FRESHWATER INFLOW EFFECTS ON FISHES AND INVERTEBRATES IN THE ANCLOTE RIVER ESTUARY

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SUMMARY

Quantitative ecological criteria are needed to establish minimum flows and levels for rivers and streams within the Southwest Florida Water Management District (SWFWMD), as well as for the more general purpose of improving overall management of aquatic ecosystems. As part of the approach to obtaining these criteria, the impacts of managed freshwater inflows on downstream estuaries are being assessed. A 12-month study of freshwater inflow effects on habitat use by estuarine organisms in the Anclote River estuary was undertaken from October 2004 to September 2005.

The general objective of the present data analysis was to identify patterns of estuarine habitat use and organism abundance under variable freshwater inflow conditions and to evaluate responses. Systematic monitoring was performed to develop a predictive capability for evaluating potential impacts of proposed freshwater withdrawals and, in the process, to contribute to baseline data. The predictive aspect involves development of regressions that describe variation in organism distribution and abundance as a function of natural variation in inflows. These regressions can be applied to any proposed alterations of freshwater inflows that fall within the range of natural variation documented during the data collection period.

For sampling purposes, the tidal Anclote River and nearby Gulf of Mexico were divided into six zones from which plankton net, seine net and trawl samples were taken on a monthly basis. Salinity, water temperature, dissolved oxygen and pH measurements were taken in association with each net deployment. Daily freshwater inflow estimates for the Anclote estuary were derived from gauged streamflow records. A large body of descriptive habitat-use information was generated and is presented in accompanying appendices.

Larval gobies and anchovies dominated the plankton net's larval fish catch. Gobies of the genera *Gobiosoma* and *Microgobius* were dominant in comparable proportions, and the anchovies were strongly dominated by the bay anchovy (*Anchoa mitchilli*). Other abundant larval fishes included silversides (*Menidia* spp.) and skilletfish (*Gobiesox strumosus*). Juvenile spot (*Leiostomus xanthurus*) were abundant relative to

other tidal rivers in west-central Florida. Spot spawn far offshore and move landward during the late larval and early juvenile stages. One possibility is that the proximity of the Anclote survey area to the open Gulf of Mexico resulted in high juvenile recruitment of spot into the area. The plankton-net invertebrate catch was dominated by gammaridean amphipods, larval crabs (decapod zoeae), larval shrimps (decapod mysis) and by river-plume taxa such as the copepods *Acartia tonsa* and *Labidocera aestiva*, the chaetognaths *Sagitta* spp., the planktonic shrimp *Lucifer faxoni*, and the ostracod *Parasterope pollex*. The strong representation of river-plume taxa occurred because two stations were located in the open gulf near the river mouth (i.e., they were in the river plume). The amphipods were most abundant in the brackish marshes and in the channel downstream of the marshes, as is commonly observed in other estuaries.

Seine fish collections were dominated by spot (*Leiostomus xanuthurus*), pinfish (*Lagodon rhomboides*), bay anchovy (*Anchoa mitchilli*), and eucinostomus mojarras (*Eucinostomus* spp.). These taxa comprised over 84% of total seine catch of fishes. Fish collections from deeper, trawled areas were dominated by pinfish, spot, bay anchovy, and eucinostomus mojarras. These taxa comprised over 86% of total trawl catch of fishes. Invertebrates collected by seines were dominated by daggerblade grass shrimp (*Palaemonetes pugio*) and brackish grass shrimp (*P. intermedius*)—these two species formed nearly 94% of the invertebrate seine catch; invertebrate trawl catches primarily consisted of arrow shrimp (*Tozeuma carolinense*), brackish grass shrimp, pink shrimp (*Farfantepenaeus duorarum*), and longtail grass shrimp (*Periclimenes longicaudatus*), which together comprised nearly 98% of total trawl catch of invertebrates.

Use of the area as spawning habitat was indicated by the presence of fish eggs or newly hatched larvae. The eggs of unidentified herrings (clupeids), the bay anchovy (*Anchoa mitchilli*), the striped anchovy (*A. hepsetus*), silversides (*Menidia* spp.) and unidentified sciaenid fishes were collected from the survey area. Sciaenid eggs were by far the most abundant egg type, followed by eggs of the bay anchovy – both types were most abundant in the Gulf of Mexico and in the lower part of the tidal river. If it is assumed that the relative abundances of different species of early-stage sciaenid larvae reflect relative spawning intensity, then the kingfishes (*Menticirrhus* spp.) are the sciaenids that are most likely to have spawned in this area. Larval distributions suggest that blennies, the lined sole (*Achirus lineatus*) and the hogchoker (*Trinectes maculatus*) spawned near the river mouth, whereas skilletfish (*Gobiesox strumosus*) and gobies (primarily *Microgobius* spp. and *Gobiosoma* spp., but also *Bathygobius soporator*) may have spawned within the interior of the tidal river. The repeated collection of very small juveniles of live-bearing Gulf pipefish (*Syngnathus scovelli*) within the interior of the tidal river suggests that this species is also reproducing within the local area.

Estuary-dependent taxa are spawned at seaward locations and migrate into tidal rivers during the late larval or early juvenile stage, whereas estuary-resident taxa are present within tidal rivers throughout their life cycles. The number of estuary-dependent taxa using the study area as a nursery is somewhat greater than resident taxa: overall, six of the ten most abundant taxa in deeper habitats and seven of the ten most abundant taxa in nearshore habitats can be considered estuary-dependent. There are considerable differences in abundance: estuary-dependents constituted nearly 86% of the total abundance of the top ten most abundant taxa in seined areas, and over 83% of total abundance of top ten taxa in trawled areas. These dependents were mostly offshore spawners and included taxa of commercial importance (i.e., pink shrimp) and taxa of ecological importance due to high abundance (i.e., spot, pinfish, eucinostomus mojarras, tidewater mojarra, and silver jenny). The juvenile nursery habitats for selected species were characterized from seine and trawl data in terms of preference for shallower or deeper areas, zone of the study area, type of shoreline, and salinity.

Based on plankton-net data, alteration of flows would appear to have the lowest potential for impacting many taxa during the period from December through March, which is the period when the fewest estuarine taxa were present. The highest potential to impact many species would appear to be from June through October. Some species were present throughout the year, whereas others had more seasonal spawning and recruitment patterns.

Based on seine or trawl collections, there were few clear seasonal patterns of taxon richness in the Anclote River estuarine system. Monthly taxon richness in seined areas was quite variable—the longest single period of relatively high richness was from

October–December; in deeper (trawled) habitats, the September–February period had greatest taxon richness. Overall abundances and abundances of newly recruiting nekton taxa indicate extensive use of the study area during all months, however. Thus, we tentatively conclude that the period from October to February appears to have the greatest potential for negative effects of anthropogenic change to the tidal river inflow, at least in terms of impacting the most species. There is no time of the year when inflow reduction would not have the potential to affect economically or ecologically important taxa, however.

Ten (26%) of the 38 plankton-net taxa evaluated for distribution responses to freshwater inflow exhibited significant responses. Nine of these were negative responses, wherein animals moved downstream as inflows increased. Downstream movement is the typical inflow response seen in tidal rivers on Florida's west coast. Overall, the time lags associated with these responses were highly variable, with many occurring within a seasonal time frame.

In the seine and trawl data, over one-half (56%) of the 32 pseudo-species/gear combinations (hereafter simply referred to as 'pseudo-species') evaluated for distributional responses to freshwater inflow exhibited significant response for at least one lagged flow period. The best-fitting models were widely dispersed among inflow lag periods. Responses to inflow within each life-history category were largely associated with different lag periods: short (0–14 days) for residents, medium (21–91 days) to long (98–364 days) for estuarine spawners, and long (98–364 days) for offshore spawners. The majority of the best models that included long lag periods involved offshore spawners. Nearly 90 percent of the significant responses were negative (i.e., animals moved upstream with decreasing freshwater inflow). The pseudo-species' centers of abundance may have shifted downstream during periods of higher inflow because individuals were seeking areas with more suitable salinities or were following displaced prey, although some physical displacement during periods of extremely high flows cannot be discounted for smaller individuals.

Sixteen (42%) of the 38 plankton-net taxa evaluated for abundance relationships with freshwater inflow exhibited significant responses. All of these were positive responses (i.e., increased abundance with increased inflow). Although it is unusual for all of the responses to be positive, there are two conditions that would favor this condition. Negative responses are usually caused by elevated flows washing river-plume taxa away from the river mouth and out of the survey area. In the present case, however, (1) the study area did not experience strongly elevated inflows during the survey, and (2) there were stations in the receiving body of water (the Gulf of Mexico) that could intercept washed-out organisms. In fact, several river-plume species had positive responses, including the ostracod *Sarsiella zostericola*, the copepod *Labidocera aestiva*, postlarvae of the shrimp *Hippolyte* spp., the chaetognaths *Sagitta* spp. and bay anchovy adults, *Anchoa mitchilli*. Organisms that typically congregate within the interiors of tidal rivers also had positive responses, including estuarine mysids (*Americamysis almyra* adults, *Americamysis* juveniles, *Bowmaniella dissimilis*), gammaridean amphipods, bay anchovy juveniles and polychaetes. In general, it could be concluded that these positive results were observed – despite the short duration of the study - because there was substantial variation in inflow and because the survey area was geographically scaled to the spatial range of freshwater influence on distribution. Only two of the positive responders, dipteran pupae and chironomid larvae, belong to groups that are primarily freshwater groups.

None of the time lags in the plankton-net distribution responses was short enough to be considered a catchability response (i.e., organisms fleeing the effects of sudden floods and thereby becoming more vulnerable to collection). A few lags were seasonal in nature, but most occurred over time frames that would be expected from true population responses.

Among the 38 pseudo-species considered in the analyses of seine and trawl data, abundances of 60.5% were significantly related to average inflow. The greatest proportion of variance in abundance was explained by linear models for 10 pseudo-species and by quadratic models for 13 pseudo-species. Of the 10 linear models, three were negative relationships, indicating increasing abundance with decreasing inflow, and seven were positive relationships, indicating increasing abundance with increasing inflow. Over half (53.8%) of quadratic models suggested greatest abundance at intermediate inflows (‘intermediate-maximum’). Of the remaining quadratic models, three suggested least abundance at intermediate inflow (‘intermediate-minimum’), two suggested greatest abundance at higher flow levels, and one indicated greatest abundance at the lower levels of inflow. The percentage of significant abundance responses to inflow ranged from 50% of tested pseudo-species in estuarine spawners to 67% in offshore spawners. Offshore and estuarine spawners tended to exhibit intermediate-maximum or positive responses to inflow, whereas tidal-river residents also showed intermediate-minimum responses to inflow. The majority of the best-fitting regression models incorporated longer lags for all life history categories, but this trend was most pronounced for estuarine and offshore spawners. An increase in abundance with increased flow may suggest beneficial aspects of increased nutrient input, for example, or perhaps better detection of the tidal-river nursery area. Intermediate-minimum relationships, where abundance is greatest at either low or high flows and least at intermediate flows, are difficult to explain in ecological terms. Intermediate-maximum relationships, which are opposite in nature to intermediate-minimum relationships, perhaps indicate differing forces operating at opposite ends of the inflow spectrum. At low flows, opportunities for either chemical detection of tidal nursery habitats or selective tidal-stream transport may be reduced, and at high flows, physical displacement may occur, or perhaps undesirable properties of fresher water (e.g., low pH) become more prominent.

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1.0 INTRODUCTION

Rivers export nutrients, detritus, and other productivity promoting materials to the estuary and sea. Freshwater inflows also strongly influence the stratification and circulation of coastal waters, which in itself may have profound effects on coastal ecosystems (Mann and Lazier 1996). Estuary-related fisheries constitute a very large portion of the total weight of the U.S. fisheries yield (66% of finfish and shellfish harvest, Day et al. 1989; 82% of finfish harvest, Imperial et al. 1992). The contribution of estuary-related fisheries is consistently high among U.S. states that border the Gulf of Mexico, where the estimates typically exceed 80% of the total weight of the catch (Day et al. 1989). Examples from around the world indicate that these high fisheries productivities are not guaranteed, however. In many locations, large amounts of fresh water have been diverted from estuaries to generate hydroelectric power or to provide water for agricultural and municipal use. Mann and Lazier (1996) reviewed cases where freshwater diversions were followed by the collapse of downstream fisheries in San Francisco Bay, the Nile River delta, James Bay, Canada, and at several inland seas in the former U.S.S.R. Sinha et al. (1996) documented a reversal of this trend where an increase in fisheries landings followed an increase in freshwater delivery to the coast.

Fishery yields around the world are often positively correlated with freshwater discharge at the coast (Drinkwater 1986). These correlations are often strongest when they are lagged by the age of the harvested animal. In south Florida, Browder (1985) correlated 14 years of pink shrimp landings with lagged water levels in the Everglades. Associations between river discharge and fisheries harvests have also been identified for various locations in the northern and western Gulf of Mexico (Day et al. 1989, Grimes 2001). Surprisingly, discharge-harvest correlations sometimes extend to non-estuarine species. Sutcliffe (1972, 1973) reported lagged correlations between discharge of the St. Lawrence River and the harvest of non-estuarine species such as American lobster and haddock. In recognition of the potential complexities behind these correlations, Drinkwater (1986) advised that the effect of freshwater inflows be considered on a species-by-species basis.

Freshwater influence on coastal ecosystems extends beyond its immediate effects on fisheries. Because of the intricate nature of many food web interactions, changes in the abundance of even a single species may be propagated along numerous pathways, some anticipated and some not, eventually causing potentially large changes in the abundance of birds, marine mammals and other groups of special concern (Christensen 1998, Okey and Pauly 1999). Mann and Lazier (1996) concluded “one lesson is clear: a major change in the circulation pattern of an estuary brought about by damming the freshwater flows, a tidal dam, or other engineering projects may well have far reaching effects on the primary and secondary productivity of the system.”

This project was conducted to support the establishment of minimum flows for the Anclote River estuarine system by the Southwest Florida Water Management District (SWFWMD). Minimum flows are defined in Florida Statutes (373.042) as the “limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area.” In the process of establishing minimum flows for an estuarine system, the SWFWMD evaluates the effects of the freshwater inflows on ecological resources and processes in the receiving estuary. The findings of this project will be used by the SWFWMD to evaluate the fish nursery function of the Anclote River estuary in relation to freshwater inflows. It is not the purpose of this project to determine the level of effect that constitutes significant harm, as that determination will be made by the Governing Board of the SWFWMD.

1.1 Objectives

This project uses plankton-net, seine, and trawl surveys to document the abundance and distribution of fishes and invertebrates that use the tidal Anclote River as habitat. There were several objectives for this project. One was to produce a descriptive database that could serve as a baseline for comparison with future ecological change. These baseline data also provide seasonality records that identify the times of year when the risk of adverse impacts would be greatest for specific organisms.

Another principal objective was to develop regressions to model the responses of estuarine organisms to variations in freshwater inflows. The resulting models would then be available for evaluating proposed minimum flows or the potential impacts of proposed freshwater management plans. These models were developed for both estuarine fishes and the invertebrate prey groups that sustain young fishes while they occupy estuarine nursery habitats.

2.0 METHODS

2.1 Study Area

The Anclote River watershed occupies parts of Pasco, Pinellas and Hillsborough counties in west central Florida. Watershed area above the Elfers gauge is 186 km^2 (73 mi^2). River length is approximately 55 km, with estuarine waters occupying the lower 16 km (Fig. 2.1.1). At Tarpon Springs, near the river's mouth at the Gulf of Mexico, the semi-diurnal tide has a range of <1.9 m. Bottom substrates in the tidal river are dominated by mud, sand, shell and limestone.

Mangrove shorelines (black mangrove, *Avicennia germinans*, and red mangrove, *Rhizophora mangle*) are primarily limited to the Gulf of Mexico shore and the lower 3 km of river. Patches of submerged aquatic vegetation are common in the Gulf of Mexico and near the river mouth. Between 5.4 and 10 km upstream, there are >2 km^2 of brackish marsh, dominated by black rush (*Juncus roemarianus*). Isolated areas of higher elevation upstream of 10 km are vegetated by coastal-hammock trees and shrubs.

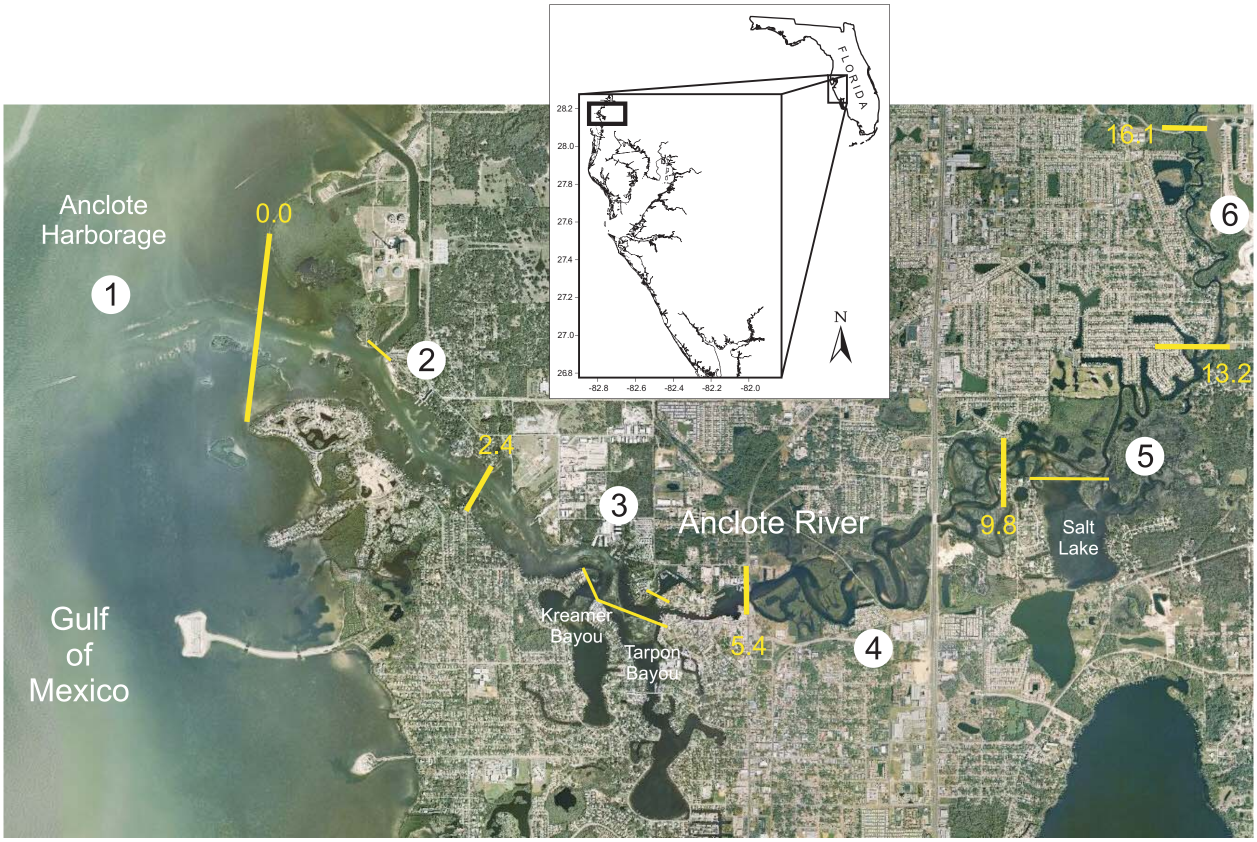

Fig. 2.1.1. Map of survey area, including sampling zones (circled numbers) and zone boundaries (yellow lines).

2.2 Survey Design

Three gear types were implemented to monitor organism distributions: a plankton net deployed during nighttime flood tides and a bag seine and otter trawl deployed during the day under variable tide stages. The plankton net surveys were conducted by the University of South Florida College of Marine Science, and the seine and trawl surveys were conducted by the Fisheries-Independent Monitoring (FIM) program of the Fish and Wildlife Research Institute (Florida Fish and Wildlife Conservation Commission).

The small organisms collected at night by the plankton net represent a combination of the zooplankton and hyperbenthos communities. The term *zooplankton* includes all weakly swimming animals that suspend in the water column during one or more life stages. The distribution of such animals is largely subject to the motion of the waters in which they live. The term *hyperbenthos* applies to animals that are associated with the bottom but tend to suspend above it, rising higher into the water column at night or during certain times of year (vertical migrators). The permanent hyperbenthos of estuaries (non-transient hyperbenthos) tends to be dominated by peracarid crustaceans, especially mysids and amphipods (Mees et al. 1993). Many types of hyperbenthos are capable of actively positioning themselves at different places along the estuarine gradient by selectively occupying opposing tidal flows.

The faunal mixture that forms in the nighttime water column includes the planktonic eggs and larvae of fishes (ichthyoplankton). One of the most common reasons for using plankton nets to survey estuarine waters is to study ichthyoplankton. Although fish eggs and larvae are the intended focus of such studies, invertebrate plankton and hyperbenthos almost always dominate the samples numerically. The invertebrate catch largely consists of organisms that serve as important food for juvenile estuary-dependent and estuary-resident fishes. In an effort to characterize the invertebrate catch more completely, all water-column animals collected by the plankton net were enumerated at a practical taxonomic level.

Seines and trawls were used to survey larger organisms that typically evade plankton nets. Generally speaking, the data from seine hauls document habitat use by shallow-water organisms whereas the data from trawls document habitat use in deeper areas. The dominant catch for both gear types is juvenile fishes, although the adults of smaller species are also commonly caught. The seines and trawls also regularly collect a few of the larger macroinvertebrate species from tidal rivers, notably juvenile and adult blue crabs (*Callinectes sapidus*) and juvenile pink shrimp (*Farfantepenaeus duorarum*).

Monthly sampling in the Anclote River and Gulf of Mexico began in October 2004 and ended in September 2005. The study area was divided into six collection zones (Fig. 2.1.1, Table 2.2.1). Two plankton-net tows, two seine hauls and two trawl deployments were made each month in each zone. The locations for seine and trawl deployment were randomly selected within each zone during each survey, whereas the plankton-net collections were made at fixed stations. The longitudinal position of each station was measured as the distance from the mouth of the tidal river, following the geometric centerline of the channel. Seines in the Gulf zone were set along the shoreline, including island shorelines.

Table 2.2.1. Distribution of sampling effort within the tidal Anclote River (October 2004–September 2005). Zone position is measured relative to the river mouth.

River km	Plankton	Seine	Trawl
-1.8–0.0 (Gulf)	24	24	12
0.0–2.4	24	24	12
2.4–5.4	24	24	12
5.4-9.8	24	24	12
9.8-13.2	24	24	12
13.2-16.1	24	24	12
Totals	144	144	72

2.3 Plankton Net Specifications and Deployment

The plankton gear consisted of a 0.5-m-mouth-diameter 500-µm-mesh conical (3:1) plankton net equipped with a 3-pt nylon bridle, a calibrated flow meter (General Oceanics model 2030R or SeaGear model MF315), a 1-liter plastic cod-end jar, and a 9-kg (20-lb.) weight. The net was deployed between low slack and high slack tide, with sampling beginning within two hours after sunset and typically ending less than four hours later. Tow duration was 5 min, with tow time being divided equally among bottom, mid-water and surface depths. The fishing depth of the weighted net was controlled by adjusting the length of the tow line while using tachometer readings to maintain a constant line angle. The tow line was attached to a winch located on the gunnel near the transom. Placement of the winch in this location caused asymmetry in the steering of the boat, which caused propeller turbulence to be directed away from the towed net. Tow speed was approximately 1.3 m s^{-1}, resulting in a tow length of >400 m over water and a typical filtration of 70-80 m^3. Upon retrieval of the net, the flowmeter reading was recorded, and the contents of the net were rinsed into the cod-end jar using an electric wash-down pump and hose with an adjustable nozzle. The samples were preserved in 6-10% formalin in ambient saline.

The net was cleaned between surveys using an enzyme solution that dissolves organic deposits. Salinity, temperature, pH and dissolved oxygen were measured at one-meter intervals from surface to bottom after each plankton-net deployment.

2.4 Seine and Trawl Specifications and Deployment

The gear used in all seine collections was a 21.3-m center-bag seine with 3.2-mm mesh and leads spaced every 150 mm. To deploy the seine in riverine environments (i.e., shorelines with water depth ≤1.8 m in the Anclote and Mud rivers), the boat dropped off a member of the seine crew near the shoreline with one end of the seine, and the boat then payed out the net in a semicircle until the boat reached a second drop-off point near the shoreline. The lead line was retrieved simultaneously from both ends, with effort made to keep the lead line in contact with the bottom. This process forced the catch into the bag portion of the seine. Area sampled by each boat-deployed seine collection was approximately 68 m^2. In shallow waters (≤ 1.5 m) of the Gulf zone, sampling offshore or along shorelines involved two crew members setting the seine into the prevailing current (determined by tide or wind) and hauling the seine by foot over a distance of 9.1 m while maintaining a constant 15.5-m distance between seine poles; after completing this distance, the two ends of the net were brought together and the sample was collected by pulling the ends of the net past a pivot pole to concentrate the catch in the center bag. Area sampled by each seine collection in the Gulf zone was approximately 140 m^2.

The 6.1-m otter trawl had 38-mm stretched mesh, a 3.2-mm mesh liner, and a tickler chain. It was towed in deeper areas (≥ 1.8 m, < 7.6 m) for five minutes in a straight line; when a suitably deep site could not be found and depths were between 1.0 and 1.8 m, the trawl was towed in an arc. Tow speed averaged 0.6 m s^{-1}, resulting in a typical tow length of about 180 m. Trawl width averaged 4 m, giving an approximate area sampled by a typical tow of 720 m^2. Salinity, temperature, pH, and dissolved oxygen were measured at the surface and at 1-m intervals to the bottom in association with each gear deployment.

2.5 Plankton Sample Processing

All aquatic taxa collected by the plankton net were identified and counted, except for invertebrate eggs and organisms that were attached to debris (sessile stages of barnacles, bryozoans, sponges, tunicates and sessile coelenterates). During sorting, the data were entered directly into an electronic database via programmable keyboards that interfaced with a macro-driven spreadsheet. Photomicrographs of representative specimens were compiled into a reference atlas that was used for quality-control purposes.

Most organisms collected by the plankton net fell within the size range of 0.5-50 mm. This size range spans three orders of magnitude, and includes mesozooplankton (0.2-20 mm) macrozooplankton/micronekton (>20 mm) and analogous sizes of hyperbenthos. To prevent larger objects from visually obscuring smaller ones during sample processing, all samples were separated into two size fractions using stacked sieves with mesh openings of 4 mm and 250 µm. The >4 mm fraction primarily consisted of juvenile and adult fishes, large macroinvertebrates and large particulate organic matter. In most cases, the fishes and macroinvertebrates in the >4 mm fraction could be identified and enumerated without the aid of microscopes.

A microscope magnification of 7-12X was used to enumerate organisms in the >250 µm fraction, with zoom magnifications as high as 90X being available for identifying individual specimens. The >250 µm fraction was usually sorted in two stages. In the first sorting stage, the entire sample was processed as 10-15 ml aliquots that were scanned in succession using a gridded petri dish. Only relatively uncommon taxa (*n*<50) were enumerated during this first stage. After the entire sample had been processed in this manner, the collective volume of the aliquots was recorded within a graduated mixing cylinder, the sample was inverted repeatedly, and then a single 30-60 ml aliquot was poured. The aliquot volume typically represented about 12-50% of the entire sample volume. The second sorting stage consisted of enumerating the relatively abundant taxa within this single aliquot. The second sorting stage was not required for all samples. The second stage was, however, sometimes extended to less abundant taxa (*n*<50) that were exceptionally small or were otherwise difficult to enumerate.

2.5.1 Staging Conventions.

All fishes were classified according to developmental stage (Fig. 2.5.1.1), where

> **preflexion** larval stage = the period between hatching and notochord flexion; the tip of the straight notochord is the most distal osteological feature.
>
> **flexion** larval stage = the period during notochord flexion; the upturned notochord or urostyle is the most distal osteological feature.
>
> **postflexion** larval stage = the period between completion of flexion and the juvenile stage; the hypural bones are the most distal osteological feature.
>
> **metamorphic** stage (clupeid fishes) = the stage after postflexion stage during which body depth increases to adult proportions (ends at juvenile stage).
>
> **juvenile** stage = the period beginning with attainment of meristic characters and body shape comparable to adult fish and ending with sexual maturity.

Decapod larvae were classified as zoea, megalopa or mysis stages. These terms are used as terms of convenience and should not be interpreted as technical definitions. Planktonic larvae belonging to Anomura and Brachyura (crabs) were called zoea. Individuals from these groups displaying the planktonic to benthic transitional morphologies were classified as megalopae. All other decapod larvae (shrimps) were classified as mysis stages until the uropods differentiated into exopods and endopods (5 total elements in the telsonic fan), after which they were classified as postlarvae until they reached the juvenile stage. The juvenile stage was characterized by resemblance to small (immature) adults. Under this system, the juvenile shrimp stage (e.g., for *Palaemonetes*) is equivalent to the postlarval designation used by some authors.

In many fish species, the juvenile stage is difficult to distinguish from other stages. At its lower limit, the juvenile stage may lack a clear developmental juncture that distinguishes it from the postflexion or metamorphic stage. Likewise, at its upper limit, more than one length at maturity may be reported for a single species or the reported length at maturity may differ between males and females. To avoid inconsistency in the staging process, length-based staging conventions were applied to the more common taxa. These staging conventions agree with stage designations used by the U.S. Fish and Wildlife Service (e.g., Jones et al. 1978). The list in Table 2.5.1.1 is comprehensive, representing the conventions that have been required to date by various surveys. Some of the species or stages in the list were not encountered during the surveys covered by this report.

Table 2.5.1.1. Length-based staging conventions used to define developmental stage limits. Fish lengths are standard length (SL) and shrimp length is total length.

Postflexion-juvenile transition (mm):	
Lucania parva	10
Menidia spp.	10
Eucinostomus spp.	10
Lagodon rhomboides	10
Bairdiella chrysoura	10
Cynoscion arenarius	10
Cynoscion nebulosus	10
Sciaenops ocellatus	10
Menticirrhus spp.	10
Leiostomus xanthurus	15
Orthopristis chrysoptera	15
Achirus lineatus	5
Trinectes maculatus	5
Gobiesox strumosus	5
Eugerres plumieri	10
Prionotus spp.	10
Symphurus plagiusa	10
Anchoa mitchilli	15
Sphoeroides spp.	10
Chilomycterus schoepfii	10
Lepomis spp.	10
Micropterus salmoides	10
Membras martinica	10
Chloroscombrus chrysurus	10
Hemicaranx amblyrhynchus	10
Micropogonias undulatus	15
Chaetodipterus faber	5

Juvenile-adult transition (mm):	
Anchoa mitchilli	30
Lucania parva	15
Gambusia holbrooki	15
Heterandria formosa	10
Menidia spp.	35
Eucinostomus spp.	50
Gobiosoma bosc	20
Gobiosoma robustum	20
Microgobius gulosus	20
Microgobius thalassinus	20
Gobiesox strumosus	35
Trinectes maculatus	35
Palaemonetes pugio	20
Membras martinica	50
Syngnathus spp.	80
Poecilia latipinna	30
Anchoa hepsetus	75

Metamorph-juvenile transition (mm):	
Brevoortia spp.	30
Dorosoma petenense	30

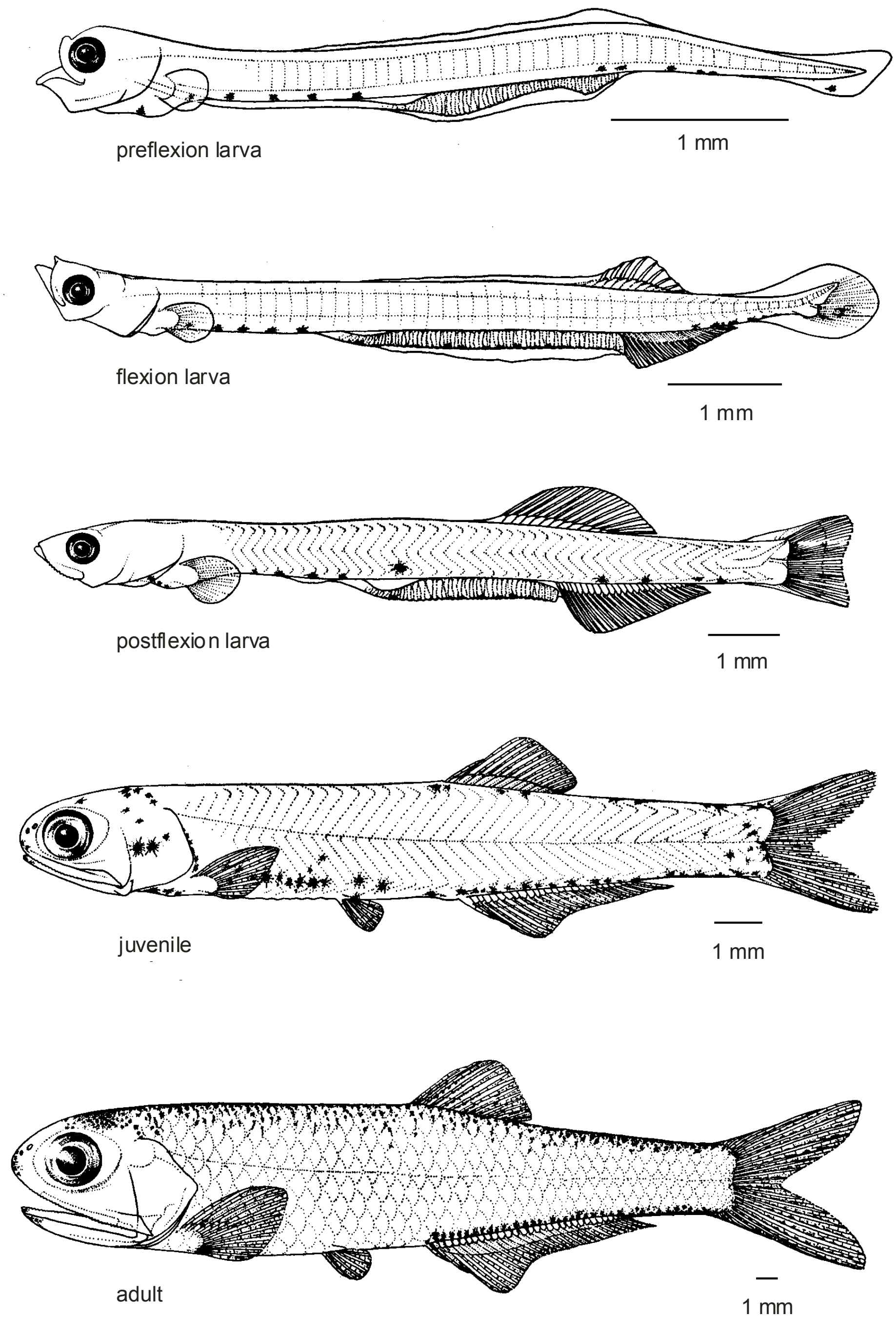

Fig. 2.5.1.1. Fish-stage designations, using the bay anchovy as an example. Specimens measured 4.6, 7.0, 10.5, 16, and 33 mm standard length.

2.6 Seine and Trawl Sample Processing

Fish and selected crustaceans collected in seine and trawl samples were removed from the net into a bucket and processed onboard. Animals were identified to lowest practical taxonomic category, generally species. Representative samples (three individuals of each species from each gear on each sampling trip) were brought back to the FWC/FWRI laboratory to confirm field identification. Species for which field identification was uncertain were also brought back to the laboratory. A maximum of 10 measurements (mm) were made per taxon, unless distinct cohorts were identifiable, in which case a maximum of 10 measurements were taken from each cohort; for certain economically valuable fish species, twenty individuals were measured. Standard length (SL) was used for fish, post-orbital head length (POHL) for pink shrimp, and carapace width (CW) for crabs. Animals that were not measured were identified and counted. When large numbers of individuals (>> 1,000) were captured, the total number was estimated by fractional expansion of sub-sampled portions of the total catch split with a modified Motoda box splitter (Winner and McMichael, 1997). Animals not chosen for further laboratory examination were returned to the river.

Due to frequent hybridization and/or extreme difficulty in the identification of smaller individuals, members of several abundant species complexes were not identified to species. We did not separate menhaden, *Brevoortia*, species. *Brevoortia patronus* and *B. smithi* frequently hybridize, and juveniles of the hybrids and the parent species are difficult to identify (Dahlberg, 1970). *Brevoortia smithi* and hybrids may be the most abundant forms on the Gulf coast of the Florida peninsula, especially in tidal rivers (Dahlberg, 1970), and we treated them as one functional group. The two abundant silverside species (genus *Menidia*) tend to hybridize, form all-female clones, and occur in great abundance that renders identification to species impractical due to the nature of the diagnostic characters (Duggins et al., 1986; Echelle and Echelle, 1997; Chernoff, personal communication). Species-level identification of mojarras (genus *Eucinostomus*) was limited to individuals ≥ 40 mm SL due to great difficulty in separating *E. gula* and *E. harengulus* below this size (Matheson, personal observation). The term “eucinostomus mojarras” is used for these small specimens. Species-level identification of gobies of the genus *Gobiosoma* (i.e., *G. robustum* and *G. bosc*) used in analyses were limited to individuals ≥ 20 mm SL for the same reason; these are hereafter referred to as "gobiosoma gobies". Similarly, needlefishes (*Strongylura* spp.) other than *S. notata* were only identified to species at lengths ≥ 100 mm SL.

2.7 Data Analysis

2.7.1 Freshwater Inflow (*F*).

Inflow rates to the study area include data from one gauged streamflow site, USGS site 02310000 (Anclote River near Elfers). All flow rates were expressed as average daily flows in cubic feet per second (cfs).

