed for 2023.



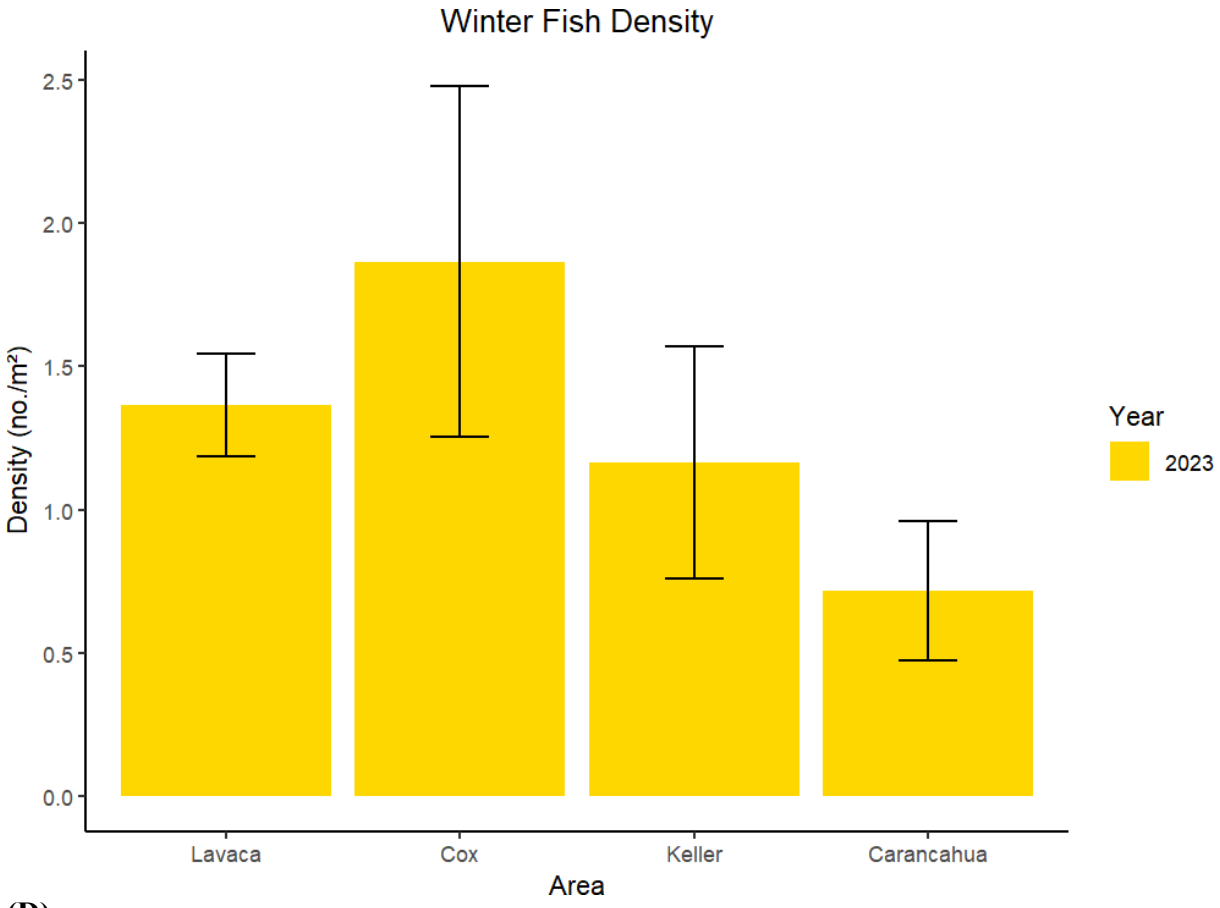
(A)


Summer Fish Density
Density (no./m²)
2
1
0
Lavaca
Cox
Keller
Carancahua
Area
Year
2022
2023

(B)


Fall Fish Density
Density (no./m²)
1.5
1.0
0.5
0.0
Lavaca
Cox
Keller
Carancahua
Area
Year
2022
2023

(C)



(D)

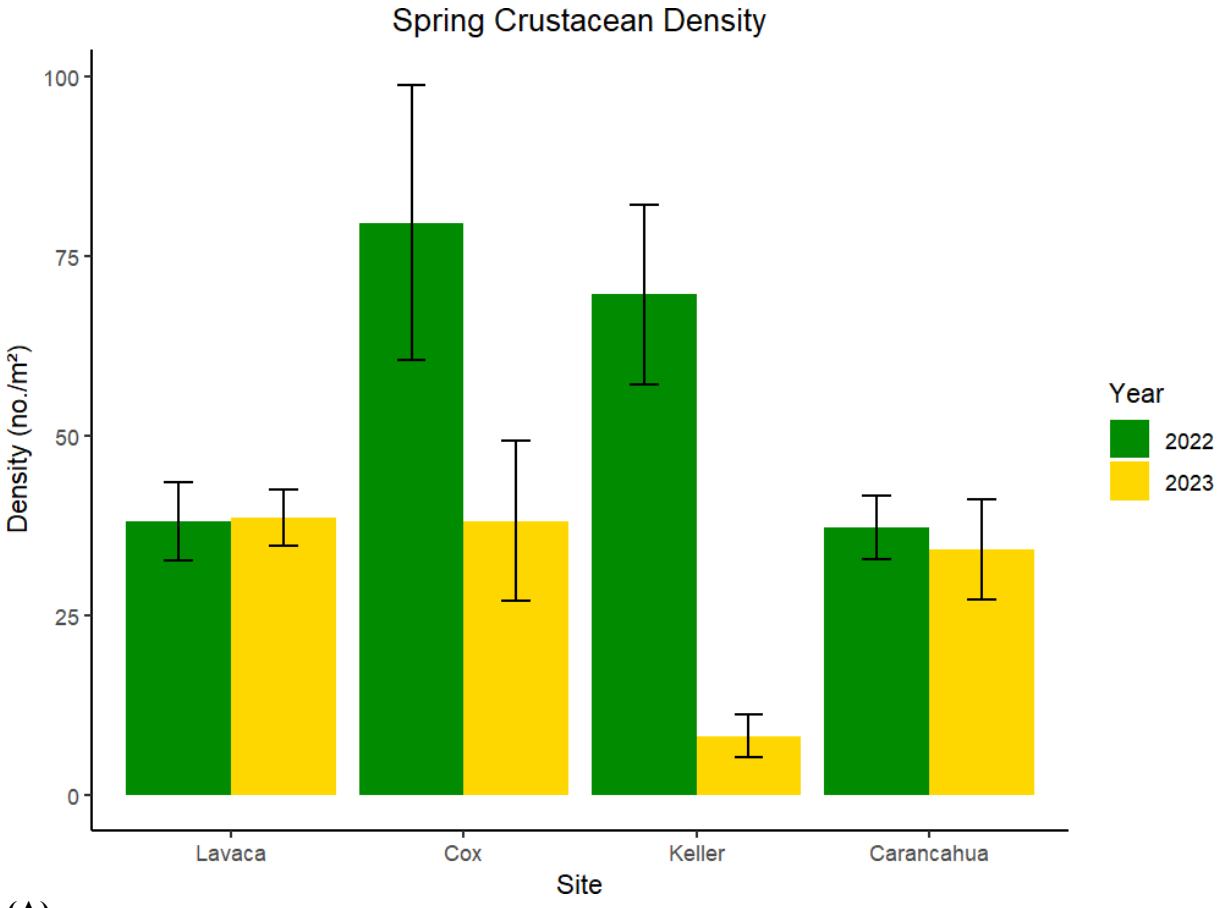
Figure 4. Bar charts (A-D) displaying seasonal mean fish density (no./m²) by area. Green bars represent 2022 samples. Yellow bars represent 2023 samples. Error bars represent standard error.

Overall Mean Crustacean Density

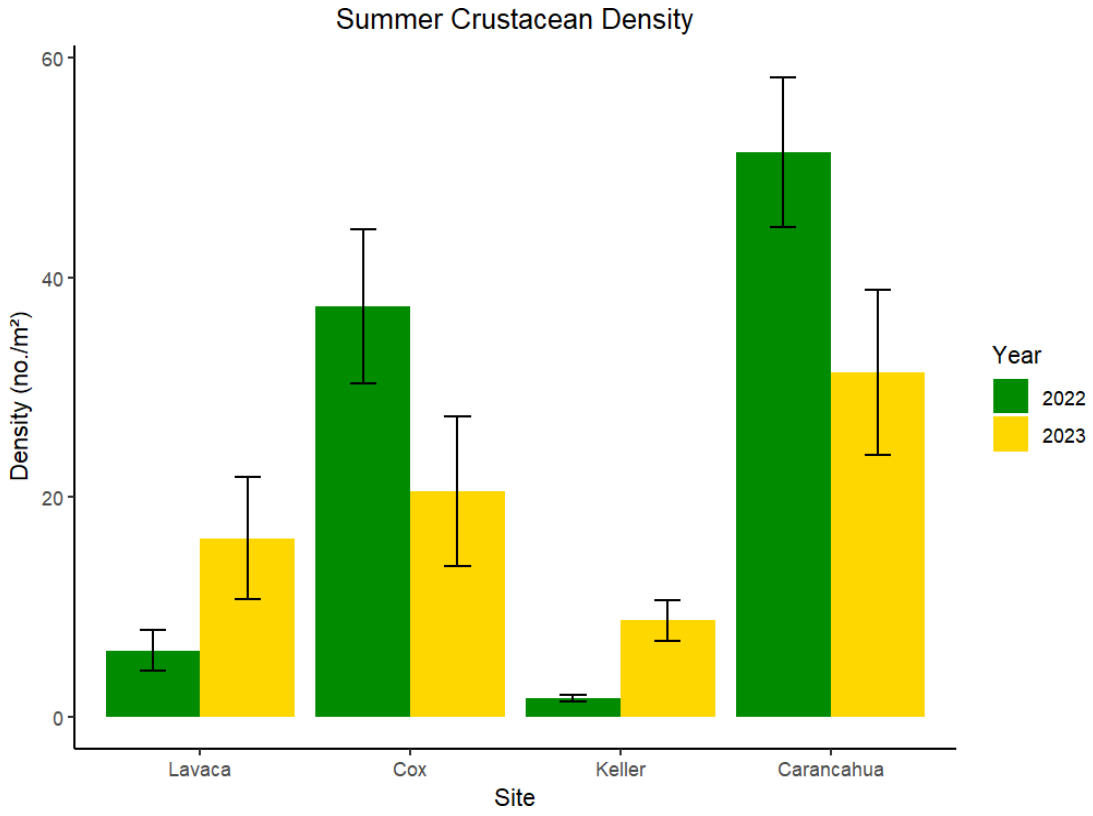
A three-way ANOVA determined that there was a significant interaction between year, season, and area for mean crustacean density (ANOVA: $F_{6, 275} = 5.33$, $p < 0.001$). A follow-up two-way ANOVA determined that there was a significant interaction between season and area for 2022 and 2023 for mean crustacean density (2022 ANOVA: $F_{6, 123} = 16.17$, $p < 0.001$; 2023 ANOVA: $F_{9, 152} = 2.19$, $p < 0.05$).

During the summer of 2022, Cox and Carancahua Bays demonstrated significantly greater mean crustacean density compared to Lavaca and Keller Bays (ANOVA: $F_{3, 44} = 43.55$, $p < 0.001$; Cox = 37.34 no./m² [SE = ± 7.00], Carancahua = 51.38 no./m² [SE = ± 6.78], Lavaca = 6.01 no./m² [SE = ± 1.82], Keller = 1.74 no./m² [SE = ± 0.29]) (**Figure 5B**). During the fall of 2022, Keller Bay demonstrated significantly greater mean crustacean density compared to Lavaca and Cox Bays (ANOVA: $F_{3, 35} = 7.39$, $p < 0.001$; Keller = 76.92 no./m² [SE = ± 14.95], Lavaca = 20.60 no./m² [SE = ± 4.23], Cox = 24.11 no./m² [SE = ± 3.09]) (**Figure 5C**). No other significant interactions were observed for mean crustacean density for 2022.

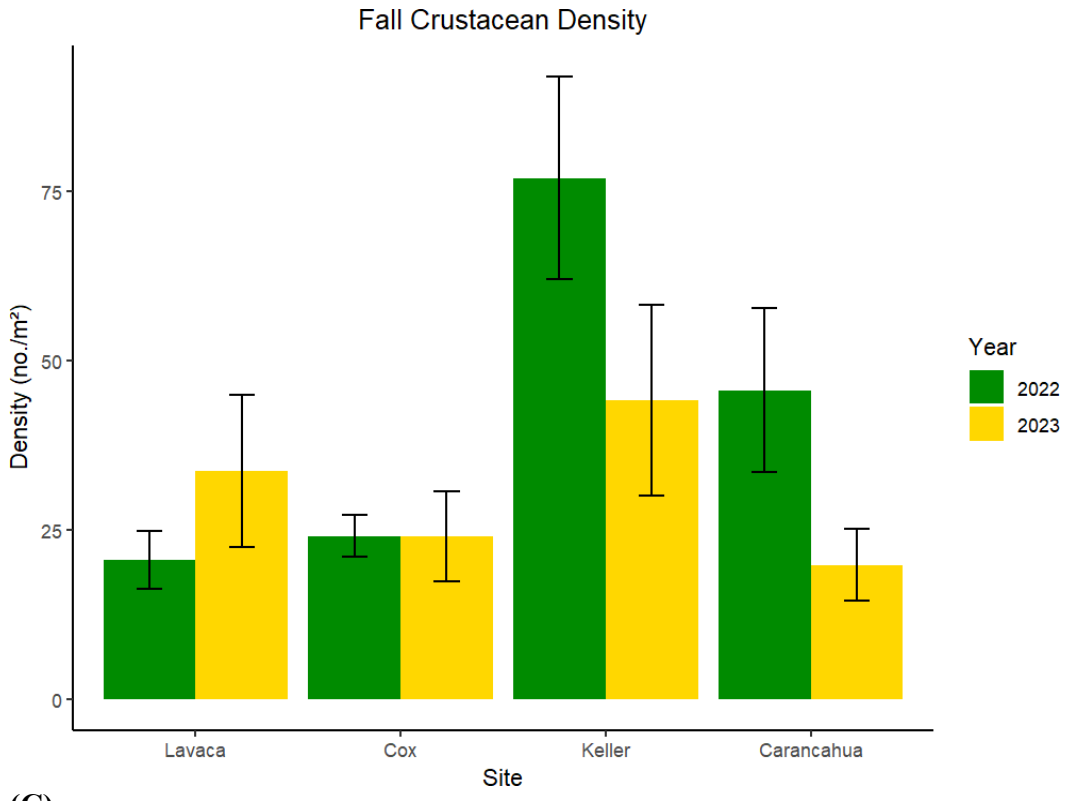
During the spring of 2023, Lavaca, Cox, and Carancahua Bays demonstrated significantly greater mean crustacean density compared to Keller Bay (ANOVA: $F_{3, 44} = 11.11$, $p < 0.001$; Lavaca = 38.61 no./m² [SE = ± 3.84], Cox = 38.18 no./m² [SE = ± 11.11], Carancahua = 34.18 no./m² [SE = ± 6.94], Keller = 8.23 no./m² [SE = ± 2.95]) (**Figure 5A**). During the summer of 2023, Carancahua Bay demonstrated significantly greater mean crustacean density compared to Keller Bay (ANOVA: $F_{3, 44} = 3.79$, $p < 0.05$; Carancahua = 31.34 no./m² [SE = ± 7.51], Keller = 8.83 no./m² [SE = ± 1.85]) (**Figure 5B**). No other significant interactions were observed for mean crustacean density for 2023.



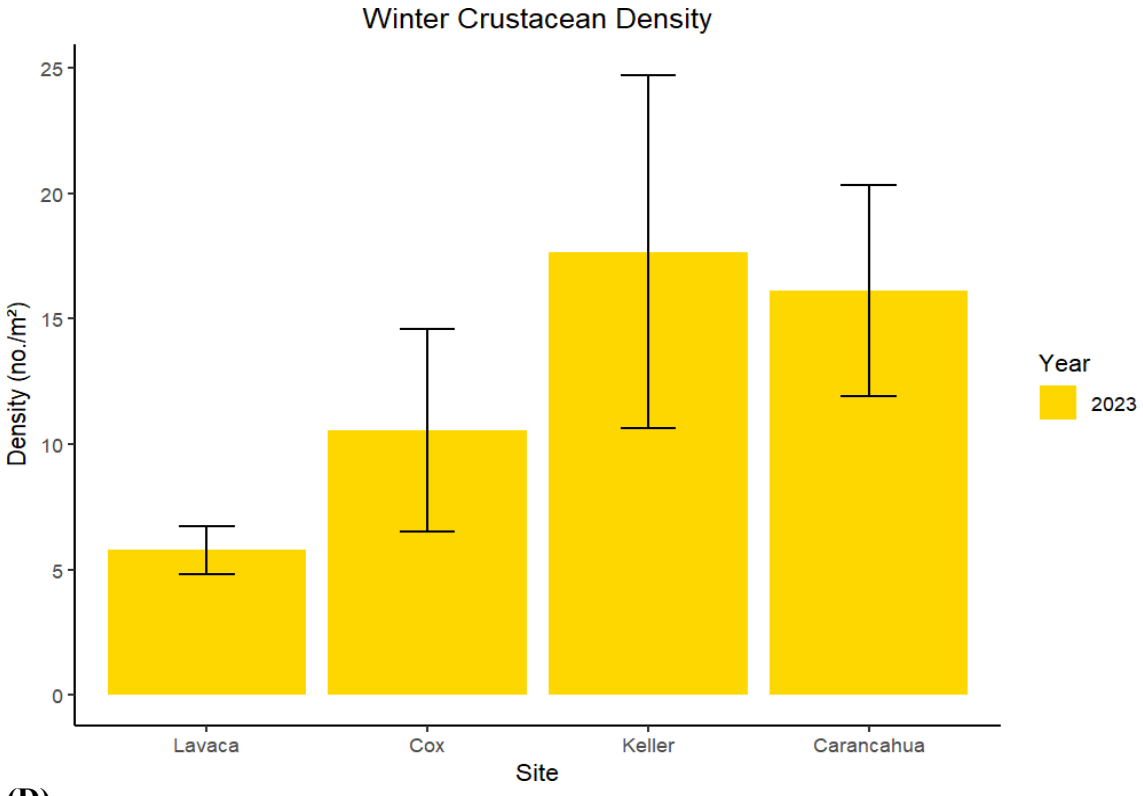
(A)


Summer Crustacean Density
Density (no./m²)
60
40
20
0
Lavaca
Cox
Keller
Carancahua
Site
Year
2022
2023

(B)


Fall Crustacean Density
Density (no./m²)
75
50
25
0
Lavaca
Cox
Keller
Carancahua
Site
Year
2022
2023

(C)



(D)

Figure 5. Bar charts (A-D) displaying seasonal mean crustacean density (no./m²) by area. Green bars represent 2022 samples. Yellow bars represent 2023 samples. Error bars represent standard error.

Key Taxa Mean Density and Length

To gain a more in depth understanding of potential differences in nekton populations between areas within the Lavaca Bay System, density and length of different taxonomic groups were compared for both fish and crustaceans using ANOVA. For fish, two resident taxa, Gobies and Sheepshead Minnows (*Cyprinodon variegatus*) were selected, and one transient species, Spotted Seatrout, was selected. Since Spotted Seatrout are a transient species demonstrating primary recruitment seasons, only spring and summer data were included in statistical analysis. Red Drum, another recreationally important species, was not included in the statistical analysis portion of this study due to a limited sample size. Sixteen total Red Drum were collected throughout the study, two in Lavaca Bay, five in Cox Bay, three in Keller Bay, and six in Carancahua Bay. Since Grass shrimp, Penaeid shrimp, and Blue Crab made up the greatest overall and relative abundance for crustaceans in all seasons, these three groups were selected.

For key fish taxa, Gobies, Sheepshead Minnows, and Spotted Seatrout, did not demonstrate significant differences in mean density or mean length between areas. For crustaceans, Grass shrimp did not demonstrate significant differences in mean density between areas; however, Grass shrimp demonstrated significantly greater mean length in Carancahua Bay compared to Keller Bay (ANOVA: $F_{3, 12} = 4.81$; $p < 0.05$; Carancahua = 18.12 mm [SE = ± 0.22], Keller = 15.55 mm

[SE = ± 1.23]). Neither Penaeid shrimp nor Blue Crab demonstrated significant differences in mean density or mean length between areas.

Community Assemblage

Community assemblage data were analyzed in PRIMER v7 statistical software. Pretreatment and analysis included fourth-root transforming data before generating a Bray-Curtis resemblance matrix and an nMDS plot. The nMDS plot demonstrated low levels of stress (0.09) and seasonally dependent groupings with spring and summer displaying greater overlap compared to fall and winter (**Figure 6**). A PERMANOVA demonstrated significant variance in community assemblage between areas for each season. During the spring and summer, PERMANOVA demonstrated significant differences between all areas (PERMANOVA: spring: $p < 0.05$, summer: $p < 0.01$).

During the spring, greater abundance from fish spawning events drove differences between areas. For example, Gulf Menhaden and Silver Perch (*Bairdiella chrysoura*) were one of the top three greatest contributing factors for four of six pairwise comparisons. Gulf Menhaden and Silver Perch were both found in greatest abundance in Lavaca Bay. Grass shrimp abundance also played a significant role in community assemblage differences and was the top contributing factor for four of six pairwise comparisons. Grass shrimp were found in greatest abundance in Cox Bay.

During the summer, differences in community assemblage were driven by Grass shrimp, Penaeid shrimp, and Blue Crab, which made up three of the top four greatest contributions in all pairwise comparisons. Grass shrimp were found in greatest abundance in Cox Bay while Penaeid shrimp and Blue Crab were found in greatest abundance in Carancahua Bay. Gobies also heavily impacted differences in community assemblage and were one of the top four contributing factors in five of six pairwise comparisons. Gobies were found in greatest abundance in Lavaca Bay.

During the fall, only Cox and Keller Bays demonstrated significant differences in community assemblage (PERMANOVA: $p < 0.01$). SIMPER analysis indicated that differences were driven by greater Grass shrimp abundance in Cox Bay and greater Penaeid shrimp and Blue Crab abundance in Keller Bay (SIMPER: Grass shrimp: 22.89%, Penaeid shrimp: 16.74%, Blue Crab: 13.03%).

During the winter, there were significant differences in community assemblage between Lavaca and Keller Bays (PERMANOVA: $p < 0.05$), Lavaca and Carancahua Bays (PERMANOVA: $p < 0.01$), and Cox and Carancahua Bays (PERMANOVA: $p < 0.05$). SIMPER analysis indicated that differences between Lavaca and Keller Bay were driven by greater Pinfish (*Lagodon rhomboides*) and Gulf Killifish (*Fundulus grandis*) abundance in Lavaca Bay and greater Grass shrimp abundance in Keller Bay (SIMPER: Pinfish: 18.75%, Gulf killifish: 13.87%, Grass Shrimp: 17.57%). Differences between Lavaca and Carancahua Bays were driven by greater Blue Crab, Pinfish, and Gulf Killifish abundance in Lavaca Bay (SIMPER: Blue Crab: 18.57%, Pinfish: 15.69%, Gulf Killifish: 14.53%). Differences between Cox and Carancahua Bays were driven by greater Blue Crab and Diamond Killifish abundance in Cox Bay and greater Grass shrimp abundance in Carancahua Bay (SIMPER: Blue Crab: 17.97%, Diamond Killifish: 13.39%, Grass shrimp: 13.37%).