2.7.2 Organism-Weighted Salinity (S_U).

The central salinity tendency for catch-per-unit-effort (CPUE) was calculated as

$$S_U = \frac{\sum (S \cdot U)}{\sum U}$$

where U is CPUE (No. m^{-3} for plankton data and No. 100 m^{-2} for seine and trawl data) and S is water-column average salinity during deployment.

2.7.3 Center of CPUE (km_U).

The central geographic tendency for CPUE was calculated as

$$km_U = \frac{\sum (km \cdot U)}{\sum U}$$

where *km* is distance from the river mouth.

2.7.4 Organism Number (*N*) and Relative Abundance ($\overline{N}$).

Using plankton-net data, the total number of organisms in the Anclote study area was estimated by summing the products of mean organism density ($\overline{U}$, as No. m^{-3}) and tide-corrected water volume (*V*) from the six collection zones as

$$N = \sum (\overline{U} \cdot V)$$

Volumes corresponding to NGVD were contoured (Surfer 7, Golden Software, kriging method, linear semivariogram model) using bathymetric transects provided by SWFWMD, and these volumes were then adjusted to the actual water level at the time of collection using data from the water-level recorder at Alt. US Hwy 19 (USGS gauge 02310175). The following water bodies were not included in the area and volume calculations: Kreamer Bayou inside a line extending from Ferguson Pt. to Chesapeake Pt., Tarpon Bayou inside a line extending from Chesapeake Pt. to a point of land west-southwest of the Sponge Docks (28° 9.34' N, 82° 45.07' W), the embayment on the north shore near Anclote Road, Salt Lake starting at its northern shoreline, the power plant canal, residential canals, and all adjoining creeks and embayments that are not part of the conveying channel. The latter group does not exclude channels that are part of the divided channel system; these were included.

Within the tidal river, zone-specific volume increased in a nonlinear manner in the downstream direction. The volume of Zone 1, which was in open water and therefore had an ecologically arbitrary seaward boundary, was extrapolated from a regression of trends in estimated zone volume within the river (average estimated zone volume = $[1463 - 222.7 \times \text{zone number}]^2$, n=5, r^2=0.98, p=0.001). Extrapolation of this relationship to zone number 1, followed by division by an average depth of 0.98 meter NGVD (from USGS topo maps), resulted in an area for Zone 1 equivalent to 1.5 km^2. The two plankton stations in Zone 1 were 0.8 km apart, with the seaward-most station being 1.8 km offshore of the river mouth. Zone 1 was therefore represented by a 1 km wide rectangle centered longitudinally on the navigational channel from the river mouth to a distance 2.3 km offshore.

For seine and trawl data, relative abundance (mean number per 100 m^2 sampled area) in the Gulf and Anclote River zones was calculated for each month as

$$\overline{N} = 100 \times \frac{N_{total}}{A_{total}}$$

where N_{total} = total number of animals captured in that month and A_{total} is the total area sampled in that month. $\overline{N}$ is also occasionally referred to as CPUE in some instances.

2.7.5 Inflow Response Regressions.

Regressions were run for km_U on F, N on F, and $\overline{N}$ on F. N, $\overline{N}$, km_U (seine/trawl data only), and F were Ln-transformed prior to regression to improve normality. To avoid censoring zero values in seine and trawl regressions, a constant of 1 was added to F, and a small constant, 2.79, was added to km_U values to adjust for negative values when pseudo-species were centered below the mouth of the river.

Regressions using plankton-net data were limited to taxa that were encountered during a minimum of 10 of the monthly surveys. Twelve linear and nonlinear regression models were evaluated for each taxon. In these regressions, F was represented by same-day inflow and by mean inflows extending as far back as 120 days prior to the sampling date. The combination of consecutive dates that produced the maximum regression fit was used to model the N and km_U responses to F for each taxon. This approach provided an indication of the temporal responsiveness of the various taxa to inflow variations. An organism was considered to be responsive if the regression slope was significantly different from zero at $p<0.05$.

Seine and trawl regressions were limited to taxa that were reasonably abundant (total abundance>100 in seines, >50 in trawls) and frequently collected (present in at least 3% of collections for each gear). Monthly length-frequency plots (Appendix C) were examined in order to assign appropriate size classes ('pseudo-species') and recruitment windows for each of these taxa. For distribution regressions (km_U), all months were considered when a pseudo-species was collected in at least one sample from that month. For abundance regressions ($\overline{N}$), all samples collected within a determined recruitment period from monthly length-frequency plots (Appendix C) were considered. Mean flows from the date of sampling, as well as continuously lagged weekly averages from the day of sampling to 365 d before sampling (i.e., average flow of sampling day and preceding 6 days, average flow of sampling day and preceding 13 days, etc.), were considered and linear and quadratic regressions were evaluated.

2.7.6 Data Limitations and Gear Biases.

All nets used to sample aquatic organisms are size selective. Small organisms pass through the meshes and large organisms evade the gear altogether. Intermediate-sized organisms are either fully retained or partially retained. When retention is partial, abundance becomes relative. However, temporal or spatial comparisons can still be made because, for a given deployment method and size of organism, the selection process can usually be assumed to have constant characteristics over space and time. The 500-µm plankton gear retains a wide range of organism sizes completely, yet it should be kept in mind that many estimates of organism density and total number are relative rather than absolute. Organism measurements from Little Manatee River and Tampa Bay plankton samples (Peebles 1996) indicate that the following taxa will be collected selectively by 500-µm mesh: marine-derived cyclopoid copepods, some cladocerans, some ostracods, harpacticoid copepods, cirriped nauplii and cypris larvae, the larvacean *Oikopleura dioica*, some decapod zoeae, and some adult calanoid copepods. Taxa that are more completely retained include: cumaceans, chaetognaths, insect larvae, fish eggs, most fish larvae and postlarvae, some juvenile fishes, gammaridean amphipods, decapod mysis larvae, most decapod megalopae, mysids, isopods, and the juveniles and adults of most shrimps. This partitioning represents a very general guide to the relative selectivities of commonly caught organisms.

The plankton nets were deployed during nighttime flood tides because larval fishes and invertebrates are generally more abundant in the water column at night (Colton et al. 1961, Temple and Fisher 1965, Williams and Bynum 1972, Wilkins and Lewis 1971, Fore and Baxter 1972, Hobson and Chess 1976, Alldredge and King 1985, Peebles 1987, Haney 1988, Lyczkowski-Shultz and Steen 1991, Olmi 1994) and during specific tide stages (Wilkins and Lewis 1971, King 1971, Peebles 1987, Olmi 1994, Morgan 1995a, 1995b). Organisms that selectively occupy the water column during flood tides tend to move upstream, and organisms that occupy the water column during all tidal stages tend to have little net horizontal movement other than that caused by net estuarine outflow (Cronin 1982, McCleave and Kleckner 1982, Olmi 1994). The plankton catch was therefore biased toward organisms that were either invading the tidal rivers or were attempting to maintain position within the tidal rivers. This bias would tend to exclude the youngest larvae of some estuarine crabs, which are released at high tide to facilitate export downstream with the ebb tide (Morgan 1995a). However, as the young crabs undergo their return migrations at later larval stages, they become most available for collection during nighttime flood tides (Olmi 1994, Morgan 1995b).

Seines and trawls tend to primarily collect small fish, either adults of small-bodied species or juveniles of larger taxa. Trawls tend to capture larger fish than seines (Nelson and Leffler, 2001), and whether this is due to gear characteristics or preferred use of channel habitat by larger fish is uncertain. Sampling efficiency inevitably varies by species and size class (Rozas and Minello, 1997), but we assume reasonable consistency between samples collected with a given gear type. We acknowledge that movement of various taxa (e.g. killifishes, Fundulidae and Cyprinodontidae) into emergent vegetation at high water levels occurs (Rozas and Minello, 1997) and could complicate interpretation of some results.

3.0 RESULTS AND DISCUSSION

3.1 Streamflow Status During Survey Years

During the one-year survey period (October 2004 through September 2005), flows averaged 40 cfs (Fig. 3.1.1). However, there was a large disparity in the strengths of the two summer rainy seasons that influenced the biological databases. During the period of July through September, 2004, gauged streamflow averaged 505 cfs, whereas the average for the same period in 2005 was 57 cfs, a full order of magnitude lower. This provided a good comparison of biological responses during an otherwise abbreviated survey duration.

3.2 Physico-chemical Conditions

Summary statistics from the electronic meter data collected during plankton sampling are presented in Table 3.2.1. Temperatures underwent seasonal variation within a typical range (Fig. 3.2.1). The two summer peaks in freshwater inflow (Fig. 3.1.1) reduced average salinities, with the reduction in October 2004 being much stronger than the reduction in September 2005. The lowest pH was also observed in October 2004, in agreement with inflow's effect of increasing overall respiration rates within the estuary. Hypoxia was not a chronic problem in the Anclote River. The lowest dissolved oxygen (DO) levels were observed during the rainy season of 2005 in reaches upstream of km 5 (Table 3.2.1). Hypoxia may have also occurred during the rainy season of 2004, as DO levels were still somewhat reduced during October, 2004. DO only occasionally reached strong supersaturation levels, which suggests that microalgal blooms sometimes occur, but not as commonly as in tidal rivers such as the Alafia and Hillsborough Rivers (Peebles 2005, MacDonald et al. 2005).

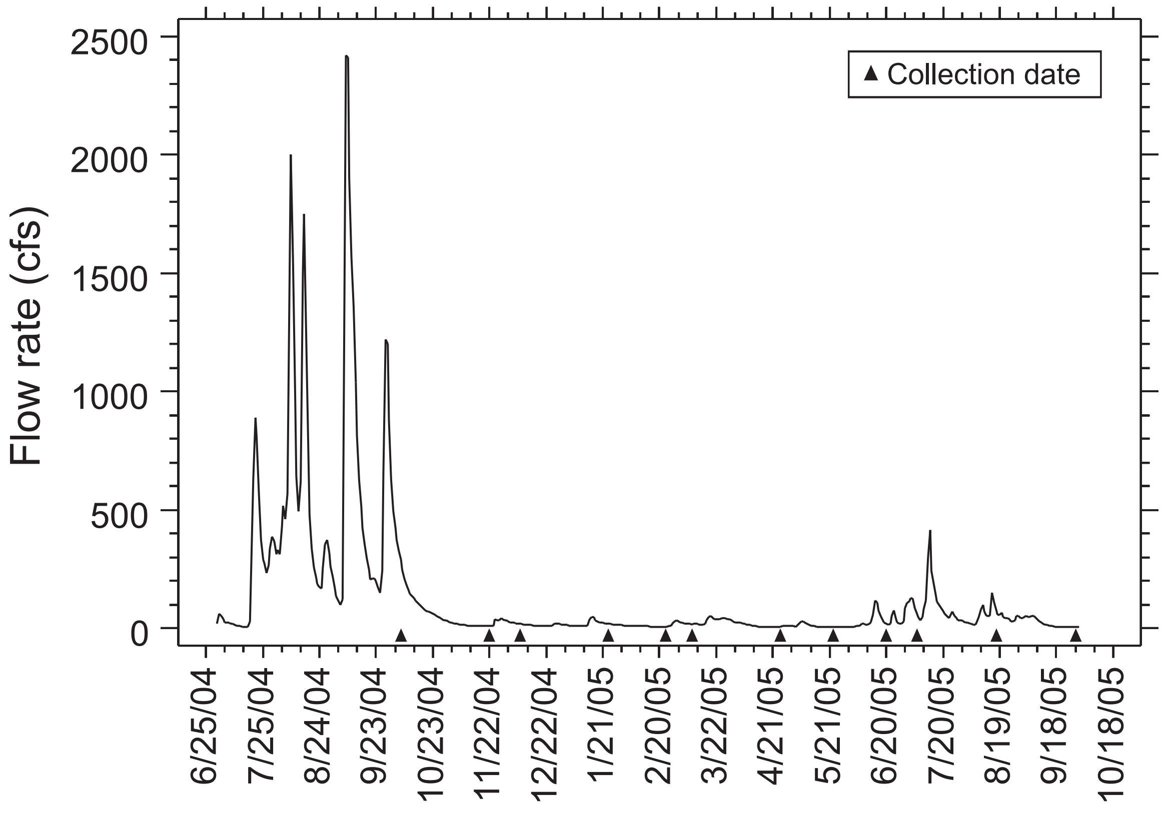

Fig. 3.1.1. Anclote River gauged streamflow and collection dates for plankton surveys.

Table 3.2.1. Electronic meter summary statistics during plankton net deployment. Mean depth is mean depth at deployment. Sample sizes (n) reflect the combination of survey frequency (12 monthly surveys) and depth of measurement. Measurements were made at surface, bottom and at one-meter intervals between surface and bottom.

Location (km from mouth)	Mean Depth (m)	Salinity (psu)					Water Temperature (°C)					Dissolved Oxygen (mg/l)					pH				
		n	mean	std. dev.	min.	max.	n	mean	std. dev.	min.	max.	n	mean	std. dev.	min.	max.	n	mean	std. dev.	min.	max.
-1.8	3.1	53	28.6	3.3	20.9	33.0	53	24.2	6.7	10.9	32.6	53	8.4	1.4	5.8	12.7	53	8.0	0.3	7.3	8.4
-1.0	3.5	58	28.1	3.5	20.9	32.6	58	25.1	6.6	11.1	32.6	58	8.1	1.2	6.4	12.5	58	8.2	0.2	7.7	8.4
0.3	3.3	57	26.8	3.6	17.9	32.2	57	24.3	6.4	12.0	32.6	57	7.8	1.4	4.1	11.4	57	8.1	0.2	7.5	8.4
1.7	3.2	55	25.2	4.0	7.6	32.1	55	25.9	6.2	12.5	32.8	55	6.9	1.5	4.8	9.8	55	8.1	0.1	7.8	8.3
2.9	3.0	52	23.0	4.6	5.5	29.2	52	25.0	6.4	12.4	33.2	52	6.4	1.3	4.5	9.5	52	8.0	0.1	7.6	8.3
4.5	3.9	64	20.5	5.8	2.4	27.6	64	25.1	6.4	11.7	33.0	64	5.7	1.5	3.4	9.8	64	7.9	0.2	7.4	8.2
6.0	2.2	43	16.6	6.9	1.9	23.6	43	24.5	6.5	11.9	31.8	43	5.6	1.5	2.8	8.7	43	7.7	0.2	7.3	8.2
8.9	1.2	30	12.7	6.6	0.4	19.3	30	24.6	5.7	13.0	30.8	30	5.3	1.5	2.7	8.1	30	7.6	0.3	7.1	8.1
10.1	1.2	31	10.2	6.4	0.2	17.8	31	24.1	5.3	13.1	29.9	31	5.2	1.5	2.5	8.3	31	7.5	0.3	6.8	8.1
12.3	1.5	32	8.1	6.8	0.1	21.2	32	24.6	4.6	13.7	29.9	32	4.6	1.8	0.1	7.1	32	7.4	0.3	6.6	8.1
13.3	1.2	31	3.6	3.2	0.1	8.4	31	23.3	4.9	13.9	28.9	31	4.9	1.1	2.7	6.7	31	7.3	0.4	6.5	8.0
15.1	2.1	42	1.4	1.6	0.1	5.7	42	22.4	4.7	14.0	28.7	42	5.1	1.1	2.8	7.0	42	7.3	0.4	6.4	8.2

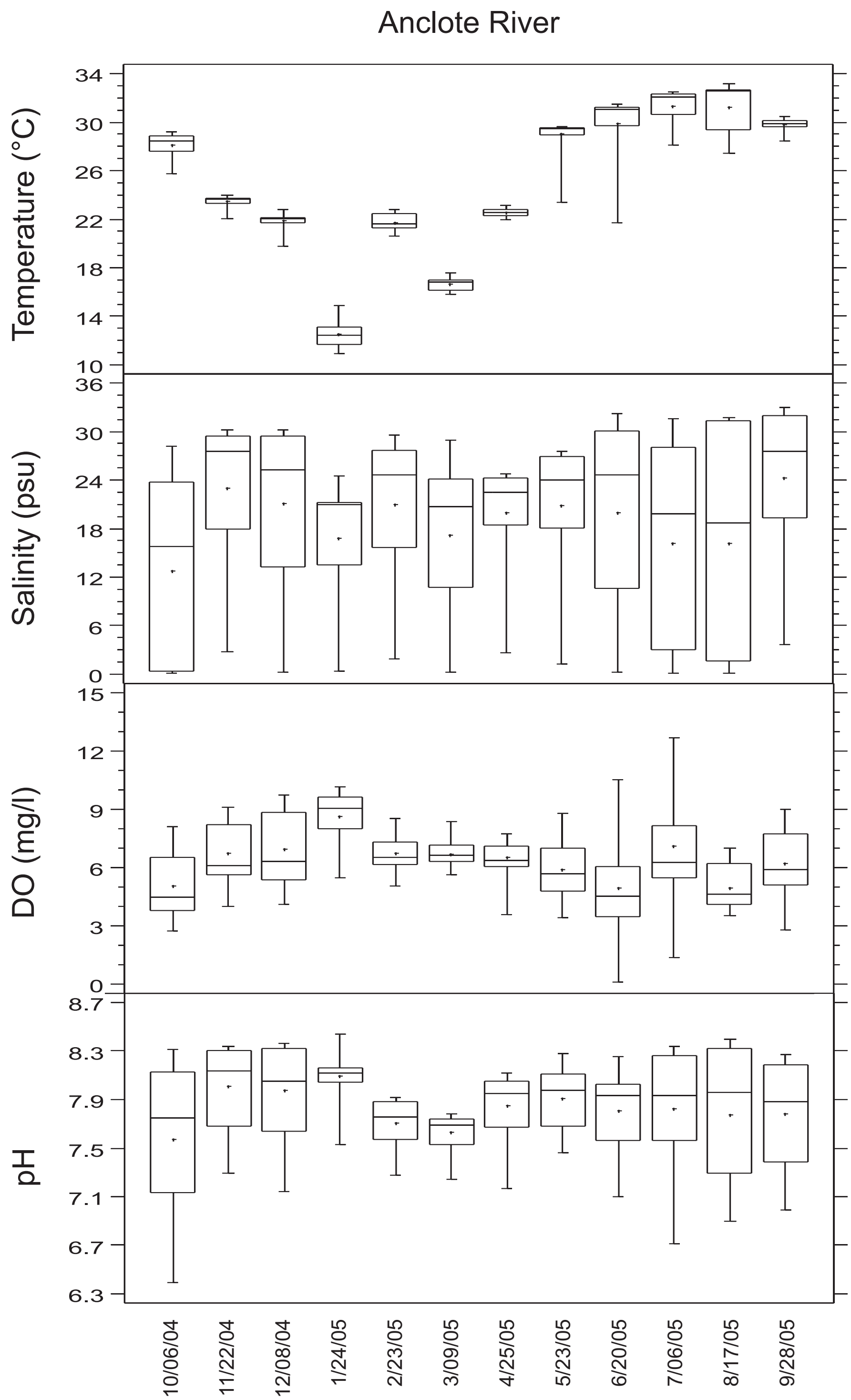

Fig. 3.2.1. Electronic meter data associated with the plankton-net surveys of the tidal Anclote River, where the cross identifies the mean, the horizontal line identifies the median, the box delimits the interquartile range, and the whiskers delimit the total range.

3.3 Catch Composition

3.3.1 Fishes.

3.3.1.1 **Plankton net.** Larval gobies and anchovies dominated the larval fish catch (Table A1). Gobies of the genera *Gobiosoma* and *Microgobius* were dominant in comparable proportions, and the anchovies were dominated by the bay anchovy (*Anchoa mitchilli*). Other abundant larval fishes included silversides (*Menidia* spp.) and skilletfish (*Gobiesox strumosus*). *Menidia* can be exceptionally abundant within estuaries, but can also complete their life cycle within fresh water. Juvenile spot (*Leiostomus xanthurus*) were abundant relative to other tidal rivers in west-central Florida. Spot spawn far offshore and move landward during the late larval and early juvenile stages. Perhaps the proximity of the Anclote survey area to the Gulf of Mexico resulted in high juvenile recruitment of spot into the area.

3.3.1.2 **Seine.** The seine catch (Table B1) was dominated by spot (*Leiostomus xanuthurus*), pinfish (*Lagodon rhomboides*), bay anchovy (*Anchoa mitchilli*), and eucinostomus mojarras (*Eucinostomus* spp.). These taxa comprised over 84% of total seine catch of fishes.

3.3.1.3 **Trawl.** The trawl catch (Table B2) was dominated by pinfish, spot, bay anchovy, and eucinostomus mojarras. These taxa comprised over 86% of total trawl catch of fishes.

3.3.2. Invertebrates.

3.3.2.1. **Plankton net.** The plankton-net invertebrate catch (Table A1) was dominated by gammaridean amphipods, larval crabs (decapod zoeae), larval shrimps (decapod mysis) and by river-plume taxa such as the copepods *Acartia tonsa* and *Labidocera aestiva*, the chaetognaths *Sagitta* spp., the planktonic shrimp *Lucifer faxoni*, and the ostracod *Parasterope pollex*. The strong representation of river-plume taxa occurred because two stations were located in the open gulf near the river mouth (i.e., they were in the river plume, Table A3). The amphipods were most abundant in the brackish marshes and in the channel downstream of the marshes, as is commonly observed in other estuaries. The mysid *Americamysis almyra* is often a numerical dominant in estuaries supplied by surface runoff, but was not as strongly dominant in the tidal Anclote River.

3.3.2.2 **Seine.** The seine catch (Table B1) was dominated by daggerblade grass shrimp (*Palaemonetes pugio*) and brackish grass shrimp (*P. intermedius*), which together comprised nearly 94% of the invertebrate catch.

3.3.2.3 **Trawl.** The trawl catch (Table B2) was dominated by arrow shrimp (*Tozeuma carolinense*), brackish grass shrimp, pink shrimp (*Farfantepenaeus duorarum*), and longtail grass shrimp (*Periclimenes longicaudatus*). These taxa comprised nearly 98% of total trawl catch of invertebrates.

3.4 Use of Area as Spawning Habitat

The eggs of unidentified herrings (clupeids), the bay anchovy (*Anchoa mitchilli*), the striped anchovy (*A. hepsetus*), silversides (*Menidia* spp.) and unidentified sciaenid fishes were collected from the survey area (Table A1). Sciaenid eggs were by far the most abundant egg type, followed by eggs of the bay anchovy – both types were most abundant in the Gulf of Mexico and in the lower part of the tidal river (Table A3). If it is assumed that the relative abundances of different species of early-stage sciaenid larvae reflect relative spawning intensity, then the kingfishes (*Menticirrhus* spp.) are the sciaenids that are most likely to have spawned in this area (Tables A3 and 3.4.1). The data in Tables A3 and 3.4.1 also suggest that blennies, the lined sole (*Achirus lineatus*) and the hogchoker (*Trinectes maculatus*) spawned near the river mouth, whereas skilletfish (*Gobiesox strumosus*) and gobies (primarily *Microgobius* spp. and *Gobiosoma* spp., but also *Bathygobius soporator*) may have spawned within the interior of the tidal river. The repeated collection of very small juveniles of live-bearing Gulf pipefish (*Syngnathus scovelli*) within the interior of the tidal river suggests that this species is also reproducing within the local area. A review of trends in spawning habitat among coastal fishes is presented by Peebles and Flannery (1992).

Table 3.4.1. Relative abundance of larval stages for non-freshwater fishes with a collection frequency >10 for the larval-stage aggregate, where *Pre* = preflexion (youngest larval stage), *Flex* = flexion stage (intermediate larval stage) and *Post* = postflexion (oldest larval stage). **X** identifies the most abundant stage and x indicates that the stage was present.

Taxon	Common Name	Pre	Flex	Post
Anchoa spp.	anchovies	**X**	x	x
Gobiesox strumosus	skilletfish	**X**	x	
Menidia spp.	silversides	**X**	x	x
Menticirrhus spp.	kingfishes	**X**	x	x
blenniids	blennies	**X**		x
Gobiids	gobies	**X**	x	x
Achirus lineatus	lined sole	**X**	x	x
Trinectes maculates	hogchoker	**X**	x	x
Brevoortia spp.	menhaden		x	**X**
Elops saurus	ladyfish			**X**

3.5 Use of Area as Nursery Habitat

The number of estuary-dependent taxa using the study area as a nursery is somewhat greater than resident taxa: overall, six of the ten most abundant taxa in deeper habitats and seven of the ten most abundant taxa in nearshore habitats can be considered estuary-dependent. There are considerable differences in abundance: estuary-dependents constituted nearly 86% of the total abundance of the top ten most abundant taxa in seined areas, and over 83% of total abundance of top ten taxa in trawled areas. These dependents were mostly offshore spawners and included taxa of commercial importance (i.e., pink shrimp) and taxa of ecological importance due to high abundance (i.e., spot, pinfish, eucinostomus mojarras, tidewater mojarra, and silver jenny).

3.6 Seasonality

3.6.1. Plankton Net.

The number of taxa collected during an individual survey is not a true measure of species richness because many taxa could not be identified to species level. Nevertheless, this index produces a clear seasonal pattern. Specifically, more taxa tend to be collected during the warmer months than during winter (Fig. 3.6.1.1).

Species diversity tends to be highest near the mouths of tidal rivers due to an increased presence of marine-derived species and at the upstream end due to the presence of freshwater species. This creates a low-diversity zone in the middle reaches of tidal rivers (Merriner et al. 1976). Changes in streamflow can shift this pattern downstream or upstream.

For a given species of fish, the length of the spawning season tends to become shorter at the more northerly locations within a species' geographic range, but the time of year when spawning takes place is otherwise consistent for a given species. Among species with long or year-round spawning seasons, local conditions have been observed to have a strong influence on egg production within the spawning season (Peebles 2002). Local influences include seasonally anomalous water temperature, seasonal variation in the abundance of prey, and seasonal variation in retention or transport of eggs and larvae after spawning. The latter processes (prey availability and retention and transport) are influenced by freshwater inflows at the coast.

Alteration of flows would appear to have the lowest potential for impacting many taxa during the period from December through March, which is the period when the fewest estuarine taxa were present. The highest potential to impact many species would appear to be from June through October. Some species were present throughout the year (bay anchovy, Fig. 3.6.1.2), whereas others had more seasonal spawning and recruitment patterns (menhaden and kingfish, Fig. 3.6.1.2).

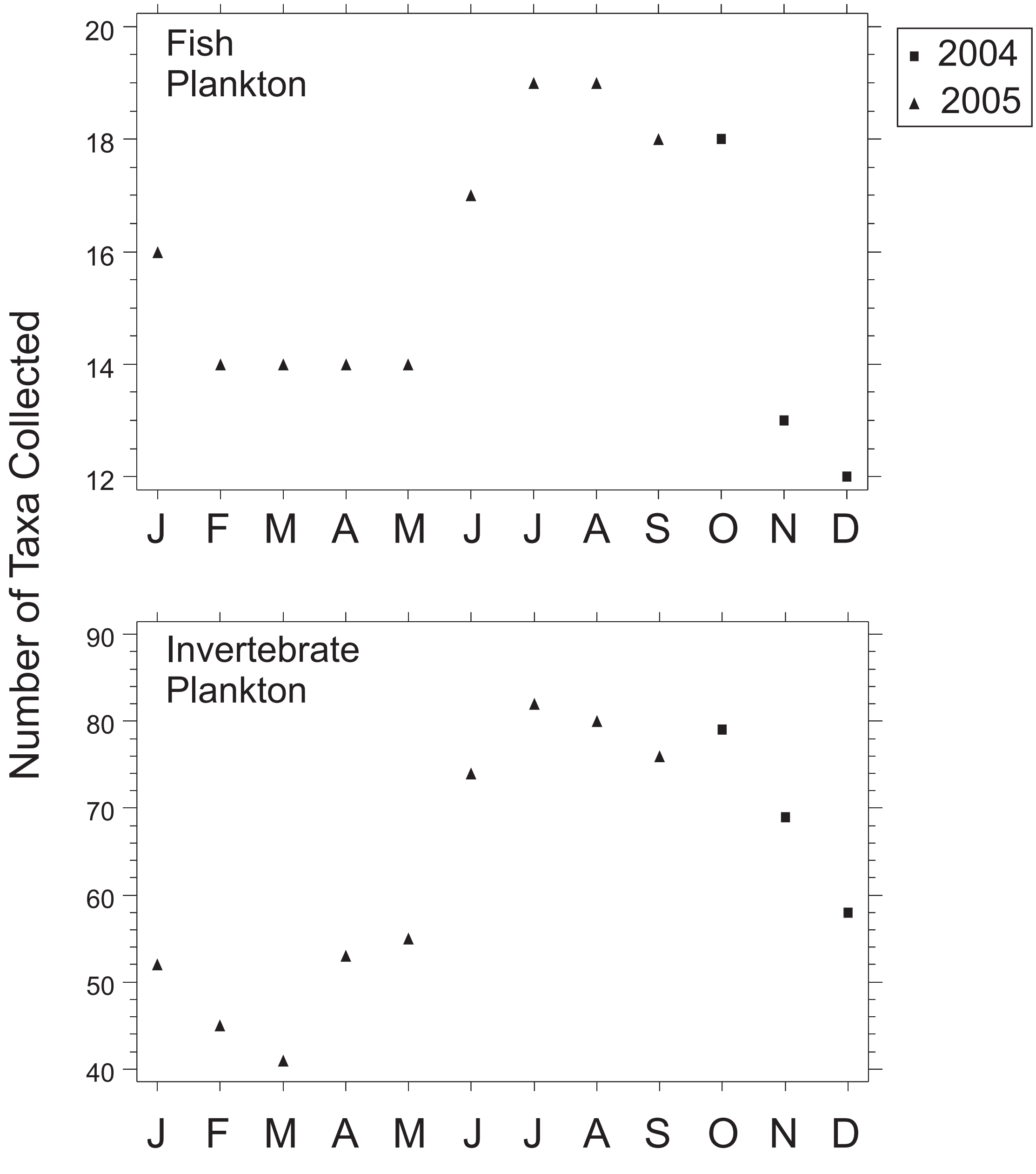

Fig. 3.6.1.1. Number of taxa collected per month by plankton net.

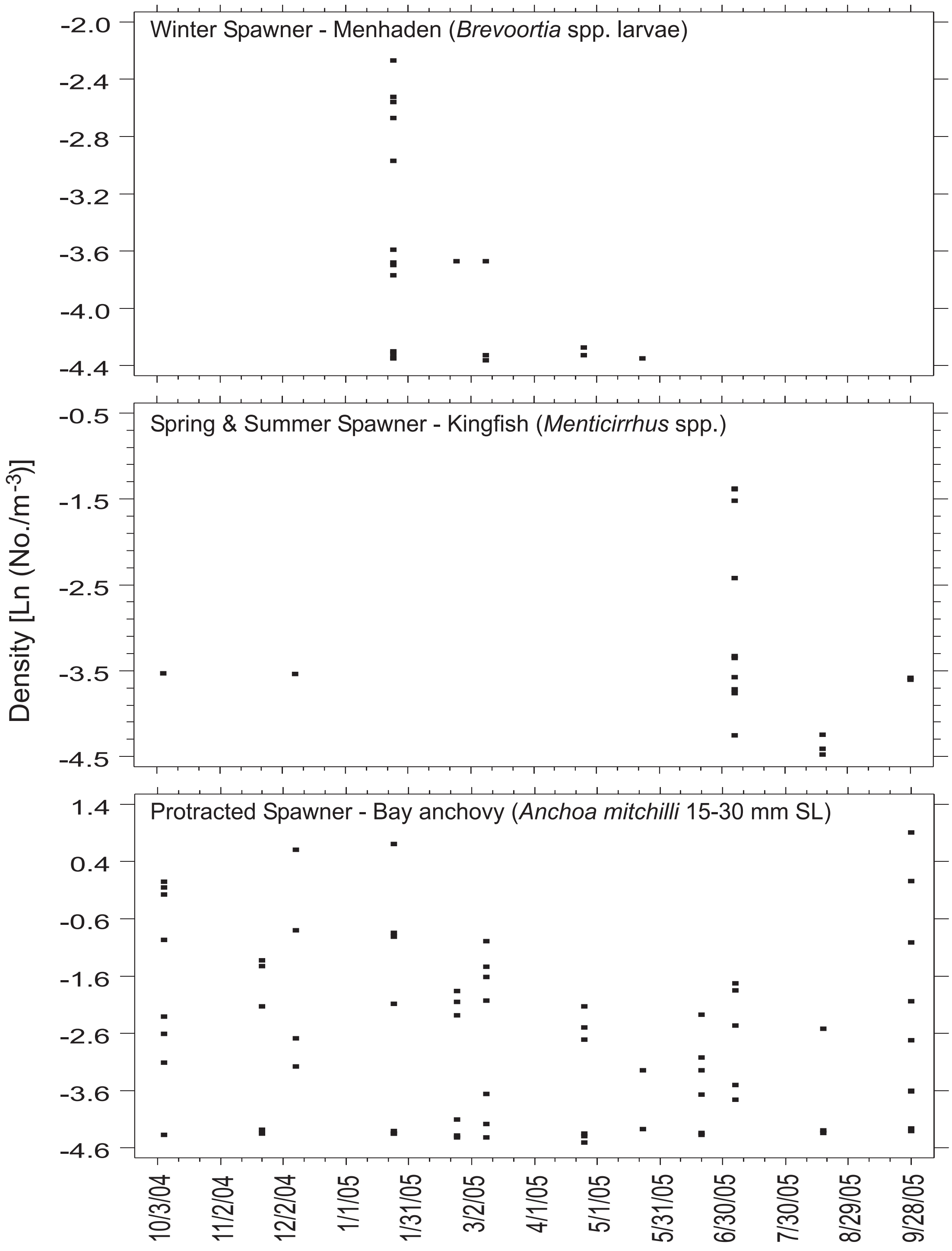

Fig. 3.6.1.2. Examples of species-specific seasonality from plankton-net data.

3.6.2. Seine and Trawl.

Few clear seasonal patterns of taxon richness were evident in the Anclote River estuarine system (Fig. 3.6.2.1), which may be attributed to both the relatively short duration of sampling and the unusual hydrological conditions encountered during the study. Monthly taxon richness in seined areas was quite variable—the longest single period of relatively high richness was from October–December; in deeper (trawled) habitats, the September–February period had greatest taxon richness. Overall abundances and abundances of new recruits of nekton taxa indicate extensive use of the study area during all months (see Appendix C), but temporal resource partitioning among species is evident. Twenty-seven taxa were deemed abundant enough to determine seasonality in either the deeper, trawled habitats or in shallow, seined habitats (i.e., total catch of at least 100 individuals in seined habitats or 50 individuals in trawled habitats and occurrence in ≥3% of samples). If the top months with maximum abundance for each of these taxa are considered (Fig. 3.6.2.2), then peaks for residents occurred throughout the year. Estuarine spawners had peak periods of abundance from fall to spring. Offshore spawners had peaks in abundance that tended to be concentrated from late summer/early fall to spring. Among new recruits (i.e., the smallest two or three 5-mm size classes captured by our gears), peak recruitment periods varied among life-history categories (Fig. 3.6.2.3): of the 16 taxa for which these trends could be judged, offshore spawners tended to recruit in winter, while residents tended to recruit in late summer and fall; there were relatively few data that could be assessed for estuarine spawners.

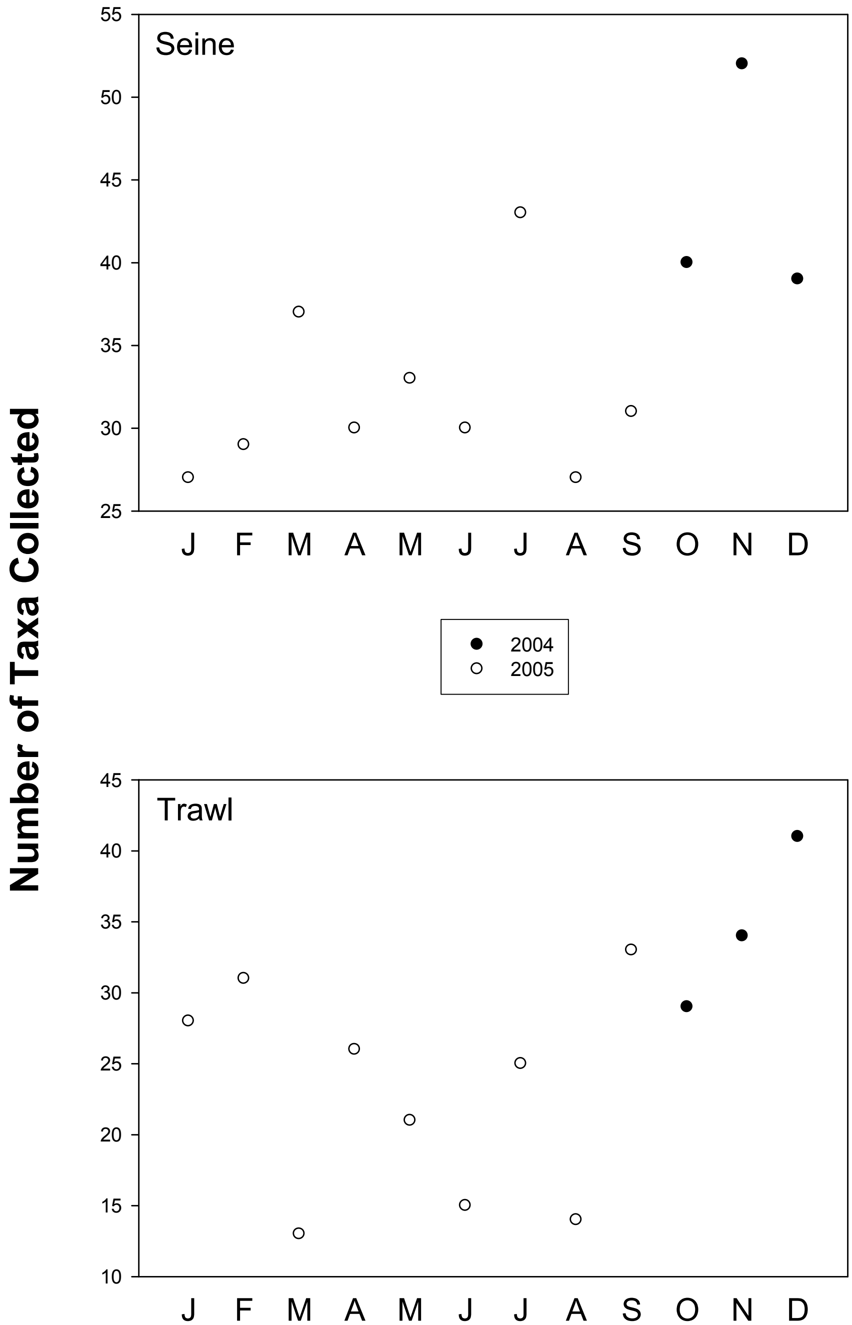

Fig. 3.6.2.1 Number of taxa collected per month by seine and trawl.

	January	February	March	April	May	June	July	August	September	October	November	December
Offshore Spawners												
F. duorarum							S			ST	ST	T
C. sapidus	S		ST	T	T					S		T
E. gula								T	T	S	S	ST
E. harengulus	T					ST	T	S	S			
O. chrysoptera						S	S			T	T	T
L. rhomboides	T	ST	S	S		T						T
L. xanthurus	ST	ST	S		T							
M. cephalus		S	S	S	S							
Total Peaks	**5**	**5**	**5**	**3**	**3**	**4**	**3**	**2**	**2**	**5**	**4**	**6**
Estuarine Spawners												
P. longicaudatus		T		T								
T. carolinense		T		T								
A. mitchilli	T	T		S	S							ST
S. notata						S	S	S				
F. carpio	S	S					S					
S. nephelus			S		ST					S	T	T
Total Peaks	**2**	**4**	**1**	**3**	**3**	**1**	**2**	**1**	**0**	**1**	**1**	**3**
Tidal River Residents												
P. intermedius	ST	S	S	T								
P. pugio	S		S	S								
N. petersoni		S	S									
L. parva	S		S				S					
L. goodei				S			S					S
G. holbrooki		S		S							S	
P. latipinna				S	S							
Menidia spp.			S			S					S	
L. sicculus									S	S	S	
L. macrochirus									S	S	S	
M. gulosus							ST	ST	ST		S	S
Total Peaks	**4**	**3**	**5**	**5**	**1**	**1**	**4**	**2**	**4**	**2**	**5**	**2**

Fig. 3.6.2.2. Top months of relative abundance for all individuals collected in seines (S) and trawls (T).

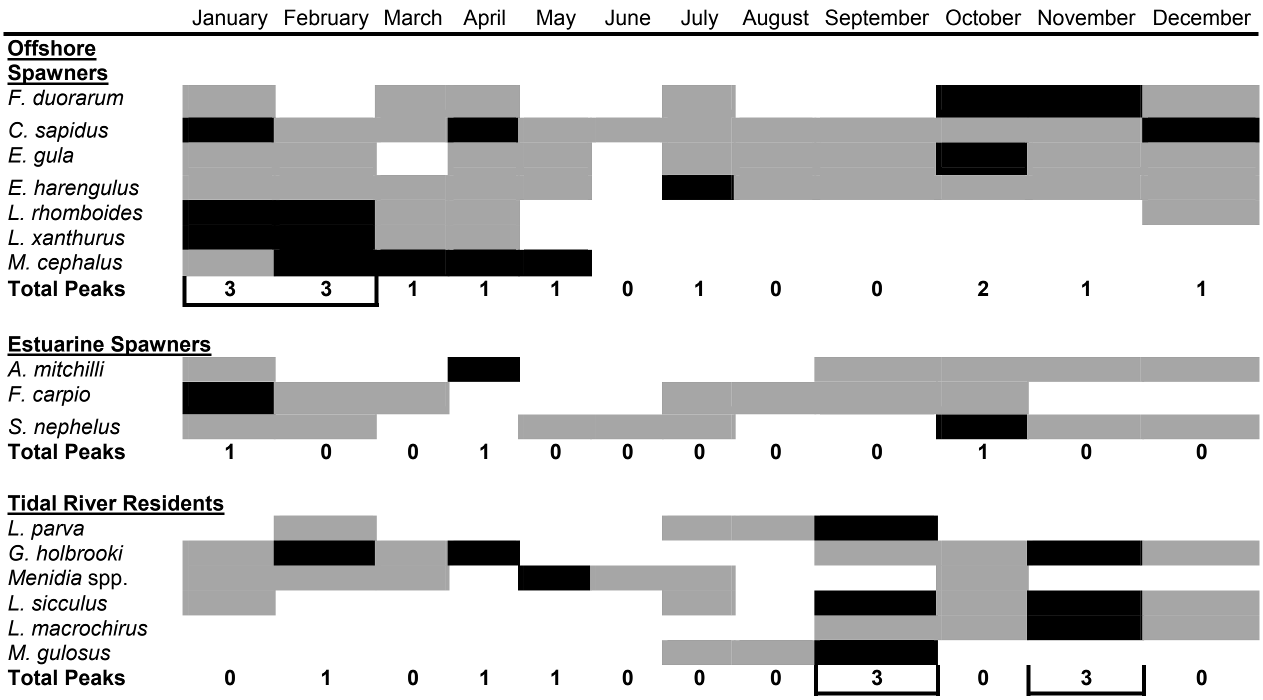

Fig. 3.6.2.3. Months of occurrence (■) and peak abundance (■) for new recruits collected by seine and trawl.

3.7 Distribution (km_u) Responses to Freshwater Inflow

3.7.1 Plankton Net.

Ten (26%) of the 38 plankton-net taxa evaluated for distribution responses to freshwater inflow exhibited significant responses. Nine of these were negative responses, wherein animals moved downstream as inflows increased (Table 3.7.1.1). Downstream movement is the typical inflow response seen in tidal rivers on Florida's west coast. The exception was upstream movement by the copepod *Pseudodiaptomus coronatus*. This relationship had the second lowest fit of the significant relationships and may be spurious. This common species is regarded as being bottom-oriented, which may have made it prone to upstream displacement if freshwater inflow created two-layered circulation in the tidal river (i.e., bottom water moving upstream to replace surface water moving downstream). Overall, time lags for the responses were highly variable, with many occurring within a seasonal time frame.

Table 3.7.1.1. Plankton-net organism distribution (km_U) responses to mean freshwater inflow (Ln *F*), ranked by linear regression slope. Other regression statistics are sample size (*n*), intercept (*Int.*), slope probability (*P*) and fit (adjusted r^2, as %). *D* is the number of daily inflow values used to calculate mean freshwater inflow. None of the time series data appeared to be serially correlated (Durbin-Watson statistic, p>0.05 for all taxa).

Description	***Common Name***	***n***	***Int.***	***Slope***	***P***	r^2	***D***
Pseudodiaptomus coronatus	copepod	12	-6.098	2.494	0.0422	35	120
Labidocera aestiva	copepods	12	0.929	-0.346	0.0470	34	120
chaetognaths, sagittid	arrow worms	10	0.859	-0.402	0.0197	43	1
gastropods, opisthobranch	sea slugs	12	5.295	-0.977	0.0065	54	70
Edotea triloba	isopod	12	12.722	-1.233	0.0086	51	61
Anchoa mitchilli juveniles	bay anchovy	11	16.540	-1.684	0.0001	79	7
Americamysis almyra	opossum shrimp, mysid	12	17.034	-1.774	0.0006	70	33
ostracods, podocopid	ostracods, seed shrimps	12	18.472	-2.511	0.0302	39	106
gobiid preflexion larvae	gobies	12	16.838	-2.668	0.0048	65	117
unidentified Americamysis juveniles	opossum shrimps, mysids	12	20.430	-3.050	0.0000	89	31

3.7.2 Seine and Trawl.

Over one-half (56%) of the 32 pseudo-species/gear combinations (hereafter simply referred to as ‘pseudo-species’) evaluated for distributional responses to freshwater inflow exhibited significant response for at least one lagged flow period. For the purposes of this discussion, we refer only to the best models for each of the 32 pseudo-species (i.e., statistically significant [$\alpha<0.05$] models with normally distributed residuals that explain the greatest proportion of the variance [highest r^2 value] for each pseudo-species) (Table 3.7.2.1). Best models are plotted in Appendix G.

The best models were widely dispersed among inflow lag periods (Fig. 3.7.2.1). Inflow lag periods are characterized as either short (0-14 days), medium (21-91 days), or long (98-364 days). Responses to inflow within each life-history category were largely associated with different lag periods: primarily short for residents, medium to long for estuarine spawners, and most commonly long for offshore spawners.

Nearly 90 percent of the significant responses were negative (i.e., animals moved upstream with decreasing freshwater inflow). The strongest negative responses (high adjusted r^2 values) were found in offshore or estuarine spawners (Table 3.7.2.1); this is mostly because these species tended to have fewer regression points to fit (because of relatively short periods of non-zero abundance) and also because there were 13 pseudo-species from these life-history categories and only five tidal-river residents. The pseudo-species’ centers of abundance may have shifted downstream during periods of higher inflow because individuals were seeking areas with preferred salinities or were following displaced prey, although some physical displacement during periods of extremely high flows cannot be discounted for smaller individuals.

Table 3.7.2.1. Best-fit seine and trawl-based pseudo-species distributional response to continuously-lagged mean freshwater inflow (ln(km_U) vs. ln(inflow)) for theAnclote River estuary. Degrees of freedom (*df*), intercept, slope, probability that the slope is significant (*P*), and fit (Adj-r^2) are provided. The number of days in the continuously-lagged mean inflow is represented by *D*. An “x” in *DW* indicates that the Durbin-Watson statistic was significant (p<0.05), a possible indication that serial correlation was present.

Species	***Common name***	***Gear***	***Size***	***Period***	***df***	***Intercept***	***Linear coef.***	***Linear P***	***Adj-r^2***	***DW***	***D***
Callinectes sapidus	Blue crab	seines	<=40	Jan. to Dec.	10	3.0625	-0.2024	0.007	53.39	x	175
Callinectes sapidus	Blue crab	trawls	<=40	Jan. to Dec.	7	3.4489	-0.3119	0.0345	49.47		210
Anchoa mitchilli	Bay anchovy	seines	>=36	Jan. to Dec.	7	0.4259	0.3464	0.0207	55.8		231
Anchoa mitchilli	Bay anchovy	trawls	<=25	Jan. to Dec.	5	3.2308	-0.1549	0.0017	88.29		21
Anchoa mitchilli	Bay anchovy	trawls	26 to 35	Jan. to Dec.	4	3.5286	-0.2338	0.0035	90.54		56
Anchoa mitchilli	Bay anchovy	trawls	>=36	Jan. to Dec.	4	3.6844	-0.3095	0.0007	95.68		42
Lucania parva	Rainwater killifish	seines	All sizes	Jan. to Dec.	7	0.4297	0.3075	0.0199	56.25		1
Floridichthys carpio	Goldspotted killifish	seines	<=30	Jan. to Dec.	6	2.6546	-0.2925	0.0465	51.03		350
Poecilia latipinna	Sailfin molly	seines	All sizes	Jan. to Dec.	6	4.0718	-0.5157	0.0032	78.93		1
Labidesthes sicculus	Brook silverside	seines	All sizes	Jan. to Dec.	9	2.9717	-0.0239	0.0281	43.14		133
Lepomis macrochirus	Bluegill	seines	>=36	Jan. to Dec.	7	3.0245	-0.056	0.0378	48.27		7
Eucinostomus harengulus	Tidewater mojarra	seines	>=40	Jan. to Dec.	10	2.6634	-0.0909	0.0428	34.99		7
Lagodon rhomboids	Pinfish	seines	<=35	Jan. to Dec.	6	3.4185	-0.5518	0.0195	62.53	x	1
Lagodon rhomboids	Pinfish	seines	>=71	Jan. to Dec.	8	1.0585	0.1525	0.0001	86.81	x	70
Lagodon rhomboids	Pinfish	trawls	<=35	Jan. to Dec.	5	3.1391	-0.4951	0.0044	82.82		28
Lagodon rhomboids	Pinfish	trawls	>=71	Jan. to Dec.	8	1.6162	-0.211	0.0487	40.27		161
Mugil cephalus	Striped mullet	seines	<=50	Jan. to Dec.	4	19.1442	-3.2328	0.0468	66.87		357
Microgobius gulosus	Clown goby	seines	All sizes	Jan. to Dec.	10	2.9578	-0.0932	0.0476	33.76	x	1

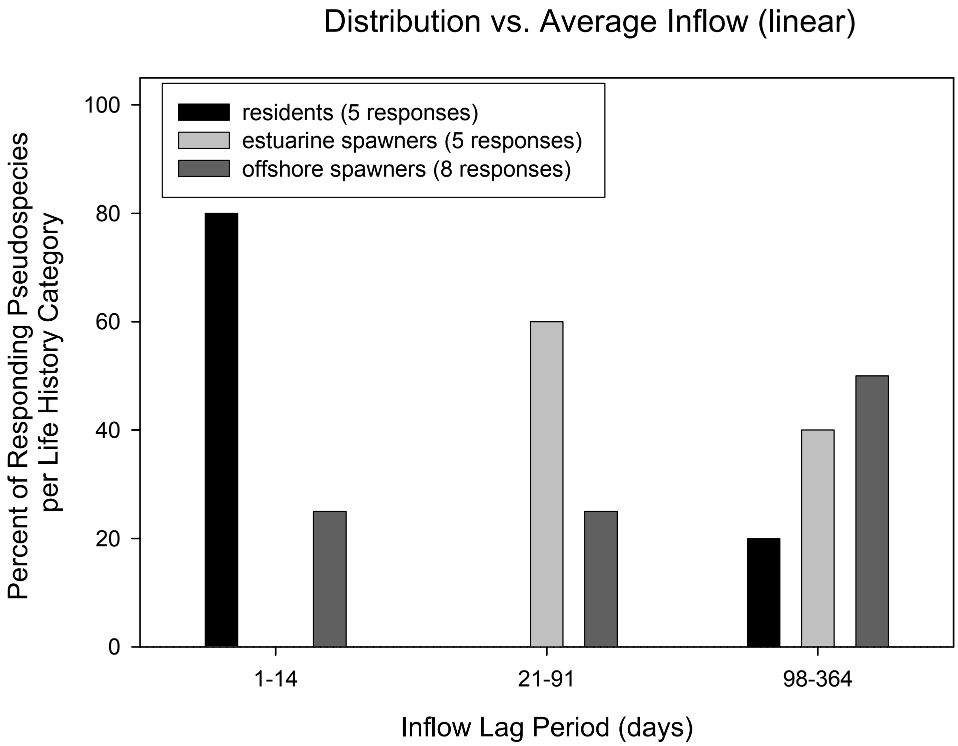

Fig. 3.7.2.1. Summary of linear regression results assessing distribution (km_U) in relation to inflow and lag period.

3.8 Abundance (N, $\bar{N}$) Responses to Freshwater Inflow

3.8.1 Plankton Net.

Sixteen (42%) of the 38 plankton-net taxa evaluated for abundance relationships with freshwater inflow exhibited significant responses (Table 3.8.1.1). All of these were positive responses. Although it is unusual for all of the responses to be positive, there are two conditions that would favor this condition. Negative responses are usually caused by elevated flows washing river-plume taxa away from the river mouth and out of the survey area. In the present case, however, (1) the study area did not experience strongly elevated inflows during the survey, and (2) there were stations in the receiving body of water (the Gulf of Mexico) that could intercept washed-out taxa. In fact, several river-plume species had positive responses, including the ostracod *Sarsiella zostericola*, the copepod *Labidocera aestiva*, postlarvae of the shrimp *Hippolyte* spp., the chaetognaths *Sagitta* spp. and bay anchovy adults, *Anchoa mitchilli*. Organisms that typically congregate within the interiors of tidal rivers also had positive responses, including estuarine mysids (*Americamysis almyra* adults, *Americamysis* juveniles, *Bowmaniella dissimilis*), gammaridean amphipods, bay anchovy juveniles and polychaetes. In general, it could be concluded that these positive results were observed – despite the short duration of the study - because there was substantial variation in inflow and because the survey area was geographically scaled to the spatial range of freshwater influence on distribution (stations were also positioned in the receiving body). Only two of the positive responders, dipteran pupae and chironomid larvae, belong to groups that are primarily freshwater groups.

None of the time lags was short enough to be considered a catchability response (i.e., organisms fleeing the effects of sudden floods and thereby becoming more vulnerable to collection). A few lags were seasonal in nature, but most occurred over time frames that would be expected from true population responses.

Table 3.8.1.1. Plankton-net organism abundance responses to mean freshwater inflow (Ln *F*), ranked by linear regression slope. Other regression statistics are sample size (*n*), intercept (*Int.*), slope probability (*P*) and fit (adjusted r^2, as %). *DW* identifies where serial correlation is possible (x indicates $p<0.05$ for Durbin-Watson statistic). *D* is the number of daily inflow values used to calculate mean freshwater inflow.

Description	***Common Name***	***n***	***Int.***	***Slope***	***P***	***r2***	***DW***	***D***
Sarsiella zostericola	ostracod, seed shrimp	10	5.387	1.723	0.0464	41		31
Americamysis almyra	opossum shrimp, mysid	12	6.512	1.695	0.0010	68		23
dipterans, pupae	flies, mosquitoes	11	4.005	1.218	0.0061	59	x	48
Labidocera aestiva	copepod	12	10.353	1.112	0.0223	42		23
Hippolyte zostericola postlarvae	zostera shrimp	12	10.258	1.048	0.0062	54	x	94
unidentified Americamysis juveniles	opossum shrimps, mysids	12	8.654	0.981	0.0321	38	x	25
branchiurans, Argulus spp.	fish lice	11	7.084	0.933	0.0024	66	x	120
amphipods, gammaridean	amphipods	12	13.942	0.902	0.0004	73		93
Anchoa mitchilli juveniles	bay anchovy	12	7.502	0.826	0.0386	36		120
decapod megalopae	post-zoea crab larvae	10	11.217	0.790	0.0128	56		39
Bowmaniella dissimilis	opossum shrimp, mysid	12	11.164	0.756	0.0070	53		38
amphipods, caprellid	skeleton shrimps	11	9.166	0.737	0.0034	63		94
dipterans, chironomid larvae	midges	12	6.691	0.666	0.0035	59		75
Anchoa mitchilli adults	bay anchovy	11	7.454	0.635	0.0232	45		22
chaetognaths, Sagitta spp.	arrow worms	12	13.114	0.578	0.0196	44		120
polychaetes	sand worms, tube worms	12	11.313	0.539	0.0008	69		93

3.8.2 Seine and Trawl.

Among the 38 pseudo-species considered in these analyses, abundances of 60.5% were significantly related to average inflow (Table 3.8.2.1). The greatest proportion of variance in abundance was explained by linear models for 10 pseudo-species and by quadratic models for 13 pseudo-species. Of the 10 linear models, three were negative relationships, indicating increasing abundance with decreasing inflow, and seven were positive relationships, indicating increasing abundance with increasing inflow. Over half (53.8%) of quadratic models suggested greatest abundance at intermediate inflows (‘intermediate-maximum’). Of the remaining quadratic models, three suggested least abundance at intermediate inflow (‘intermediate-minimum’), two suggested greatest abundance at higher flow levels, and one indicated greatest abundance at the lower levels of inflow. The percentage of significant abundance responses to inflow ranged from 50% of tested pseudo-species in estuarine spawners to 67% in offshore spawners. Offshore and estuarine spawners tended to exhibit intermediate-maximum or positive responses to inflow, whereas tidal-river residents also showed intermediate-minimum responses to inflow (Fig. 3.8.2.1). All best models are plotted in Appendix I.

The majority of the best-fitting regression models incorporated longer lags for all life history categories, but this trend was most pronounced for estuarine and offshore spawners (Fig. 3.8.2.2). Best models incorporated lagged inflows ranging from 14 to 287 days for residents, 161 to 245 days for estuarine spawners, and 21 to 357 days for offshore spawners.

The nine strongest abundance-inflow relationships—those where inflow explained a sizeable portion of variance (r^2>~50%) in at least six data points—mostly involved offshore-spawning species but also included some tidal-river residents. Relationships of abundance to flow in these nine pseudo-species were positive (Figs. I2, I14, I15, and I21), intermediate-minimum (Figs. I8 and I18), r intermediate-maximum (Figs. I3, I10, and I20). An increase in abundance with increased flow may suggest beneficial aspects of increased nutrient input, for example, or perhaps better detection of the tidal-river nursery area. Intermediate-minimum relationships, where abundance is greatest at either low or high flows and least at intermediate flows, are difficult to explain in ecological terms. Intermediate-maximum relationships, which are opposite in nature to intermediate-minimum relationships, perhaps indicate differing forces operating at opposite ends of the inflow spectrum. At low flows, opportunities for either chemical detection of tidal nursery habitats or selective tidal-stream transport may be reduced, and at high flows, physical displacement may occur, or perhaps undesirable properties of fresher water (e.g., low pH) become more prominent.

Table 3.8.2.1. Best-fit seine and trawl-based pseudo-species abundance ($\bar{N}$) response to continuously-lagged mean freshwater inflow (ln(cpue) vs. ln(inflow)) for the Anclote River estuary. The type of response is either quadratic (Q) or linear (L). Degrees of freedom (*df*), intercept, slope (*Linear coef.*), probability that the slope is significant (*Linear P*), quadratic coefficient (*Quad. coef.*), probability that the quadratic coefficient is significant (*Quad. P*), and fit (r^2) are provided. The number of days in the continuously-lagged mean inflow is represented by *D*. An “x” in *DW* indicates that the Durbin-Watson statistic was significant (p<0.05), a possible indication that serial correlation was present.

Species	***Common name***	***Gear***	***Size***	***Period***	***Response***	***df***	***Intercept***	***Linear coef.***	***Linear P***	***Quad. Coef.***	***Quad. P***	***Adj-r^2***	***DW***	***D***
Palaemonetes intermedius	Brackish grass shrimp	seines	All sizes	Dec. to Apr.	L	3	1255.1488	-237.06	0.0477	.	.	77.81		273
Palaemonetes pugio	Daggerblade grass shrimp	seines	All sizes	Nov. to May	L	5	-4.0586	2.5999	0.0038	.	.	83.78	x	14
Callinectes sapidus	Blue crab	trawls	<=40	Oct. to May	Q	5	-172.7243	68.192	0.0184	-6.708	0.0185	73.4		259
Anchoa mitchilli	Bay anchovy	seines	26 to 35	Jan. to Dec.	Q	9	-38.9353	19.2345	0.0426	-2.182	0.0449	39.21		231
Anchoa mitchilli	Bay anchovy	seines	>=36	Jan. to Dec.	Q	9	-55.6959	27.2449	0.025	-3.122	0.0247	44.65		245
Anchoa mitchilli	Bay anchovy	trawls	<=25	Jan. to Dec.	L	10	-0.5936	0.1926	0.021	.	.	42.8	x	168
Anchoa mitchilli	Bay anchovy	trawls	>=36	Jan. to Dec.	L	10	-0.7878	0.2504	0.0049	.	.	56.4		161
Lucania parva	Rainwater killifish	seines	All sizes	Jan. to Sep.	Q	6	24.3348	-11.26	0.0093	1.2846	0.0093	70.29		252
Poecilia latipinna	Sailfin molly	seines	All sizes	Jan. to Dec.	Q	9	-17.55	8.7991	0.0335	-1.013	0.0333	41.18		231
Labidesthes	Brook	seines	All	Sep.	Q	7	-5.6869	3.19	0.0087	-0.328	0.0157	78.14		42

Table 3.8.2.1, Page 2 of 2

Species	Common name	Gear	Size	Period	Response	df	Intercept	Linear coef.	Linear P	Quad. Coef.	Quad. P	Adj-r^2	DW	D
sicculus	silverside		sizes	to Jun.										
Lepomis macrochirus	Bluegill	seines	<=35	Sep. to Jan.	Q	2	168.8059	-80.554	0.006	9.2276	0.0059	98.96		287
Eucinostomus gula	Silver jenny	seines	>=40	Jan. to Dec.	L	10	0.2573	0.549	0.0074	.	.	52.79		105
Eucinostomus harengulus	Tidewater mojarra	seines	>=40	Jan. to Dec.	L	10	4.387	-0.3909	0.0407	.	.	35.57		231
Orthopristis chrysoptera	Pigfish	trawls	All sizes	Jan. to Dec.	Q	9	1.0147	-0.5205	0.0093	0.0661	0.0047	80.11		126
Lagodon rhomboides	Pinfish	seines	<=35	Jan. to Jul.	L	5	-5.3375	1.9969	0.0002	.	.	94.54		238
Lagodon rhomboides	Pinfish	seines	36 to 70	Jan. to Dec.	Q	9	17.4419	-6.5555	0.0041	0.6598	0.0076	78.32		126
Lagodon rhomboides	Pinfish	trawls	<=35	Jan. to Jul.	L	5	-221.648	44.0493	0.0097	.	.	76.78		357
Lagodon rhomboides	Pinfish	trawls	36 to 70	Jan. to Dec.	Q	9	15.9777	-7.7155	0.0056	0.907	0.005	62.07	x	217
Leiostomus xanthurus	Spot	seines	<=30	Jan. to Apr.	L	2	-10.7586	3.2392	0.0007	.	.	99.87		189
Leiostomus xanthurus	Spot	seines	>=31	Feb. to Jul.	Q	3	-7.5057	8.0698	0.004	-1.277	0.0033	97.07		21
Leiostomus xanthurus	Spot	trawls	>=31	Feb. to Jul.	Q	3	7.194	-4.4229	0.023	0.6798	0.0136	98.5		161
Microgobius gulosus	Clown goby	seines	All sizes	Jul. to Dec.	L	4	3.0382	-0.4612	0.0471	.	.	66.77		35
Sphoeroides nephelus	Southern puffer	trawls	<=60	Oct. to Jul.	Q	7	-3.2803	1.6067	0.006	-0.181	0.0063	68.8		252

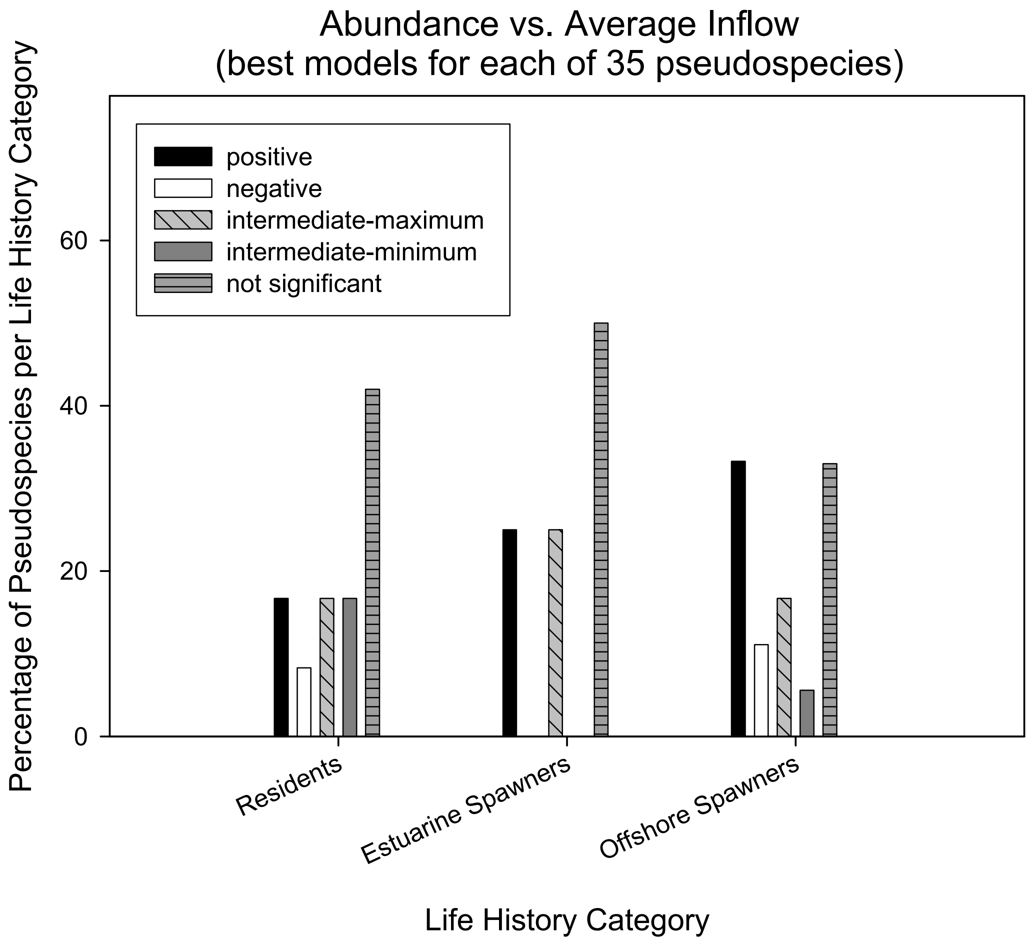

Fig. 3.8.2.1. Summary of regression results assessing abundance ($\overline{N}$) in relation to inflow. Positive and negative indicate increase and decrease in abundance with increasing inflow, respectively, while intermediate indicates maximum or minimum abundance at intermediate inflows.

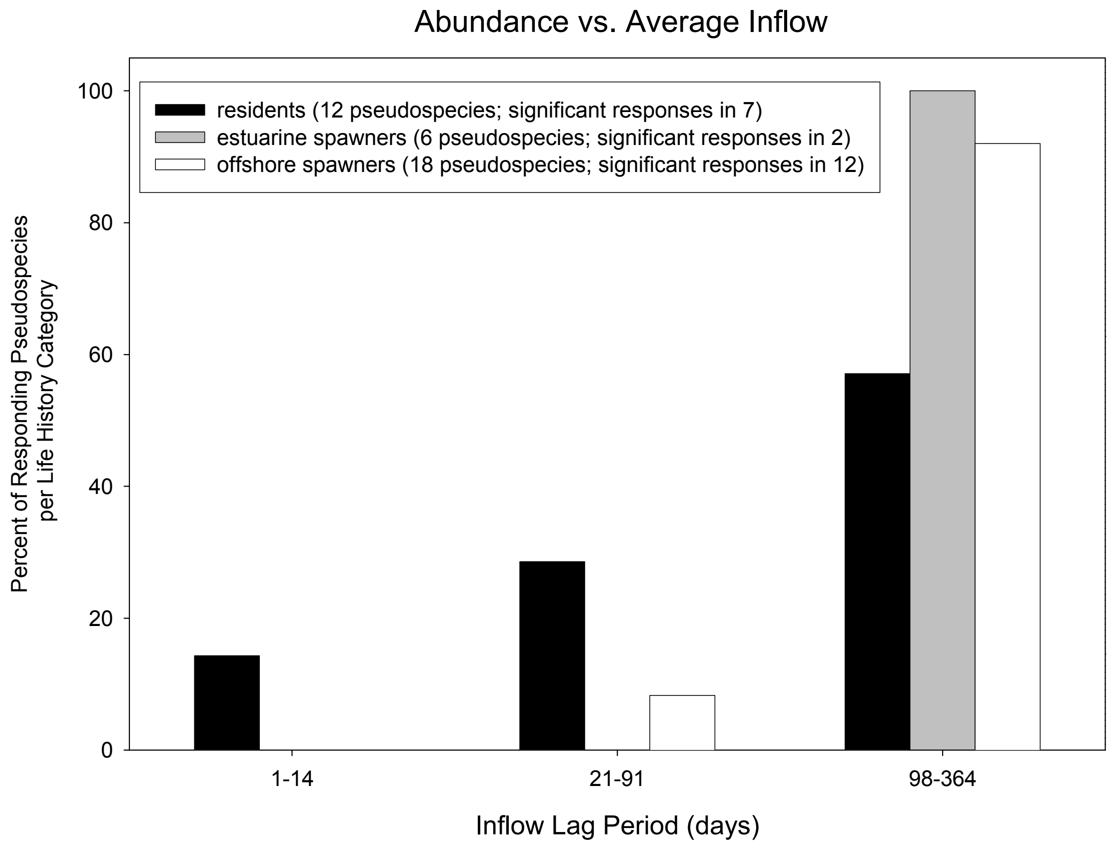

Fig. 3.8.2.2. Summary of regression results assessing abundance ($\overline{N}$) in relation to inflow and lag period.

4.0 CONCLUSIONS

4.1 Descriptive Observations

1.) **Dominant Catch.** Larval gobies and anchovies dominated the planktonic (larval) fish catch. Gobies of the genera *Gobiosoma* and *Microgobius* were dominant in comparable proportions, and the anchovies were dominated by the bay anchovy (*Anchoa mitchilli*). Other abundant larval fishes included silversides (*Menidia* spp.) and skilletfish (*Gobiesox strumosus*). Juvenile spot (*Leiostomus xanthurus*) were abundant in the plankton-net catch relative to other tidal rivers in west-central Florida. Seine fish collections were dominated by spot (*Leiostomus xanuthurus*), pinfish (*Lagodon rhomboides*), bay anchovy (*Anchoa mitchilli*), and eucinostomus mojarras (*Eucinostomus* spp.). Fish collections from deeper, trawled areas were also dominated by pinfish, spot, bay anchovy, and eucinostomus mojarras.

The plankton-net invertebrate catch was dominated by gammaridean amphipods, larval crabs, larval shrimps and by river-plume taxa such as the copepods *Acartia tonsa* and *Labidocera aestiva*, the chaetognaths *Sagitta* spp., the planktonic shrimp *Lucifer faxoni*, and the ostracod *Parasterope pollex*. The strong representation of river-plume taxa occurred because two stations were located in the river plume. Invertebrates collected by seines were dominated by daggerblade grass shrimp (*Palaemonetes pugio*) and brackish grass shrimp (*P. intermedius*); invertebrate trawl catches primarily consisted of arrow shrimp (*Tozeuma carolinense*), brackish grass shrimp, pink shrimp (*Farfantepenaeus duorarum*), and longtail grass shrimp (*Periclimenes longicaudatus*).

2.) **Use of Area as Spawning Habitat.** The eggs of unidentified herrings (clupeids), the bay anchovy (*Anchoa mitchilli*), the striped anchovy (*A. hepsetus*), silversides (*Menidia* spp.) and unidentified sciaenid fishes were collected from the survey area (Table A1). Sciaenid eggs were by far the most abundant egg type, followed by eggs of the bay anchovy – both types were most abundant in the Gulf of Mexico and in the lower part of the tidal river. If it is assumed that the relative abundances of different species of early-stage sciaenid larvae reflect relative spawning intensity, then the kingfishes (*Menticirrhus* spp.) are the sciaenids that are most likely to have spawned in this area. Blennies, the lined sole (*Achirus lineatus*) and the hogchoker (*Trinectes maculatus*) spawned near the river mouth, whereas skilletfish (*Gobiesox strumosus*) and gobies (primarily *Microgobius* spp. and *Gobiosoma* spp., but also *Bathygobius soporator*) may have spawned within the interior of the tidal river. The repeated collection of very small juveniles of live-bearing Gulf pipefish (*Syngnathus scovelli*) within the interior of the tidal river suggests that this species is also reproducing within the local area.

3.) **Use of Area as Nursery Habitat.** The number of estuary-dependent taxa using the study area as a nursery is somewhat greater than resident taxa: overall, six of the ten most abundant taxa in deeper habitats and seven of the ten most abundant taxa in nearshore habitats can be considered estuary-dependent. There are considerable differences in abundance: estuary-dependents constituted nearly 86% of the total abundance of the top ten most abundant taxa in seined areas, and over 83% of total abundance of top ten taxa in trawled areas. These dependents were mostly offshore spawners and included taxa of commercial importance (i.e., pink shrimp) and taxa of ecological importance due to high abundance (i.e., spot, pinfish, eucinostomus mojarras, tidewater mojarra, and silver jenny). The juvenile nursery habitats for selected species were characterized from seine and trawl data in terms of preference for shallower or deeper areas, zone of the study area, type of shoreline, and salinity (Appendices D and E). Distribution of fishes within the Anclote River Estuary as determined from this study compares very well with distributions noted in the same estuary by Szedlmayer (1991). The studies differ in that Szedlmayer (1991) observed dominance of the nearshore fish assemblages by residents (primarily silversides, which constituted nearly 80% of total catch), whereas we noted greater abundance of transient, estuary-dependent species.

4.) **Plankton Catch Seasonality.** Alteration of flows would appear to have the lowest potential for impacting many taxa during the period from December through March, which is the period when the fewest estuarine taxa were present. The highest potential to impact many species would appear to be from June through October. Some species were present throughout the year, whereas others had more seasonal spawning and recruitment patterns.

5.) **Seine and Trawl Catch Seasonality.** Based on seine or trawl collections, there were few clear seasonal patterns of taxon richness in the Anclote River estuarine system, undoubtedly due to the relatively short duration of sampling and the unusual hydrological conditions encountered. Monthly taxon richness in seined areas was quite variable—the longest single period of relatively high richness was from October–December; in deeper (trawled) habitats, the September–February period had greatest taxon richness. Overall abundances and abundances of newly recruiting nekton taxa indicate extensive use of the study area during all months, however. Thus, we tentatively conclude that the period from October to February appears to have the greatest potential for negative effects of anthropogenic change to the tidal river inflow, at least in terms of impacting the most species. There is no time of the year when inflow reduction would not have the potential to affect economically or ecologically important taxa, however.