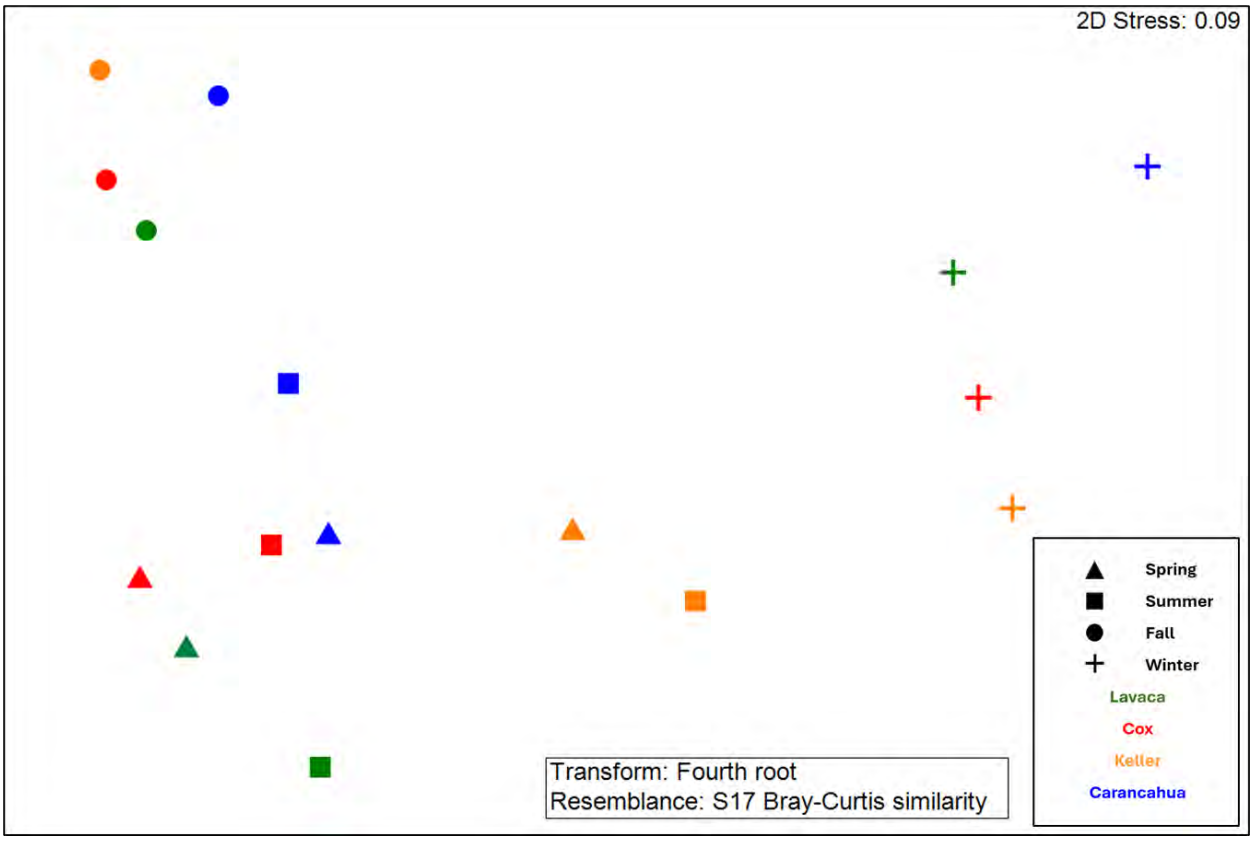


Figure 6. Non-metric Multidimensional Scaling (nMDS) ordination using fourth-root transformed densities and Bray-Curtis similarities from Lavaca Bay System and Carancahua Bay nekton sampling.

Coastal Bird Assessment

Over the course of this project, six seasonal coastal bird surveys were conducted. Two surveys per season (spring, fall, winter) were completed at each area. Seasonal surveys were not conducted during summer, as this season typically has the least species richness and diversity along the mid-Texas coast. Fall, winter and spring encompass observations of migratory and resident species utilization of coastal habitats.

Point count surveys were conducted from a boat within vegetated marsh, adjacent to marsh, or from open water, to represent a diversity of observation sites. Species observations were reported by avian monitoring area section and associated dominant habitat. This was reported along with habitat utilization. Dominant habitat was the habitat in use at the time of observation. This included: emergent marsh, open water, shoreline/mud flat, shell hash (usually oyster shells or oyster reef), woody scrub, and riparian woodland.

The avian community across the monitoring areas in Lavaca Bay was typical of an ecosystem presenting an assortment of saltwater-influenced marsh edge, shoreline mudflat (Foster et al. 2009), freshwater inflow-influenced riparian woodland, and higher altitude woody thorn scrub. All avian monitoring areas were characterized by an abundance of shorebird and/or migratory bird species,

with high species overlaps between sites. Out of 2,198 observations, 8,566 birds across 130 species were observed between all monitoring areas (**Appendix 4**).

The most commonly observed species was Red-winged Blackbird (11.98%; *Agelaius phoeniceus*), followed by Boat-tailed Grackle (10.08%, *Quiscalus major*), Brown Pelican (6.17%, *Pelecanus occidentalis*), Laughing Gull (4.40%, *Leucophaeus atricilla*), and American White Pelican (4.32%, *Pelecanus erythrorhynchos*) (**Table 1**). These five species comprised 36.95% of all species observations. Most species observed (71.3%) were utilizing the predominant habitat type of emergent marsh. Passerine abundance, aside from Red-winged Blackbirds which were nearly ubiquitous across monitoring areas across seasons, was highest at the Cox Bay area due to the presence of freshwater inflow and riparian and scrub woodlands. Cox Bay showed a high abundance of Migratory Passerines such as Blue-headed Vireo, Painted Bunting, Yellow-billed Cuckoo, and Yellow-throated Warbler. Due to the freshwater inflow into open emergent marsh at Cox Bay, several migratory waterfowl such as Eared Grebe and Red-breasted Merganser were observed foraging at this site but never observed at any other monitoring area.

Both factors likely contributed to Cox Bay exhibiting the greatest taxa richness (107 species) and Shannon-Wiener diversity (3.77) (**Table 2**). Lavaca Bay exhibited the lowest taxa richness (76 species) with a Shannon-Wiener diversity of 3.31. Keller Bay had the greatest observed number of individual birds during surveys (2,939), while Lavaca Bay had the fewest (1,488). Although Keller Bay showed the highest number of individuals observed during surveys, it showed the lowest Shannon-Weiner diversity (3.18). This is likely due to the uneven distribution of species, with Boat-tailed Grackle, Red-winged Blackbird, and Dowitchers making up 41 percent of the 82 species observed Marsh and shoreline associated species such as Egrets, Gulls, and Red-winged Blackbirds were generally common at all monitoring areas.

The sixteen automated acoustic recorders deployed within the Lavaca Bay avian monitoring areas during spring and summer 2022 produced 2,700 hours of recorded audio files which after processing resulted in 201,691 detections, of which the classifier automatically identified 2,191 putative detections (1.09% of total detections) across all monitoring areas (**Table 3**). Manual review of putative detections by project team biologists found all detections were false-positive detections and not true Eastern Black Rail or Whooping Crane calls.

Table 1. Seasonal occurrence, site occurrence, count (#), relative abundance (above 0.7%) and dominant habitat type of the avian communities observed during seasonal sampling. Dominant habitat types: emergent vegetated marsh edge (EM), open water (OW), shoreline/mud flat (SL), shell hash (SH), riparian woodland (WD) and woody scrub (ScL).

Taxa	Season			Site				Count	Relative Abundance (%)	Dominant Habitat Type					
	Sp	F	W	Keller	Cox	Lav. River	Caran. Bay			EM	OW	SL	SH	WD	ScL
American White Pelican	x	x	x	x	x	x	x	359	4.32%	x	x	x	x	x	
Black Vulture	x	x	x		x	x		66	0.79%	x	x	x		x	x
Black-bellied Plover	x	x	x	x	x	x	x	60	0.72%	x	x	x	x		
Boat-tailed Grackle	x	x	x	x	x	x	x	838	10.08%	x	x	x		x	x
Brown Pelican	x	*x*	*x*	x	x	x	x	513	6.17%	x	x	x	x	x	x
Double-crested Cormorant	x	x	x	x	x	x	x	325	3.91%	x	x	x	x	x	
Dowitcher sp.		*x*	*x*	*x*	x	x	x	327	3.93%	x	x	x			
Forster's Tern	x	x	x	x	x	x	x	117	1.41%	x	x	x	x		x
Great Blue Heron	x	x	x	x	x	x	x	146	1.76%	x	x	x		x	x
Great Egret	x	x	x	x		x	x	194	2.33%	x	x	x			
Green-winged Teal		x	x	x	x	x	x	304	3.66%	x	x	x			
Laughing Gull	x	*x*	x	*x*	x	x	x	366	4.40%	x	x	x	x	x	x
Least Sandpiper	x	x	x	x	x	x	x	259	3.12%	x		x		x	
Least Tern	x			x	x	x		64	0.77%	x	x				
Northern Pintail	x		x	x	x		x	113	1.36%	x	x	x			
Red-winged Blackbird	x	x	x	x	x	x	x	996	11.98%	x	x	x	x	x	x
Roseate Spoonbill	x	x	x	x	x	x	x	82	0.99%	x	x	x			
Royal Tern	x	x	x	x	x	x	x	73	0.88%	x	x	x	x	x	
Sandwich Tern			x	x			x	148	1.78%	x	x		x		
Scaup sp.			x	x		x	x	68	0.82%	x	x	x			
Seaside Sparrow	x	x	x	x	x	x	x	61	0.73%	x					
Short-billed Dowitcher		x	x	x	x			133	1.60%	x	x	x			
Snow Geese		x			x		x	210	2.53%	x	x				
Snowy Egret	x	x	x	x	x	x	x	161	1.94%	x	x	x	x	x	x
Tri-colored Heron	x	x	x	x	x	x	x	139	1.67%	x	x	x			
Turkey Vulture	x	x	x	x	x	x	x	129	1.55%	x	x	x		x	x
Willet	x	x	x	x	x	x	x	225	2.71%	x	x	x	x	x	x

Table 2. Avian count (#), taxa richness (#), relative abundance (%), and Shannon diversity by site.

Site	Count	Taxa Richness	Relative Abundance (%)	Shannon Diversity
Keller	2,939	82	34.3	3.18
Cox	1,780	107	20.8	3.77
Lavaca	1,488	76	17.4	3.31
Carancahua	2,359	89	27.5	3.48

Table 3. Data collected by audio recording units.

Site	Logging Period	Hours Logged	Output Detections	Putative Detections (Percent of Output)	Black Rail True Detections	Whooping Crane True Detections
Carancahua Bay E	May 19 - Aug 16	242	25,697	491 (1.91%)	**0**	**0**
Carancahua Bay W	May 19 - Aug 16	161	12,105	271 (2.24%)	**0**	**0**
Carancahua Bay W	May 19 - Aug 16	166	9,683	918 (9.48%)	**0**	**0**
Carancahua Bay W	May 19 - Aug 16	111	21,305	463 (2.17%)	**0**	**0**
Carancahua Bay W	May 19 - Aug 16	143	21,419	201 (0.94%)	**0**	**0**
Keller Bay W	May 17 - Aug 16	216	8,962	1483 (17.06%)	**0**	**0**
Keller Bay E	May 17 - Aug 16	209	10,429	341 (3.27%)	**0**	**0**
Keller Bay E	May 17 - Aug 16	216	12,237	541 (4.42%)	**0**	**0**
Cox Bay E	May 17 - Aug 16	99	6,881	304 (4.42%)	**0**	**0**
Cox Bay E	May 17 - Aug 16	132	9,228	145 (1.57%)	**0**	**0**
Cox Bay E	May 17 - Aug 16	223	12,800	299 (2.34%)	**0**	**0**
Cox Bay W	May 17 - Aug 16	209	5,186	234 (4.51%)	**0**	**0**
Lavaca Outflow E	May 18 - Aug 16	105	20,339	1052 (5.17%)	**0**	**0**
Lavaca Outflow E	May 18 - Aug 16	171	22,694	601 (2.65%)	**0**	**0**
Lavaca Outflow W	May 18 - Aug 16	124	18,582	299 (1.61%)	**0**	**0**
Lavaca Outflow E	May 18 - Aug 16	173	30,106	196 (0.65%)	**0**	**0**
Total	—	**2700**	**201,691**	**2191 (1.09%)**	**0**	**0**

Discussion and Implications

The Lavaca Bay System serves as important nursery habitat for a variety of ecologically and economically important estuarine species and resident or transitory home for a plethora of coastal birds. The goal of this study was to establish baseline ecological data for estuarine-dependent nekton and coastal bird populations occupying fringe marsh habitats in the Lavaca Bay System and Carancahua Bay. This study also sought to determine whether there were significant differences in nekton abundance, distribution, and mean length between sample sites which were selected across a presumed pollution gradient. While this study observed significant differences driven by seasonal

spawning events, a trend consistent with previous studies (Grüss et al. 2018; Heyman et al. 2019), there appeared to be a minimal nekton and coastal bird abundance and proximity to historical pollution sources. In general, shorebird and migratory birds maintained a relatively high species overlap between all sites. However, Cox Bay was characterized by an increased prevalence of passerines due to the presence of nearby riparian and scrub woodland areas. Cox Bay also exhibited both the highest taxa richness and diversity of birds. Nekton communities were composed of both resident species that spend their entire lives in estuaries (e.g., grass shrimp, pinfish, gobies) and estuarine-dependent species which may rely heavily on estuarine nursery habitats especially during their early life as post-settlement juveniles (e.g., redfish, penaeid shrimp). Nekton samples in this study were dominated by grass shrimp and penaeid shrimp, important prey resources for a variety of organisms including coastal birds and sportfish such as spotted seatrout and red drum. Community structure differed seasonally for many nekton species, and these differences were influenced by variation in the timing of spawning and subsequent recruitment of early juveniles to nursery habitats which is common for estuarine dependent species (Kneib 1993; Minello 1999). Site-to-site differences were far less pronounced, and few trends were evident suggesting that all areas where nekton sampling occurred serve as important habitat for estuarine-dependent nekton and coastal bird populations.