4.2 Responses to Freshwater Inflow

1.) **Plankton Catch Distribution Responses.** Ten (26%) of the 38 plankton-net taxa evaluated for distribution responses to freshwater inflow exhibited significant responses. Nine of these were negative responses, wherein animals moved downstream as inflows increased. Downstream movement is the typical inflow response seen in tidal rivers on Florida's west coast. Overall, time lags for the responses were highly variable, with many occurring within a seasonal time frame.

2.) **Seine and Trawl Catch Distribution Responses.** Over one-half (56%) of the 32 pseudo-species/gear combinations (hereafter simply referred to as ‘pseudo-species’) evaluated for distributional responses to freshwater inflow exhibited significant response for at least one lagged flow period. The best-fitting models were widely dispersed among inflow lag periods. Responses to inflow within each life-history category were largely associated with different lag periods: short (0–14 days) for residents, medium (21–91 days) to long (98–364 days) for estuarine spawners, and long (98–364 days) for offshore spawners. The great majority of the best models that included long lag periods involved offshore spawners. Ninety-four percent of the significant responses were negative (i.e., animals moved upstream with decreasing freshwater inflow). The pseudo-species’ centers of abundance may have shifted downstream during periods of higher inflow because individuals were seeking areas with more suitable salinities or were following displaced prey, although some physical displacement during periods of extremely high flows cannot be discounted for smaller individuals.

3.) **Plankton Catch Abundance Responses.** Sixteen (42%) of the 38 plankton-net taxa evaluated for abundance relationships with freshwater inflow exhibited significant responses. All of these were positive responses. Several river-plume species had positive responses, including the ostracod *Sarsiella zostericola*, the copepod *Labidocera aestiva*, postlarvae of the shrimp *Hippolyte* spp., the chaetognaths *Sagitta* spp. and bay anchovy adults, *Anchoa mitchilli*. Organisms that typically congregate within the interiors of tidal rivers also had positive responses, including estuarine mysids (*Americamysis almyra* adults, *Americamysis* juveniles, *Bowmaniella dissimilis*), gammaridean amphipods, bay anchovy juveniles and polychaetes. Only two of the positive responders, dipteran pupae and chironomid larvae, belong to groups that are primarily freshwater groups. None of the time lags was short enough to be considered a catchability response (i.e., organisms fleeing the effects of sudden floods and thereby becoming more vulnerable to collection). A few lags were seasonal in nature, but most occurred over time frames that would be expected from true population responses.

4.) **Seine and Trawl Catch Abundance Responses.** Offshore and estuarine spawners tended to exhibit intermediate-maximum or positive responses to inflow, whereas tidal-river residents also showed intermediate-minimum responses to inflow. The majority of the best-fitting regression models incorporated longer lags for all life history categories, but this trend was most pronounced for estuarine and offshore spawners. An increase in abundance with increased flow may suggest beneficial aspects of increased nutrient input, for example, or perhaps better detection of the tidal-river nursery area. Intermediate-minimum relationships, where abundance is greatest at either low or high flows and least at intermediate flows, are difficult to explain in ecological terms. Intermediate-maximum relationships, which are opposite in nature to intermediate-minimum relationships, perhaps indicate differing forces operating at opposite ends of the inflow spectrum. At low flows, opportunities for either chemical detection of tidal nursery habitats or selective tidal-stream transport may be reduced, and at high flows, physical displacement may occur, or perhaps undesirable properties of fresher water (e.g., low pH) become more prominent.

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Appendix A:

Plankton data summary tables

Table A1, page 1 of 5.

Plankton-net catch statistics (October 2004 through September 2005, n=144 samples)

Organisms are listed in phylogenetic order.

Taxon	Common Name	Number Collected	Collection Frequency	*Kmu* (km)	*Su* (psu)	Mean CPUE (No./10^3 m^3)	Max CPUE (No./10^3 m^3)
foraminiferans	foraminiferans	42	13	0.4	29.1	3.79	232.77
Liriope tetraphylla	hydromedusa	11	4	2.7	27.2	1.09	88.39
Clytia sp.	hydromedusa	462	19	11.2	12.3	35.82	2435.29
medusa sp. a	hydromedusa	166	6	7.7	7.3	14.16	1453.15
medusa sp. c	hydromedusa	17	5	1.5	27.9	1.68	88.39
medusa sp. d	hydromedusa	16	3	4.1	17.9	1.52	116.63
medusa sp. e	hydromedusa	43	7	7.1	14.0	3.60	240.32
medusa, Bougainvillia sp.	hydromedusa	12	7	0.7	27.0	0.93	71.35
medusa, Obelia sp.	hydromedusa	5	3	-0.8	32.2	0.42	28.61
Mnemiopsis mccradyi	comb jelly, ctenophore	79	5	9.5	16.8	6.35	421.96
Beroe ovata	sea walnut, ctenophore	1	1	4.5	21.2	0.08	12.84
turbellarians	flatworms	8	5	2.3	23.2	0.69	27.70
nemerteans	ribbon worms	2	2	14.2	2.1	0.16	13.72
nematodes	roundworms, threadworms	114	28	2.4	24.6	9.78	197.58
polychaetes	sand worms, tube worms	2541	115	8.3	12.4	219.59	13701.21
oligochaetes	freshwater worms	65	16	12.1	3.9	4.95	328.89
hirudinoideans	leeches	5	4	10.1	4.1	0.42	29.97
Simocephalus vetulus	water flea	1363	17	14.2	0.3	107.39	9473.81
Grimaldina brazzai	water flea	1	1	12.3	0.1	0.08	12.18
Ilyocryptus sp.	water flea	157	6	13.1	0.1	12.37	1177.01
Sida crystallina	water flea	5	5	11.2	4.6	0.40	13.02
Latona setifera	water flea	9	2	15.1	0.1	0.74	106.37
Penilia avirostris	water flea	30	6	1.7	25.8	2.54	153.65
Latonopsis fasciculata	water flea	46	5	13.4	0.2	3.71	399.75
Euryalona occidentalis	water flea	8	2	14.6	0.1	0.63	74.30
Leydigia sp.	water flea	2	2	12.8	0.2	0.17	14.10
Evadne tergestina	water flea	16	3	-0.1	28.3	1.32	125.71
decapod zoeae	crab larvae	129227	135	3.3	22.4	10573.71	84175.05
decapod mysis	shrimp larvae	33773	132	8.7	10.7	2819.44	64863.87
decapod megalopae	post-zoea crab larvae	2944	82	0.7	24.5	252.88	5005.17
shrimps, unidentified postlarvae	shrimps	16	4	-0.4	29.6	1.55	139.33
penaeid postlarvae	penaeid shrimps	3	1	-1.0	29.0	0.22	35.68
penaeid metamorphs	penaeid shrimps	75	18	0.3	25.0	7.61	436.69
Farfantepenaeus duorarum juveniles	pink shrimp	17	10	1.6	21.5	1.56	63.17
Lucifer faxoni mysis	shrimp	78	8	-0.3	29.5	7.78	487.98
Lucifer faxoni juveniles and adults	shrimp	7921	62	1.1	22.9	656.01	24712.61
Palaemon floridanus adults	Florida grass shrimp	1	1	-1.8	22.4	0.08	12.67
Palaemonetes spp. postlarvae	grass shrimp	201	41	2.5	23.4	17.32	231.34
Palaemonetes pugio juveniles	daggerblade grass shrimp	31	18	9.8	11.5	2.56	132.29
Palaemonetes pugio adults	daggerblade grass shrimp	5	4	6.5	18.9	0.39	26.69
Palaemonetes vulgaris adults	grass shrimp	1	1	-1.0	29.8	0.09	15.07
Periclimenes longicaudatus juveniles	longtail grass shrimp	27	11	0.3	27.9	2.51	94.45
alphaeid postlarvae	snapping shrimps	217	26	0.2	25.8	20.46	769.41
alphaeid juveniles	snapping shrimps	3	3	3.3	18.2	0.25	14.18
Alpheus viridari juveniles	snapping shrimp	1	1	-1.8	24.8	0.07	11.07
Hippolyte zostericola postlarvae	zostera shrimp	5038	66	-0.4	28.6	451.38	8900.17
Hippolyte zostericola juveniles	zostera shrimp	143	29	1.0	26.9	13.21	795.51
Hippolyte zostericola adults	zostera shrimp	9	4	1.9	24.0	0.75	53.04
Thor sp. juveniles	shrimp	1	1	1.7	20.0	0.09	14.85
Latreutes parvulus postlarvae	sargassum shrimp	2	1	-1.8	24.8	0.14	22.14
Tozeuma carolinense postlarvae	arrow shrimp	7	2	-1.2	26.0	0.62	73.82
Tozeuma carolinense juveniles	arrow shrimp	253	14	-1.2	32.1	23.16	2255.52
Tozeuma carolinense adults	arrow shrimp	85	6	-1.2	30.0	9.69	935.77
processid postlarvae	night shrimps	147	18	-0.5	30.8	12.58	534.96
Ambidexter symmetricus postlarvae	shrimp	122	12	0.2	23.9	11.48	400.93
Ambidexter symmetricus juveniles	shrimp	26	9	0.1	28.6	2.34	133.63
Callianassa spp. juveniles	ghost shrimps	1	1	8.9	0.4	0.08	12.90
Upogebia spp. postlarvae	mud shrimps	21	7	-0.5	26.0	1.81	118.12
Upogebia spp. juveniles	mud shrimps	26	11	4.8	18.1	2.15	65.65
paguroid megalops larvae	hermit crabs	36	4	-0.6	28.8	3.31	191.53
paguroid juveniles	hermit crabs	828	24	-1.1	30.6	65.38	3289.10

Plankton-net catch statistics (October 2004 through September 2005, n=144 samples)

Organisms are listed in phylogenetic order.

Taxon	Common Name	Number Collected	Collection Frequency	*Kmu* (km)	*Su* (psu)	Mean CPUE (No./10^3 m^3)	Max CPUE (No./10^3 m^3)
Callinectes sapidus juveniles	blue crab	146	29	4.7	17.4	12.75	468.55
Callinectes sapidus adults	blue crab	1	1	0.3	26.9	0.09	13.68
Portunus sp. juveniles	swimming crab	9	5	1.5	22.6	0.85	59.40
Pinnixa sp. a juveniles	pea crab	4	1	1.7	20.0	0.37	59.40
Pinnixa sayana juveniles	pea crab	2	2	-1.0	28.8	0.16	14.30
unidentified Americamysis juveniles	opossum shrimps, mysids	3384	82	8.8	8.6	281.92	8649.70
Americamysis almyra	opossum shrimp, mysid	8024	88	8.8	8.4	664.82	23200.90
Americamysis bahia	opossum shrimp, mysid	1	1	1.7	21.5	0.07	11.63
Americamysis stucki	opossum shrimp, mysid	220	15	0.4	26.4	19.73	826.81
Bowmaniella dissimilis	opossum shrimp, mysid	7303	114	7.4	12.6	609.90	14156.79
Mysidopsis mortenseni	opossum shrimp, mysid	2	1	1.7	26.6	0.15	24.22
Taphromysis bowmani	opossum shrimp, mysid	403	48	10.2	10.3	33.01	1047.62
cumaceans	cumaceans	6421	107	4.1	23.3	532.62	14862.52
Sinelobus stanfordi	tanaid	36	18	10.8	7.4	2.88	64.48
Apseudes sp.	tanaid	28	10	3.5	23.7	2.45	103.93
Hargeria rapax	tanaid	325	50	4.1	21.2	27.07	429.02
Cyathura polita	isopod	27	13	6.2	12.8	2.31	84.87
Xenanthura brevitelson	isopod	29	13	4.2	20.1	2.40	73.44
Munna reynoldsi	isopod	655	22	14.8	0.7	57.76	7442.85
Anopsilana jonesi	isopod	2	2	7.9	4.2	0.16	13.79
cymothoid sp. a (Lironeca) juveniles	isopod	94	44	4.5	19.7	7.65	113.41
Cassidinidea ovalis	isopod	27	17	6.6	17.5	2.22	65.65
Harrieta faxoni	isopod	202	29	0.9	29.4	17.30	696.66
Sphaeroma quadridentata	isopod	20	9	2.8	21.5	1.73	89.08
Sphaeroma terebrans	isopod	228	30	12.7	4.3	18.66	705.06
Sphaeroma walkeri	isopod	1	1	4.5	21.7	0.08	12.33
Edotea triloba	isopod	2719	82	7.3	7.3	210.45	17139.52
Erichsonella attenuata	isopod	104	28	2.6	26.3	8.75	375.03
Erichsonella filiforme	isopod	1	1	-1.0	24.6	0.07	11.80
amphipods, gammaridean	amphipods	235817	143	5.4	17.5	20147.91	552672.94
amphipods, caprellid	skeleton shrimps	295	53	1.0	27.1	25.98	393.53
cirriped nauplius stage	barnacles	76	13	-0.4	26.7	7.75	583.15
branchiurans, Argulus spp.	fish lice	136	39	0.5	25.6	12.47	316.57
Alteutha sp.	copepod	1	1	6.0	23.6	0.09	13.81
unidentified harpacticoids	copepods	272	42	0.7	27.5	24.13	506.30
siphonostomatids	parasitic copepods	198	31	0.4	29.1	16.89	528.08
Monstrilla sp.	copepod	5	3	0.0	30.7	0.45	30.33
Macrocyclops albidus	copepods	29	13	13.6	1.0	2.33	75.94
Mesocyclops edax	copepod	40	14	13.3	1.4	3.22	111.46
Oithona spp.	copepods	32	5	-1.2	25.3	2.96	236.23
Orthocyclops modestus	copepod	12	9	13.3	1.0	0.95	25.44
Saphirella spp.	copepods	36	16	10.7	6.2	3.00	104.91
paracalanids	copepods	21	4	-0.4	25.5	1.75	135.84
Acartia tonsa	copepod	27575	96	-0.6	28.4	2367.36	40528.43
Calanopia americana	copepod	854	28	0.9	29.2	75.45	2358.40
Centropages hamatus	copepod	17	8	-0.2	22.4	1.32	62.95
Centropages velificatus	copepod	93	18	0.9	27.8	8.16	214.06
Diaptomus spp.	copepods	2	2	11.1	2.4	0.18	14.99
Eucalanus sp.	copepod	3	2	1.8	25.7	0.25	28.02
Eurytemora affinis	copepod	8	6	14.3	1.5	0.65	38.20
Labidocera aestiva	copepod	6070	78	-0.1	25.8	510.65	16639.60
Osphranticum labronectum	copepod	2	1	12.3	5.4	0.15	24.74
Pseudodiaptomus coronatus	copepod	153	38	3.4	20.6	13.21	920.65
Temora turbinata	copepod	88	18	-0.2	27.2	7.60	293.33
myodocopod sp. a	ostracod, seed shrimp	22	7	-1.0	26.9	2.03	118.12
Euconchoecia chierchiae	ostracod, seed shrimp	1	1	1.7	25.2	0.08	13.26
Sarsiella zostericola	ostracod, seed shrimp	155	31	1.5	28.6	13.00	495.58
Parasterope pollex	ostracod, seed shrimp	2689	62	1.0	26.9	222.13	6055.12
ostracods, podocopid	ostracods, seed shrimps	97	34	7.8	14.1	7.95	173.50
collembolas, podurid	springtails	3	3	12.6	1.8	0.24	13.02
ephemeropteran larvae	mayflies	67	12	13.7	0.7	5.49	172.85

Table A1, page 3 of 5.

Plankton-net catch statistics (October 2004 through September 2005, n=144 samples)

Organisms are listed in phylogenetic order.

Taxon	Common Name	Number Collected	Collection Frequency	*Kmu* (km)	*Su* (psu)	Mean CPUE (No./10^3 m^3)	Max CPUE (No./10^3 m^3)
odonates, anisopteran larvae	dragonflies	1	1	15.1	0.1	0.08	12.38
odonates, zygopteran larvae	damselflies	9	4	12.0	2.5	0.74	49.48
hemipterans, corixid adults	water boatmen	1	1	13.3	0.1	0.08	12.66
hemipterans, gerrid adults	water striders	2	1	15.1	0.2	0.18	28.90
coleopterans, curculionid adults	beetles	1	1	15.1	0.3	0.09	14.10
coleopterans, elmid larvae	riffle beetles	2	1	15.1	3.0	0.17	26.45
coleopterans, elmid adults	riffle beetles	6	2	11.2	0.2	0.47	49.83
coleopterans, gyrinid larvae	whirligig beetles	2	1	15.1	0.1	0.16	25.44
coleopterans, dytiscid adults	predaceous diving beetles	1	1	6.0	22.0	0.09	14.38
dipterans, pupae	flies, mosquitoes	393	32	13.6	1.2	31.74	804.96
dipterans, ceratopogonid larvae	biting midges	4	3	13.3	2.7	0.31	24.74
dipteran, Chaoborus punctipennis larvae	phantom midge	105	18	11.1	3.3	8.25	298.96
dipterans, chironomid larvae	midges	425	43	13.4	3.2	34.64	1005.08
dipterans, sciomyzid larvae	marsh flies	1	1	15.1	3.0	0.08	13.22
trichopteran larvae	caddisflies	22	8	14.2	0.2	1.79	72.26
pycnogonids	sea spiders	534	16	3.0	28.6	45.37	3308.33
Limulus polyphemus larvae	horsehoe crab	116	17	4.7	25.0	10.25	576.74
acari	water mites	36	12	12.5	3.3	2.91	193.52
gastropods, prosobranch	snails	1066	80	3.8	21.3	93.23	3599.00
gastropods, opisthobranch	sea slugs	120	39	2.2	23.5	9.97	311.46
pelecypods	clams, mussels, oysters	881	67	6.0	17.8	75.61	3918.66
ophiopluteus larvae	brittlestars	12	2	-1.6	29.5	0.96	109.23
ophiuroidean juveniles	brittlestars	10	5	-0.9	30.1	0.90	53.72
brachiopod, Glottidia pyramidata larvae	lamp shell	18	6	-0.2	27.1	1.59	59.40
chaetognaths, sagittid	arrow worms	9752	95	-0.0	27.3	830.56	18088.49
ascidiacean larvae	tunicate larvae	2	2	-1.8	32.4	0.17	14.46
appendicularian, Oikopleura dioica	larvacean	9055	33	-0.7	30.0	801.50	36804.95
Branchiostoma floridae	lancelet	2	1	0.3	29.2	0.19	29.70
Elops saurus postflexion larvae	ladyfish	28	15	6.0	17.0	2.26	79.11
Elops saurus juveniles	ladyfish	1	1	10.1	11.0	0.09	13.85
Myrophis punctatus postflexion larvae	speckled worm eel	21	2	-1.1	21.9	1.53	219.56
Myrophis punctatus metamorphs	speckled worm eel	2	2	-1.4	22.2	0.15	12.67
Myrophis punctatus juveniles	speckled worm eel	8	4	4.3	21.0	0.63	51.37
clupeid eggs	herrings	14	4	-1.6	28.0	1.11	74.80
clupeid preflexion larvae	herrings	20	3	-1.6	29.7	1.64	192.92
Brevoortia spp. flexion larvae	menhaden	2	1	-1.0	21.9	0.14	23.11
Brevoortia spp. postflexion larvae	menhaden	42	13	9.0	12.5	3.37	103.48
Brevoortia spp. metamorphs	menhaden	8	7	6.9	14.0	0.65	25.18
Harengula jaguana postflexion larvae	scaled sardine	96	5	2.4	19.2	7.40	547.24
Harengula jaguana metamorphs	scaled sardine	1	1	2.9	17.6	0.08	12.73
Opisthonema oglinum juveniles	Atlantic thread herring	1	1	1.7	20.0	0.09	14.85
Anchoa spp. preflexion larvae	anchovies	133	25	1.1	24.0	10.95	356.77
Anchoa spp. flexion larvae	anchovies	103	15	1.4	22.3	8.39	244.33
Anchoa spp. juveniles	anchovies	1	1	4.5	14.1	0.09	14.09
Anchoa hepsetus eggs	striped anchovy	1	1	0.3	24.3	0.07	11.74
Anchoa mitchilli eggs	bay anchovy	465	13	0.4	27.5	36.93	4864.68
Anchoa mitchilli postflexion larvae	bay anchovy	92	27	4.0	16.0	7.75	190.35
Anchoa mitchilli juveniles	bay anchovy	1246	68	11.0	7.0	101.73	2470.17
Anchoa mitchilli adults	bay anchovy	101	39	6.8	12.3	8.20	149.86
Notemigonus crysoleucas flexion larvae	golden shiner	1	1	10.1	1.4	0.08	13.35
Synodus foetens juveniles	inshore lizardfish	3	3	1.1	21.1	0.24	14.64
Gobiesox strumosus preflexion larvae	skilletfish	138	39	7.1	18.9	11.17	231.78
Gobiesox strumosus flexion larvae	skilletfish	15	6	8.9	18.4	1.23	91.91
Lucania parva postflexion larvae	rainwater killifish	1	1	10.1	0.9	0.09	14.99
Lucania parva adults	rainwater killifish	1	1	2.9	17.6	0.08	12.73
Gambusia holbrooki juveniles	eastern mosquitofish	2	1	13.3	0.1	0.16	25.31
Heterandria formosa juveniles	least killifish	1	1	15.1	0.1	0.08	12.72
Menidia spp. eggs	silversides	1	1	-1.0	32.6	0.08	13.54
Menidia spp. preflexion larvae	silversides	149	39	10.0	11.3	11.61	320.41
Menidia spp. flexion larvae	silversides	8	5	6.5	15.2	0.64	26.70
Menidia spp. postflexion larvae	silversides	1	1	4.5	26.3	0.08	13.51

Plankton-net catch statistics (October 2004 through September 2005, n=144 samples)

Organisms are listed in phylogenetic order.

Taxon	Common Name	Number Collected	Collection Frequency	*Kmu* (km)	*Su* (psu)	Mean CPUE (No./10^3 m^3)	Max CPUE (No./10^3 m^3)
Menidia spp. juveniles	silversides	6	5	14.5	1.5	0.49	26.59
Menidia spp. adults	silversides	1	1	15.1	4.0	0.09	13.72
Membras martinica preflexion larvae	rough silverside	7	5	3.0	24.4	0.49	24.70
fish eggs, percomorph	sciaenid eggs (primarily)	19995	46	0.8	26.8	1668.89	47274.78
Hippocampus erectus juveniles	lined seahorse	1	1	-1.0	29.8	0.09	15.07
Hippocampus erectus adults	lined seahorse	1	1	-1.8	25.3	0.10	16.66
Hippocampus zosterae juveniles	dwarf seahorse	1	1	-1.8	25.3	0.10	16.66
Syngnathus floridae juveniles	dusky pipefish	7	6	2.7	23.4	0.59	28.92
Syngnathus floridae adults	dusky pipefish	1	1	-1.8	33.0	0.09	14.46
Syngnathus louisianae juveniles	chain pipefish	3	1	-1.8	30.1	0.39	62.38
Syngnathus scovelli juveniles	gulf pipefish	15	8	2.9	22.5	1.34	73.44
Prionotus spp. preflexion larvae	searobins	1	1	-1.0	32.6	0.08	13.54
Prionotus tribulus juveniles	bighead searobin	2	2	6.5	17.5	0.17	13.54
Lepomis spp. flexion larvae	sunfishes	1	1	15.1	0.1	0.08	13.30
Oligoplites saurus preflexion larvae	leatherjack	3	2	0.5	25.0	0.22	23.27
Oligoplites saurus flexion larvae	leatherjack	1	1	1.7	21.5	0.07	11.63
Oligoplites saurus postflexion larvae	leatherjack	1	1	1.7	27.0	0.09	14.29
Oligoplites saurus juveniles	leatherjack	1	1	8.9	10.6	0.08	12.95
gerreid preflexion larvae	mojjaras	2	1	4.5	20.0	0.18	29.38
Eucinostomus spp. postflexion larvae	mojarras	29	9	4.6	22.0	2.54	144.19
Eucinostomus spp. juveniles	mojarras	43	8	5.1	10.7	3.75	164.29
Orthopristis chrysoptera flexion larvae	pigfish	1	1	4.5	19.8	0.08	13.19
Orthopristis chrysoptera postflexion larvae	pigfish	1	1	-1.8	27.0	0.08	12.47
Orthopristis chrysoptera juveniles	pigfish	3	1	-1.0	21.9	0.22	34.67
Archosargus probatocephalus postflexion larva	sheepshead	2	1	-1.8	27.0	0.16	24.93
Lagodon rhomboides postflexion larvae	pinfish	14	5	1.5	26.7	1.25	92.88
Lagodon rhomboides juveniles	pinfish	102	18	3.0	21.0	8.19	323.57
Bairdiella chrysoura flexion larvae	silver perch	1	1	1.7	21.5	0.07	11.63
Cynoscion arenarius preflexion larvae	sand seatrout	3	2	-0.1	28.1	0.23	24.70
Cynoscion nebulosus preflexion larvae	spotted seatrout	1	1	-1.8	33.0	0.09	14.46
Cynoscion nebulosus juveniles	spotted seatrout	1	1	10.1	1.4	0.08	13.35
Leiostomus xanthurus postflexion larvae	spot	3	3	5.4	16.1	0.24	13.19
Leiostomus xanthurus juveniles	spot	241	13	6.7	15.3	19.42	843.48
Menticirrhus spp. preflexion larvae	kingfishes	72	9	-0.1	28.0	5.82	251.42
Menticirrhus spp. flexion larvae	kingfishes	11	6	0.6	25.5	0.85	35.68
Menticirrhus spp. postflexion larvae	kingfishes	5	3	4.3	11.3	0.42	29.28
Sciaenops ocellatus flexion larvae	red drum	2	1	4.5	14.0	0.18	28.29
Sciaenops ocellatus postflexion larvae	red drum	4	3	3.8	12.5	0.33	25.27
Mugil cephalus juveniles	striped mullet	4	4	7.9	12.6	0.31	12.93
Mugil curema juveniles	white mullet	2	1	6.0	23.6	0.17	27.62
blenniid preflexion larvae	blennies	82	29	0.9	25.7	6.52	165.23
Hypsoblennius spp. postflexion larvae	blennies	1	1	-1.0	32.2	0.09	14.30
gobiid preflexion larvae	gobies	1249	79	7.3	14.1	101.73	1083.96
gobiid flexion larvae	gobies	382	52	4.1	21.8	31.48	503.85
gobiid postflexion larvae	gobies	6	2	2.1	18.7	0.55	59.40
Bathygobius soporator preflexion larvae	frillfin goby	7	6	4.1	23.8	0.57	25.20
Bathygobius soporator flexion larvae	frillfin goby	1	1	2.9	23.6	0.08	12.60
Gobionellus spp. postflexion larvae	gobies	2	2	3.7	21.4	0.16	13.54
Gobionellus oceanicus juveniles	highfin goby	1	1	6.0	5.2	0.08	12.64
Gobiosoma spp. postflexion larvae	gobies	361	44	2.8	21.2	29.62	773.01
Gobiosoma bosc juveniles	naked goby	2	1	4.5	14.1	0.18	28.18
Gobiosoma robustum juveniles	code goby	2	2	4.5	13.0	0.18	14.18
Microgobius spp. flexion larvae	gobies	352	42	6.9	17.0	29.20	652.99
Microgobius spp. postflexion larvae	gobies	222	28	7.1	12.4	18.49	493.12
Microgobius spp. juveniles	gobies	20	1	4.5	20.0	1.84	293.76
Microgobius gulosus juveniles	clown goby	21	9	10.3	5.9	1.69	91.13
Paralichthys spp. juveniles	flounders	15	5	0.9	21.4	1.17	64.67
Achirus lineatus preflexion larvae	lined sole	70	12	-0.5	28.3	5.45	321.10
Achirus lineatus flexion larvae	lined sole	8	6	0.3	27.4	0.66	28.23
Achirus lineatus postflexion larvae	lined sole	4	3	0.9	27.0	0.31	24.22
Trinectes maculatus preflexion larvae	hogchoker	28	7	-0.2	26.8	2.27	107.03

Plankton-net catch statistics (October 2004 through September 2005, n=144 samples)

Organisms are listed in phylogenetic order.

Taxon	Common Name	Number Collected	Collection Frequency	*Kmu* (km)	*Su* (psu)	Mean CPUE (No./10^3 m^3)	Max CPUE (No./10^3 m^3)
Trinectes maculatus flexion larvae	hogchoker	5	3	1.0	24.7	0.47	35.81
Trinectes maculatus postflexion larvae	hogchoker	15	7	4.9	13.7	1.28	99.26
Trinectes maculatus juveniles	hogchoker	14	7	11.8	7.2	1.20	82.34
Monacanthus hispidus juveniles	planehead filefish	3	3	-0.6	30.2	0.32	20.79
Chilomycterus schoepfi juveniles	striped burrfish	1	1	6.0	20.0	0.09	13.68
unidentified preflexion larvae	fish	2	1	-1.0	32.6	0.17	27.08

Table A2. Page 1 of 6.

Anclote River plankton net catch by month (October 2004 to September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (12)	Feb (12)	Mar (12)	Apr (12)	May (12)	Jun (12)	Jul (12)	Aug (12)	Sep (12)	Oct (12)	Nov (12)	Dec (12)
foraminiferans	foraminiferans		4	1			4		23	5		3	2
Liriope tetraphylla	hydromedusa											11	
Clytia sp.	hydromedusa	4		1	13				1	418	3	22	
medusa sp. a	hydromedusa				2				156	5		3	
medusa sp. c	hydromedusa										2	15	
medusa sp. d	hydromedusa									6	10		
medusa sp. e	hydromedusa							5	21	17			
medusa, Bougainvillia sp.	hydromedusa							8	1	3			
medusa, Obelia sp.	hydromedusa						2		1	2			
Mnemiopsis mccradyi	comb jelly, ctenophore						2			77			
Beroe ovata	sea walnut, ctenophore	1											
turbellarians	flatworms	3				4			1				
nemerteans	ribbon worms									1	1		
nematodes	roundworms, threadworms	4	33	17	2	4	9		8	17		9	11
polychaetes	sand worms, tube worms	45	132	68	111	58	90	295	91	124	149	131	1247
oligochaetes	freshwater worms		11	3			1	3	15	2	29	1	
hirudinoideans	leeches	1						3	1				
Simocephalus vetulus	water flea	1		5			10	842	356		146		3
Grimaldina brazzai	water flea										1		
Ilyocryptus sp.	water flea							1	26		130		
Sida crystallina	water flea			1				2	1		1		
Latona setifera	water flea							1	8				
Penilia avirostris	water flea						2	20				8	
Latonopsis fasciculata	water flea								41		5		
Euryalona occidentalis	water flea							8					
Leydigia sp.	water flea										1		1
Evadne tergestina	water flea					1		15					
decapod zoeae	crab larvae	188	6319	22432	16225	11616	12724	16230	6080	29973	4288	2854	298
decapod mysis	shrimp larvae	161	241	291	2202	4479	14623	9187	292	1043	1062	137	55
decapod megalopae	post-zoea crab larvae	37			399	134	257	523	251	32	1029	239	43
shrimps, unidentified postlarvae	shrimps											4	12
penaeid postlarvae	penaeid shrimps							3					
penaeid metamorphs	penaeid shrimps	6				1	3			2	28	25	10
Farfantepenaeus duorarum juveniles	pink shrimp							3			9	5	
Lucifer faxoni mysis	shrimp							5				73	
Lucifer faxoni juveniles and adults	shrimp	28	12	3	1	31	142	6575	1	31	450	385	262
Palaemon floridanus adults	Florida grass shrimp	1											
Palaemonetes spp. postlarvae	grass shrimp	4		1		6	45	27	31	53	28	6	
Palaemonetes pugio juveniles	daggerblade grass shrimp	2						1		5	5	16	2
Palaemonetes pugio adults	daggerblade grass shrimp	1				2			1			1	
Palaemonetes vulgaris adults	grass shrimp											1	
Periclimenes longicaudatus juveniles	longtail grass shrimp	4				3						11	9
alphaeid postlarvae	snapping shrimps				2		11	64	3	15	66	53	3
alphaeid juveniles	snapping shrimps							1	1		1		
Alpheus viridari juveniles	snapping shrimp				1								
Hippolyte zostericola postlarvae	zostera shrimp	9	11	108	46	114	395	934	436	459	706	556	1264
Hippolyte zostericola juveniles	zostera shrimp	20		12	8	10	14	6	1	9		58	5
Hippolyte zostericola adults	zostera shrimp				2	4	2		1				

Table A2. Page 2 of 6.

Anclote River plankton net catch by month (October 2004 to September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (12)	Feb (12)	Mar (12)	Apr (12)	May (12)	Jun (12)	Jul (12)	Aug (12)	Sep (12)	Oct (12)	Nov (12)	Dec (12)
Thor sp. juveniles	shrimp										1		
Latreutes parvulus postlarvae	sargassum shrimp				2								
Tozeuma carolinense postlarvae	arrow shrimp							2			5		
Tozeuma carolinense juveniles	arrow shrimp						11			210		23	9
Tozeuma carolinense adults	arrow shrimp									4		81	
processid postlarvae	night shrimps					2	16	36	13	80			
Ambidexter symmetricus postlarvae	shrimp				2			1			85	17	17
Ambidexter symmetricus juveniles	shrimp					3	2	6		13		2	
Callianassa spp. juveniles	ghost shrimps										1		
Upogebia spp. postlarvae	mud shrimps							8		1	11	1	
Upogebia spp. juveniles	mud shrimps				1		1	3	3	9	9		
paguroid megalops larvae	hermit crabs					14							22
paguroid juveniles	hermit crabs				15	8	123	314	292	76			
Callinectes sapidus juveniles	blue crab	30	1			1	3			6	75	16	14
Callinectes sapidus adults	blue crab					1							
Portunus sp. juveniles	swimming crab										5	4	
Pinnixa sp. a juveniles	pea crab										4		
Pinnixa sayana juveniles	pea crab				1		1						
unidentified Americamysis juveniles	opossum shrimps, mysids	484	15	55	219	80	207	1225	596	228	54	46	175
Americamysis almyra	opossum shrimp, mysid	338	11	31	241	69	2232	2884	350	146	1333	36	353
Americamysis bahia	opossum shrimp, mysid							1					
Americamysis stucki	opossum shrimp, mysid						3		5	105	107		
Bowmaniella dissimilis	opossum shrimp, mysid	146	102	123	690	149	380	601	1939	1593	906	281	393
Mysidopsis mortenseni	opossum shrimp, mysid						2						
Taphromysis bowmani	opossum shrimp, mysid	41	2	5	5	9	132	70	73	66			
cumaceans	cumaceans	113	264	196	1198	256	324	394	416	3023	122	79	36
Sinelobus stanfordi	tanaid	1	4	1			4	6	12	2		5	1
Apseudes sp.	tanaid						3	4	3	18			
Hargeria rapax	tanaid	2	8	3	55	48	21	50	3	55	13	11	56
Cyathura polita	isopod					1	7	5	6	2	6		
Xenanthura brevitelson	isopod		1		5	6	10	3	2	2			
Munna reynoldsi	isopod		1	7	1	5	516	85	20	3	1	3	13
Anopsilana jonesi	isopod								1		1		
cymothoid sp. a (Lironeca) juveniles	isopod	2		5	22	13	25	9		6	4	2	6
Cassidinidea ovalis	isopod		1		1		5		3	10	4	1	2
Harrieta faxoni	isopod				1	5	10	26	24	130		4	2
Sphaeroma quadridentata	isopod		1		2	5	2	7				3	
Sphaeroma terebrans	isopod				7	11	62	122	7	9	8	2	
Sphaeroma walkeri	isopod				1								
Edotea triloba	isopod	5	3	5	37	64	185	2094	25	217	24	13	47
Erichsonella attenuata	isopod	1	3		3	4	6	8	7	64	5		3
Erichsonella filiforme	isopod				1								
amphipods, gammaridean	amphipods	1174	1094	2158	14220	10201	10707	33955	5963	29514	69965	18193	38673
amphipods, caprellid	skeleton shrimps	4	12	10	24	18	69	14	8	40		49	47
cirriped nauplius stage	barnacles						4			1	42	26	3
branchiurans, Argulus spp.	fish lice	13	11	5	4		1	3	3	6	41	39	10
Alteutha sp.	copepod											1	
unidentified harpacticoids	copepods	11	87	11		14	4	1	4	16	5	62	57

Table A2. Page 3 of 6.