Water quality parameters varied seasonally and between areas. Additional factors such as the time of day in which areas were sampled and relative freshwater inflow may have also impacted results. Although zero nurdles were found at sample sites during this study, remedial sampling within the Lavaca Bay System found nurdles at other locations during the same period (Formosa 2023).

Area, season, and year were each significant factors for overall fish and crustacean mean densities. This study was primarily concerned with differences between areas across a presumed pollution gradient. For mean fish density, ANOVA and post-hoc testing indicated that there were significant differences between areas during the spring, summer, and fall of 2022 and spring of 2023. Spring and summer results were representative of relatively greater mean fish density in Lavaca and Cox Bays, while fall results represented relatively greater mean fish density in Keller Bay. SIMPER analyses supported that spring variability was driven by spawning events of transient species such as Gulf Menhaden. Resident species demonstrated more consistency in distribution and relative abundance across remaining seasons. For example, Gobies and Sheepshead Minnows made up a greater proportion of fish populations during the summer, fall, and winter, compared to the spring. SIMPER results supported the finding that resident genera/species, played a greater impact during the summer, fall, and winter, as evidenced by greater relative impact by taxa such as Gobies and Silver Perch. While seasonal changes in abundance were demonstrated for crustacean populations, the community assemblage remained similar with Grass shrimp, Penaeid shrimp, and Blue Crab making up the vast proportion of samples, respectively. Significant differences in mean crustacean density occurred during the summer of 2022 and spring of 2023.

One observation that may influence mean density and merits further study is habitat availability. This may have played a significant role in Keller Bay. Unlike the other areas, Keller Bay had greater mean fish and crustacean density during the fall and lower mean fish and crustacean density during the spring. This may be due to differences in habitat type since Keller Bay has greater seagrass coverage throughout the bay and beyond the marsh edge compared to the other areas. Previous studies have demonstrated the productivity of seagrass as nursery habitat (Stunz et al.

2001; Stunz et al. 2002a, 2002b). Greater habitat availability in the form of seagrass may indeed be a contributing factor for relatively lower nekton density during the spring and relatively higher nekton density during the fall.

Another key factor affecting habitat availability is marsh inundation time (Minello et al. 2012). Throughout the study, sampling area varied due to changing tidal conditions. This was particularly relevant during the winter, when low tides extended beyond the marsh edge, but played a noticeable role throughout the rest of the year as well (**Figure 7**). For example, during sampling events in heavily flooded marsh areas, nekton may have been dispersed and present in lower densities compared to sampling events when water levels occupied a smaller portion of the marsh edge. Daily movements of marsh-dependent nekton based on tidal conditions are not factored into this study's statistical analyses but may provide an area for future study.

Figure 7. Inundated marsh edge habitat in Keller Bay during the summer of 2023 (left) and limited marsh edge in Carancahua Bay during the winter of 2024 (right).

Another notable takeaway from this study was that there were no significant differences in mean density and few differences in mean length for selected key taxa between areas. The only statistically significant interaction was that Grass shrimp had relatively greater mean length in Lavaca and Cox Bays compared to Keller Bay. This may have been due to differences in relative abundance between seasons or habitat availability. Overall, this trend appears to indicate that, for the key taxa analyzed in this study and overall fish and crustaceans, relative locations along the presumed pollution gradient have a limited effect on mean density and length.
Despite negligible differences in abundance, distribution, and mean length based on proximity to historical pollution sources, this study does not delve into other potential impacts such as toxicology and physiological responses. Further study may provide greater insight on the impacts

of environmental pollution, particularly for transient species or higher trophic levels whose range includes and extends outside of the Lavaca Bay System. For example, previous studies have detected mercury in tissue samples of highly mobile finfish species such as Red Drum and Spotted Seatrout (Myers 2022). Potential contamination of finfish, as well as prey species, could lead to further contamination in other areas.

Overall, PRIMER analyses revealed significant variability in community assemblage between all areas during the spring and summer. Spring variability was primarily due to greater fish abundance resulting from spawning events by transient nekton such as Gulf Menhaden as well as resident fish species such as Silver Perch. Summer differences, meanwhile, were driven primarily by increased relative abundance of resident nekton such as Grass shrimp, Penaeid shrimp, and Gobies. Fall and winter did not demonstrate the same degree of variability in community assemblage and were again driven by resident nekton such as Grass shrimp and Gulf Killifish. Differences in the degree of variability are reflected in the nMDS plot which shows more clearly delineated groupings during the fall and winter and greater overlap between the spring and summer. For the purposes of this study, the most notable takeaway is that there were not clearly identifiable trends in nekton community structure based on proximity to historical pollution sources.

This study provides key baseline data for fringe marsh habitats within the Lavaca Bay System. Overall, two years of seasonal ecological sampling do not appear to indicate substantial differences in mean density or length for both fish and crustaceans or coastal bird abundance or diversity due to proximity to historical pollution sources. For example, Lavaca and Cox Bays, which are closest to waste and stormwater outfalls and the Alcoa hazardous waste site, demonstrated greater mean fish density compared to Keller and Carancahua Bays (**Figures 1 & 2**). Similarly, Cox Bay, which receieves the effluent from numerous Formosa wastewaters discharges, exhibited high abundance and the greatest diversity of coastal birds. Differences in abundance and distribution can instead be attributed to other factors such as seasonal spawning events or habitat availability (e.g., increased passerines in ripiarian and woodland scrub at Cox Bay).

Data from this study contributes to an improved understanding of the Lavaca Bay System and provides wildlife managers and policy makers with a benchmark for the region's fringe marsh habitats by which future trends in estuarine-dependent nekton and coastal bird abundance and distribution can be compared. While the presumed pollution gradient did not appear to influence abundance or distribution of the key taxa in this study, there are potential sublethal effects on growth or reproduction that may warrant further study. These effects may not have been evident due to the mobile or transient nature of coastal birds or the limited time estuarine-dependent nekton have resided in the marsh edge habitats of the Lavaca Bay System (new recruits). This study has laid the foundation for future research by highlighting questions associated with the impact of habitat availability on nekton abundance and distribution, as well as the implications of continued biological productivity in areas defined by historical environmental pollution.

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Appendix A. Fish Data Tables

Total Catch (n), Relative Abundance (RA), Mean Density (no./m²), and Mean Length (mm) for fish by area and season.

Lavaca (1-2)

Spring 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	5	0.01	0.04	0.02	20.52	0.68
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	3	0.01	0.03	0.02	17.10	0.15
Goby	*Gobiidae sp.*	6	0.01	0.05	0.02	13.92	3.82
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	19	0.05	0.16	0.08	25.39	0.97
Gulf menhaden	*Brevoortia patronus*	1	0.00	0.01	0.01	25.80	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	1	0.00	0.01	0.01	48.10	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	98	0.23	0.82	0.29	18.17	0.60
Pipefish	*Syngnathus sp.*	8	0.02	0.07	0.02	102.75	9.78
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	2	0.00	0.02	0.02	18.95	0.45
Silver perch	*Bairdiella chrysoura*	252	0.60	2.10	0.72	15.73	0.31
Skilletfish	*Gobiesox strumosus*	4	0.01	0.03	0.02	17.90	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	19	0.05	0.16	0.16	23.75	0.34
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

Spring 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	7	0.00	0.06	0.03	18.71	1.72
Black drum	*Pogonias cromis*	2	0.00	0.02	0.02	15.35	0.35

Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	1	0.00	0.01	0.01	28.40	0.00
Goby	*Gobiidae sp.*	1	0.00	0.01	0.01	6.20	0.00
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	13	0.01	0.11	0.07	26.86	1.72
Gulf menhaden	*Brevoortia patronus*	1598	0.79	13.32	7.21	20.50	0.27
Inland silverside	*Menidia beryllina*	1	0.00	0.01	0.01	6.70	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	21	0.01	0.18	0.07	24.75	2.52
Pipefish	*Syngnathus sp.*	2	0.00	0.02	0.02	98.55	9.35
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	0	0.00	0.00	0.00	0.00	0.00
Silver perch	*Bairdiella chrysoura*	145	0.07	1.21	0.60	17.11	0.52
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	1	0.00	0.01	0.01	29.30	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	7	0.00	0.06	0.05	16.27	1.32
Striped mullet	*Mugil cephalus*	227	0.11	1.89	1.12	22.99	0.25
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

	Spring 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	1	0.02	0.01	0.01	17.30	0.00
Goby	*Gobiidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	10	0.18	0.08	0.05	30.62	2.51
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	6	0.11	0.05	0.03	19.25	0.87
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00

Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	23	0.40	0.19	0.06	27.56	1.23
Pipefish	*Syngnathus sp.*	2	0.04	0.02	0.01	102.85	7.35
Rainwater killifish	*Lucania parva*	1	0.02	0.01	0.01	31.60	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	5	0.09	0.04	0.03	27.14	2.33
Silver perch	*Bairdiella chrysoura*	1	0.02	0.01	0.01	27.20	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	8	0.14	0.07	0.05	21.49	1.21
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

	Spring 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	17	0.02	0.14	0.08	20.48	0.90
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	8	0.01	0.07	0.03	21.89	1.30
Goby	*Gobiidae sp.*	5	0.01	0.04	0.04	7.70	0.42
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	8	0.01	0.07	0.04	23.48	1.87
Gulf menhaden	*Brevoortia patronus*	498	0.69	4.15	1.93	23.58	0.47
Inland silverside	*Menidia beryllina*	2	0.00	0.02	0.02	17.60	3.10
Inshore lizardfish	*Synodus foetens*	7	0.01	0.06	0.02	39.97	4.26
Least puffer	*Sphoeroides parvus*	3	0.00	0.03	0.02	18.63	0.84
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	18	0.02	0.15	0.06	22.18	2.73
Pipefish	*Syngnathus sp.*	11	0.02	0.09	0.03	77.95	6.30
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	10	0.01	0.08	0.07	18.28	1.46
Silver perch	*Bairdiella chrysoura*	123	0.17	1.03	0.46	19.47	0.72
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00

Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	1	0.00	0.01	0.01	16.90	0.00
Striped mullet	*Mugil cephalus*	16	0.02	0.13	0.12	27.44	0.54
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

	Summer 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	102	0.76	0.85	0.46	18.43	0.27
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	0	0.00	0.00	0.00	0.00	0.00
Goby	*Gobiidae sp.*	24	0.18	0.20	0.09	10.27	0.82
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	2	0.01	0.02	0.01	43.20	0.20
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	2	0.01	0.02	0.01	7.35	0.25
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	2	0.01	0.02	0.02	142.30	20.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	0	0.00	0.00	0.00	0.00	0.00
Silver perch	*Bairdiella chrysoura*	1	0.01	0.01	0.01	6.80	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	2	0.01	0.02	0.01	21.40	7.80
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