Anclote River plankton net catch by month (October 2004 to September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (12)	Feb (12)	Mar (12)	Apr (12)	May (12)	Jun (12)	Jul (12)	Aug (12)	Sep (12)	Oct (12)	Nov (12)	Dec (12)
siphonostomatids	parasitic copepods					14	18	37	6	123			
Monstrilla sp.	copepod						1			2			2
Macrocyclops albidus	copepods	2		1	2			8	7		9		
Mesocyclops edax	copepod	1					2	12	9	1	13		2
Oithona spp.	copepods							3		2	27		
Orthocyclops modestus	copepod							4	2		6		
Saphirella spp.	copepods	1			2			18	5	2	1	4	3
paracalanids	copepods	2	11								8		
Acartia tonsa	copepod	1380	5678	1633	9	2255	2090	3720	196	4635	2331	2124	1524
Calanopia americana	copepod					1	16	6	301	501	2	22	5
Centropages hamatus	copepod	10	2	4							1		
Centropages velificatus	copepod					3	4	40				34	12
Diaptomus spp.	copepods			1				1					
Eucalanus sp.	copepod	1										2	
Eurytemora affinis	copepod	1	1	3					1		1	1	
Labidocera aestiva	copepod	42	59	97	7	103	506	3018	26	247	1724	168	73
Osphranticum labronectum	copepod							2					
Pseudodiaptomus coronatus	copepod	1	5	5	9	10	3	7	3	26	72	10	2
Temora turbinata	copepod					18	3	45		2	12	8	
myodocopod sp. a	ostracod, seed shrimp				1					7	14		
Euconchoecia chierchiae	ostracod, seed shrimp					1							
Sarsiella zostericola	ostracod, seed shrimp		1	1	11	5	13	12	15	90		2	5
Parasterope pollex	ostracod, seed shrimp	6	62	9	68	138	937	798	220	414	20	9	8
ostracods, podocopid	ostracods, seed shrimps	3	15	2	2	1	17	8	13	22	4	3	7
collembolas, podurid	springtails	1							2				
ephemeropteran larvae	mayflies						12	9	27		19		
odonates, anisopteran larvae	dragonflies							1					
odonates, zygopteran larvae	damselflies							6	3				
hemipterans, corixid adults	water boatmen										1		
hemipterans, gerrid adults	water striders						2						
coleopterans, curculionid adults	beetles												1
coleopterans, elmid larvae	riffle beetles											2	
coleopterans, elmid adults	riffle beetles								2		4		
coleopterans, gyrinid larvae	whirligig beetles										2		
coleopterans, dytiscid adults	predaceous diving beetles												1
dipterans, pupae	flies, mosquitoes	2	5		6	19	33	116	113	10	78	9	2
dipterans, ceratopogonid larvae	biting midges							4					
dipteran, Chaoborus punctipennis larvae	phantom midge					1		33	11	1	56		3
dipterans, chironomid larvae	midges	5	7	16	15	12	24	97	44	10	57	92	46
dipterans, sciomyzid larvae	marsh flies											1	
trichopteran larvae	caddisflies					1	5	5	2		9		
pycnogonids	sea spiders				3		10	2		519			
Limulus polyphemus larvae	horsehoe crab		3						1	6		93	13
acari	water mites	1	4				2	25	3			1	
gastropods, prosobranch	snails	58	30	4	4	17	96	45	622	122	8	32	28
gastropods, opisthobranch	sea slugs	40	3	2	27	9	4	7	4	4	11	2	7
pelecypods	clams, mussels, oysters	55	5	3	11	41	148	38	212	52	2	14	300
ophiopluteus larvae	brittlestars								9		3		

Table A2. Page 4 of 6.

Anclote River plankton net catch by month (October 2004 to September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (12)	Feb (12)	Mar (12)	Apr (12)	May (12)	Jun (12)	Jul (12)	Aug (12)	Sep (12)	Oct (12)	Nov (12)	Dec (12)
ophiuroidean juveniles	brittlestars		2		1		2	2	3				
brachiopod, Glottidia pyramidata larvae	lamp shell				1		10				7		
chaetognaths, sagittid	arrow worms	1150	253	552	677	142	318	2289	286	1428	769	1234	654
ascidiacean larvae	tunicate larvae								1	1			
appendicularian, Oikopleura dioica	larvacean		64			4	5720	5	2	1257	1088	651	264
Branchiostoma floridae	lancelet									2			
Elops saurus postflexion larvae	ladyfish	4	1	22									1
Elops saurus juveniles	ladyfish												1
Myrophis punctatus postflexion larvae	speckled worm eel	21											
Myrophic punctatus metamorphs	speckled worm eel	2											
Myrophis punctatus juveniles	speckled worm eel	7	1										
clupeid eggs	herrings		7	7									
clupeid preflexion larvae	herrings		2					15			3		
Brevoortia spp. flexion larvae	menhaden	2											
Brevoortia spp. postflexion larvae	menhaden	36	2	2	2								
Brevoortia spp. metamorphs	menhaden	5		2		1							
Harengula jaguana postflexion larvae	scaled sardine							96					
Harengula jaguana metamorphs	scaled sardine							1					
Opisthonema oglinum juveniles	Atlantic thread herring										1		
Anchoa spp. preflexion larvae	anchovies					5	2	68	23	6	29		
Anchoa spp. flexion larvae	anchovies					2	2	74	2		23		
Anchoa spp. juveniles	anchovies								1				
Anchoa hepsetus eggs	striped anchovy				1								
Anchoa mitchilli eggs	bay anchovy		458	1	6								
Anchoa mitchilli postflexion larvae	bay anchovy						9	32	7	1	37	2	4
Anchoa mitchilli juveniles	bay anchovy	231	34	76	24	4	18	37	8	319	257	50	188
Anchoa mitchilli adults	bay anchovy	3	3	3	15	7	13	36	5	1	14	1	
Notemigonus crysoleucas flexion larvae	golden shiner								1				
Synodus foetens juveniles	inshore lizardfish				2						1		
Gobiesox strumosus preflexion larvae	skilletfish	20	24	7	5	4	3	14		22		35	4
Gobiesox strumosus flexion larvae	skilletfish		1			1				10		2	1
Lucania parva postflexion larvae	rainwater killifish							1					
Lucania parva adults	rainwater killifish							1					
Gambusia holbrooki juveniles	eastern mosquitofish										2		
Heterandria formosa juveniles	least killifish										1		
Menidia spp. eggs	silversides									1			
Menidia spp. preflexion larvae	silversides	1	33	21	44	8	7	18	7	5		4	1
Menidia spp. flexion larvae	silversides			3			1		2	2			
Menidia spp. postflexion larvae	silversides									1			
Menidia spp. juveniles	silversides					1	2		2	1			
Menidia spp. adults	silversides									1			
Membras martinica preflexion larvae	rough silverside	1	6										
fish eggs, percomorph	sciaenid eggs (primarily)		307	74	1	4515	9786	4632	19	656	5		
Hippocampus erectus juveniles	lined seahorse											1	
Hippocampus erectus adults	lined seahorse										1		
Hippocampus zosterae juveniles	dwarf seahorse										1		
Syngnathus floridae juveniles	dusky pipefish	2			1				1	2		1	
Syngnathus floridae adults	dusky pipefish									1			

Table A2. Page 5 of 6.

Anclote River plankton net catch by month (October 2004 to September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (12)	Feb (12)	Mar (12)	Apr (12)	May (12)	Jun (12)	Jul (12)	Aug (12)	Sep (12)	Oct (12)	Nov (12)	Dec (12)
Syngnathus louisianae juveniles	chain pipefish											3	
Syngnathus scovelli juveniles	gulf pipefish	2				1	6						6
Prionotus spp. preflexion larvae	searobins									1			
Prionotus tribulus juveniles	bighead searobin	2											
Lepomis spp. flexion larvae	sunfishes								1				
Oligoplites saurus preflexion larvae	leatherjack							2	1				
Oligoplites saurus flexion larvae	leatherjack							1					
Oligoplites saurus postflexion larvae	leatherjack								1				
Oligoplites saurus juveniles	leatherjack						1						
gerreid preflexion larvae	mojjaras						2						
Eucinostomus spp. postflexion larvae	mojarras					2					6	20	1
Eucinostomus spp. juveniles	mojarras										38	4	1
Orthopristis chrysoptera flexion larvae	pigfish			1									
Orthopristis chrysoptera postflexion larvae	pigfish			1									
Orthopristis chrysoptera juveniles	pigfish	3											
Archosargus probatocephalus postflexion larv	sheepshead			2									
Lagodon rhomboides postflexion larvae	pinfish			2								5	7
Lagodon rhomboides juveniles	pinfish	79	9	7								7	
Bairdiella chrysoura flexion larvae	silver perch							1					
Cynoscion arenarius preflexion larvae	sand seatrout		3										
Cynoscion nebulosus preflexion larvae	spotted seatrout									1			
Cynoscion nebulosus juveniles	spotted seatrout								1				
Leiostomus xanthurus postflexion larvae	spot			3									
Leiostomus xanthurus juveniles	spot	240		1									
Menticirrhus spp. preflexion larvae	kingfishes							65	1	4			2
Menticirrhus spp. flexion larvae	kingfishes							9	2				
Menticirrhus spp. postflexion larvae	kingfishes							3			2		
Sciaenops ocellatus flexion larvae	red drum										2		
Sciaenops ocellatus postflexion larvae	red drum										4		
Mugil cephalus juveniles	striped mullet	1		2	1								
Mugil curema juveniles	white mullet											2	
blenniid preflexion larvae	blennies		10	5	28	5	8	10	4	7			5
Hypsoblennius spp. postflexion larvae	blennies						1						
gobiid preflexion larvae	gobies		1	4	136	239	126	261	219	245	16		2
gobiid flexion larvae	gobies		2	1	61	58	59	84	25	86	4	2	
gobiid postflexion larvae	gobies										6		
Bathygobius soporator preflexion larvae	frillfin goby				1		3			3			
Bathygobius soporator flexion larvae	frillfin goby						1						
Gobionellus spp. postflexion larvae	gobies	2											
Gobionellus oceanicus juveniles	highfin goby										1		
Gobiosoma spp. postflexion larvae	gobies				1	7	76	212	25	26	1	12	1
Gobiosoma bosc juveniles	naked goby								2				
Gobiosoma robustum juveniles	code goby							1	1				
Microgobius spp. flexion larvae	gobies		3		49	41	75	24	61	98	1		
Microgobius spp. postflexion larvae	gobies				2	5	14	62	82	57			
Microgobius spp. juveniles	gobies						20						
Microgobius gulosus juveniles	clown goby							3	12	6			
Paralichthys spp. juveniles	flounders	15											

Table A2. Page 6 of 6.

Anclote River plankton net catch by month (October 2004 to September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (12)	Feb (12)	Mar (12)	Apr (12)	May (12)	Jun (12)	Jul (12)	Aug (12)	Sep (12)	Oct (12)	Nov (12)	Dec (12)
Achirus lineatus preflexion larvae	lined sole							59	4	7			
Achirus lineatus flexion larvae	lined sole						3	4		1			
Achirus lineatus postflexion larvae	lined sole						3	1					
Trinectes maculatus preflexion larvae	hogchoker					2		19	2	5			
Trinectes maculatus flexion larvae	hogchoker							2	3				
Trinectes maculatus postflexion larvae	hogchoker						1	10	1	2	1		
Trinectes maculatus juveniles	hogchoker									6	2	1	5
Monacanthus hispidus juveniles	planehead filefish						1					2	
Chilomycterus schoepfi juveniles	striped burrfish					1							
unidentified preflexion larvae	fish									2			

Table A3, page 1 of 6. Location specific plankton-net catch.

Data are presented as mean number per 1,000 cubic meters.

Organisms are listed in phylogenetic order.

		Location (km from mouth)											
Description	Common Name	-1.8	-1.0	0.3	1.7	2.9	4.5	6.0	8.9	10.1	12.3	13.3	15.1
foraminiferans	foraminiferans	6.16	12.87	3.96	1.59	3.36	0.00	0.65	0.41	0.67	0.00	0.00	0.64
Liriope tetraphylla	hydromedusa	0.00	0.00	1.57	4.42	1.40	0.00	0.00	1.29	0.00	0.00	0.00	0.00
Clytia sp.	hydromedusa	2.77	5.07	13.37	1.20	4.73	0.00	12.52	7.88	9.83	123.06	95.88	10.29
medusa sp. a	hydromedusa	1.67	0.00	3.15	4.42	2.80	1.44	0.00	0.00	0.00	0.00	0.00	0.00
medusa sp. c	hydromedusa	1.11	0.00	0.00	0.00	2.10	4.93	32.46	72.66	0.00	0.00	0.00	0.00
medusa sp. d	hydromedusa	5.83	2.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.12
medusa sp. e	hydromedusa	1.29	1.78	0.00	0.00	1.35	0.70	8.40	3.28	12.02	0.00	0.00	0.00
medusa, Bougainvillia sp.	hydromedusa	1.33	3.57	0.00	0.58	1.31	0.00	0.00	0.00	0.65	0.00	0.00	0.00
medusa, Obelia sp.	hydromedusa	0.00	2.78	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mnemiopsis mccradyi	comb jelly, ctenophore	0.00	0.00	0.00	0.00	0.00	0.00	14.00	14.42	1.31	21.10	0.00	0.00
Beroe ovata	sea walnut, ctenophore	0.00	0.00	0.00	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00
turbellarians	flatworms	1.29	0.90	0.00	0.00	2.74	0.00	0.00	0.00	0.00	0.00	0.62	0.00
nemerteans	ribbon worms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.69
nematodes	roundworms, threadworms	11.78	16.53	13.57	9.94	1.40	5.35	3.33	11.15	2.74	0.65	1.81	0.00
polychaetes	sand worms, tube worms	203.01	207.68	171.36	78.51	57.71	13.74	21.16	2.62	14.29	58.02	124.47	804.16
oligochaetes	freshwater worms	0.00	0.00	0.00	0.00	0.00	1.35	1.21	4.98	1.80	17.10	3.90	9.25
hirudinoideans	leeches	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22	1.50	0.65	0.00	0.00
Simocephalus vetulus	water flea	3.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.47	93.42	234.84	517.74
Grimaldina brazzai	water flea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00
Ilyocryptus sp.	water flea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.44	74.32	3.18
Sida crystallina	water flea	0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.00	0.65	1.28	0.62
Latona setifera	water flea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.94
Penilia avirostris	water flea	0.00	6.51	7.68	0.00	4.20	0.00	0.00	0.00	0.00	0.00	1.94	0.00
Latonopsis fasciculata	water flea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	3.70	19.99	5.32
Euryalona occidentalis	water flea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.29	3.72
Leydigia sp.	water flea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.70
Evadne tergestina	water flea	0.00	3.57	6.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
decapod zoeae	crab larvae	11632.99	14250.61	11512.47	7114.01	7730.96	8348.65	5992.86	5073.10	5080.37	3287.12	2691.75	1874.79
decapod mysis	shrimp larvae	325.98	371.97	349.83	327.05	475.81	1352.00	3789.07	3898.04	6100.91	3437.65	1858.68	268.53
decapod megalopae	post-zoea crab larvae	439.51	573.81	175.82	259.91	346.42	155.74	24.41	10.49	28.90	6.18	1.85	0.00
shrimps, unidentified postlarvae	shrimps	6.97	0.00	2.28	1.77	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
penaeid postlarvae	penaeid shrimps	0.00	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
penaeid metamorphs	penaeid shrimps	28.38	7.41	1.48	5.94	8.54	7.83	1.26	0.00	0.00	0.00	0.00	0.00
Farfantepenaeus duorarum juveniles	pink shrimp	3.12	0.00	3.16	1.48	1.34	1.42	1.93	0.00	0.00	0.00	0.00	0.00
Lucifer faxoni mysis	shrimp	10.40	22.13	25.80	1.77	0.70	1.44	0.00	0.00	0.00	0.00	0.00	0.00
Lucifer faxoni juveniles and adults	shrimp	698.68	1510.74	577.62	644.90	542.47	1265.20	3.33	3.87	0.00	1.24	0.00	0.00
Palaemon floridanus adults	Florida grass shrimp	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Palaemonetes spp. postlarvae	grass shrimp	22.38	19.67	6.58	32.71	16.90	14.25	4.04	11.74	9.07	1.21	0.00	0.00
Palaemonetes pugio juveniles	daggerblade grass shrimp	0.00	0.00	2.96	0.00	0.00	2.75	0.63	0.64	0.62	3.07	7.82	2.01
Palaemonetes pugio adults	daggerblade grass shrimp	0.00	0.58	0.57	0.00	0.00	0.00	0.00	1.33	0.00	0.00	0.66	0.00
Palaemonetes vulgaris adults	grass shrimp	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Periclimenes longicaudatus juveniles	longtail grass shrimp	5.28	1.33	8.26	3.09	0.69	1.44	0.00	0.00	0.00	0.00	0.00	0.00
alphaeid postlarvae	snapping shrimps	53.33	37.06	27.81	18.18	8.31	17.04	0.00	1.31	0.65	0.00	0.00	0.00
alphaeid juveniles	snapping shrimps	0.00	0.00	0.57	0.00	0.00	1.42	0.00	0.00	0.00	0.00	0.00	0.00
Alpheus viridari juveniles	snapping shrimp	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hippolyte zostericola postlarvae	zostera shrimp	1340.87	836.33	737.98	382.22	217.09	88.19	7.00	1.31	0.00	0.00	0.00	0.00
Hippolyte zostericola juveniles	zostera shrimp	12.04	11.62	17.35	56.29	2.58	5.82	0.00	0.00	0.00	0.00	0.00	0.00

Table A3, page 2 of 6. Location specific plankton-net catch.

Data are presented as mean number per 1,000 cubic meters.

Organisms are listed in phylogenetic order.

		Location (km from mouth)											
Description	Common Name	-1.8	-1.0	0.3	1.7	2.9	4.5	6.0	8.9	10.1	12.3	13.3	15.1
Hippolyte zostericola adults	zostera shrimp	0.00	1.18	0.00	3.37	0.00	1.47	0.00	0.00	0.00	0.00	0.00	0.00
Thor sp. juveniles	shrimp	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Latreutes parvulus postlarvae	sargassum shrimp	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tozeuma carolinense postlarvae	arrow shrimp	1.29	3.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tozeuma carolinense juveniles	arrow shrimp	133.46	26.19	8.76	14.17	0.70	0.68	0.00	1.29	0.00	0.00	0.00	0.00
Tozeuma carolinense adults	arrow shrimp	49.68	16.58	6.30	3.54	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
processid postlarvae	night shrimps	41.54	23.31	17.00	15.48	1.34	0.68	0.00	1.31	0.00	0.00	0.00	0.00
Ambidexter symmetricus postlarvae	shrimp	21.50	23.72	15.27	20.65	5.03	5.66	0.00	0.00	0.00	0.00	0.00	0.00
Ambidexter symmetricus juveniles	shrimp	3.53	1.78	10.13	2.60	0.00	0.71	0.00	0.00	0.00	0.00	0.00	0.00
Callianassa spp. juveniles	ghost shrimps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.00
Upogebia spp. postlarvae	mud shrimps	4.88	7.69	0.63	0.00	0.70	0.00	0.00	0.00	0.00	0.60	0.00	0.00
Upogebia spp. juveniles	mud shrimps	0.55	3.14	0.00	3.68	0.63	0.00	2.78	3.28	2.49	0.61	0.00	0.00
paguroid megalops larvae	hermit crabs	9.29	3.79	13.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
paguroid juveniles	hermit crabs	280.34	159.67	53.32	26.41	1.22	2.09	0.00	0.00	0.00	0.00	0.00	0.00
Callinectes sapidus juveniles	blue crab	3.68	2.09	0.63	5.85	27.49	36.40	8.11	9.72	3.97	0.00	3.33	0.70
Callinectes sapidus adults	blue crab	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Portunus sp. juveniles	swimming crab	1.04	1.51	0.00	2.97	0.70	0.00	0.00	0.00	0.62	0.00	0.00	0.00
Pinnixa sp. a juveniles	pea crab	0.00	0.00	0.00	2.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pinnixa sayana juveniles	pea crab	0.00	1.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
unidentified Americamysis juveniles	opossum shrimps, mysids	11.09	8.42	10.96	23.16	61.00	514.36	328.84	135.09	512.74	196.57	208.29	244.82
Americamysis almyra	opossum shrimp, mysid	2.43	8.45	1.88	25.10	84.14	941.02	1266.41	219.46	1017.86	1236.86	209.34	305.66
Americamysis bahia	opossum shrimp, mysid	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Americamysis stucki	opossum shrimp, mysid	23.66	62.37	10.55	40.80	0.67	12.83	7.00	0.00	0.00	0.00	0.00	0.00
Bowmaniella dissimilis	opossum shrimp, mysid	156.47	153.48	72.66	93.57	85.40	955.54	465.78	743.47	1867.71	83.22	190.15	11.75
Mysidopsis mortenseni	opossum shrimp, mysid	0.00	0.00	0.00	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taphromysis bowmani	opossum shrimp, mysid	0.63	1.16	3.63	16.19	14.38	21.07	3.23	9.39	49.44	80.14	21.03	43.80
cumaceans	cumaceans	495.93	489.06	307.38	391.29	241.51	401.78	656.46	915.82	349.04	5.64	5.73	1.35
Sinelobus stanfordi	tanaid	0.00	0.00	0.00	0.00	0.00	1.47	4.03	1.50	0.67	8.18	5.76	1.45
Apseudes sp.	tanaid	0.00	0.72	5.20	2.79	1.34	7.67	0.00	0.00	0.00	1.24	0.00	0.62
Hargeria rapax	tanaid	8.24	4.52	14.18	54.47	44.13	10.02	34.98	36.90	9.09	0.00	0.00	0.00
Cyathura polita	isopod	0.00	0.00	0.00	0.00	5.19	5.62	0.64	2.01	4.41	0.00	0.64	0.00
Xenanthura brevitelson	isopod	0.00	0.00	0.00	3.14	4.65	5.52	5.21	0.68	0.00	0.00	0.00	0.00
Munna reynoldsi	isopod	1.29	0.00	0.00	0.00	0.00	0.00	0.00	3.69	4.20	11.10	33.61	408.15
Anopsilana jonesi	isopod	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.62	0.00	0.00	0.00
cymothoid sp. a (Lironeca) juveniles	isopod	1.84	3.84	3.77	4.86	19.58	6.22	8.63	3.29	3.57	3.66	1.29	0.69
Cassidinidea ovalis	isopod	0.61	0.90	0.00	1.21	0.00	2.09	4.60	5.04	2.68	0.00	0.60	0.00
Harrieta faxoni	isopod	12.24	30.21	22.28	50.18	14.59	7.59	0.64	0.67	0.00	0.00	0.00	0.00
Sphaeroma quadridentata	isopod	2.08	0.59	1.41	2.65	5.15	0.00	0.65	0.00	0.00	0.00	0.00	1.32
Sphaeroma terebrans	isopod	0.00	0.00	0.00	0.60	0.00	2.09	1.38	4.83	22.16	52.91	18.04	47.29
Sphaeroma walkeri	isopod	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.00	0.00
Edotea triloba	isopod	3.00	7.01	3.51	19.82	33.87	76.56	890.23	352.53	137.60	123.32	33.45	2.70
Erichsonella attenuata	isopod	0.61	2.87	6.20	21.65	25.82	4.73	6.89	1.25	0.00	0.00	0.00	0.00
Erichsonella filiforme	isopod	0.00	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
amphipods, gammaridean	amphipods	693.14	1221.08	2019.34	39541.59	24622.50	25681.11	25473.12	13009.14	11345.70	9376.08	6156.98	2043.48
amphipods, caprellid	skeleton shrimps	28.47	27.99	52.67	41.74	32.38	23.30	1.29	0.00	0.00	0.00	0.00	0.00
cirriped nauplius stage	barnacles	33.32	5.91	5.11	13.59	3.43	0.00	0.00	0.00	0.00	0.60	0.00	0.00
branchiurans, Argulus spp.	fish lice	27.88	20.50	15.39	14.97	10.20	6.41	2.75	0.41	0.60	0.00	0.65	0.00

Table A3, page 3 of 6. Location specific plankton-net catch.

Data are presented as mean number per 1,000 cubic meters.

Organisms are listed in phylogenetic order.

		Location (km from mouth)											
Description	Common Name	-1.8	-1.0	0.3	1.7	2.9	4.5	6.0	8.9	10.1	12.3	13.3	15.1
Alteutha sp.	copepod	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.00
unidentified harpacticoids	copepods	56.04	31.65	37.68	19.30	21.88	12.84	9.08	3.25	0.67	0.00	0.64	0.00
siphonostomatids	parasitic copepods	37.28	41.33	13.86	21.00	5.95	5.69	5.36	3.93	0.70	0.00	0.00	0.00
Monstrilla sp.	copepod	0.00	2.23	0.00	1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Macrocyclops albidus	copepods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	4.38	7.02	6.58
Mesocyclops edax	copepod	0.00	0.00	0.00	0.00	0.00	1.47	0.00	0.00	1.91	4.31	5.11	12.98
Oithona spp.	copepods	7.50	14.95	1.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Orthocyclops modestus	copepod	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	2.50	1.91	2.56
Saphirella spp.	copepods	0.00	0.00	0.00	0.00	0.00	0.00	1.41	6.31	7.26	1.30	7.69	0.00
paracalanids	copepods	0.63	12.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00
Acartia tonsa	copepod	6143.44	6624.88	4173.16	1259.43	457.06	143.58	46.26	60.78	24.56	3.08	1.25	1.38
Calanopia americana	copepod	134.01	92.38	36.65	223.63	68.41	31.53	10.50	3.28	2.61	0.60	0.00	0.00
Centropages hamatus	copepod	1.88	4.24	3.15	0.65	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00
Centropages velificatus	copepod	9.94	10.70	19.21	8.54	7.51	8.66	0.72	0.00	0.00	0.00	0.00	0.00
Diaptomus spp.	copepods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.66	0.00	0.00
Eucalanus sp.	copepod	0.00	0.58	0.00	0.00	1.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eurytemora affinis	copepod	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.64	3.93
Labidocera aestiva	copepod	811.03	1831.41	459.91	512.18	248.69	171.48	37.77	7.17	5.56	0.00	0.00	0.00
Osphranticum labronectum	copepod	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.24	0.00	0.00
Pseudodiaptomus coronatus	copepod	8.09	3.50	4.32	49.71	6.03	7.67	4.69	15.06	4.69	1.24	0.00	0.69
Temora turbinata	copepod	19.64	12.77	19.50	1.16	4.20	3.54	0.00	0.00	0.00	0.00	0.00	0.00
myodocopod sp. a	ostracod, seed shrimp	7.06	7.26	0.63	0.60	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Euconchoecia chierchiae	ostracod, seed shrimp	0.00	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sarsiella zostericola	ostracod, seed shrimp	15.18	13.85	9.76	23.10	29.34	9.39	2.77	0.00	0.00	0.60	0.00	0.00
Parasterope pollex	ostracod, seed shrimp	99.28	261.30	642.38	403.59	264.55	88.22	12.46	3.92	1.31	0.00	0.00	0.00
ostracods, podocopid	ostracods, seed shrimps	12.91	3.68	5.05	0.00	2.58	0.00	0.00	4.88	2.00	9.46	9.29	13.76
collembolas, podurid	springtails	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.64	0.00
ephemeropteran larvae	mayflies	0.00	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.62	4.96	18.00	19.63
odonates, anisopteran larvae	dragonflies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62
odonates, zygopteran larvae	damselflies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	3.12	1.29	0.00
hemipterans, corixid adults	water boatmen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00
hemipterans, gerrid adults	water striders	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.45
coleopterans, curculionid adults	beetles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
coleopterans, elmid larvae	riffle beetles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.32
coleopterans, elmid adults	riffle beetles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.49	0.00	1.29	0.00
coleopterans, gyrinid larvae	whirligig beetles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27
coleopterans, dytiscid adults	predaceous diving beetles	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.00
dipterans, pupae	flies, mosquitoes	0.00	0.00	0.00	0.00	0.00	0.00	7.92	3.84	8.54	45.40	57.06	131.17
dipterans, ceratopogonid larvae	biting midges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.24	0.65	0.62
dipteran, Chaoborus punctipennis larvae	phantom midge	0.00	5.35	0.00	0.00	0.00	0.00	0.00	4.45	15.70	14.87	15.37	10.24
dipterans, chironomid larvae	midges	1.29	0.00	0.00	0.00	1.46	0.68	0.61	9.61	6.17	81.94	49.95	125.42
dipterans, sciomyzid larvae	marsh flies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66
trichopteran larvae	caddisflies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	4.49	8.00
pycnogonids	sea spiders	1.11	1.94	5.20	114.47	166.68	44.86	18.89	7.88	1.31	0.60	0.00	0.00
Limulus polyphemus larvae	horsehoe crab	0.00	0.00	0.00	8.80	16.26	30.14	17.29	8.86	0.00	0.62	0.00	0.00
acari	water mites	0.65	0.00	1.29	0.00	0.00	0.00	0.00	0.64	1.42	0.00	11.03	8.27
gastropods, prosobranch	snails	121.39	231.58	54.45	52.06	36.79	16.67	6.95	3.17	47.44	32.26	79.82	63.29

Table A3, page 4 of 6. Location specific plankton-net catch.

Data are presented as mean number per 1,000 cubic meters.

Organisms are listed in phylogenetic order.

Description	Common Name	Location (km from mouth)											
		-1.8	-1.0	0.3	1.7	2.9	4.5	6.0	8.9	10.1	12.3	13.3	15.1
gastropods, opisthobranch	sea slugs	6.33	11.86	8.93	13.31	19.16	11.03	6.48	1.29	1.40	0.00	0.00	0.00
pelecypods	clams, mussels, oysters	76.20	107.77	96.85	26.95	33.27	8.65	10.05	5.08	6.66	10.67	7.49	215.25
ophiopluteus larvae	brittlestars	5.46	2.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ophiuroidean juveniles	brittlestars	1.84	3.92	1.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
brachiopod, Glottidia pyramidata larvae	lamp shell	1.88	5.08	2.82	2.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
chaetognaths, sagittid	arrow worms	2047.41	1864.51	962.27	889.45	511.65	176.85	150.92	22.62	11.17	5.02	0.00	2.60
ascidiacean larvae	tunicate larvae	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
appendicularian, Oikopleura dioica	larvacean	2152.85	1510.02	2642.09	66.47	39.90	0.68	0.00	0.00	0.00	0.00	0.00	0.00
Branchiostoma floridae	lancelet	0.00	0.00	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elops saurus postflexion larvae	ladyfish	0.00	0.64	0.60	3.69	1.22	3.96	1.39	1.40	1.93	1.96	1.28	0.00
Elops saurus juveniles	ladyfish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.00
Myrophis punctatus postflexion larvae	speckled worm eel	1.27	10.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Myrophic punctatus metamorphs	speckled worm eel	0.63	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Myrophis punctatus juveniles	speckled worm eel	0.00	1.20	0.00	0.00	0.00	2.57	0.00	1.29	0.00	0.00	0.00	0.00
clupeid eggs	herrings	6.97	1.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
clupeid preflexion larvae	herrings	9.65	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brevoortia spp. flexion larvae	menhaden	0.00	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brevoortia spp. postflexion larvae	menhaden	0.00	3.47	0.00	0.00	0.68	2.57	0.67	3.86	4.71	6.45	1.24	3.31
Brevoortia spp. metamorphs	menhaden	0.00	0.00	1.26	0.65	0.68	0.00	0.00	0.64	0.00	0.66	0.64	0.64
Harengula jaguana postflexion larvae	scaled sardine	0.64	1.78	0.00	24.43	27.36	4.96	0.00	0.00	0.00	0.00	0.00	0.00
Harengula jaguana metamorphs	scaled sardine	0.00	0.00	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opisthonema oglinum juveniles	Atlantic thread herring	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anchoa spp. preflexion larvae	anchovies	9.28	25.99	7.55	17.22	18.43	7.10	0.69	0.00	0.70	0.00	0.00	0.61
Anchoa spp. flexion larvae	anchovies	9.43	8.92	5.52	21.79	18.08	2.13	0.00	0.00	0.00	0.00	0.00	1.24
Anchoa spp. juveniles	anchovies	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.00	0.00
Anchoa hepsetus eggs	striped anchovy	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anchoa mitchilli eggs	bay anchovy	2.49	16.66	243.82	28.12	1.78	1.87	0.00	0.00	0.70	0.00	0.00	0.00
Anchoa mitchilli postflexion larvae	bay anchovy	3.94	0.90	3.29	9.50	18.43	11.33	3.92	4.58	3.57	1.25	1.34	0.00
Anchoa mitchilli juveniles	bay anchovy	0.00	5.05	1.23	5.81	30.49	69.10	80.57	50.06	32.07	281.41	53.86	204.17
Anchoa mitchilli adults	bay anchovy	0.00	2.70	1.17	6.96	11.11	4.96	11.26	1.82	12.19	6.31	5.90	1.24
Notemigonus crysoleucas flexion larvae	golden shiner	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.00
Synodus foetens juveniles	inshore lizardfish	0.55	0.00	0.00	0.60	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gobiesox strumosus preflexion larvae	skilletfish	7.72	0.59	1.17	6.62	3.26	8.66	9.56	18.77	19.51	7.60	5.85	0.00
Gobiesox strumosus flexion larvae	skilletfish	0.00	0.00	0.00	0.00	0.69	0.00	0.00	5.88	3.25	0.00	0.00	0.00
Lucania parva postflexion larvae	rainwater killifish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.00	0.00	0.00
Lucania parva adults	rainwater killifish	0.00	0.00	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gambusia holbrooki juveniles	eastern mosquitofish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.00
Heterandria formosa juveniles	least killifish	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64
Menidia spp. eggs	silversides	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Menidia spp. preflexion larvae	silversides	0.00	1.27	0.00	1.39	3.11	5.80	7.96	14.58	21.76	6.88	24.35	5.81
Menidia spp. flexion larvae	silversides	0.62	0.00	0.00	0.00	1.22	0.00	0.00	1.96	1.34	0.00	0.00	0.00
Menidia spp. postflexion larvae	silversides	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.00
Menidia spp. juveniles	silversides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	2.66
Menidia spp. adults	silversides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69
Membras martinica preflexion larvae	rough silverside	0.00	1.23	0.00	0.57	0.61	0.64	0.00	0.82	0.00	0.00	0.00	0.00
fish eggs, percomorph	sciaenid eggs (primarily)	2121.51	3163.48	2852.57	2494.25	132.58	2288.75	225.70	57.25	15.02	0.00	0.00	0.00
Hippocampus erectus juveniles	lined seahorse	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A3, page 5 of 6. Location specific plankton-net catch.

Data are presented as mean number per 1,000 cubic meters.

Organisms are listed in phylogenetic order.

Description	Common Name	Location (km from mouth)											
		-1.8	-1.0	0.3	1.7	2.9	4.5	6.0	8.9	10.1	12.3	13.3	15.1
Hippocampus erectus adults	lined seahorse	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hippocampus zosterae juveniles	dwarf seahorse	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Syngnathus floridae juveniles	dusky pipefish	1.45	0.59	0.00	0.00	0.70	0.00	1.36	0.64	0.00	0.00	0.00	0.00
Syngnathus floridae adults	dusky pipefish	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Syngnathus louisianae juveniles	chain pipefish	3.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Syngnathus scovelli juveniles	gulf pipefish	2.96	0.00	0.63	0.00	1.32	5.12	0.00	0.00	0.00	0.00	0.68	0.00
Prionotus spp. preflexion larvae	searobins	0.00	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Prionotus tribulus juveniles	bighead searobin	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00	0.67	0.00	0.00	0.00
Lepomis spp. flexion larvae	sunfishes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66
Oligoplites saurus preflexion larvae	leatherjack	0.61	0.00	0.00	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oligoplites saurus flexion larvae	leatherjack	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oligoplites saurus postflexion larvae	leatherjack	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oligoplites saurus juveniles	leatherjack	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.00
gerreid preflexion larvae	mojjaras	0.00	0.00	0.00	0.00	0.00	1.47	0.00	0.00	0.00	0.00	0.00	0.00
Eucinostomus spp. postflexion larvae	mojarras	1.29	0.00	0.00	0.00	5.03	8.62	2.76	1.29	0.69	0.63	0.00	0.00
Eucinostomus spp. juveniles	mojarras	4.16	0.74	0.00	0.00	5.86	2.83	8.21	1.94	5.61	0.00	0.68	0.00
Orthopristis chrysoptera flexion larvae	pigfish	0.00	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.00	0.00
Orthopristis chrysoptera postflexion larvae	pigfish	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Orthopristis chrysoptera juveniles	pigfish	0.00	1.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Archosargus probatocephalus postflexion larv	sheepshead	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lagodon rhomboides postflexion larvae	pinfish	5.89	0.00	0.00	0.00	0.74	0.00	2.07	1.29	0.00	0.00	0.00	0.00
Lagodon rhomboides juveniles	pinfish	12.28	16.18	1.29	3.61	3.43	10.29	1.34	10.53	5.96	0.00	0.64	0.00
Bairdiella chrysoura flexion larvae	silver perch	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cynoscion arenarius preflexion larvae	sand seatrout	0.00	1.23	0.00	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cynoscion nebulosus preflexion larvae	spotted seatrout	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cynoscion nebulosus juveniles	spotted seatrout	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.00
Leiostomus xanthurus postflexion larvae	spot	0.62	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.64	0.00
Leiostomus xanthurus juveniles	spot	9.50	11.56	23.92	6.47	4.06	2.57	6.68	18.14	42.17	15.52	9.91	4.83
Menticirrhus spp. preflexion larvae	kingfishes	10.93	13.84	12.57	3.27	4.45	1.45	0.00	0.00	0.00	0.00	0.00	0.00
Menticirrhus spp. flexion larvae	kingfishes	0.61	1.78	1.96	1.75	0.00	0.71	0.00	0.00	0.00	0.00	0.00	0.00
Menticirrhus spp. postflexion larvae	kingfishes	0.00	0.00	0.00	0.00	1.46	0.71	1.21	0.00	0.00	0.00	0.00	0.00
Sciaenops ocellatus flexion larvae	red drum	0.00	0.00	0.00	0.00	0.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00
Sciaenops ocellatus postflexion larvae	red drum	0.00	0.00	0.63	0.00	0.73	0.00	1.26	0.00	0.00	0.00	0.00	0.00
Mugil cephalus juveniles	striped mullet	0.00	0.00	0.59	0.00	0.61	0.00	0.00	0.00	0.00	0.65	0.00	0.64
Mugil curema juveniles	white mullet	0.00	0.00	0.00	0.00	0.00	0.00	1.38	0.00	0.00	0.00	0.00	0.00
blenniid preflexion larvae	blennies	9.78	11.01	9.86	5.63	5.89	8.07	1.92	0.00	0.00	0.00	0.00	0.00
Hypsoblennius spp. postflexion larvae	blennies	0.00	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
gobiid preflexion larvae	gobies	28.95	42.45	27.35	29.16	89.16	53.81	114.82	110.20	147.16	42.73	57.97	70.08
gobiid flexion larvae	gobies	21.39	29.13	22.96	11.83	39.07	27.86	45.27	13.73	32.05	0.59	3.99	3.95
gobiid postflexion larvae	gobies	0.00	0.00	0.00	2.97	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bathygobius soporator preflexion larvae	frillfin goby	0.00	0.72	0.00	0.00	1.93	1.29	0.00	0.00	0.00	0.00	0.60	0.00
Bathygobius soporator flexion larvae	frillfin goby	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gobionellus spp. postflexion larvae	gobies	0.00	0.00	0.00	0.00	0.68	0.64	0.00	0.00	0.00	0.00	0.00	0.00
Gobionellus oceanicus juveniles	highfin goby	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00
Gobiosoma spp. postflexion larvae	gobies	43.44	43.66	23.17	18.07	13.82	34.11	9.96	17.46	32.01	1.24	0.00	0.00
Gobiosoma bosc juveniles	naked goby	0.00	0.00	0.00	0.00	0.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00
Gobiosoma robustum juveniles	code goby	0.00	0.00	0.00	0.00	0.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00

Table A3, page 6 of 6. Location specific plankton-net catch.

Data are presented as mean number per 1,000 cubic meters.

Organisms are listed in phylogenetic order.

		Location (km from mouth)											
Description	Common Name	-1.8	-1.0	0.3	1.7	2.9	4.5	6.0	8.9	10.1	12.3	13.3	15.1
Microgobius spp. flexion larvae	gobies	0.00	0.00	0.59	10.18	32.24	44.59	38.48	40.62	59.41	2.98	1.94	2.55
Microgobius spp. postflexion larvae	gobies	0.00	0.00	0.00	5.37	13.47	42.92	13.85	20.67	43.53	4.91	1.21	2.00
Microgobius spp. juveniles	gobies	0.00	0.00	0.00	0.00	0.00	14.69	0.00	0.00	0.00	0.00	0.00	0.00
Microgobius gulosus juveniles	clown goby	0.00	0.00	0.00	0.00	0.00	0.00	1.90	2.55	3.32	5.16	0.60	0.00
Paralichthys spp. juveniles	flounders	0.63	2.31	1.89	3.23	0.00	1.28	0.00	0.00	0.00	0.00	0.00	0.00
Achirus lineatus preflexion larvae	lined sole	15.40	17.41	1.40	5.60	2.61	0.00	1.21	0.00	0.00	0.00	0.00	0.00
Achirus lineatus flexion larvae	lined sole	2.01	0.00	1.41	0.58	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Achirus lineatus postflexion larvae	lined sole	0.00	0.72	0.00	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trinectes maculatus preflexion larvae	hogchoker	6.79	6.25	0.00	0.00	5.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trinectes maculatus flexion larvae	hogchoker	0.00	1.79	0.00	0.00	1.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trinectes maculatus postflexion larvae	hogchoker	0.00	0.00	0.00	0.00	1.95	6.31	0.63	0.58	0.74	0.00	0.00	0.00
Trinectes maculatus juveniles	hogchoker	0.00	0.00	0.00	0.00	1.43	0.00	1.35	0.00	0.00	0.62	0.00	6.23
Monacanthus hispidus juveniles	planehead filefish	1.70	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chilomycterus schoepfi juveniles	striped burrfish	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.00
unidentified preflexion larvae	fish	0.00	1.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B:

Seine and trawl summary tables

Table B1, page 1 of 2.

Seine catch statistics (October 2004 through September 2005, n=144).

Organisms are listed in phylogenetic order.

Taxon	Common Name	Number Collected	Collection Frequency	km_U (km)	S_U (psu)	Mean CPUE (No./100m^2)	Max CPUE (No./100m^2)
Farfantepenaeus duorarum	Pink shrimp	80	23	4.405	18.1	0.82	26.47
Palaemonetes intermedius	Brackish grass shrimp	1268	27	2.551	21.9	12.95	727.94
Palaemonetes paludosus	Riverine grass shrimp	3	1	2.49	24.1	0.03	4.41
Palaemonetes pugio	Daggerblade grass shrimp	4101	32	13.41	4.35	41.88	1702.94
Palaemon floridanus	Florida grass shrimp	2	1	0.06	27.9	0.02	2.94
Alpheus spp.	Snapping shrimp	1	1	3.32	24.2	0.01	1.47
Tozeuma carolinense	Arrow shrimp	2	1	-0.77	25	0.02	2.94
Ambidexter symmetricus	Night shrimp	1	1	0.8	22.6	0.01	1.47
Callinectes sapidus	Blue crab	266	62	5.18	18.3	2.72	66.18
Rhinoptera bonasus	Cownose ray	1	1	1.09	31.1	0.01	1.47
Amia calva	Bowfin	4	3	15.74	0.96	0.04	2.94
Elops saurus	Ladyfish	2	1	10.39	0.3	0.02	2.94
Brevoortia spp.	Menhadens	40	3	5.449	16.5	0.41	55.88
Harengula jaguana	Scaled sardine	1	1	2.68	21.8	0.01	1.47
Anchoa hepsetus	Striped anchovy	16	1	1.73	24.5	0.16	23.53
Anchoa mitchilli	Bay anchovy	5919	19	5.058	18.6	60.45	5748.53
Synodus foetens	Inshore lizardfish	34	26	5.178	21.6	0.35	4.41
Notropis petersoni	Coastal shiner	836	5	15.72	0.78	8.54	732.35
Loricariidae spp.	Suckermouth catfish	1	1	13.22	0.1	0.01	1.47
Opsanus beta	Gulf toadfish	1	1	10.39	0.3	0.01	1.47
Hyporhamphus unifasciatus	Silverstripe halfbeak	1	1	-0.96	32.5	0.01	1.47
Hyporhamphus meeki	False silverstripe halfbeak	1	1	-1.68	32.6	0.01	1.47
Strongylura spp.	Needlefishes	3	2	1.833	26.8	0.03	2.94
Strongylura marina	Atlantic needlefish	1	1	4.55	27.4	0.01	1.47
Strongylura notata	Redfin needlefish	198	30	2.474	23.8	2.02	30.88
Strongylura timucu	Timucu	11	8	2.637	23.3	0.11	4.41
Cyprinodon variegatus	Sheepshead minnow	54	8	1.072	26.5	0.55	29.41
Fundulus confluentus	Marsh killifish	4	4	11.77	7.95	0.04	1.47
Fundulus similis	Striped killifish	10	4	3.631	22.2	0.10	8.82
Fundulus grandis	Gulf killifish	65	15	4.124	16.9	0.66	29.41
Lucania parva	Rainwater killifish	87	19	2.419	19.9	0.89	26.47
Lucania goodei	Bluefin killifish	294	6	15.98	0.32	3.00	354.41
Floridichthys carpio	Goldspotted killifish	1044	34	1.204	24.1	10.66	332.35
Gambusia holbrooki	Eastern mosquitofish	777	12	15.71	1.04	7.94	486.76
Poecilia latipinna	Sailfin molly	143	12	11.94	9.13	1.46	101.47
Menidia spp.	Silversides	3422	75	7.925	15.8	34.95	439.71
Labidesthes sicculus	Brook silverside	210	16	14.95	1.96	2.14	77.94
Syngnathus floridae	Dusky pipefish	1	1	8.02	22.3	0.01	1.47
Syngnathus louisianae	Chain pipefish	5	3	3.96	16.9	0.05	4.41
Syngnathus scovelli	Gulf pipefish	40	17	3.931	19.1	0.41	26.47
Prionotus tribulus	Bighead searobin	6	4	4.038	19.9	0.06	2.94
Centropomus undecimalis	Common snook	5	4	5.586	17.9	0.05	2.94
Lepomis spp.	Sunfishes	7	2	15.37	0.19	0.07	5.88
Lepomis auritus	Redbreast sunfish	2	1	16.09	0.3	0.02	2.94
Lepomis gulosus	Warmouth	2	1	16.09	0.3	0.02	2.94
Lepomis macrochirus	Bluegill	154	13	14.81	1.39	1.57	75.00
Lepomis marginatus	Dollar sunfish	18	4	15.38	0.36	0.18	13.24
Lepomis microlophus	Redear sunfish	11	2	15.78	0.25	0.11	13.24
Lepomis punctatus	Spotted sunfish	2	1	16.09	0.3	0.02	2.94
Micropterus salmoides	Largemouth bass	15	9	14.18	2.02	0.15	4.41
Etheostoma fusiforme	Swamp darter	3	2	15.19	1.02	0.03	2.94
Caranx hippos	Crevalle jack	1	1	13.69	5.75	0.01	1.47

Seine catch statistics (October 2004 through September 2005, n=144).

Organisms are listed in phylogenetic order.

Taxon	Common Name	Number Collected	Collection Frequency	km_U (km)	S_U (psu)	Mean CPUE (No./100m^2)	Max CPUE (No./100m^2)
Caranx latus	Horse-eye jack	1	1	10.09	10.8	0.01	1.47
Oligoplites saurus	Leatherjack	27	15	3.515	23.5	0.28	7.35
Trachinotus falcatus	Permit	7	4	3.317	22.2	0.07	5.88
Lutjanus griseus	Gray snapper	4	2	4.243	11.9	0.04	4.41
Eucinostomus spp.	Eucinostomus mojarras	4458	85	8.484	12.9	45.53	416.18
Eucinostomus gula	Silver jenny	1453	62	3.012	23.3	14.84	185.29
Eucinostomus harengulus	Tidewater mojarra	1453	82	8.01	16.8	14.84	173.53
Eugerres plumieri	Striped mojarra	23	8	12.77	4.94	0.23	11.76
Haemulon plumieri	White grunt	1	1	-1.69	31.7	0.01	1.47
Orthopristis chrysoptera	Pigfish	40	6	3.34	27.2	0.41	38.24
Lagodon rhomboides	Pinfish	11463	116	4.431	21.6	117.06	2979.41
Archosargus probatocephalus	Sheepshead	8	6	8.528	12.6	0.08	2.94
Diplodus holbrooki	Spottail pinfish	18	7	-1.16	30.4	0.18	8.82
Cynoscion nebulosus	Spotted seatrout	12	5	4.818	14.2	0.12	8.82
Bairdiella chrysoura	Silver perch	316	1	2.14	17	3.23	464.71
Leiostomus xanthurus	Spot	26259	76	5.641	17.6	268.17	6458.82
Menticirrhus saxatilis	Northern kingfish	1	1	1.7	24.5	0.01	1.47
Sciaenops ocellatus	Red drum	10	7	7.346	14.6	0.10	4.41
Cichlasoma spp.	Cichlasoma cichlids	13	1	11.45	8.8	0.13	19.12
Tilapia spp.	Tilapias	2	2	13.57	0.53	0.02	1.47
Tilapia melanotheron	Blackchin tilapia	1	1	13.69	5.75	0.01	1.47
Mugil cephalus	Striped mullet	1747	30	14.11	3.87	17.84	920.59
Mugil curema	White mullet	6	3	6.09	13.6	0.06	4.41
Mugil gyrans	Whirligig mullet	42	9	3.201	22	0.43	35.29
Sphyraena borealis	Northern sennet	6	1	4.02	30.8	0.06	8.82
Sphyraena barracuda	Great barracuda	1	1	3.07	18.4	0.01	1.47
Astroscopus y-graecum	Southern stargazer	1	1	2.35	25.5	0.01	1.47
Ctenogobius boleosoma	Darter goby	2	1	2.77	31.7	0.02	2.94
Ctenogobius smaragdus	Emerald goby	1	1	1.84	27.1	0.01	1.47
Gobiosoma spp.	Gobiosoma gobies	18	10	11.8	4.06	0.18	11.76
Gobiosoma bosc	Naked goby	42	18	11.59	7.6	0.43	11.76
Gobiosoma robustum	Code goby	2	2	2.89	17.6	0.02	1.47
Gobiosoma longipala	Twoscale goby	1	1	-0.08	28.3	0.01	1.47
Microgobius gulosus	Clown goby	137	32	12.2	4.67	1.40	61.76
Paralichthys albigutta	Gulf flounder	9	7	3.254	23.1	0.09	2.94
Trinectes maculatus	Hogchoker	92	23	13.84	3.73	0.94	14.71
Achirus lineatus	Lined sole	12	10	5.314	17.6	0.12	4.41
Stephanolepis hispidus	Planehead filefish	4	2	7.308	8.83	0.04	4.41
Sphoeroides nephelus	Southern puffer	91	29	2.376	23.2	0.93	19.12
	Unidentified species	1	1	5.34	21.1	0.01	1.47

Trawl catch statistics (October 2004 through September 2005, n=72).

Organisms are listed in phylogenetic order.

Taxon	Common Name	Number Collected	Collection Frequency	km_U (km)	S_U (psu)	Mean CPUE (No./100m^2)	Max CPUE (No./100m^2)
Farfantepenaeus duorarum	Pink shrimp	210	19	3.406	22.1	0.40	11.60
Palaemonetes intermedius	Brackish grass shrimp	379	7	0.468	29	0.88	59.87
Palaemonetes pugio	Daggerblade grass shrimp	8	2	15.02	0.43	0.02	1.08
Periclimenes longicaudatus	Longtail grass shrimp	107	3	-1.37	29	0.20	8.36
Palaemon floridanus	Florida grass shrimp	4	2	-1.47	28.1	0.01	0.40
Alpheus spp.	Snapping shrimp	1	1	0.37	29.2	0.00	0.17
Hippolyte zostericola	Zostera shrimp	15	4	-1.3	28.9	0.03	0.94
Lysmata wurdemanni	Peppermint shrimp	1	1	-1.24	28.9	0.00	0.13
Lysmata rathbunae	Rathbun cleaner shrimp	1	1	-1.57	29	0.00	0.13
Tozeuma carolinense	Arrow shrimp	872	6	-1.5	29	1.64	102.27
Thor dobkini	Squat grass shrimp	6	1	-1.57	29	0.01	0.81
Callinectes sapidus	Blue crab	107	37	3.805	22.5	0.21	1.72
Callinectes ornatus	Shelligs	1	1	5.13	4.4	0.00	0.15
Dasyatis sabina	Atlantic stingray	7	7	5.157	21.5	0.01	0.17
Dasyatis say	Bluntnose stingray	2	2	2.457	23	0.00	0.15
Lepisosteus osseus	Longnose gar	4	3	10.91	9.4	0.01	0.27
Amia calva	Bowfin	1	1	14.87	0.3	0.00	0.15
Elops saurus	Ladyfish	1	1	15.11	0.5	0.00	0.27
Anchoa mitchilli	Bay anchovy	888	13	12.68	5.93	2.13	75.33
Synodus foetens	Inshore lizardfish	36	22	4.855	21.6	0.07	0.75
Ariopsis felis	Hardhead catfish	8	3	3.841	17.6	0.02	0.54
Opsanus beta	Gulf toadfish	15	5	-1.28	27.1	0.04	2.02
Gobiesox strumosus	Skilletfish	1	1	5.02	22.6	0.00	0.13
Ogcocephalus radiatus	Polka-dot batfish	1	1	-1.44	30.6	0.00	0.13
Urophycis floridana	Southern hake	3	2	-0.45	27.6	0.01	0.27
Lucania parva	Rainwater killifish	119	4	-1.25	26.6	0.36	25.18
Menidia spp.	Silversides	1	1	-1.04	26.2	0.00	0.13
Labidesthes sicculus	Brook silverside	1	1	13.54	3.13	0.00	0.15
Syngnathus floridae	Dusky pipefish	41	9	-0.88	27.9	0.08	1.89
Syngnathus louisianae	Chain pipefish	6	3	3.317	24.5	0.01	0.40
Syngnathus scovelli	Gulf pipefish	14	8	1.587	27.9	0.03	0.67
Hippocampus erectus	Lined seahorse	1	1	1.09	27.5	0.00	0.13
Scorpaena brasiliensis	Barbfish	8	3	-1.36	28.3	0.02	0.54
Prionotus scitulus	Leopard searobin	14	8	1.525	27	0.03	0.49
Prionotus tribulus	Bighead searobin	13	7	7.654	19.1	0.03	0.75
Serranidae spp.	Sea basses	1	1	-1.54	25.3	0.00	0.15
Centropristis striata	Black sea bass	22	5	-1.39	28	0.05	1.21
Diplectrum formosum	Sand perch	3	1	-1.29	28	0.01	0.51
Lepomis macrochirus	Bluegill	14	4	14.85	0.54	0.03	1.35
Lepomis marginatus	Dollar sunfish	1	1	14.87	0.3	0.00	0.15
Micropterus salmoides	Largemouth bass	7	2	14.82	0.39	0.01	0.60
Lutjanus griseus	Gray snapper	9	8	0.059	24	0.02	0.30
Lutjanus synagris	Lane snapper	8	4	1.175	25.6	0.01	0.40
Ocyurus chrysurus	Yellowtail snapper	7	1	0.37	29.2	0.02	1.18
Eucinostomus spp.	Eucinostomus mojarras	849	28	8.651	12.3	1.69	51.42
Eucinostomus gula	Silver jenny	172	14	0.096	28.5	0.34	11.54
Eucinostomus harengulus	Tidewater mojarra	33	6	12.5	4.09	0.07	3.75
Diapterus plumieri	Striped mojarra	3	1	14.87	0.3	0.01	0.45
Haemulon plumieri	White grunt	33	6	-1.3	27.4	0.07	2.16
Orthopristis chrysoptera	Pigfish	50	7	-0.95	27.4	0.10	2.70
Lagodon rhomboides	Pinfish	2788	28	0.492	26.1	5.79	84.70
Archosargus probatocephalus	Sheepshead	48	13	4.078	21.3	0.09	2.02

Trawl catch statistics (October 2004 through September 2005, n=72).

Organisms are listed in phylogenetic order.

Taxon	Common Name	Number Collected	Collection Frequency	km_U (km)	S_U (psu)	Mean CPUE (No./100m^2)	Max CPUE (No./100m^2)
Diplodus holbrooki	Spottail pinfish	16	3	-1.38	26.2	0.04	1.80
Calamus arctifrons	Grass porgy	2	1	2.31	24.1	0.00	0.27
Cynoscion nebulosus	Spotted seatrout	16	6	3.372	18.1	0.03	0.94
Bairdiella chrysoura	Silver perch	28	7	-1.12	26	0.06	2.25
Leiostomus xanthurus	Spot	2354	14	6.821	16.6	5.08	142.26
Menticirrhus americanus	Southern kingfish	13	4	4.978	20.3	0.03	0.81
Menticirrhus saxatilis	Northern kingfish	1	1	6.4	23.9	0.00	0.13
Pogonias cromis	Black drum	2	2	4.62	12.2	0.00	0.13
Sciaenops ocellatus	Red drum	9	2	10.14	6.15	0.02	0.94
Chaetodipterus faber	Atlantic spadefish	2	2	1.265	24.2	0.00	0.13
Sphyraena barracuda	Great barracuda	1	1	-1.54	25.3	0.00	0.15
Lachnolaimus maximus	Hogfish	3	1	-1.54	25.3	0.01	0.45
Nicholsina usta	Emerald parrotfish	10	5	-1.02	28.4	0.02	0.54
Paraclinus fasciatus	Banded blenny	1	1	-1.29	26.5	0.00	0.22
Gobiosoma spp.	Gobiosoma gobies	5	3	0.647	24.9	0.01	0.67
Gobiosoma bosc	Naked goby	2	1	14.76	0.5	0.00	0.30
Gobiosoma robustum	Code goby	13	3	-0.49	27.6	0.03	1.35
Microgobius gulosus	Clown goby	35	13	11.92	7.03	0.07	1.95
Paralichthys albigutta	Gulf flounder	28	17	1.801	27	0.06	0.51
Ancylopsetta quadrocellata	Ocellated flounder	1	1	-0.09	28.6	0.00	0.13
Trinectes maculatus	Hogchoker	29	8	10.83	7.32	0.06	2.25
Achirus lineatus	Lined sole	6	5	1.104	26.4	0.01	0.25
Symphurus plagiusa	Blackcheek tonguefish	23	8	2.318	22.5	0.04	0.67
Monacanthidae spp.	Filefishes	7	1	-1.54	25.3	0.01	1.05
Aluterus schoepfii	Orange filefish	1	1	-0.94	32.4	0.00	0.15
Monacanthus ciliatus	Fringed filefish	8	3	-1.44	26.1	0.02	0.75
Stephanolepis hispidus	Planehead filefish	33	4	-0.68	27.2	0.06	2.02
Acanthostracion quadricornis	Scrawled cowfish	5	4	-1.12	27.7	0.01	0.30
Sphoeroides nephelus	Southern puffer	80	21	2.4	24.6	0.15	1.21
Chilomycterus schoepfii	Striped burrfish	30	13	-0.21	28.3	0.06	1.08

Table B3. Page 1 of 4.

Seine catch by month (October 2004 through September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (12)	Feb (12)	Mar (12)	Apr (12)	May (12)	Jun (12)	Jul (12)	Aug (12)	Sep (12)	Oct (12)	Nov (12)	Dec (12)
Farfantepenaeus duorarum	Pink shrimp	7	0	5	2	1	0	12	0	0	39	8	6
Palaemonetes intermedius	Brackish grass shrimp	1031	90	85	9	4	0	11	0	0	0	11	27
Palaemonetes paludosus	Riverine grass shrimp	0	0	0	0	3	0	0	0	0	0	0	0
Palaemonetes pugio	Daggerblade grass shrimp	650	47	741	1627	138	0	0	0	0	2	256	640
Palaemon floridanus	Florida grass shrimp	0	0	0	0	0	0	0	0	0	0	0	2
Alpheus spp.	Snapping shrimp	0	0	1	0	0	0	0	0	0	0	0	0
Tozeuma carolinense	Arrow shrimp	0	0	0	0	0	0	0	0	2	0	0	0
Ambidexter symmetricus	Night shrimp	1	0	0	0	0	0	0	0	0	0	0	0
Callinectes sapidus	Blue crab	79	21	38	32	17	8	5	4	1	47	6	8
Rhinoptera bonasus	Cownose ray	0	0	0	0	0	1	0	0	0	0	0	0
Amia calva	Bowfin	0	0	1	0	0	1	0	0	0	0	2	0
Elops saurus	Ladyfish	0	0	0	0	0	0	2	0	0	0	0	0
Brevoortia spp.	Menhadens	0	1	0	38	1	0	0	0	0	0	0	0
Harengula jaguana	Scaled sardine	1	0	0	0	0	0	0	0	0	0	0	0
Anchoa hepsetus	Striped anchovy	0	0	0	0	16	0	0	0	0	0	0	0
Anchoa mitchilli	Bay anchovy	35	1	6	3909	1775	0	50	10	1	43	2	87
Synodus foetens	Inshore lizardfish	0	4	1	2	4	4	2	2	3	4	5	3
Notropis petersoni	Coastal shiner	1	498	326	0	0	0	0	0	0	0	11	0
Loricariidae spp.	Suckermouth catfish	0	0	0	0	0	0	0	1	0	0	0	0
Opsanus beta	Gulf toadfish	0	0	0	0	0	0	1	0	0	0	0	0
Hyporhamphus unifasciatus	Silverstripe halfbeak	0	0	0	0	0	1	0	0	0	0	0	0
Hyporhamphus meeki	False silverstripe halfbeak	0	0	0	0	0	1	0	0	0	0	0	0
Strongylura spp.	Needlefishes	0	0	0	0	2	1	0	0	0	0	0	0
Strongylura marina	Atlantic needlefish	0	0	0	0	0	0	0	1	0	0	0	0
Strongylura notata	Redfin needlefish	0	0	0	0	2	25	70	69	10	3	3	16
Strongylura timucu	Timucu	0	0	0	0	0	0	0	0	6	1	3	1
Cyprinodon variegatus	Sheepshead minnow	3	9	7	24	0	0	6	0	0	0	0	5
Fundulus confluentus	Marsh killifish	2	0	1	1	0	0	0	0	0	0	0	0
Fundulus similis	Striped killifish	0	0	0	0	0	0	0	0	0	1	6	3
Fundulus grandis	Gulf killifish	29	0	6	1	1	0	19	0	1	0	3	5

Table B3. Page 2 of 4.

Seine catch by month (October 2004 through September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (12)	Feb (12)	Mar (12)	Apr (12)	May (12)	Jun (12)	Jul (12)	Aug (12)	Sep (12)	Oct (12)	Nov (12)	Dec (12)
Lucania parva	Rainwater killifish	22	3	14	6	0	1	28	8	4	0	0	1
Lucania goodei	Bluefin killifish	0	9	0	32	0	0	10	1	0	0	241	1
Floridichthys carpio	Goldspotted killifish	277	201	8	96	0	0	288	6	28	76	15	49
Gambusia holbrooki	Eastern mosquitofish	3	331	3	226	0	1	1	0	48	1	162	1
Poecilia latipinna	Sailfin molly	1	1	1	70	17	0	0	0	35	0	17	1
Menidia spp.	Silversides	299	270	353	160	247	752	199	29	285	126	540	162
Labidesthes sicculus	Brook silverside	4	15	1	14	2	7	3	0	37	22	90	15
Syngnathus floridae	Dusky pipefish	0	0	0	0	0	0	0	0	0	0	0	1
Syngnathus louisianae	Chain pipefish	0	0	0	0	0	0	0	0	0	3	1	1
Syngnathus scovelli	Gulf pipefish	0	1	3	1	2	7	21	0	0	1	1	3
Prionotus tribulus	Bighead searobin	0	0	0	0	0	0	0	0	0	3	3	0
Centropomus undecimalis	Common snook	0	0	0	0	0	1	0	1	2	1	0	0
Lepomis spp.	Sunfishes	0	0	0	0	0	0	0	0	0	3	4	0
Lepomis auritus	Redbreast sunfish	0	0	0	0	0	0	0	0	0	0	2	0
Lepomis gulosus	Warmouth	0	0	0	0	0	0	0	0	0	0	2	0
Lepomis macrochirus	Bluegill	0	0	16	1	13	4	0	4	18	27	62	9
Lepomis marginatus	Dollar sunfish	0	0	4	0	0	0	0	0	0	4	9	1
Lepomis microlophus	Redear sunfish	0	0	0	0	0	0	0	0	0	2	9	0
Lepomis punctatus	Spotted sunfish	0	0	0	0	0	0	0	0	0	0	2	0
Micropterus salmoides	Largemouth bass	0	1	0	0	0	1	1	5	4	3	0	0
Etheostoma fusiforme	Swamp darter	0	0	0	0	0	0	0	0	0	0	2	1
Caranx hippos	Crevalle jack	0	0	0	0	0	0	0	0	1	0	0	0
Caranx latus	Horse-eye jack	0	0	0	0	0	0	0	0	0	0	1	0
Oligoplites saurus	Leatherjack	0	0	0	0	0	0	7	9	10	0	1	0
Trachinotus falcatus	Permit	0	0	0	0	0	0	0	0	2	1	4	0
Lutjanus griseus	Gray snapper	0	0	0	0	0	0	1	0	0	3	0	0
Eucinostomus spp.	Eucinostomus mojarras	355	641	365	355	72	1	638	8	22	379	817	805
Eucinostomus gula	Silver jenny	101	51	3	121	56	56	17	110	185	223	313	217
Eucinostomus harengulus	Tidewater mojarra	17	36	64	139	104	213	110	182	212	79	146	151
Eugerres plumieri	Striped mojarra	4	0	0	0	0	0	0	0	4	11	1	3

Seine catch by month (October 2004 through September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (12)	Feb (12)	Mar (12)	Apr (12)	May (12)	Jun (12)	Jul (12)	Aug (12)	Sep (12)	Oct (12)	Nov (12)	Dec (12)
Haemulon plumieri	White grunt	0	0	0	0	0	0	1	0	0	0	0	0
Orthopristis chrysoptera	Pigfish	0	0	0	0	1	28	10	1	0	0	0	0
Lagodon rhomboides	Pinfish	909	2945	4551	1169	609	407	567	37	66	59	42	102
Archosargus probatocephalus	Sheepshead	0	0	0	0	0	1	2	3	0	0	0	2
Diplodus holbrooki	Spottail pinfish	0	0	0	0	0	8	5	0	3	1	1	0
Cynoscion nebulosus	Spotted seatrout	0	0	0	0	0	0	5	0	0	6	1	0
Bairdiella chrysoura	Silver perch	0	0	0	0	0	0	316	0	0	0	0	0
Leiostomus xanthurus	Spot	15045	5973	2907	990	996	250	87	2	4	0	5	0
Menticirrhus saxatilis	Northern kingfish	0	0	0	0	1	0	0	0	0	0	0	0
Sciaenops ocellatus	Red drum	2	0	0	0	1	0	0	0	2	0	4	1
Cichlasoma spp.	Cichlasoma cichlids	0	0	0	0	0	0	0	0	0	0	13	0
Tilapia spp.	Tilapias	0	0	0	0	1	0	0	1	0	0	0	0
Tilapia melanotheron	Blackchin tilapia	0	0	0	0	0	0	0	0	1	0	0	0
Mugil cephalus	Striped mullet	60	315	293	345	649	73	4	0	0	0	6	2
Mugil curema	White mullet	0	0	0	0	1	0	3	0	0	0	2	0
Mugil gyrans	Whirligig mullet	0	0	2	0	0	0	2	0	0	3	35	0
Sphyraena borealis	Northern sennet	0	0	0	0	0	6	0	0	0	0	0	0
Sphyraena barracuda	Great barracuda	0	0	0	0	0	0	0	0	0	1	0	0
Astroscopus y-graecum	Southern stargazer	0	0	1	0	0	0	0	0	0	0	0	0
Ctenogobius boleosoma	Darter goby	0	0	0	0	0	2	0	0	0	0	0	0
Ctenogobius smaragdus	Emerald goby	0	0	0	1	0	0	0	0	0	0	0	0
Gobiosoma spp.	Gobiosoma gobies	0	0	1	0	0	0	1	10	0	2	3	1
Gobiosoma bosc	Naked goby	0	6	6	4	0	0	3	6	0	1	1	15
Gobiosoma robustum	Code goby	0	0	0	0	0	0	1	0	0	1	0	0
Gobiosoma longipala	Twoscale goby	0	0	1	0	0	0	0	0	0	0	0	0
Microgobius gulosus	Clown goby	2	7	3	7	1	2	11	20	11	7	11	55
Paralichthys albigutta	Gulf flounder	0	2	2	0	2	0	1	1	0	0	1	0
Trinectes maculatus	Hogchoker	0	7	3	3	20	7	1	7	7	13	7	17
Achirus lineatus	Lined sole	0	0	0	0	2	0	2	0	1	4	1	2
Stephanolepis hispidus	Planehead filefish	0	0	0	0	0	0	1	0	0	3	0	0

Table B3. Page 4 of 4.

Seine catch by month (October 2004 through September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (12)	Feb (12)	Mar (12)	Apr (12)	May (12)	Jun (12)	Jul (12)	Aug (12)	Sep (12)	Oct (12)	Nov (12)	Dec (12)
Sphoeroides nephelus	Southern puffer	4	5	12	1	28	5	4	0	0	19	4	9
	Unidentified species	0	1	0	0	0	0	0	0	0	0	0	0

Table B4. Page 1 of 3.

Trawl catch by month (October 2004 through September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (6)	Feb (6)	Mar (6)	Apr (6)	May (6)	Jun (6)	Jul (6)	Aug (6)	Sep (6)	Oct (6)	Nov (6)	Dec (6)
Farfantepenaeus duorarum	Pink shrimp	15	8	0	5	2	0	16	0	5	30	87	42
Palaemonetes intermedius	Brackish grass shrimp	10	0	0	356	2	0	0	1	7	0	0	3
Palaemonetes pugio	Daggerblade grass shrimp	4	0	0	4	0	0	0	0	0	0	0	0
Periclimenes longicaudatus	Longtail grass shrimp	0	40	0	5	0	0	0	0	0	0	0	62
Palaemon floridanus	Florida grass shrimp	0	3	0	0	0	0	0	0	1	0	0	0
Alpheus spp.	Snapping shrimp	0	0	0	1	0	0	0	0	0	0	0	0
Hippolyte zostericola	Zostera shrimp	0	7	0	5	0	0	0	0	2	0	0	1
Lysmata wurdemanni	Peppermint shrimp	0	0	0	0	0	0	0	0	0	0	0	1
Lysmata rathbunae	Rathbun cleaner shrimp	0	1	0	0	0	0	0	0	0	0	0	0
Tozeuma carolinense	Arrow shrimp	0	758	0	25	0	0	0	0	2	0	0	87
Thor dobkini	Squat grass shrimp	0	6	0	0	0	0	0	0	0	0	0	0
Callinectes sapidus	Blue crab	9	12	5	13	13	5	7	6	6	8	7	16
Callinectes ornatus	Shelligs	0	0	0	0	0	0	1	0	0	0	0	0
Dasyatis sabina	Atlantic stingray	0	3	1	0	1	0	0	0	0	0	1	1
Dasyatis say	Bluntnose stingray	1	0	0	0	1	0	0	0	0	0	0	0
Lepisosteus osseus	Longnose gar	2	1	1	0	0	0	0	0	0	0	0	0
Amia calva	Bowfin	1	0	0	0	0	0	0	0	0	0	0	0
Elops saurus	Ladyfish	0	0	0	1	0	0	0	0	0	0	0	0
Anchoa mitchilli	Bay anchovy	161	335	0	1	5	0	1	0	9	125	2	249
Synodus foetens	Inshore lizardfish	5	6	0	1	4	0	1	2	2	5	4	6
Ariopsis felis	Hardhead catfish	0	0	0	0	0	0	2	2	0	4	0	0
Opsanus beta	Gulf toadfish	0	0	0	0	0	2	0	0	9	1	2	1
Gobiesox strumosus	Skilletfish	0	0	0	0	0	0	0	0	0	0	1	0
Ogcocephalus radiatus	Polka-dot batfish	0	0	1	0	0	0	0	0	0	0	0	0
Urophycis floridana	Southern hake	0	3	0	0	0	0	0	0	0	0	0	0
Lucania parva	Rainwater killifish	0	0	0	2	0	3	0	0	114	0	0	0
Menidia spp.	Silversides	0	0	0	0	1	0	0	0	0	0	0	0
Labidesthes sicculus	Brook silverside	0	0	0	0	0	0	0	0	0	0	0	1
Syngnathus floridae	Dusky pipefish	7	7	0	2	0	2	0	0	0	0	2	21
Syngnathus louisianae	Chain pipefish	0	0	0	0	0	0	0	0	0	0	1	5
Syngnathus scovelli	Gulf pipefish	0	1	1	3	1	1	1	0	1	0	0	5
Hippocampus erectus	Lined seahorse	0	0	0	0	0	0	0	0	0	0	0	1

Trawl catch by month (October 2004 through September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (6)	Feb (6)	Mar (6)	Apr (6)	May (6)	Jun (6)	Jul (6)	Aug (6)	Sep (6)	Oct (6)	Nov (6)	Dec (6)
Scorpaena brasiliensis	Barbfish	0	0	0	2	0	0	0	0	0	0	2	4
Prionotus scitulus	Leopard searobin	1	3	5	0	0	0	3	0	0	1	0	1
Prionotus tribulus	Bighead searobin	1	9	1	0	0	0	0	0	0	0	0	2
Serranidae spp.	Sea basses	0	0	0	0	0	0	0	0	0	0	1	0
Centropristis striata	Black sea bass	0	9	0	0	0	0	0	2	3	0	4	4
Diplectrum formosum	Sand perch	0	0	0	0	0	0	0	0	0	3	0	0
Lepomis macrochirus	Bluegill	9	0	0	0	0	0	1	0	1	3	0	0
Lepomis marginatus	Dollar sunfish	1	0	0	0	0	0	0	0	0	0	0	0
Micropterus salmoides	Largemouth bass	4	0	0	0	3	0	0	0	0	0	0	0
Lutjanus griseus	Gray snapper	2	0	0	0	0	1	1	0	2	0	2	1
Lutjanus synagris	Lane snapper	0	0	0	0	0	0	0	0	0	2	1	5
Ocyurus chrysurus	Yellowtail snapper	0	0	0	7	0	0	0	0	0	0	0	0
Eucinostomus spp.	Eucinostomus mojarras	36	1	0	0	0	9	44	4	1	6	222	526
Eucinostomus gula	Silver jenny	3	0	0	5	0	0	2	78	15	9	6	54
Eucinostomus harengulus	Tidewater mojarra	27	0	0	0	0	0	2	2	1	0	1	0
Diapterus plumieri	Striped mojarra	3	0	0	0	0	0	0	0	0	0	0	0
Haemulon plumieri	White grunt	10	1	0	0	0	2	0	0	3	1	0	16
Orthopristis chrysoptera	Pigfish	0	3	0	0	4	6	0	0	0	7	18	12
Lagodon rhomboides	Pinfish	707	884	7	250	9	309	2	20	55	28	196	321
Archosargus probatocephalus	Sheepshead	15	4	0	0	4	0	2	1	16	1	2	3
Diplodus holbrooki	Spottail pinfish	0	0	0	0	0	0	0	0	8	0	7	1
Calamus arctifrons	Grass porgy	0	0	0	0	2	0	0	0	0	0	0	0
Cynoscion nebulosus	Spotted seatrout	0	0	0	1	0	0	5	0	9	1	0	0
Bairdiella chrysoura	Silver perch	0	3	0	0	0	1	1	0	0	1	15	7
Leiostomus xanthurus	Spot	659	1675	3	5	12	0	0	0	0	0	0	0
Menticirrhus americanus	Southern kingfish	0	0	0	0	0	0	2	0	4	1	6	0
Menticirrhus saxatilis	Northern kingfish	0	0	0	0	1	0	0	0	0	0	0	0
Pogonias cromis	Black drum	0	0	0	0	0	0	1	0	0	1	0	0
Sciaenops ocellatus	Red drum	0	0	0	0	0	0	0	0	0	7	2	0
Chaetodipterus faber	Atlantic spadefish	0	0	0	0	0	0	0	0	1	1	0	0
Sphyraena barracuda	Great barracuda	0	0	0	0	0	0	0	0	0	0	1	0
Lachnolaimus maximus	Hogfish	0	0	0	0	0	0	0	0	0	0	3	0

Trawl catch by month (October 2004 through September 2005).

Number of monthly samples is indicated in parentheses.