	Summer 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00

Bay anchovy	*Anchoa mitchilli*	122	0.81	1.02	0.53	25.96	0.58
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	0	0.00	0.00	0.00	0.00	0.00
Goby	*Gobiidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	2	0.01	0.02	0.01	38.10	4.10
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	10	0.07	0.08	0.04	41.05	0.94
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	1	0.01	0.01	0.01	68.10	0.00
Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	0	0.00	0.00	0.00	0.00	0.00
Silver perch	*Bairdiella chrysoura*	2	0.01	0.02	0.01	22.60	1.80
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	1	0.01	0.01	0.01	22.60	0.00
Spotted seatrout	*Cynoscion nebulosus*	12	0.08	0.10	0.03	24.80	3.45
Striped mullet	*Mugil cephalus*	1	0.01	0.01	0.01	74.30	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

	Keller (5-6)						
	Summer 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	0	0.00	0.00	0.00	0.00	0.00
Goby	*Gobiidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	0	0.00	0.00	0.00	0.00	0.00
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00

Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	1	0.25	0.01	0.01	9.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	1	0.25	0.01	0.01	82.10	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	0	0.00	0.00	0.00	0.00	0.00
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	1	0.25	0.01	0.01	48.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	1	0.25	0.01	0.01	14.70	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

	Summer 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	25	0.38	0.21	0.09	19.81	1.14
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	1	0.02	0.01	0.01	21.80	0.00
Goby	*Gobiidae sp.*	21	0.32	0.18	0.07	16.72	1.21
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	1	0.02	0.01	0.01	30.20	0.00
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	4	0.06	0.03	0.01	14.60	1.68
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	1	0.02	0.01	0.01	30.30	0.00
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00

Skilletfish	*Gobiesox strumosus*	1	0.02	0.01	0.01	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	3	0.05	0.03	0.02	21.67	1.71
Spotted seatrout	*Cynoscion nebulosus*	6	0.09	0.05	0.02	39.07	8.87
Striped mullet	*Mugil cephalus*	1	0.02	0.01	0.01	25.10	0.00
Tonguefish	*Symphurus sp.*	2	0.03	0.02	0.01	23.50	4.50
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

	Fall 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	5	0.03	0.04	0.03	12.44	0.95
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	3	0.02	0.03	0.02	28.77	3.49
Diamond killifish	*Adinia xenica*	14	0.08	0.12	0.06	17.50	1.01
Goby	*Gobiidae sp.*	62	0.36	0.52	0.16	16.37	0.70
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	22	0.13	0.18	0.07	24.13	1.69
Gulf menhaden	*Brevoortia patronus*	36	0.21	0.30	0.30	16.67	0.31
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	2	0.01	0.02	0.01	79.80	3.60
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	27	0.16	0.23	0.10	21.49	0.83
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

	Fall 2022	Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	1	0.01	0.01	0.01	12.70	0.00
Diamond killifish	*Adinia xenica*	5	0.07	0.06	0.04	16.58	0.59
Goby	*Gobiidae sp.*	33	0.48	0.37	0.10	14.11	0.82
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	17	0.25	0.19	0.13	16.01	1.13
Gulf menhaden	*Brevoortia patronus*	1	0.01	0.01	0.01	22.50	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	1	0.01	0.01	0.01	11.00	0.00
Pipefish	*Syngnathus sp.*	2	0.03	0.02	0.01	120.15	3.65
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	3	0.04	0.03	0.02	23.10	5.84
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	6	0.09	0.07	0.06	20.20	2.10
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

	Fall 2022	Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Atlantic croaker	*Micropogonias undulatus*	1	0.01	0.01	0.01	8.80	0.00
Bay anchovy	*Anchoa mitchilli*	3	0.02	0.03	0.02	14.03	2.13
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	1	0.01	0.01	0.01	27.50	0.00
Diamond killifish	*Adinia xenica*	35	0.22	0.29	0.19	21.01	0.45
Goby	*Gobiidae sp.*	32	0.20	0.27	0.09	15.79	1.01
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00

Gulf killifish	*Fundulus grandis*	16	0.10	0.13	0.04	23.19	1.26
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	1	0.01	0.01	0.01	28.70	0.00
Pinfish	*Lagodon rhomboides*	1	0.01	0.01	0.01	10.20	0.00
Pipefish	*Syngnathus sp.*	44	0.28	0.37	0.12	46.45	2.02
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	2	0.01	0.02	0.01	24.95	4.75
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	24	0.15	0.20	0.09	22.58	0.64
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

	Fall 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	5	0.29	0.08	0.05	9.32	0.24
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	2	0.12	0.03	0.03	22.30	7.40
Diamond killifish	*Adinia xenica*	0	0.00	0.00	0.00	0.00	0.00
Goby	*Gobiidae sp.*	6	0.35	0.10	0.07	13.07	1.75
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	0	0.00	0.00	0.00	0.00	0.00
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	1	0.06	0.02	0.02	74.80	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00

Red drum	*Sciaenops ocellatus*	3	0.18	0.05	0.03	18.60	7.95
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	0	0.00	0.00	0.00	0.00	0.00
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

Winter 2022		**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	3	0.04	0.05	0.05	9.00	0.55
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	2	0.02	0.03	0.02	28.65	2.05
Goby	*Gobiidae sp.*	2	0.02	0.03	0.02	23.60	6.80
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	10	0.12	0.17	0.05	47.20	4.36
Gulf menhaden	*Brevoortia patronus*	1	0.01	0.02	0.02	21.70	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	24	0.29	0.40	0.17	17.41	1.70
Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	1	0.01	0.02	0.02	14.20	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	38	0.46	0.63	0.20	30.72	0.97
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	1	0.01	0.02	0.02	20.10	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00

White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

	Winter 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	43	0.38	0.72	0.37	11.94	0.31
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	21	0.19	0.35	0.20	21.12	0.60
Goby	*Gobiidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	6	0.05	0.10	0.05	27.92	5.71
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	24	0.21	0.40	0.21	16.30	0.70
Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	17	0.15	0.28	0.23	25.62	1.13
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	1	0.01	0.02	0.02	24.90	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

	Winter 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	12	0.17	0.20	0.07	18.48	0.75

Goby	*Gobiidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	1	0.01	0.02	0.02	26.90	0.00
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	1	0.01	0.02	0.02	68.20	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	56	0.80	0.93	0.35	23.32	0.56
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

	Winter 2022	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	6	0.14	0.10	0.04	18.53	3.01
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	0	0.00	0.00	0.00	0.00	0.00
Goby	*Gobiidae sp.*	3	0.07	0.05	0.02	9.77	0.41
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	0	0.00	0.00	0.00	0.00	0.00
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	3	0.07	0.05	0.05	13.87	2.59

Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	1	0.02	0.02	0.02	25.60	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	30	0.70	0.50	0.22	24.90	0.63
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

	Spring 2023	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	647	0.31	5.39	2.20	19.31	0.16
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	1	0.00	0.01	0.01	32.40	0.00
Goby	*Gobiidae sp.*	29	0.01	0.24	0.12	9.92	1.42
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	12	0.01	0.10	0.04	31.59	1.97
Gulf menhaden	*Brevoortia patronus*	1303	0.63	10.86	6.20	20.27	0.13
Inland silverside	*Menidia beryllina*	9	0.00	0.08	0.04	23.87	1.48
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	61	0.03	0.51	0.12	29.15	0.92
Pipefish	*Syngnathus sp.*	4	0.00	0.03	0.02	57.98	15.85
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	1	0.00	0.01	0.01	14.50	0.00
Sheepshead minnow	*Cyprinodon variegatus*	2	0.00	0.02	0.01	21.40	1.50
Silver perch	*Bairdiella chrysoura*	1	0.00	0.01	0.01	8.00	0.00
Skilletfish	*Gobiesox strumosus*	8	0.00	0.07	0.03	15.13	2.20
Spot	*Leiostomus xanthurus*	2	0.00	0.02	0.02	62.30	8.08
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	2	0.00	0.02	0.01	101.50	82.50

Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

	Spring 2023	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	16	0.30	0.13	0.09	16.58	1.06
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	0	0.00	0.00	0.00	0.00	0.00
Goby	*Gobiidae sp.*	6	0.11	0.05	0.04	7.78	0.35
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	5	0.09	0.04	0.01	34.08	6.69
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	3	0.06	0.03	0.02	27.60	2.07
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	19	0.36	0.16	0.06	31.80	1.77
Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	0	0.00	0.00	0.00	0.00	0.00
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	1	0.02	0.01	0.01	13.80	0.00
Striped mullet	*Mugil cephalus*	3	0.06	0.03	0.03	22.03	0.48
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

	Spring 2023	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00

Diamond killifish	*Adinia xenica*	5	0.05	0.04	0.02	27.48	0.72
Goby	*Gobiidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	7	0.08	0.06	0.03	26.04	3.28
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	6	0.07	0.05	0.03	23.47	1.30
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	12	0.13	0.10	0.07	0.00	0.00
Pipefish	*Syngnathus sp.*	3	0.03	0.03	0.02	74.23	6.88
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	56	0.62	0.47	0.22	26.99	0.38
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	2	0.02	0.02	0.02	16.25	5.65

Carancahua (7-8)

	Spring 2023	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	3	0.08	0.03	0.01	26.80	1.45
Goby	*Gobiidae sp.*	9	0.23	0.08	0.05	11.84	3.01
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	4	0.10	0.03	0.03	16.18	1.97
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	2	0.05	0.02	0.02	27.85	3.15

Pinfish	*Lagodon rhomboides*	4	0.10	0.03	0.01	37.65	6.81
Pipefish	*Syngnathus sp.*	1	0.03	0.01	0.01	57.20	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	1	0.03	0.01	0.01	19.50	0.00
Sheepshead minnow	*Cyprinodon variegatus*	5	0.13	0.04	0.03	27.70	1.39
Silver perch	*Bairdiella chrysoura*	1	0.03	0.01	0.01	4.90	0.00
Skilletfish	*Gobiesox strumosus*	4	0.10	0.03	0.01	18.80	3.52
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	5	0.13	0.04	0.02	22.30	0.36
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

Summer 2023		**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	1	0.00	0.01	0.01	24.50	0.00
Goby	*Gobiidae sp.*	206	0.96	1.72	0.80	10.05	0.34
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	2	0.01	0.02	0.01	31.85	6.75
Gulf menhaden	*Brevoortia patronus*	1	0.00	0.01	0.01	21.70	0.00
Inland silverside	*Menidia beryllina*	1	0.00	0.01	0.01	44.50	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	0	0.00	0.00	0.00	0.00	0.00
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	1	0.00	0.01	0.01	32.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	1	0.00	0.01	0.01	24.10	0.00
Spotted seatrout	*Cynoscion nebulosus*	2	0.01	0.02	0.01	15.55	11.05

Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

Summer 2023		**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	2	0.04	0.02	0.01	25.25	5.05
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	3	0.06	0.03	0.01	21.47	3.12
Goby	*Gobiidae sp.*	18	0.36	0.15	0.05	8.95	0.61
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	1	0.02	0.01	0.01	15.80	0.00
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	1	0.02	0.01	0.01	20.60	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	1	0.02	0.01	0.01	119.60	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	2	0.04	0.02	0.01	24.95	2.65
Silver perch	*Bairdiella chrysoura*	15	0.30	0.13	0.07	15.12	1.67
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	7	0.14	0.06	0.02	20.47	4.17
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

Summer 2023		**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00

Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	44	0.25	0.37	0.15	22.03	0.39
Goby	*Gobiidae sp.*	3	0.02	0.03	0.01	11.03	2.03
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	35	0.20	0.29	0.08	20.75	2.04
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	1	0.01	0.01	0.01	35.70	0.00
Pinfish	*Lagodon rhomboides*	3	0.02	0.03	0.01	50.33	3.08
Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	22	0.13	0.18	0.07	18.20	0.96
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	67	0.38	0.56	0.29	19.45	1.02
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	1	0.01	0.01	0.01	38.90	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

	Summer 2023	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	17	0.13	0.14	0.08	22.25	0.91
Goby	*Gobiidae sp.*	82	0.61	0.68	0.25	12.84	0.52
Gray snapper	*Lutjanus griseus*	1	0.01	0.01	0.01	28.50	0.00
Gulf killifish	*Fundulus grandis*	5	0.04	0.04	0.02	32.62	3.74
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	1	0.01	0.01	0.01	13.20	0.00