Taxon	Common Name	Jan (6)	Feb (6)	Mar (6)	Apr (6)	May (6)	Jun (6)	Jul (6)	Aug (6)	Sep (6)	Oct (6)	Nov (6)	Dec (6)
Nicholsina usta	Emerald parrotfish	0	1	1	2	0	0	0	0	0	0	2	4
Paraclinus fasciatus	Banded blenny	0	0	0	0	0	0	0	0	1	0	0	0
Gobiosoma spp.	Gobiosoma gobies	0	0	0	1	0	0	0	0	4	0	0	0
Gobiosoma bosc	Naked goby	0	0	0	0	2	0	0	0	0	0	0	0
Gobiosoma robustum	Code goby	0	0	0	6	0	0	0	0	6	0	0	1
Microgobius gulosus	Clown goby	0	0	0	0	1	0	6	3	20	2	2	1
Paralichthys albigutta	Gulf flounder	1	3	6	3	2	1	1	3	3	3	0	2
Ancylopsetta quadrocellata	Ocellated flounder	0	0	0	0	0	0	1	0	0	0	0	0
Trinectes maculatus	Hogchoker	1	0	0	0	0	0	16	0	3	8	0	1
Achirus lineatus	Lined sole	0	0	0	0	0	0	0	0	1	2	0	3
Symphurus plagiusa	Blackcheek tonguefish	0	0	0	0	0	0	2	0	1	10	6	4
Monacanthidae spp.	Filefishes	0	0	0	0	0	0	0	0	0	0	7	0
Aluterus schoepfii	Orange filefish	0	0	0	0	0	1	0	0	0	0	0	0
Monacanthus ciliatus	Fringed filefish	5	2	0	0	0	0	0	0	0	0	0	1
Stephanolepis hispidus	Planehead filefish	0	0	0	0	0	0	0	0	0	0	11	22
Acanthostracion quadricornis	Scrawled cowfish	0	1	2	0	0	0	0	0	0	0	2	0
Sphoeroides nephelus	Southern puffer	7	8	8	3	18	7	2	0	0	7	9	11
Chilomycterus schoepfii	Striped burrfish	0	4	0	2	1	4	0	1	1	1	2	14

Table B5, page 1 of 2. Location-specific seine catch.

Data are presented as mean number per 100m^2.

Organisms are listed in phylogenetic order.

Taxon	Common Name	Location (km from mouth) -1.8-0.0	0.0-2.4	2.4-5.4	5.4-9.8	9.8-13.2	13.2-16.1
Farfantepenaeus duorarum	Pink shrimp	0.368	1.042	1.838	1.287	0.368	0.000
Palaemonetes intermedius	Brackish grass shrimp	7.966	4.779	63.664	1.287	0.000	0.000
Palaemonetes paludosus	Riverine grass shrimp	0.000	0.000	0.184	0.000	0.000	0.000
Palaemonetes pugio	Daggerblade grass shrimp	0.000	0.061	0.000	0.674	118.260	132.292
Palaemon floridanus	Florida grass shrimp	0.000	0.123	0.000	0.000	0.000	0.000
Alpheus spp.	Snapping shrimp	0.000	0.000	0.061	0.000	0.000	0.000
Tozeuma carolinense	Arrow shrimp	0.123	0.000	0.000	0.000	0.000	0.000
Ambidexter symmetricus	Night shrimp	0.000	0.061	0.000	0.000	0.000	0.000
Callinectes sapidus	Blue crab	0.551	5.821	4.228	1.287	3.309	1.103
Rhinoptera bonasus	Cownose ray	0.000	0.061	0.000	0.000	0.000	0.000
Amia calva	Bowfin	0.000	0.000	0.000	0.000	0.000	0.245
Elops saurus	Ladyfish	0.000	0.000	0.000	0.000	0.123	0.000
Brevoortia spp.	Menhadens	0.000	0.061	2.328	0.000	0.000	0.061
Harengula jaguana	Scaled sardine	0.000	0.000	0.061	0.000	0.000	0.000
Anchoa hepsetus	Striped anchovy	0.000	0.980	0.000	0.000	0.000	0.000
Anchoa mitchilli	Bay anchovy	0.000	66.176	242.463	45.772	5.760	2.512
Synodus foetens	Inshore lizardfish	0.245	0.184	0.797	0.551	0.306	0.000
Notropis petersoni	Coastal shiner	0.000	0.000	0.000	0.000	0.000	51.225
Loricariidae spp.	Suckermouth catfish	0.000	0.000	0.000	0.000	0.000	0.061
Opsanus beta	Gulf toadfish	0.000	0.000	0.000	0.000	0.061	0.000
Hyporhamphus unifasciatus	Silverstripe halfbeak	0.061	0.000	0.000	0.000	0.000	0.000
Hyporhamphus meeki	False silverstripe halfbeak	0.061	0.000	0.000	0.000	0.000	0.000
Strongylura spp.	Needlefishes	0.000	0.184	0.000	0.000	0.000	0.000
Strongylura marina	Atlantic needlefish	0.000	0.000	0.061	0.000	0.000	0.000
Strongylura notata	Redfin needlefish	4.105	2.145	3.431	2.206	0.245	0.000
Strongylura timucu	Timucu	0.061	0.368	0.184	0.061	0.000	0.000
Cyprinodon variegatus	Sheepshead minnow	2.206	0.797	0.000	0.061	0.245	0.000
Fundulus confluentus	Marsh killifish	0.000	0.000	0.000	0.000	0.184	0.061
Fundulus similis	Striped killifish	0.000	0.123	0.490	0.000	0.000	0.000
Fundulus grandis	Gulf killifish	1.225	0.797	0.551	0.429	0.919	0.061
Lucania parva	Rainwater killifish	2.512	1.838	0.123	0.000	0.858	0.000
Lucania goodei	Bluefin killifish	0.000	0.000	0.000	0.000	0.061	17.953
Floridichthys carpio	Goldspotted killifish	24.510	21.140	18.260	0.061	0.000	0.000
Gambusia holbrooki	Eastern mosquitofish	0.000	0.000	0.000	0.000	0.061	47.549
Poecilia latipinna	Sailfin molly	0.000	0.061	0.000	0.061	6.066	2.574
Menidia spp.	Silversides	0.858	39.767	22.488	59.130	51.961	35.478
Labidesthes sicculus	Brook silverside	0.000	0.000	0.000	0.000	0.000	12.868
Syngnathus floridae	Dusky pipefish	0.000	0.000	0.000	0.061	0.000	0.000
Syngnathus louisianae	Chain pipefish	0.061	0.000	0.184	0.000	0.061	0.000
Syngnathus scovelli	Gulf pipefish	0.123	1.409	0.368	0.123	0.429	0.000
Prionotus tribulus	Bighead searobin	0.000	0.000	0.306	0.061	0.000	0.000
Centropomus undecimalis	Common snook	0.123	0.000	0.000	0.061	0.123	0.000
Lepomis spp.	Sunfishes	0.000	0.000	0.000	0.000	0.000	0.429
Lepomis auritus	Redbreast sunfish	0.000	0.000	0.000	0.000	0.000	0.123
Lepomis gulosus	Warmouth	0.000	0.000	0.000	0.000	0.000	0.123
Lepomis macrochirus	Bluegill	0.000	0.000	0.000	0.061	0.306	9.069
Lepomis marginatus	Dollar sunfish	0.000	0.000	0.000	0.000	0.000	1.103
Lepomis microlophus	Redear sunfish	0.000	0.000	0.000	0.000	0.000	0.674
Lepomis punctatus	Spotted sunfish	0.000	0.000	0.000	0.000	0.000	0.123
Micropterus salmoides	Largemouth bass	0.000	0.000	0.000	0.000	0.184	0.735
Etheostoma fusiforme	Swamp darter	0.000	0.000	0.000	0.000	0.000	0.184
Caranx hippos	Crevalle jack	0.000	0.000	0.000	0.000	0.000	0.061
Caranx latus	Horse-eye jack	0.000	0.000	0.000	0.000	0.061	0.000
Oligoplites saurus	Leatherjack	0.061	0.735	0.490	0.245	0.123	0.000
Trachinotus falcatus	Permit	0.000	0.306	0.061	0.061	0.000	0.000
Lutjanus griseus	Gray snapper	0.061	0.000	0.000	0.184	0.000	0.000
Eucinostomus spp.	Eucinostomus mojarras	16.789	25.735	46.385	24.755	103.983	55.515
Eucinostomus gula	Silver jenny	6.740	26.532	49.755	5.944	0.061	0.000
Eucinostomus harengulus	Tidewater mojarra	0.000	7.047	25.000	22.120	22.733	12.132

Table B5, page 2 of 2. Location-specific seine catch.

Data are presented as mean number per 100m^2.

Organisms are listed in phylogenetic order.

		Location (km from mouth)					
Taxon	Common Name	-1.8-0.0	0.0-2.4	2.4-5.4	5.4-9.8	9.8-13.2	13.2-16.1
Eugerres plumieri	Striped mojarra	0.000	0.000	0.000	0.184	0.490	0.735
Haemulon plumieri	White grunt	0.061	0.000	0.000	0.000	0.000	0.000
Orthopristis chrysoptera	Pigfish	0.000	0.797	1.654	0.000	0.000	0.000
Lagodon rhomboides	Pinfish	89.093	80.699	367.279	73.407	89.461	2.451
Archosargus probatocephalus	Sheepshead	0.000	0.061	0.000	0.245	0.184	0.000
Diplodus holbrooki	Spottail pinfish	1.103	0.000	0.000	0.000	0.000	0.000
Cynoscion nebulosus	Spotted seatrout	0.000	0.123	0.368	0.184	0.061	0.000
Bairdiella chrysoura	Silver perch	0.000	19.363	0.000	0.000	0.000	0.000
Leiostomus xanthurus	Spot	173.591	415.931	295.956	112.316	541.238	69.975
Menticirrhus saxatilis	Northern kingfish	0.000	0.061	0.000	0.000	0.000	0.000
Sciaenops ocellatus	Red drum	0.184	0.000	0.000	0.000	0.368	0.061
Cichlasoma spp.	Cichlasoma cichlids	0.000	0.000	0.000	0.000	0.797	0.000
Tilapia spp.	Tilapias	0.000	0.000	0.000	0.000	0.061	0.061
Tilapia melanotheron	Blackchin tilapia	0.000	0.000	0.000	0.000	0.000	0.061
Mugil cephalus	Striped mullet	0.797	0.061	4.718	0.490	16.912	84.069
Mugil curema	White mullet	0.000	0.061	0.000	0.306	0.000	0.000
Mugil gyrans	Whirligig mullet	0.306	0.368	1.593	0.184	0.123	0.000
Sphyraena borealis	Northern sennet	0.000	0.000	0.368	0.000	0.000	0.000
Sphyraena barracuda	Great barracuda	0.000	0.000	0.061	0.000	0.000	0.000
Astroscopus y-graecum	Southern stargazer	0.000	0.061	0.000	0.000	0.000	0.000
Ctenogobius boleosoma	Darter goby	0.000	0.000	0.123	0.000	0.000	0.000
Ctenogobius smaragdus	Emerald goby	0.000	0.061	0.000	0.000	0.000	0.000
Gobiosoma spp.	Gobiosoma gobies	0.000	0.000	0.123	0.123	0.123	0.735
Gobiosoma bosc	Naked goby	0.000	0.061	0.245	0.306	0.858	1.103
Gobiosoma robustum	Code goby	0.000	0.000	0.123	0.000	0.000	0.000
Gobiosoma longipala	Twoscale goby	0.061	0.000	0.000	0.000	0.000	0.000
Microgobius gulosus	Clown goby	0.000	0.123	0.245	0.368	4.841	2.819
Paralichthys albigutta	Gulf flounder	0.000	0.245	0.184	0.123	0.000	0.000
Trinectes maculatus	Hogchoker	0.000	0.000	0.000	0.123	1.348	4.167
Achirus lineatus	Lined sole	0.000	0.061	0.368	0.245	0.061	0.000
Stephanolepis hispidus	Planehead filefish	0.000	0.061	0.000	0.184	0.000	0.000
Sphoeroides nephelus	Southern puffer	0.490	3.064	1.532	0.306	0.184	0.000
	Unidentified species	0.000	0.000	0.061	0.000	0.000	0.000

Table B6, page 1 of 2. Location-specific trawl catch.

Data are presented as mean number per 100m^2.

Organisms are listed in phylogenetic order.

Taxon	Common Name	Location (km from mouth) -1.8-0.0	0.0-2.4	2.4-5.4	5.4-9.8	9.8-13.2	13.2-16.1
Farfantepenaeus duorarum	Pink shrimp	0.166	0.390	1.835	0.027	0.000	0.000
Palaemonetes intermedius	Brackish grass shrimp	0.012	5.124	0.137	0.000	0.000	0.000
Palaemonetes pugio	Daggerblade grass shrimp	0.000	0.000	0.000	0.000	0.000	0.140
Periclimenes longicaudatus	Longtail grass shrimp	1.209	0.000	0.000	0.000	0.000	0.000
Palaemon floridanus	Florida grass shrimp	0.052	0.000	0.000	0.000	0.000	0.000
Alpheus spp.	Snapping shrimp	0.000	0.014	0.000	0.000	0.000	0.000
Hippolyte zostericola	Zostera shrimp	0.179	0.011	0.000	0.000	0.000	0.000
Lysmata wurdemanni	Peppermint shrimp	0.011	0.000	0.000	0.000	0.000	0.000
Lysmata rathbunae	Rathbun cleaner shrimp	0.011	0.000	0.000	0.000	0.000	0.000
Tozeuma carolinense	Arrow shrimp	9.730	0.112	0.000	0.000	0.000	0.000
Thor dobkini	Squat grass shrimp	0.067	0.000	0.000	0.000	0.000	0.000
Callinectes sapidus	Blue crab	0.120	0.263	0.627	0.180	0.045	0.042
Callinectes ornatus	Shelligs	0.000	0.000	0.012	0.000	0.000	0.000
Dasyatis sabina	Atlantic stingray	0.011	0.014	0.023	0.022	0.012	0.000
Dasyatis say	Bluntnose stingray	0.000	0.011	0.012	0.000	0.000	0.000
Lepisosteus osseus	Longnose gar	0.000	0.000	0.000	0.012	0.034	0.000
Amia calva	Bowfin	0.000	0.000	0.000	0.000	0.000	0.012
Elops saurus	Ladyfish	0.000	0.000	0.000	0.000	0.000	0.022
Anchoa mitchilli	Bay anchovy	0.000	0.090	1.046	0.195	1.990	9.485
Synodus foetens	Inshore lizardfish	0.037	0.079	0.108	0.184	0.011	0.000
Ariopsis felis	Hardhead catfish	0.000	0.045	0.025	0.025	0.000	0.000
Opsanus beta	Gulf toadfish	0.244	0.000	0.000	0.000	0.000	0.000
Gobiesox strumosus	Skilletfish	0.000	0.000	0.011	0.000	0.000	0.000
Ogcocephalus radiatus	Polka-dot batfish	0.011	0.000	0.000	0.000	0.000	0.000
Urophycis floridana	Southern hake	0.022	0.014	0.000	0.000	0.000	0.000
Lucania parva	Rainwater killifish	2.161	0.022	0.000	0.000	0.000	0.000
Menidia spp.	Silversides	0.011	0.000	0.000	0.000	0.000	0.000
Labidesthes sicculus	Brook silverside	0.000	0.000	0.000	0.000	0.000	0.012
Syngnathus floridae	Dusky pipefish	0.386	0.082	0.010	0.000	0.000	0.000
Syngnathus louisianae	Chain pipefish	0.000	0.034	0.020	0.000	0.011	0.000
Syngnathus scovelli	Gulf pipefish	0.000	0.135	0.023	0.010	0.000	0.000
Hippocampus erectus	Lined seahorse	0.000	0.011	0.000	0.000	0.000	0.000
Scorpaena brasiliensis	Barbfish	0.095	0.000	0.000	0.000	0.000	0.000
Prionotus scitulus	Leopard searobin	0.048	0.039	0.076	0.000	0.000	0.000
Prionotus tribulus	Bighead searobin	0.000	0.014	0.020	0.073	0.049	0.000
Serranidae spp.	Sea basses	0.012	0.000	0.000	0.000	0.000	0.000
Centropristis striata	Black sea bass	0.277	0.000	0.000	0.000	0.000	0.000
Diplectrum formosum	Sand perch	0.042	0.000	0.000	0.000	0.000	0.000
Lepomis macrochirus	Bluegill	0.000	0.000	0.000	0.000	0.000	0.171
Lepomis marginatus	Dollar sunfish	0.000	0.000	0.000	0.000	0.000	0.012
Micropterus salmoides	Largemouth bass	0.000	0.000	0.000	0.000	0.000	0.087
Lutjanus griseus	Gray snapper	0.080	0.024	0.012	0.000	0.000	0.000
Lutjanus synagris	Lane snapper	0.034	0.022	0.034	0.000	0.000	0.000
Ocyurus chrysurus	Yellowtail snapper	0.000	0.098	0.000	0.000	0.000	0.000
Eucinostomus spp.	Eucinostomus mojarras	0.978	1.430	1.726	0.055	1.066	4.868
Eucinostomus gula	Silver jenny	1.187	0.800	0.070	0.000	0.000	0.000
Eucinostomus harengulus	Tidewater mojarra	0.025	0.011	0.036	0.000	0.022	0.312
Diapterus plumieri	Striped mojarra	0.000	0.000	0.000	0.000	0.000	0.037
Haemulon plumieri	White grunt	0.411	0.000	0.000	0.000	0.000	0.000
Orthopristis chrysoptera	Pigfish	0.533	0.079	0.000	0.000	0.000	0.000
Lagodon rhomboides	Pinfish	20.049	4.253	10.137	0.056	0.175	0.069
Archosargus probatocephalus	Sheepshead	0.000	0.376	0.060	0.044	0.081	0.000
Diplodus holbrooki	Spottail pinfish	0.249	0.000	0.000	0.000	0.000	0.000
Calamus arctifrons	Grass porgy	0.000	0.022	0.000	0.000	0.000	0.000
Cynoscion nebulosus	Spotted seatrout	0.019	0.093	0.074	0.000	0.011	0.000
Bairdiella chrysoura	Silver perch	0.315	0.011	0.012	0.000	0.000	0.000
Leiostomus xanthurus	Spot	0.000	6.282	12.028	0.161	8.253	3.746
Menticirrhus americanus	Southern kingfish	0.000	0.000	0.154	0.000	0.000	0.000
Menticirrhus saxatilis	Northern kingfish	0.000	0.000	0.000	0.011	0.000	0.000

Table B6, page 2 of 2. Location-specific trawl catch.

Data are presented as mean number per $100m^2$.

Organisms are listed in phylogenetic order.

Taxon	Common Name	Location (km from mouth) -1.8-0.0	0.0-2.4	2.4-5.4	5.4-9.8	9.8-13.2	13.2-16.1
Pogonias cromis	Black drum	0.000	0.011	0.000	0.011	0.000	0.000
Sciaenops ocellatus	Red drum	0.000	0.000	0.000	0.000	0.101	0.000
Chaetodipterus faber	Atlantic spadefish	0.000	0.022	0.000	0.000	0.000	0.000
Sphyraena barracuda	Great barracuda	0.012	0.000	0.000	0.000	0.000	0.000
Lachnolaimus maximus	Hogfish	0.037	0.000	0.000	0.000	0.000	0.000
Nicholsina usta	Emerald parrotfish	0.106	0.000	0.010	0.000	0.000	0.000
Paraclinus fasciatus	Banded blenny	0.019	0.000	0.000	0.000	0.000	0.000
Gobiosoma spp.	Gobiosoma gobies	0.069	0.000	0.000	0.000	0.011	0.000
Gobiosoma bosc	Naked goby	0.000	0.000	0.000	0.000	0.000	0.025
Gobiosoma robustum	Code goby	0.112	0.096	0.000	0.000	0.000	0.000
Microgobius gulosus	Clown goby	0.014	0.020	0.023	0.022	0.115	0.221
Paralichthys albigutta	Gulf flounder	0.038	0.146	0.151	0.000	0.000	0.000
Ancylopsetta quadrocellata	Ocellated flounder	0.011	0.000	0.000	0.000	0.000	0.000
Trinectes maculatus	Hogchoker	0.070	0.000	0.021	0.000	0.012	0.260
Achirus lineatus	Lined sole	0.014	0.034	0.020	0.000	0.000	0.000
Symphurus plagiusa	Blackcheek tonguefish	0.056	0.043	0.168	0.000	0.000	0.000
Monacanthidae spp.	Filefishes	0.087	0.000	0.000	0.000	0.000	0.000
Aluterus schoepfii	Orange filefish	0.012	0.000	0.000	0.000	0.000	0.000
Monacanthus ciliatus	Fringed filefish	0.096	0.000	0.000	0.000	0.000	0.000
Stephanolepis hispidus	Planehead filefish	0.294	0.079	0.011	0.000	0.000	0.000
Acanthostracion quadricornis	Scrawled cowfish	0.047	0.011	0.000	0.000	0.000	0.000
Sphoeroides nephelus	Southern puffer	0.139	0.258	0.520	0.000	0.011	0.000
Chilomycterus schoepfii	Striped burrfish	0.207	0.141	0.012	0.000	0.000	0.000

Appendix C:

Length-frequency plots for selected taxa

Farfantepenaeus duorarum (Pink shrimp)

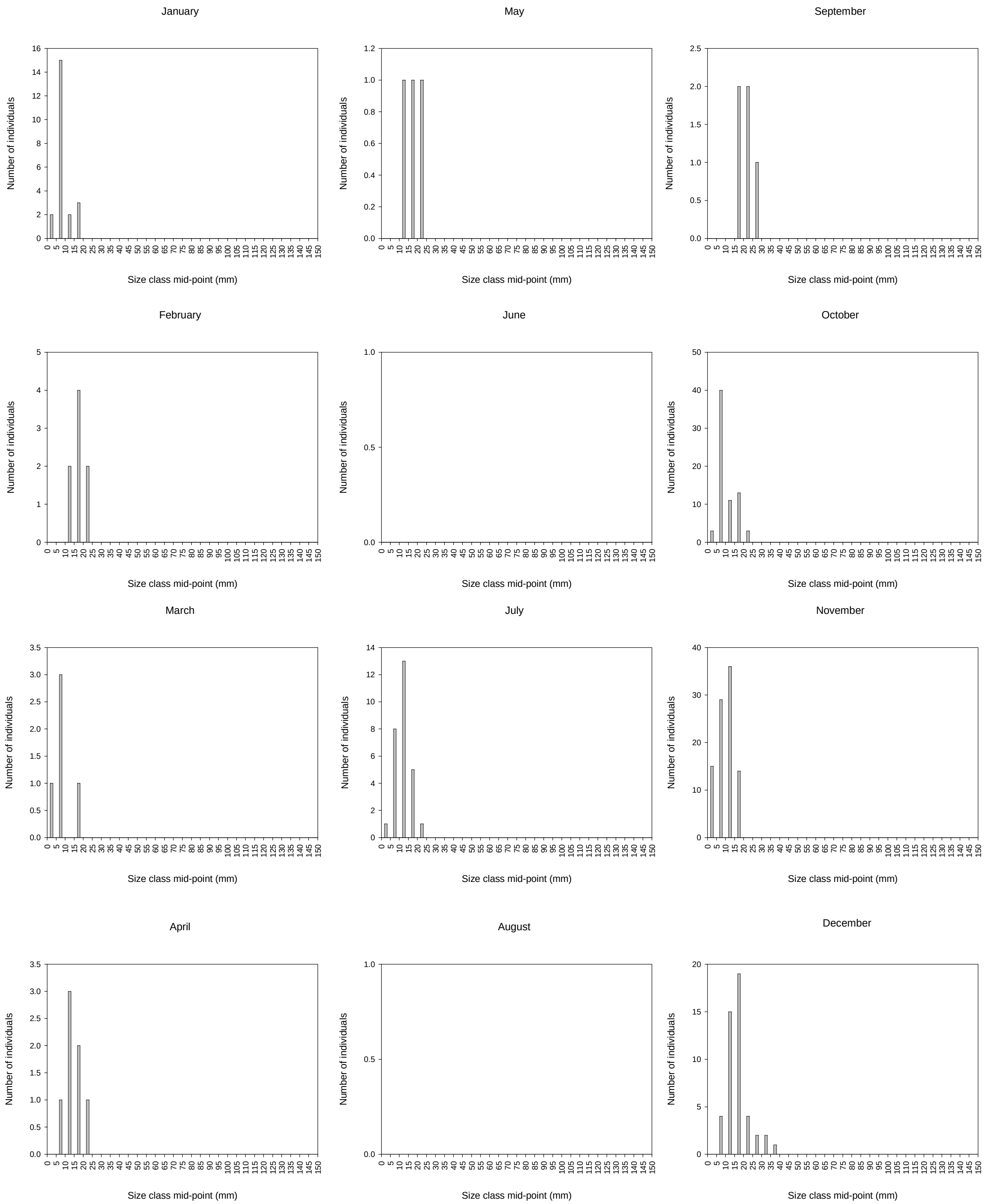


Fig. C1. Monthly length frequencies of Pink shrimp collected in seines and trawls.

Callinectes sapidus (Blue crab)

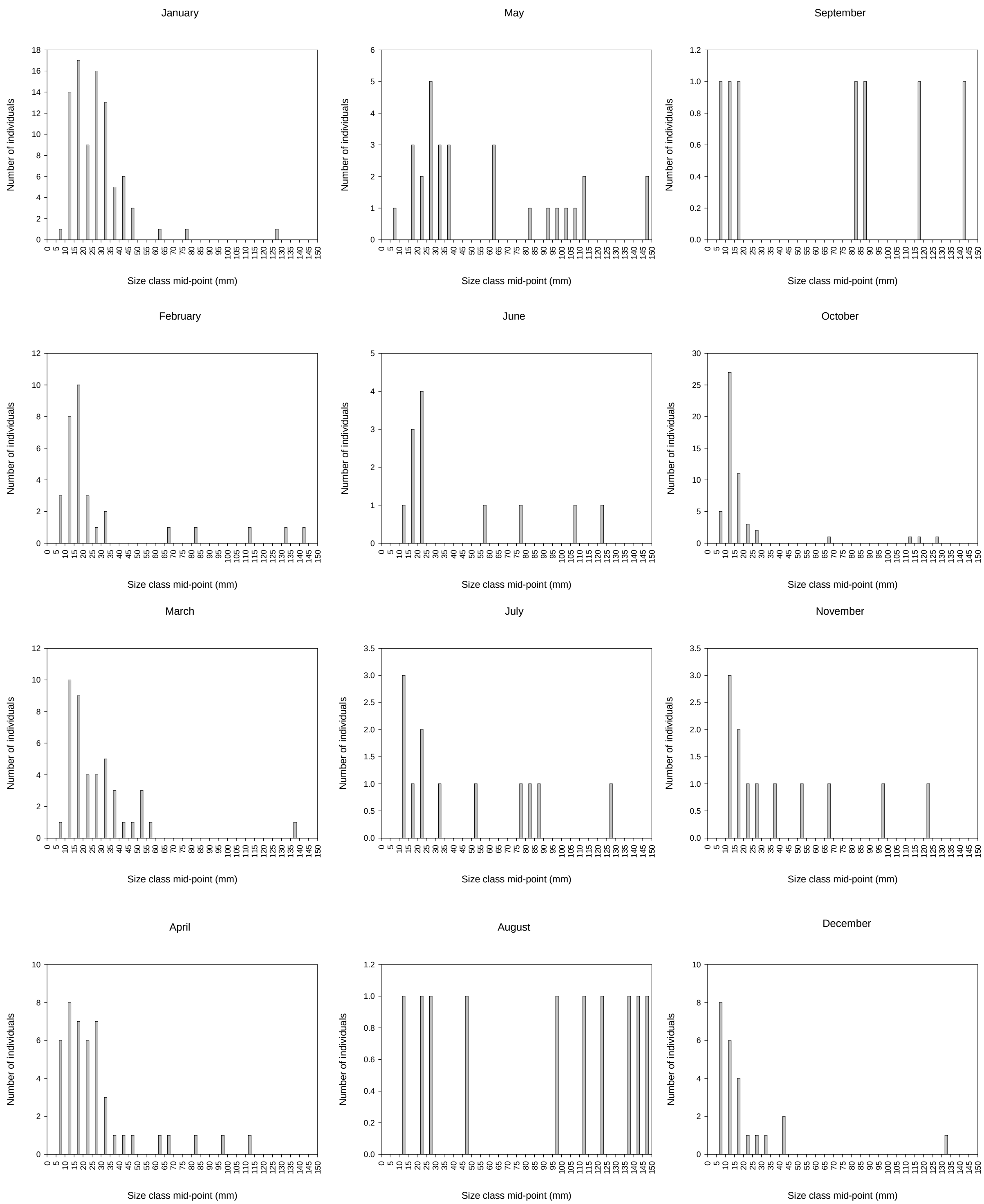


Fig. C2. Monthly length frequencies of Blue crab collected in seines and trawls.

Anchoa mitchilli (Bay anchovy)

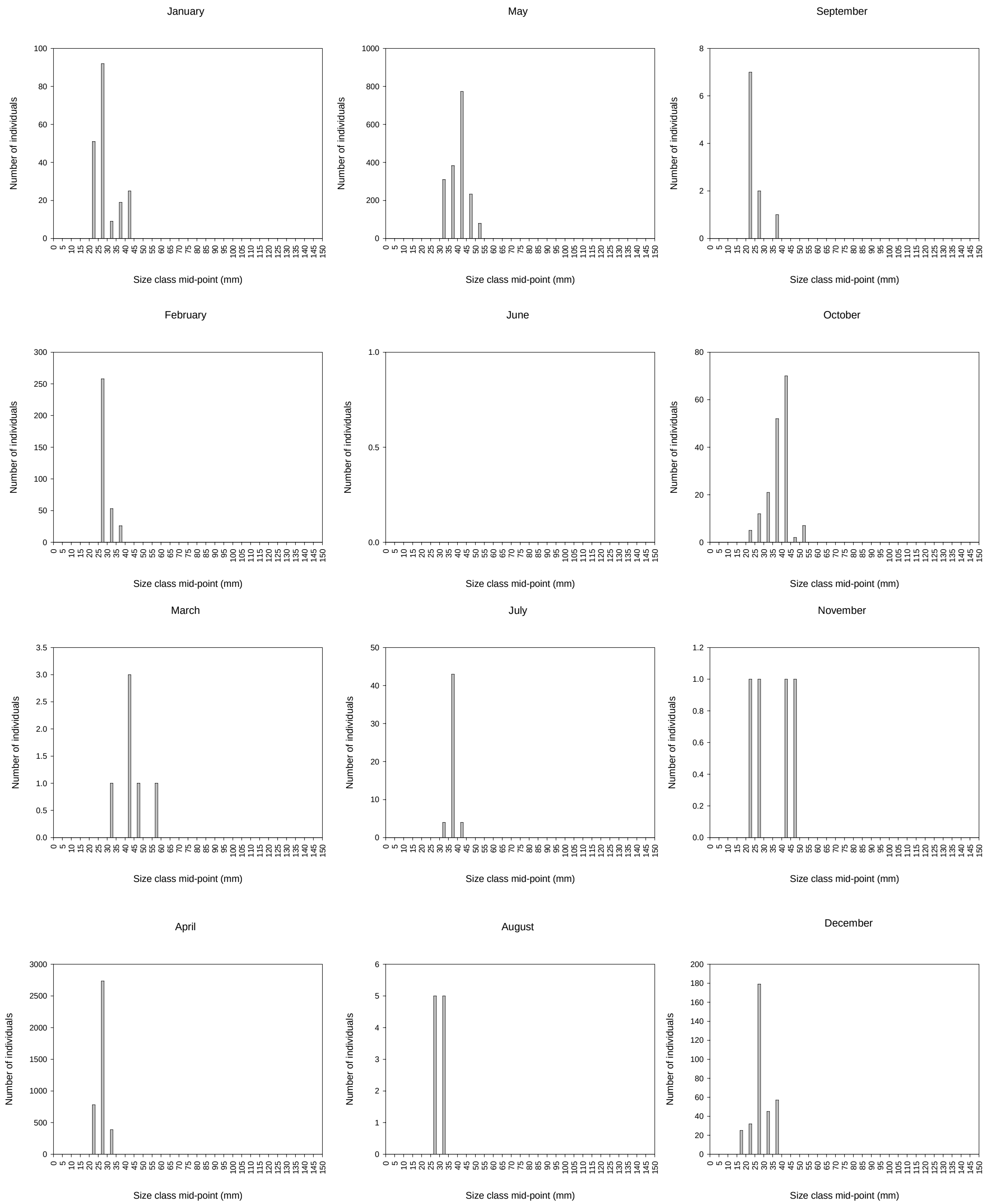


Fig. C3. Monthly length frequencies of Bay anchovy collected in seines and trawls.

Notropis petersoni (Coastal shiner)

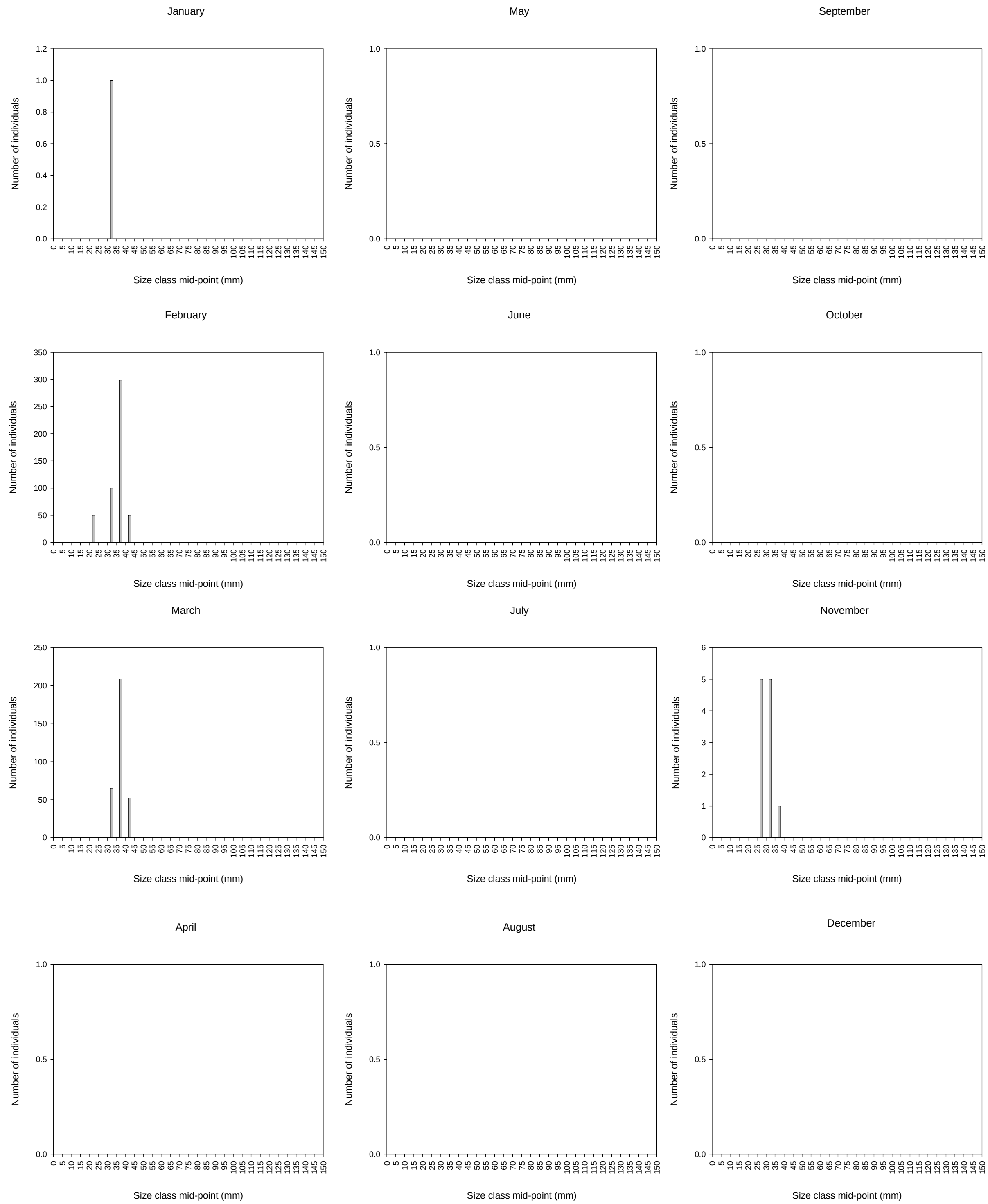


Fig. C4. Monthly length frequencies of Coastal shiner collected in seines and trawls.