Longnose killifish	*Fundulus similis*	2	0.01	0.02	0.01	36.10	5.50
Pinfish	*Lagodon rhomboides*	7	0.05	0.06	0.04	7.41	0.20
Pipefish	*Syngnathus sp.*	1	0.01	0.01	0.01	86.80	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	2	0.01	0.02	0.02	12.60	2.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	1	0.01	0.01	0.01	27.10	0.00
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	1	0.01	0.01	0.01	11.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	13	0.10	0.11	0.06	23.28	1.81
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	1	0.01	0.01	0.01	28.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

	Fall 2023	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	5	0.23	0.04	0.03	15.98	0.85
Goby	*Gobiidae sp.*	2	0.09	0.02	0.01	15.60	4.90
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	2	0.09	0.02	0.01	33.05	8.05
Gulf menhaden	*Brevoortia patronus*	1	0.05	0.01	0.01	6.30	0.00
Inland silverside	*Menidia beryllina*	9	0.41	0.08	0.07	12.56	0.28
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	1	0.05	0.01	0.01	18.70	0.00
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	1	0.05	0.01	0.01	13.30	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	0	0.00	0.00	0.00	0.00	0.00
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00

Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	1	0.05	0.01	0.01	5.30	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

	Fall 2023	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	1	0.11	0.01	0.01	17.90	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	1	0.11	0.01	0.01	14.00	0.00
Goby	*Gobiidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	1	0.11	0.01	0.01	26.30	0.00
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	0	0.00	0.00	0.00	0.00	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	0	0.00	0.00	0.00	0.00	0.00
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	2	0.22	0.02	0.02	8.40	0.70
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	3	0.33	0.03	0.02	21.33	1.41
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	1	0.11	0.01	0.01	19.30	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

	Fall 2023	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00

Bay anchovy	*Anchoa mitchilli*	0	0.00	0.00	0.00	0.00	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	1	0.02	0.01	0.01	18.40	0.00
Goby	*Gobiidae sp.*	5	0.11	0.04	0.02	10.58	3.70
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	5	0.11	0.04	0.02	22.06	6.74
Gulf menhaden	*Brevoortia patronus*	1	0.02	0.01	0.01	11.30	0.00
Inland silverside	*Menidia beryllina*	21	0.47	0.18	0.08	10.48	0.90
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00
Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	3	0.07	0.03	0.03	16.10	2.08
Pinfish	*Lagodon rhomboides*	2	0.04	0.02	0.01	59.10	1.40
Pipefish	*Syngnathus sp.*	3	0.07	0.03	0.03	55.53	8.13
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	1	0.02	0.01	0.01	12.60	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	3	0.07	0.03	0.03	12.37	1.36
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	0	0.00	0.00	0.00	0.00	0.00
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

	Fall 2023	**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Atlantic croaker	*Micropogonias undulatus*	0	0.00	0.00	0.00	0.00	0.00
Bay anchovy	*Anchoa mitchilli*	1	0.02	0.01	0.01	24.40	0.00
Black drum	*Pogonias cromis*	0	0.00	0.00	0.00	0.00	0.00
Blackcheek tonguefish	*Symphurus plagiusa*	0	0.00	0.00	0.00	0.00	0.00
Diamond killifish	*Adinia xenica*	1	0.02	0.01	0.01	24.30	0.00
Goby	*Gobiidae sp.*	1	0.02	0.01	0.01	7.50	0.00
Gray snapper	*Lutjanus griseus*	0	0.00	0.00	0.00	0.00	0.00
Gulf killifish	*Fundulus grandis*	5	0.08	0.04	0.03	22.34	6.11
Gulf menhaden	*Brevoortia patronus*	0	0.00	0.00	0.00	0.00	0.00
Inland silverside	*Menidia beryllina*	1	0.02	0.01	0.01	42.30	0.00
Inshore lizardfish	*Synodus foetens*	0	0.00	0.00	0.00	0.00	0.00

Least puffer	*Sphoeroides parvus*	0	0.00	0.00	0.00	0.00	0.00
Lined sole	*Achirus lineatus*	0	0.00	0.00	0.00	0.00	0.00
Longnose killifish	*Fundulus similis*	6	0.09	0.05	0.03	31.40	5.54
Pinfish	*Lagodon rhomboides*	0	0.00	0.00	0.00	0.00	0.00
Pipefish	*Syngnathus sp.*	0	0.00	0.00	0.00	0.00	0.00
Rainwater killifish	*Lucania parva*	0	0.00	0.00	0.00	0.00	0.00
Red drum	*Sciaenops ocellatus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead	*Archosargus probatocephalus*	0	0.00	0.00	0.00	0.00	0.00
Sheepshead minnow	*Cyprinodon variegatus*	49	0.74	0.41	0.28	26.14	0.81
Silver perch	*Bairdiella chrysoura*	0	0.00	0.00	0.00	0.00	0.00
Skilletfish	*Gobiesox strumosus*	0	0.00	0.00	0.00	0.00	0.00
Spot	*Leiostomus xanthurus*	0	0.00	0.00	0.00	0.00	0.00
Spotfin mojarra	*Eucinostomus argenteus*	0	0.00	0.00	0.00	0.00	0.00
Spotted seatrout	*Cynoscion nebulosus*	2	0.03	0.02	0.01	19.70	4.70
Striped mullet	*Mugil cephalus*	0	0.00	0.00	0.00	0.00	0.00
Tonguefish	*Symphurus sp.*	0	0.00	0.00	0.00	0.00	0.00
White mullet	*Mugil curema*	0	0.00	0.00	0.00	0.00	0.00

Appendix B. Crustacean Data Tables

Total Catch (n), Relative Abundance (RA), Mean Density (no./²), and Mean Length (mm) for crustaceans by area and season.

Lavaca (1-2)

Spring 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	14	0.00	0.12	0.04	14.17	2.83
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	3218	0.70	26.82	5.76	21.14	0.45
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	4	0.00	0.03	0.03	2.73	0.45
Penaeid shrimp	*Penaeidae sp.*	1335	0.29	11.13	2.73	28.19	1.08
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

Spring 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	2	0.00	0.02	0.01	14.50	0.70
Blue crab	*Callinectus sapidus*	56	0.01	0.47	0.19	11.06	1.37
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	8436	0.88	70.30	17.22	22.50	0.48
Hippo shrimp	*Hippolytidae sp.*	16	0.00	0.13	0.13	9.76	0.51
Mud crab	*Xanthidae sp.*	1	0.00	0.01	0.01	4.80	0.00
Penaeid shrimp	*Penaeidae sp.*	1044	0.11	8.70	2.91	25.27	0.71
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

Spring 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	31	0.00	0.26	0.09	26.61	2.38
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	7499	0.90	62.49	11.36	21.10	0.38
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	1	0.00	0.01	0.01	3.70	0.00
Penaeid shrimp	*Penaeidae sp.*	824	0.10	6.87	1.86	34.29	0.82

Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

Spring 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	32	0.01	0.27	0.07	19.42	2.24
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	3504	0.78	29.20	4.16	21.85	0.47
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	4	0.00	0.03	0.03	7.60	3.83
Penaeid shrimp	*Penaeidae sp.*	935	0.21	7.79	0.82	27.13	0.93
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

Summer 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	1	0.00	0.01	0.01	5.00	0.00
Blue crab	*Callinectus sapidus*	7	0.01	0.06	0.02	9.61	1.12
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	369	0.51	3.08	1.18	20.94	0.61
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	1	0.00	0.01	0.01	2.00	0.00
Penaeid shrimp	*Penaeidae sp.*	350	0.48	2.92	0.66	17.22	0.94
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

Summer 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	9	0.00	0.08	0.07	17.18	1.74
Blue crab	*Callinectus sapidus*	71	0.02	0.59	0.10	9.31	0.35
Dark shore crab	*Pachygrapsus gracilis*	1	0.00	0.01	0.01	5.80	0.00
Grass shrimp	*Palaemonetes sp.*	3118	0.70	25.98	5.42	20.86	0.38
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	21	0.00	0.18	0.09	4.23	0.65
Penaeid shrimp	*Penaeidae sp.*	1264	0.28	10.53	3.41	22.45	0.99
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

Summer 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	2	0.01	0.02	0.01	5.05	0.35
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	56	0.27	0.47	0.13	17.26	0.90
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	6	0.03	0.05	0.04	4.55	0.95
Penaeid shrimp	*Penaeidae sp.*	145	0.69	1.21	0.27	25.96	1.10
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

Summer 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	222	0.04	1.85	0.44	10.15	0.31
Dark shore crab	*Pachygrapsus gracilis*	22	0.00	0.18	0.08	3.68	0.83
Grass shrimp	*Palaemonetes sp.*	2282	0.37	19.02	6.29	19.24	0.34
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	3	0.00	0.03	0.01	2.90	0.55
Penaeid shrimp	*Penaeidae sp.*	3631	0.59	30.26	6.23	25.33	0.87
Porcelain crab	*Porcellanid sp.*	5	0.00	0.04	0.04	0.98	0.07
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

Fall 2022		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	100	0.04	0.83	0.40	15.64	0.43
Blue crab	*Callinectus sapidus*	168	0.07	1.40	0.36	9.01	0.39
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	1749	0.71	14.58	4.08	20.16	0.52
Hippo shrimp	*Hippolytidae sp.*	7	0.00	0.06	0.05	6.77	0.45
Mud crab	*Xanthidae sp.*	7	0.00	0.06	0.03	5.20	1.56
Penaeid shrimp	*Penaeidae sp.*	441	0.18	3.68	0.58	22.47	0.84
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

	Fall 2022	Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	100	0.05	1.11	0.55	16.03	0.61
Blue crab	*Callinectus sapidus*	215	0.10	2.39	0.27	8.07	0.29
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	653	0.30	7.26	0.93	17.29	0.48
Hippo shrimp	*Hippolytidae sp.*	11	0.01	0.12	0.11	5.34	0.71
Mud crab	*Xanthidae sp.*	1	0.00	0.01	0.01	2.30	0.00
Penaeid shrimp	*Penaeidae sp.*	1189	0.55	13.21	2.42	18.56	0.75
Porcelain crab	*Porcellanid sp.*	1	0.00	0.01	0.01	3.40	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

	Fall 2022	Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	80	0.01	0.67	0.43	14.83	0.59
Blue crab	*Callinectus sapidus*	240	0.03	2.00	0.61	6.86	0.28
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	8056	0.87	67.13	16.00	14.28	0.38
Hippo shrimp	*Hippolytidae sp.*	115	0.01	0.96	0.57	7.80	0.44
Mud crab	*Xanthidae sp.*	10	0.00	0.08	0.05	4.88	1.10
Penaeid shrimp	*Penaeidae sp.*	713	0.08	5.94	0.78	17.80	0.54
Porcelain crab	*Porcellanid sp.*	7	0.00	0.06	0.04	2.84	0.57
Snapping shrimp	*Alpheus heterochaelis*	9	0.00	0.08	0.07	9.31	1.42

Carancahua (7-8)

	Fall 2022	Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	35	0.01	0.58	0.30	19.40	1.07
Blue crab	*Callinectus sapidus*	128	0.05	2.13	0.55	6.87	0.45
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	2134	0.78	35.57	9.19	16.51	0.40
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Penaeid shrimp	*Penaeidae sp.*	440	0.16	7.33	3.22	17.61	1.01
Porcelain crab	*Porcellanid sp.*	1	0.00	0.02	0.02	3.40	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

Winter 2023		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	26	0.07	0.43	0.10	14.37	1.09
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	321	0.93	5.35	0.93	22.08	0.45
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Penaeid shrimp	*Penaeidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

Winter 2023		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	39	0.06	0.65	0.24	11.24	1.04
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	591	0.93	9.85	3.89	21.74	0.67
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Penaeid shrimp	*Penaeidae sp.*	3	0.00	0.05	0.03	13.17	4.08
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

Winter 2023		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	37	0.03	0.62	0.29	7.04	0.21
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	1023	0.97	17.05	6.81	13.20	0.28
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Penaeid shrimp	*Penaeidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

Winter 2023		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	1	0.00	0.02	0.02	8.20	0.00
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	967	1.00	16.12	4.21	18.15	0.37
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Penaeid shrimp	*Penaeidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

Spring 2023		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	46	0.01	0.38	0.08	30.42	2.57
Dark shore crab	*Pachygrapsus gracilis*	215	0.05	1.79	1.79	20.68	0.34
Grass shrimp	*Palaemonetes sp.*	2565	0.55	21.38	3.71	26.68	0.51
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Penaeid shrimp	*Penaeidae sp.*	1807	0.39	15.06	3.95	27.31	0.86
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

Spring 2023		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	27	0.01	0.23	0.09	15.56	0.74
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	3084	0.67	25.70	10.00	23.66	0.55
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Penaeid shrimp	*Penaeidae sp.*	1470	0.32	12.25	1.97	25.15	0.93
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

Spring 2023		Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	15	0.02	0.13	0.04	33.50	7.63

Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	853	0.86	7.11	2.73	18.96	0.48
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Penaeid shrimp	*Penaeidae sp.*	119	0.12	0.99	0.36	0.00	0.00
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

Spring 2023		**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	67	0.02	0.56	0.19	20.73	1.81
Dark shore crab	*Pachygrapsus gracilis*	2	0.00	0.02	0.01	6.95	0.85
Grass shrimp	*Palaemonetes sp.*	2603	0.63	21.69	6.09	17.83	0.64
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	5	0.00	0.04	0.02	7.68	0.65
Penaeid shrimp	*Penaeidae sp.*	1424	0.35	11.87	3.38	0.00	0.00
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Lavaca (1-2)

Summer 2023		**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	29	0.01	0.24	0.09	7.39	1.00
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	1498	0.77	12.48	4.70	21.56	0.51
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	3	0.00	0.03	0.01	7.60	1.90
Penaeid shrimp	*Penaeidae sp.*	424	0.22	3.53	0.99	19.70	0.84
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

Summer 2023		**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Arrow shrimp	*Tozeuma carolinense*	11	0.00	0.09	0.06	8.52	1.06
Blue crab	*Callinectus sapidus*	50	0.02	0.42	0.15	7.27	0.43
Dark shore crab	*Pachygrapsus gracilis*	3	0.00	0.03	0.02	2.60	0.35
Grass shrimp	*Palaemonetes sp.*	1974	0.80	16.45	6.43	19.03	0.47
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	5	0.00	0.04	0.03	3.88	0.31

Penaeid shrimp	*Penaeidae sp.*	425	0.17	3.54	0.68	19.49	0.85
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	1	0.00	0.01	0.01	10.70	0.00

Keller (5-6)

Summer 2023		**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	26	0.02	0.22	0.08	9.04	0.86
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	789	0.75	6.58	1.54	14.51	0.41
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Penaeid shrimp	*Penaeidae sp.*	244	0.23	2.03	0.49	14.82	0.71
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

Summer 2023		**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Arrow shrimp	*Tozeuma carolinense*	3	0.00	0.03	0.02	5.23	0.54
Blue crab	*Callinectus sapidus*	143	0.04	1.19	0.13	8.47	0.35
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	2443	0.65	20.36	8.07	17.78	0.44
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	8	0.00	0.07	0.04	3.36	1.04
Penaeid shrimp	*Penaeidae sp.*	1163	0.31	9.69	1.47	20.25	0.71
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	1	0.00	0.01	0.01	27.20	0.00

Lavaca (1-2)

Fall 2023		**Total Catch**	**RA**	**Mean Density (no./m²)**	**SE**	**Mean Length (mm)**	**SE**
Arrow shrimp	*Tozeuma carolinense*	4	0.00	0.03	0.01	12.73	4.79
Blue crab	*Callinectus sapidus*	14	0.00	0.12	0.03	7.66	2.62
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	3915	0.97	32.63	11.39	17.17	0.55
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	4	0.00	0.03	0.01	3.23	0.38
Penaeid shrimp	*Penaeidae sp.*	115	0.03	0.96	0.32	12.74	1.24
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00

Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Cox (3-4)

	Fall 2023	Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	4	0.00	0.03	0.03	11.95	2.18
Blue crab	*Callinectus sapidus*	78	0.03	0.65	0.32	8.15	0.33
Dark shore crab	*Pachygrapsus gracilis*	4	0.00	0.03	0.03	4.15	0.18
Grass shrimp	*Palaemonetes sp.*	2462	0.85	20.52	6.06	18.80	0.38
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	10	0.00	0.08	0.07	6.06	0.60
Penaeid shrimp	*Penaeidae sp.*	332	0.11	2.77	1.01	25.30	2.17
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Keller (5-6)

	Fall 2023	Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	16	0.00	0.13	0.05	17.64	0.91
Blue crab	*Callinectus sapidus*	10	0.00	0.08	0.04	10.63	2.37
Dark shore crab	*Pachygrapsus gracilis*	0	0.00	0.00	0.00	0.00	0.00
Grass shrimp	*Palaemonetes sp.*	5234	0.99	43.62	14.10	15.52	0.39
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	1	0.00	0.01	0.01	3.00	0.00
Penaeid shrimp	*Penaeidae sp.*	31	0.01	0.26	0.10	31.59	3.86
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Carancahua (7-8)

	Fall 2023	Total Catch	RA	Mean Density (no./m²)	SE	Mean Length (mm)	SE
Arrow shrimp	*Tozeuma carolinense*	0	0.00	0.00	0.00	0.00	0.00
Blue crab	*Callinectus sapidus*	81	0.03	0.68	0.22	7.53	0.50
Dark shore crab	*Pachygrapsus gracilis*	38	0.02	0.32	0.18	3.10	0.11
Grass shrimp	*Palaemonetes sp.*	2090	0.88	17.42	5.77	18.74	0.27
Hippo shrimp	*Hippolytidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Mud crab	*Xanthidae sp.*	0	0.00	0.00	0.00	0.00	0.00
Penaeid shrimp	*Penaeidae sp.*	176	0.07	1.47	0.40	16.38	0.82
Porcelain crab	*Porcellanid sp.*	0	0.00	0.00	0.00	0.00	0.00
Snapping shrimp	*Alpheus heterochaelis*	0	0.00	0.00	0.00	0.00	0.00

Appendix C. Physical Parameters

Temperature (C°), Salinity (ppt), Dissolved Oxygen (DO) (mg/L), and pH measurements. “NA” values are due to equipment malfunction.

Date	Trip	Site	Temp	Sal	Ph	DO	Nurdles
5/10/2022	1	1	28.22	25.82	8.32	6.48	0
5/10/2022	1	2	28.22	25.85	8.28	6.05	0
5/10/2022	1	3	28.64	29.3	8.33	6.41	0
5/10/2022	1	4	28.39	29.77	8.24	6.53	0
5/10/2022	1	5	28.7	30.58	8.5	8.72	0
5/10/2022	1	6	29.01	30.7	8.43	9.47	0
5/10/2022	1	7	31.25	29.94	8.51	8.31	0
5/10/2022	1	8	30.25	29.61	8.55	7.94	0
5/25/2022	2	1	25.39	24.05	8.11	6.7	0
5/25/2022	2	2	25.59	24.16	8.28	6.45	0
5/25/2022	2	3	27.06	29.4	8.45	8.39	0
5/25/2022	2	4	27.36	28.99	8.27	7.75	0
5/25/2022	2	5	28.17	29.82	8.35	8.12	0
5/25/2022	2	6	28.66	29.83	8.73	NA	0
5/25/2022	2	7	30.72	29.35	8.54	9.45	0
5/25/2022	2	8	29.69	29.52	8.58	8.54	0
8/9/2022	3	1	30.39	32.28	8.02	7.02	0
8/9/2022	3	2	30.44	32.33	8.02	6.68	0
8/9/2022	3	3	31.23	34.6	8.06	7.69	0
8/9/2022	3	4	31.42	35.12	8.09	6.67	0
8/9/2022	3	5	30.65	36.77	8.08	3.55	0
8/9/2022	3	6	30.24	36.69	8.07	5.41	0
8/9/2022	3	7	28.79	35.78	7.94	4.78	0
8/9/2022	3	8	29.5	35.78	8.07	5.75	0
8/22/2022	4	1	29.99	33.89	8.07	6.61	0
8/22/2022	4	2	30.81	34.14	8.09	7.3	0
8/22/2022	4	3	30.62	36.8	7.97	6.73	0
8/22/2022	4	4	30.53	36.46	8.07	6.9	0
8/22/2022	4	5	29.55	37.59	8.07	5.1	0
8/22/2022	4	6	28.71	38.25	7.92	5.18	0
8/22/2022	4	7	32.71	35.19	8.22	7.35	0

8/22/2022	4	8	32.55	35.3	8.14	7.86	0
10/26/2022	5	1	20.13	28.35	7.88	7.37	0
10/26/2022	5	2	20.1	28.03	8.07	7.34	0
10/26/2022	5	3	NA	NA	NA	NA	0
10/26/2022	5	4	23.08	34.36	7.99	8.04	0
10/26/2022	5	5	22.61	35.62	8.81	NA	0
10/26/2022	5	6	22.7	35.72	8.2	8.39	0
10/26/2022	5	7	NA	NA	NA	NA	0
10/26/2022	5	8	NA	NA	NA	NA	0
11/10/2022	6	1	25.51	31.89	7.99	5.61	0
11/10/2022	6	2	26.01	27.55	8.03	7.56	0
11/10/2022	6	3	28.2	31.82	8.15	7.15	0
11/10/2022	6	4	27.75	32.01	8.17	8.01	0
11/10/2022	6	5	26.85	33.63	8.03	7.24	0
11/10/2022	6	6	26.95	33.53	8.23	7.91	0
11/10/2022	6	7	25.56	32	7.8	6.13	0
11/10/2022	6	8	25.51	31.89	7.99	5.61	0
2/9/2023	7	1	16.69	NA	8.49	9.92	0
2/9/2023	7	2	16.39	NA	8.47	9.89	0
2/9/2023	7	3	15	24.6	8.32	8.68	0
2/9/2023	7	4	16.65	24.91	8.23	8.41	0
2/9/2023	7	5	14.13	27.34	8.25	6.73	0
2/9/2023	7	6	14.41	27.04	8.25	6.23	0
2/9/2023	7	7	12.55	27.33	7.99	7.68	0
2/9/2023	7	8	12.99	27.28	8.25	7.89	0
5/3/2023	8	1	24.4	NA	8.62	7.77	0
5/3/2023	8	2	24.52	NA	8.6	7.75	0
5/3/2023	8	3	25.16	22.84	8.46	7.49	0
5/3/2023	8	4	25.29	22.91	8.47	6.88	0
5/3/2023	8	5	23.5	28.47	8.25	6.91	0
5/3/2023	8	6	24.04	28.44	8.92	9.84	0
5/3/2023	8	7	28.64	28.07	8.45	7.94	0
5/3/2023	8	8	28.86	28.15	8.5	8.33	0
5/11/2023	9	1	24.37	NA	8.28	6.67	0
5/11/2023	9	2	24.55	NA	8.14	6.68	0
5/11/2023	9	3	26.95	NA	8.5	6.88	0
5/11/2023	9	4	27.49	NA	8.44	7.24	0

5/11/2023	9	5	27.2	21.94	8.58	9.32	0
5/11/2023	9	6	27.51	23.61	8.66	9.9	0
5/11/2023	9	7	29.42	22.75	8.61	8.86	0
5/11/2023	9	8	28.06	22.39	8.7	NA	0
8/16/2023	10	1	31.02	NA	8.79	6.12	0
8/16/2023	10	2	31.42	NA	8.82	5.31	0
8/16/2023	10	3	35.16	29.95	8.91	7.31	0
8/16/2023	10	4	34.2	31.01	8.89	7.64	0
8/16/2023	10	5	30.6	33.93	8.61	7.37	0
8/16/2023	10	6	30.94	35.21	8.43	6.09	0
8/16/2023	10	7	32.39	32.86	8.81	7.55	0
8/16/2023	10	8	32.8	34.04	8.71	6.86	0
8/31/2023	11	1	31.4	22.25	8.94	7.31	0
8/31/2023	11	2	31.02	21.29	8.93	7.24	0
8/31/2023	11	3	30.42	33.06	8.77	7.35	0
8/31/2023	11	4	31.75	33.1	8.82	7.82	0
8/31/2023	11	5	30.05	34.08	8.72	7.59	0
8/31/2023	11	6	30.23	34.34	8.58	5.28	0
8/31/2023	11	7	29.02	34.32	8.7	5.62	0
8/31/2023	11	8	28.81	34.15	8.48	5.72	0
10/25/2023	12	1	26.5	30.92	NA	5.65	0
10/25/2023	12	2	26.2	30.65	8.16	5.15	0
10/25/2023	12	3	27.6	33.5	8.09	5.31	0
10/25/2023	12	4	27.5	33.95	8.13	5.95	0
10/25/2023	12	5	27	35.79	8.11	4.44	0
10/25/2023	12	6	27.1	35.93	8.13	5.13	0
10/25/2023	12	7	25.8	34.67	8.16	4.67	0
10/25/2023	12	8	25.8	34.95	8.18	4.99	0
11/2/2023	13	1	16.1	28.82	8.15	8.4	0
11/2/2023	13	2	16.2	28.71	8.21	8.34	0
11/2/2023	13	3	16.7	34.47	8.27	8.8	0
11/2/2023	13	4	15.8	34.23	8.29	7.93	0
11/2/2023	13	5	14.8	36.84	8.09	8.52	0
11/2/2023	13	6	16.2	37.11	8.2	8.2	0
11/2/2023	13	7	13.4	35.5	8.04	8.6	0
11/2/2023	13	8	14.6	35.01	8.19	8.06	0

Appendix 4. Coastal Bird Observations

Avian observations across all sites including season, individual count, relative abundance, and dominant habitat type utilized by observed birds Dominant habitat types: emergent vegetated marsh edge (EM), open water (OW), shoreline/mud flat (SL), shell hash (SH), riparian woodland (WD) and woody scrub (ScL).

Taxa	Season			Site				Count	Relative Abundance (%)	Dominant Habitat Type					
	Sp	F	W	Keller	Cox	Lav. River	Caran. Bay			EM	OW	SL	SH	WD	ScL
American Avocet	x	x	x	x	x		x	46	0.55%	x	x	x			
American Kestrel			x				x	3	0.04%	x					
American Oystercatcher	x		x			x	x	6	0.07%		x	x	x		
American White Ibis	x	x	x	x	x	x	x	27	0.32%	x					x
American White Pelican	x	x	x	x	x	x	x	359	4.32%	x	x	x	x	x	
American Wigeon			x		x			12	0.14%		x				
Barn Swallow	x	x	x	x	x	x	x	55	0.66%	x	x	x			
Belted Kingfisher		x	x		x	x	x	9	0.11%	x	x				
Black Skimmer	x	*x*			x		x	51	0.61%	x			x		
Black Tern	x			*x*	x	x	x	32	0.38%	x	x	x		x	x
Black Vulture	x	x	x		x	x		66	0.79%	x	x	x		x	x
Black-bellied Plover	x	x	x	x	x	x	x	60	0.72%	x	x	x	x		
Black-bellied Whistling Duck	x			x				7	0.08%	x	x				
Black-crowned Night Heron	x					x		1	0.01%	x					
Black-necked Stilt	x				x	x	x	19	0.23%	x	x	x			x
Blue-grey Gnatcatcher		x	x	x	x			7	0.08%					x	x
Blue-headed Vireo			x		x			1	0.01%					x	
Blue-winged Teal				x	x	x	x	27	0.32%	x	x	x			
Boat-tailed Grackle	x	x	x	x	x	x	x	838	10.08%	x	x	x		x	x
Brown Pelican	x	*x*	*x*	x	x	x	x	513	6.17%	x	x	x	x	x	x
Brown-headed Cowbird	x	x		x		x		4	0.05%						x
Bufflehead Duck		x	x		x	x	x	9	0.11%	x	x				
Carolina Wren	x		x	x	x			6	0.07%						x
Caspian Tern	x	x	x	x	x	x	x	54	0.65%	x	x	x	x	x	
Cattle Egret	x	x	x		x	x		13	0.16%	x					
Cedar Waxwing		x			x			10	0.12%	x					
Clapper Rail	x			x	x	x	x	55	0.66%	x	x	x		x	
Cliff Swallow	x		x			x	x	7	0.08%	x					
Common Grackle	x	x		x	x		x	20	0.24%	x		x			x

Common Loon	x	x	x	x	x	x		26	0.31%	x	x	x			
Common Nighthawk	x			x	x	x	x	8	0.10%	x					
Common Snipe			x		x			1	0.01%			x			
Common Tern	x		x	x	x	x	x	31	0.37%	x	x	x		x	x
Common Yellow Throat		x	x			x		3	0.04%	x					
Coopers Hawk		x		x	x			1	0.01%		x				
Couch's Kingbird	x						x	1	0.01%						x
Crested Caracara	x	x	x	x	x	x	x	10	0.12%	x	x	x		x	x
Downy Woodpecker	x				x			1	0.01%	x					
Double-crested Cormorant	x	x	x	x	x	x	x	325	3.91%	x	x	x	x	x	
Dowitcher sp.		*x*	*x*	*x*	x	x	x	327	3.93%	x	x	x			
Duck sp.	x	x		x	x	x		32	0.38%	x	x				
Eared Grebe	x		x		x			4	0.05%		x				
Eastern Kingbird	x				x			1	0.01%						
Eastern Meadowlark	x	x	x	x		x	x	16	0.19%	x					
Eastern Phoebe		x			x			1	0.01%	x					
Forster's Tern	x	x	x	x	x	x	x	117	1.41%	x	x	x	x		x
Franklin's Gull	x		x	x	x	x		8	0.10%	x	x	x			
Gadwall			x		x			4	0.05%		x				
Great Bittern	x					x		1	0.01%	x					
Great Blue Heron	x	x	x	x	x	x	x	146	1.76%	x	x	x		x	x
Great Egret	x	x	x	x		x	x	194	2.33%	x	x	x			
Greater Yellowlegs	x	x	x	x	x	x	x	29	0.35%	x	x	x			
Green Heron	x					x		2	0.02%	x					
Green-winged Teal		x	x	x	x	x	x	304	3.66%	x	x	x			
Gull-billed Tern	x				x	x		3	0.04%	x					
Harris Hawk		x					x	2	0.02%	x					
Herring Gull			x		x	x	x	13	0.16%		x				
House Wren		x	x		x			4	0.05%					x	
Killdeer	x	x	x	x	x	x	x	34	0.41%	x		x		x	
King Rail	x			x	x		x	2	0.02%	x					
LeConte's Sparrow		x	x		x	x		3	0.04%	x					
Laughing Gull	x	*x*	x	*x*	x	x	x	366	4.40%	x	x	x	x	x	x
Least Bittern	x			*x*	x	x	x	10	0.12%	x	x				
Least Sandpiper	x	x	x	x	x	x	x	259	3.12%	x		x		x	
Least Tern	x			x	x	x		64	0.77%	x	x				
Lesser Scaup	x						x	1	0.01%			x			
Lesser Yellowlegs		x	x	x	x	x	x	39	0.47%	x	x	x			

Lincoln Sparrow			x				x	3	0.04%	x					
Little Blue Heron	x	x	x	x	x	x	x	46	0.55%	x	x	x	x	x	x
Loggerhead Shrike	x		x	x			x	3	0.04%	x					x
Long-billed Curlew	x	x	x	x	x	x	x	21	0.25%	x	x	x			
Long-billed Dowitcher		x	x		x			45	0.54%	x				x	
Mallard			x	x			x	18	0.22%	x	x				
Marbled Godwit		x		x	x			7	0.08%	x	x			x	
Marsh Wren	x	x	x	x	x	x	x	37	0.45%	x		x			x
Meadowlark sp.	x	x	x	x		x	x	10	0.12%						x
Mottled Duck	x		x	x	x		x	7	0.08%	x	x				
Mourning Dove	x		x	x	x	x	x	57	0.69%	x					x
Muscovy	x						x	4	0.05%						x
Neotropical Cormorant	x	x	x	x	x	x	x	39	0.47%	x	x			x	
Northern Bobwhite	x	x					x	5	0.06%	x					x
Northern Cardinal	x	x	x	x	x	x	x	57	0.69%	x		x		x	x
Northern Harrier		x	x	x	x	x	x	42	0.51%	x	x	x			x
Northern Mockingbird	x	x	x	x	x	x	x	36	0.43%	x	x	x			x
Northern Pintail	x		x	x	x		x	113	1.36%	x	x	x			
Northern Rough-winged Swallow	x	x		x			x	4	0.05%	x					
Northern Shoveler	x		x	x		x		10	0.12%	x	x				
Osprey	x	x	x	x	x	x	x	32	0.38%	x	x	x			x
Painted Bunting	x			x	x			4	0.05%						x
Pied-billed Grebe		x	x	x	x			4	0.05%		x	x			
Plover sp.			x		x			12	0.14%	x					
Red-breasted Merganser		x	x		x			10	0.12%	x	x				
Reddish Egret	x	x	x	x	x	x	x	39	0.47%	x	x	x			x
Redhead Duck		x	x		x		x	48	0.58%	x	x	x			
Red-tailed Hawk			x		x		x	2	0.02%	x					x
Red-winged Blackbird	x	x	x	x	x	x	x	996	11.98%	x	x	x	x	x	x
Ring-billed Gull		x	x	x	x	x	x	22	0.26%	x	x	x			
Ring-necked Duck			x		x			1	0.01%		x				
Rock Dove	x				x			6	0.07%		x				
Roseate Spoonbill	x	x	x	x	x	x	x	82	0.99%	x	x	x			
Royal Tern	x	x	x	x	x	x	x	73	0.88%	x	x	x	x	x	
Ruddy Turnstone	x	x	x	x	x		x	35	0.42%	x		x	x	x	
Sanderling	x	x	x		x		x	53	0.64%	x	x	x			
Sandhill Crane		x	x	x	x		x	31	0.37%	x					
Sandpiper sp.	x	x	x		x	x	x	40	0.48%	x	x	x			x

Sandwich Tern			x	x			x	148	1.78%	x	x		x		
Savannah Sparrow		x	x	x	x	x	x	24	0.29%	x		x			x
Scaup sp.			x	x		x	x	68	0.82%	x	x	x			
Scissor-tailed Flycatcher	x				x		x	5	0.06%	x					x
Seaside Sparrow	x	x	x	x	x	x	x	61	0.73%	x					
Sedge Wren			x			x		3	0.04%	x					
Semipalmated Plover		x		x				28	0.34%		x				
Short-billed Dowitcher		x	x	x	x			133	1.60%	x	x	x			
Skimmer	x		x			x	x	10	0.12%		x				x
Snow Geese		x			x		x	210	2.53%	x	x				
Snowy Egret	x	x	x	x	x	x	x	161	1.94%	x	x	x	x	x	x
Sparrow sp.		x		x	x		x	6	0.07%	x	x				
Spotted Sandpiper	x	x	x	x	x		x	9	0.11%	x		x			
Swallow sp.			x	x				1	0.01%	x					
Swamp sparrow		x	x		x	x	x	13	0.16%		x	x		x	x
Tern Sp			x				x	2	0.02%		x				
Tree Swallow	x	x	x	x	x	x	x	25	0.30%	x		x		x	
Tri-colored Heron	x	x	x	x	x	x	x	139	1.67%	x	x	x			
Turkey Vulture	x	x	x	x	x	x	x	129	1.55%	x	x	x		x	x
Western Kingbird	x	x	x				x	2	0.02%						x
Western Sandpiper	x	x	x	x	x		x	56	0.67%	x		x			
Whimbrel	x			x	x	x		6	0.07%	x					
White-eyed Vireo	x	x	x		x			23	0.28%	x		x			x
White-tailed Hawk		x		x				2	0.02%	x					
White-winged Dove			x			x		1	0.01%						x
Willet	x	x	x	x	x	x	x	225	2.71%	x	x	x	x	x	x
Wilson's Plover	x	x		x	x	x	x	52	0.63%	x	x	x			
Wren sp.			x		x			2	0.02%					x	
Yellow-billed Cuckoo	x				x			1	0.01%			x			
Yellow-crowned Night Heron	x				x			1	0.01%	x					
Yellow-rumped Warbler			x		x			2	0.02%						x
Yellow-throated Warbler		x			x	x		2	0.02%						x