Strongylura notata (Redfin needlefish)

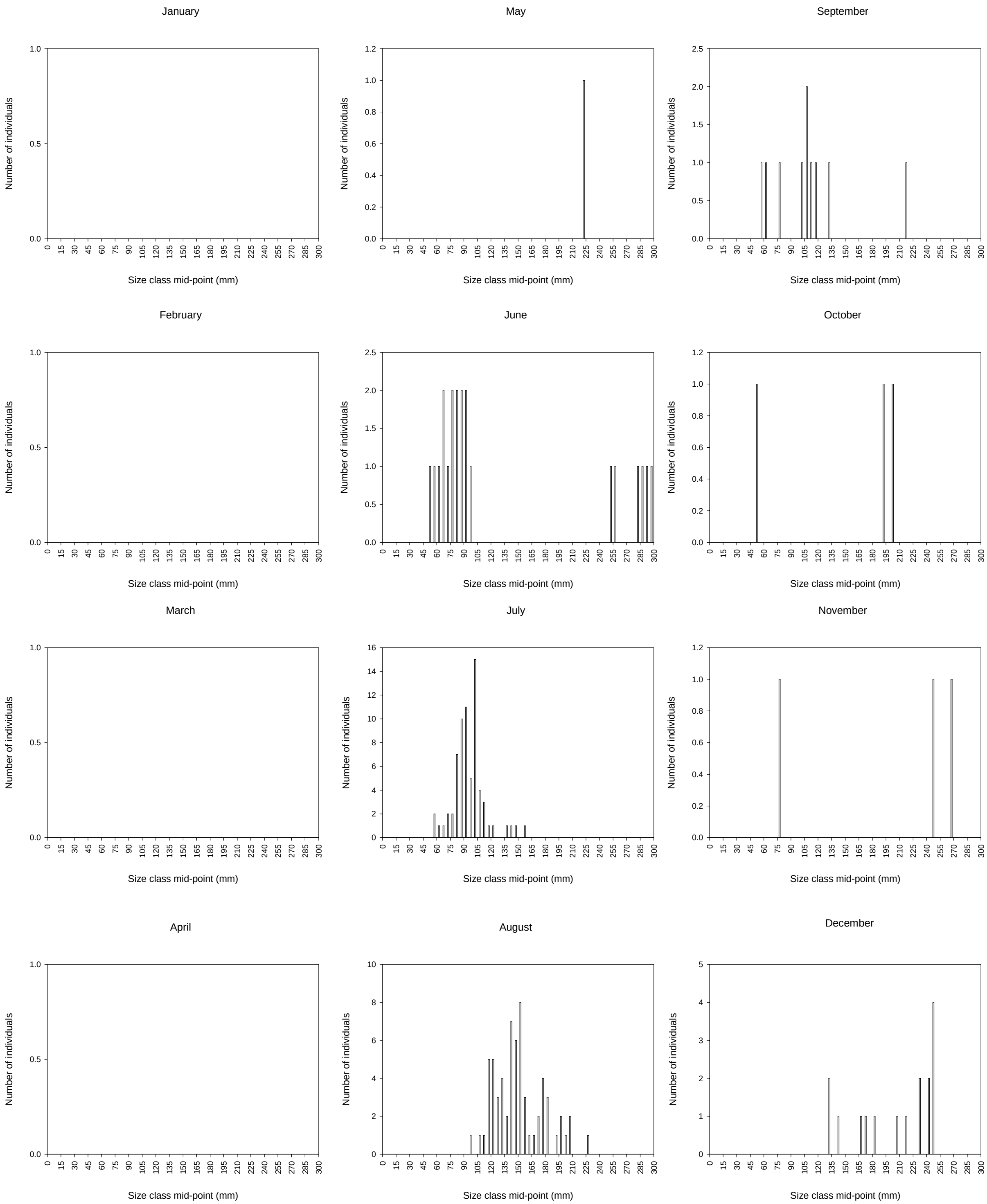


Fig. C5. Monthly length frequencies of Redfin needlefish collected in seines and trawls.

Lucania parva (Rainwater killifish)

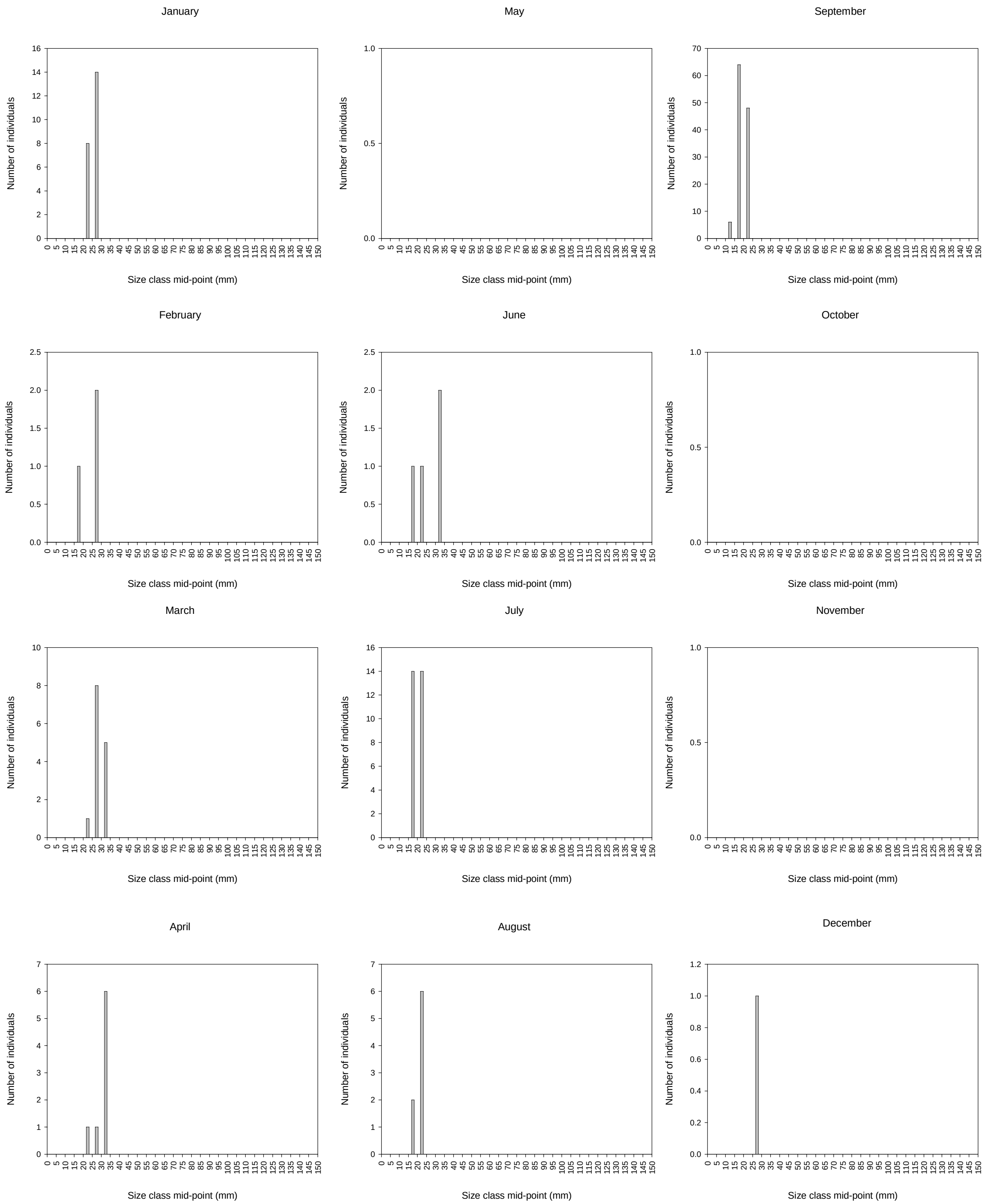


Fig. C6. Monthly length frequencies of Rainwater killifish collected in seines and trawls.

Lucania goodei (Bluefin killifish)

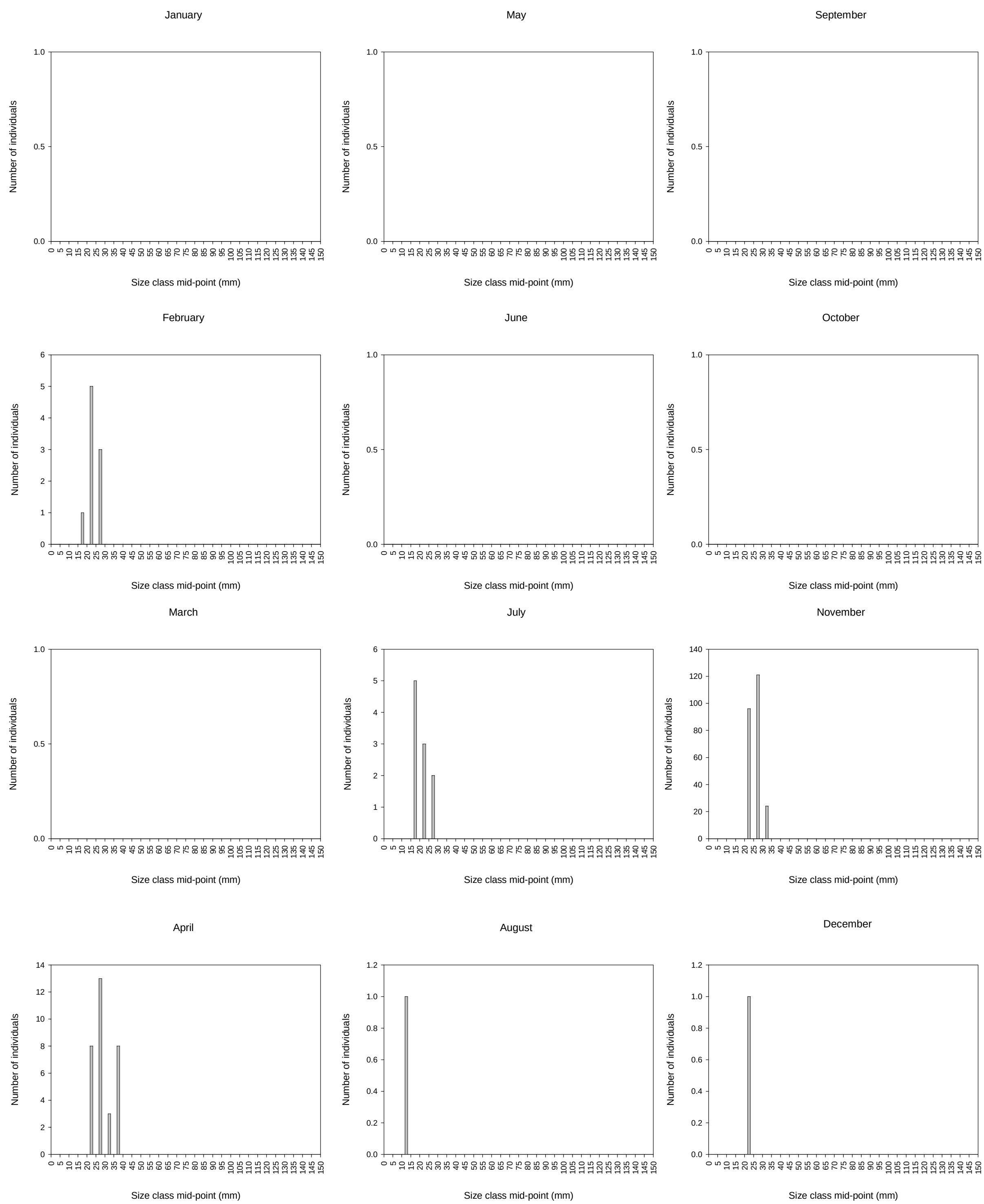


Fig. C7. Monthly length frequencies of Bluefin killifish collected in seines and trawls.

Floridichthys carpio (Goldspotted killifish)

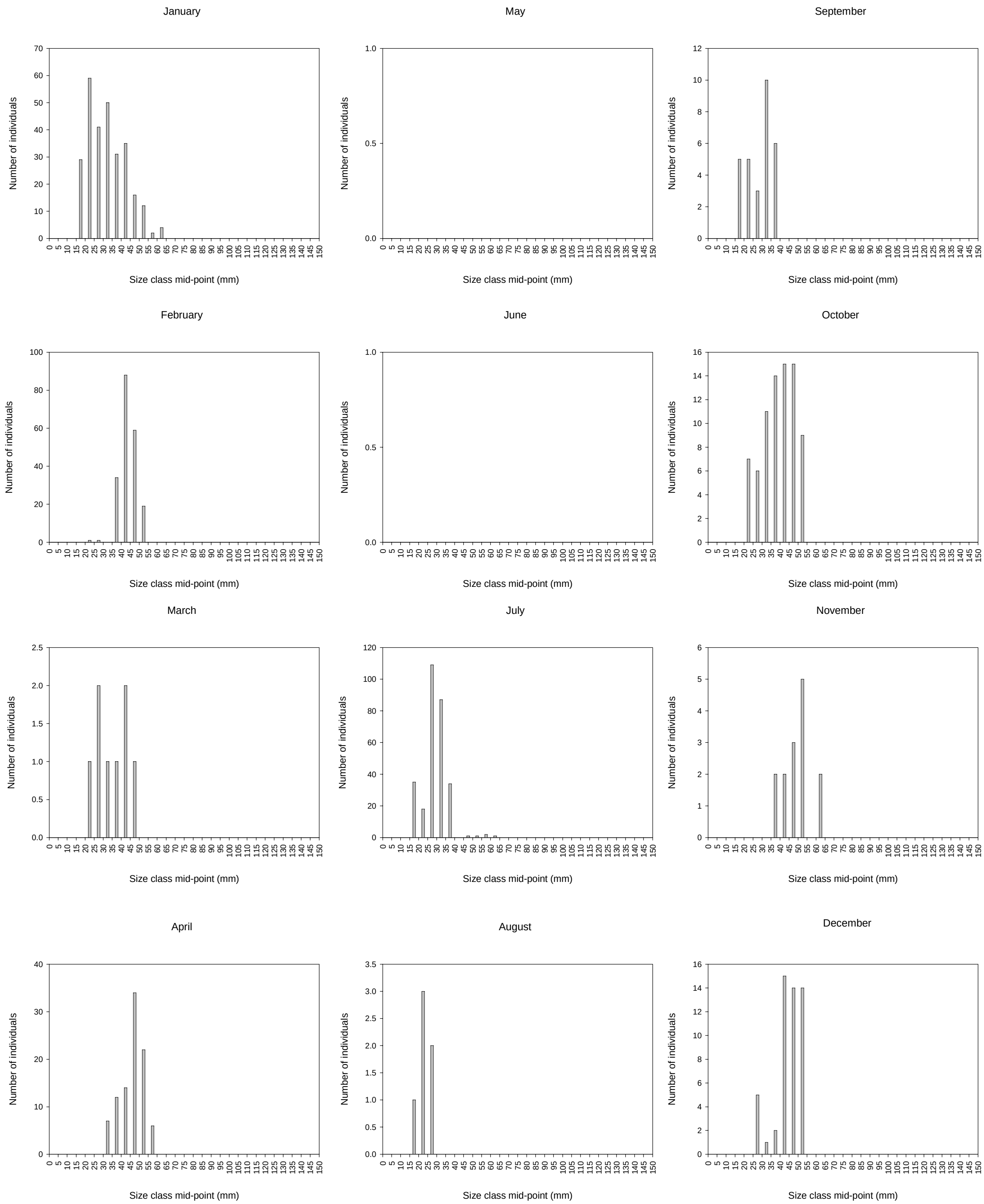


Fig. C8. Monthly length frequencies of Goldspotted killifish collected in seines and trawls.

Gambusia holbrooki (Eastern mosquitofish)

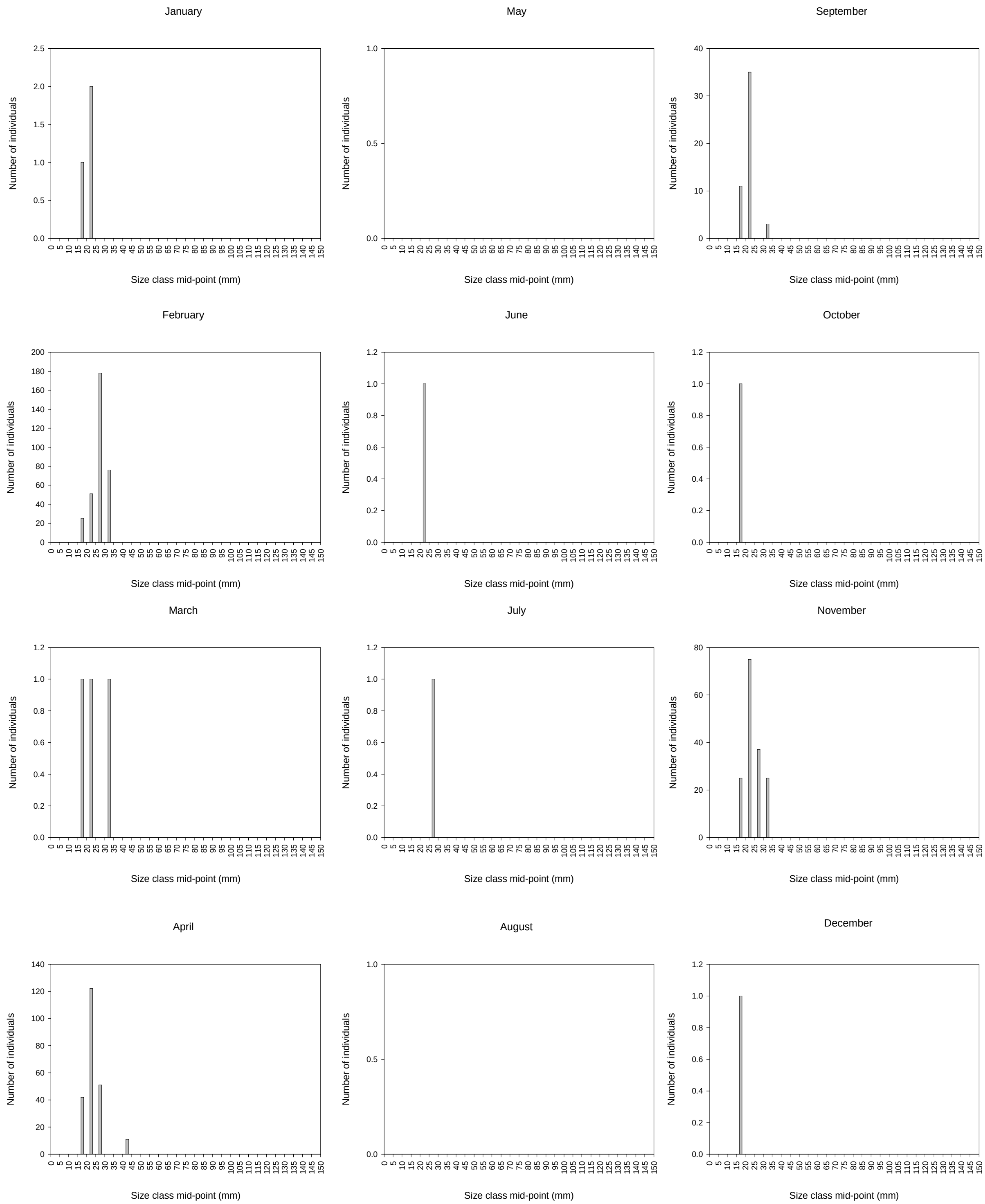


Fig. C9. Monthly length frequencies of Eastern mosquitofish collected in seines and trawls.

Poecilia latipinna (Sailfin molly)

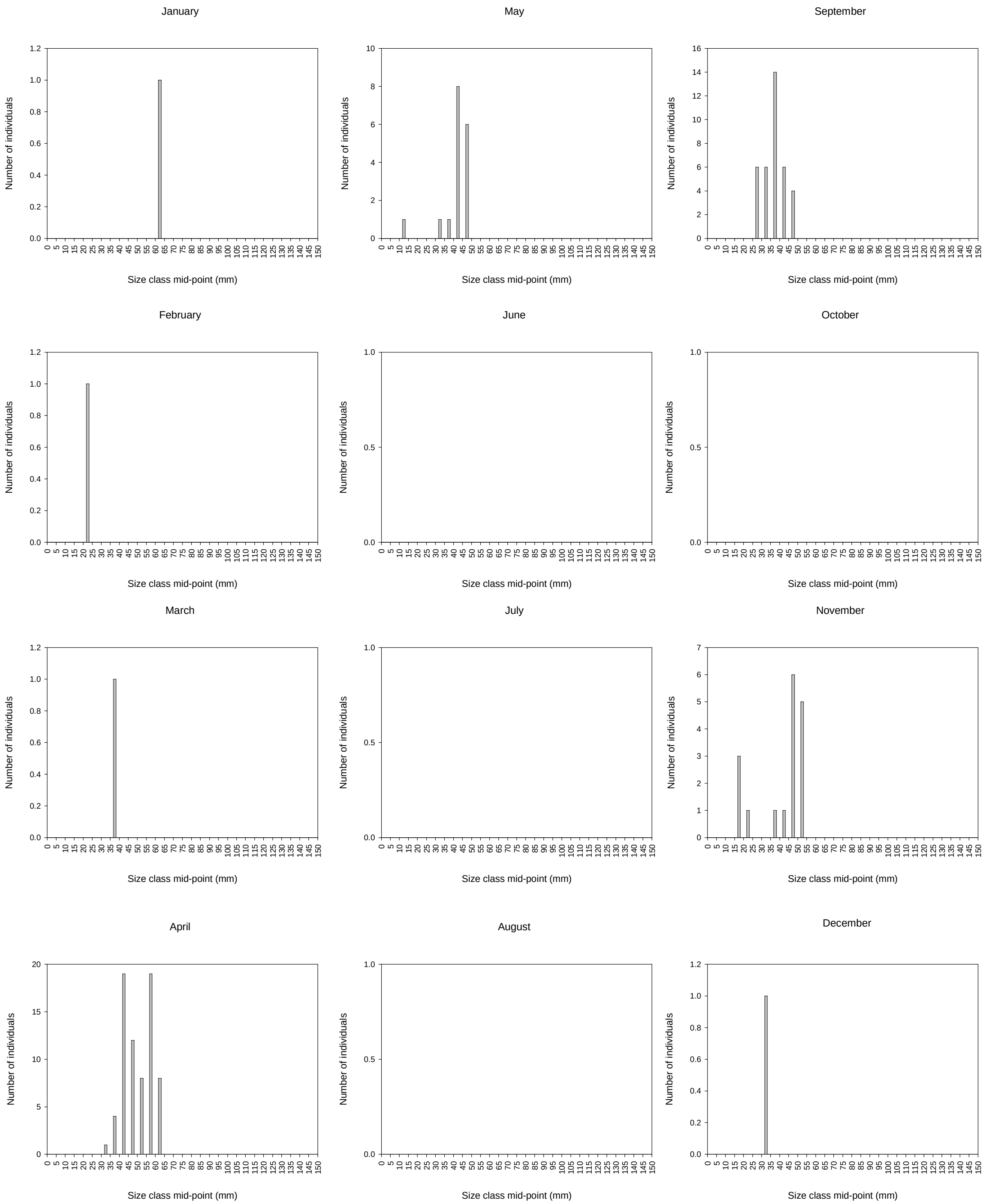


Fig. C10. Monthly length frequencies of Sailfin molly collected in seines and trawls.

Menidia spp. (Silversides)

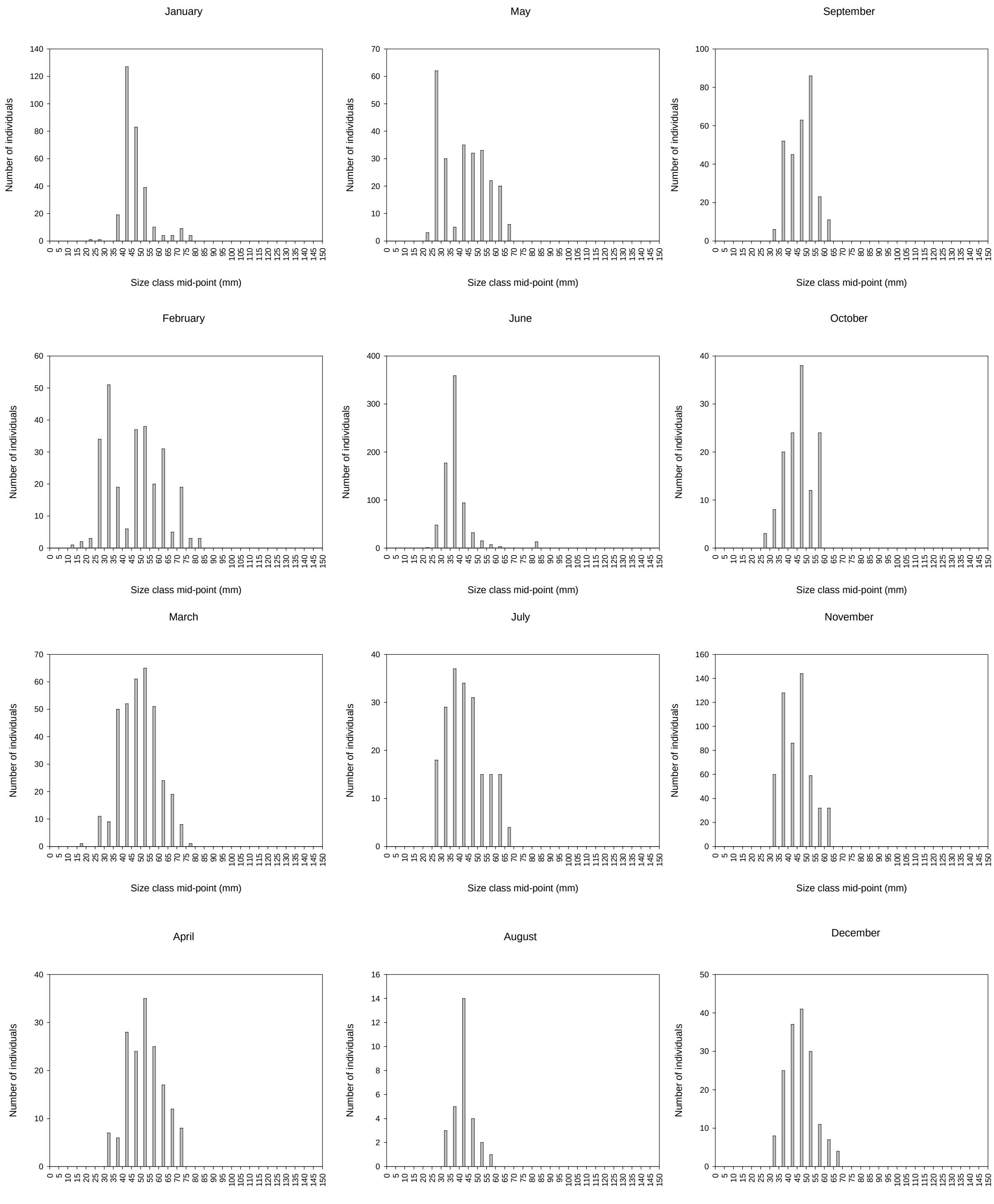


Fig. C11. Monthly length frequencies of Silversides collected in seines and trawls.

Labidesthes sicculus (Brook silverside)

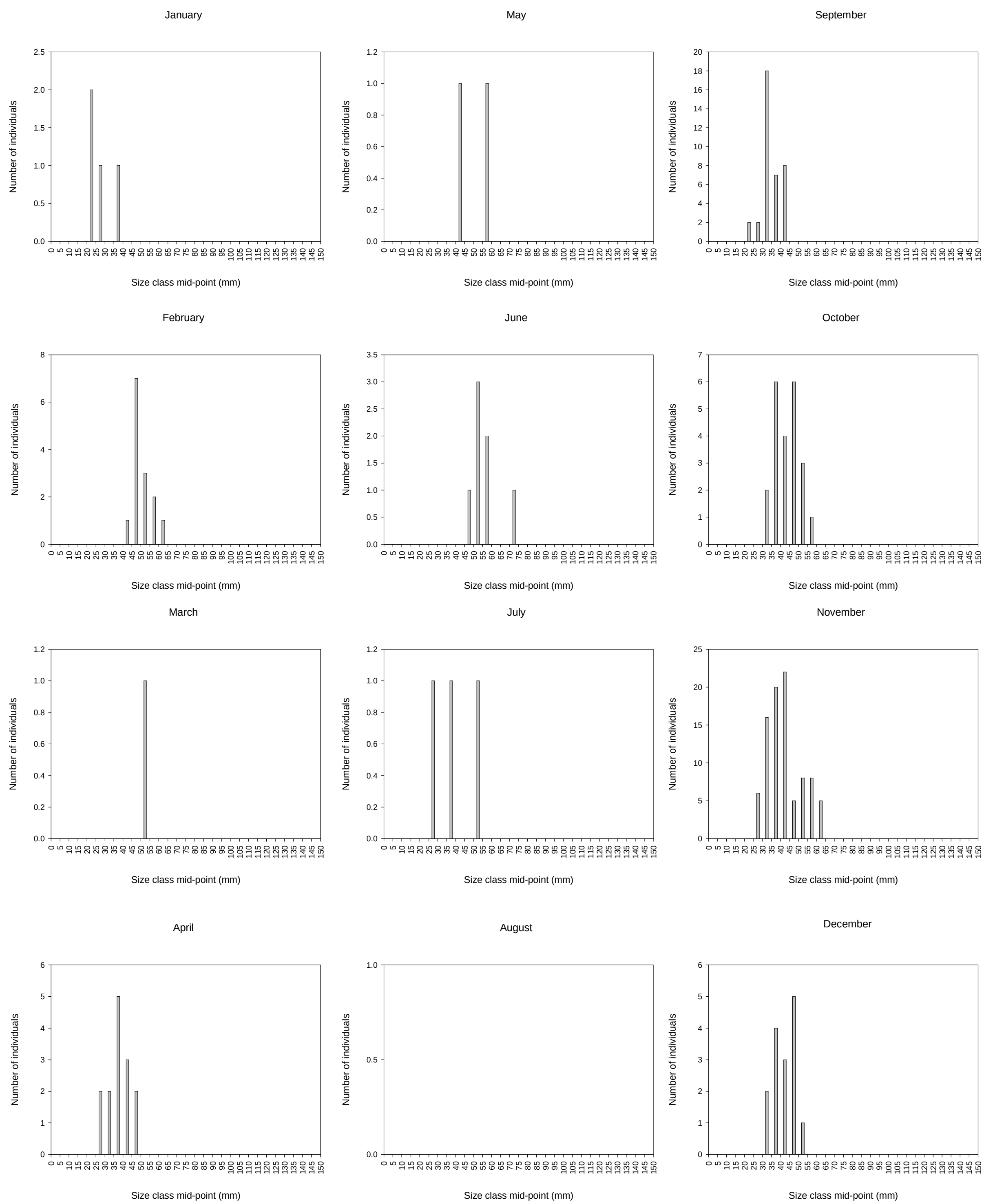


Fig. C12. Monthly length frequencies of Brook silverside collected in seines and trawls.

Lepomis macrochirus (Bluegill)

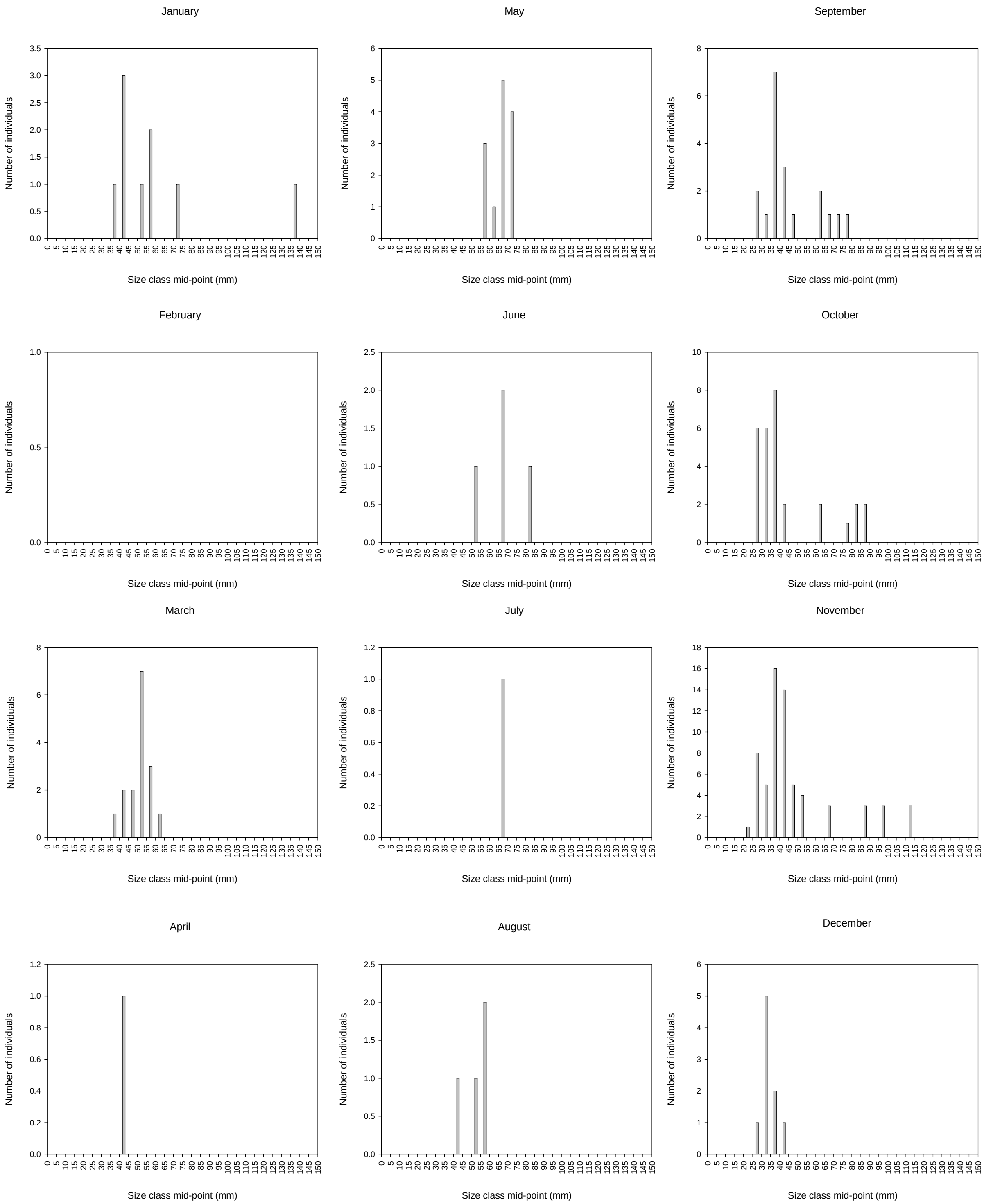


Fig. C13. Monthly length frequencies of Bluegill collected in seines and trawls.

Eucinostomus spp. (Eucinostomus mojarras)

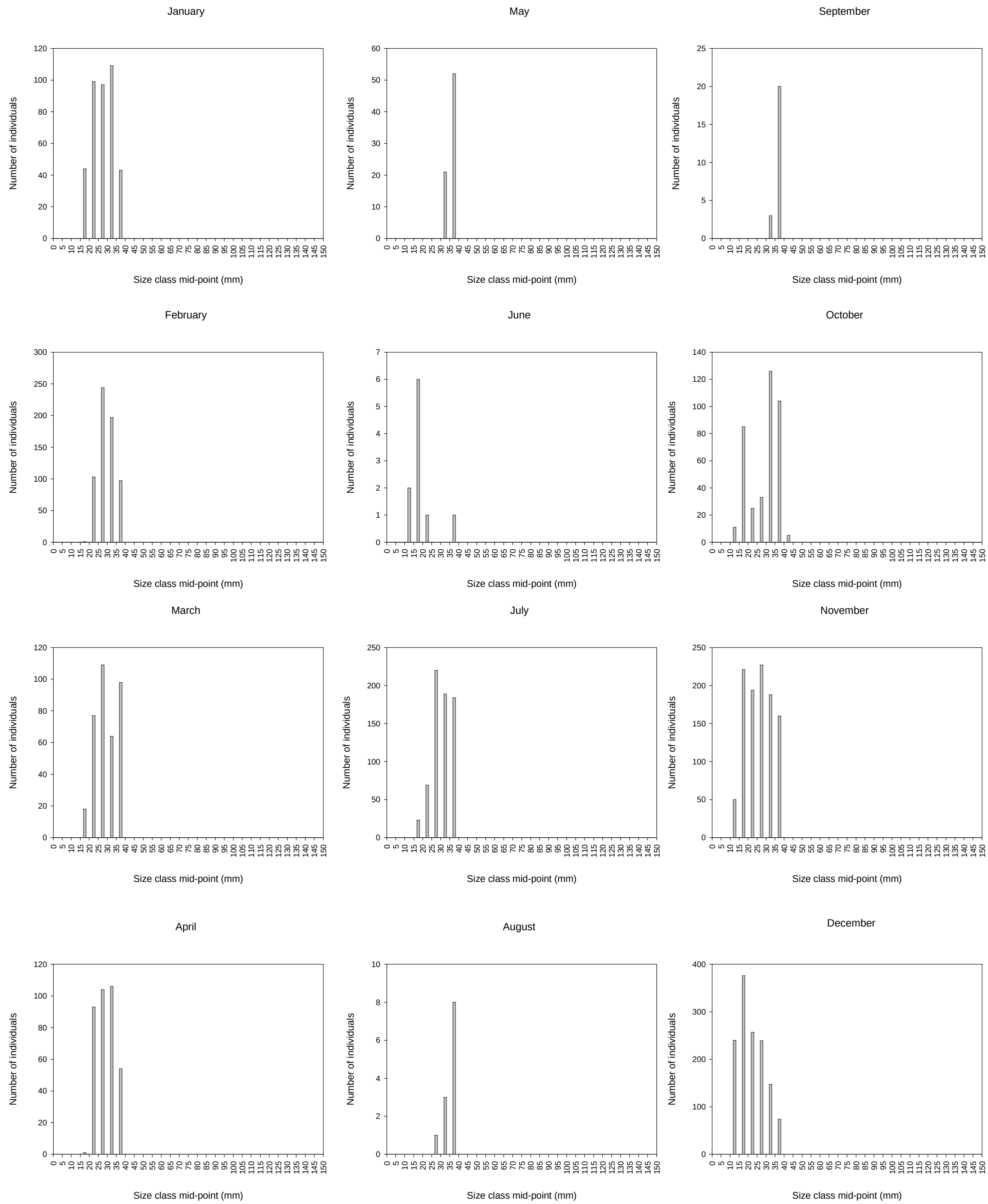


Fig. C14. Monthly length frequencies of Eucinostomus mojarras collected in seines and trawls.

Eucinostomus gula (Silver jenny)

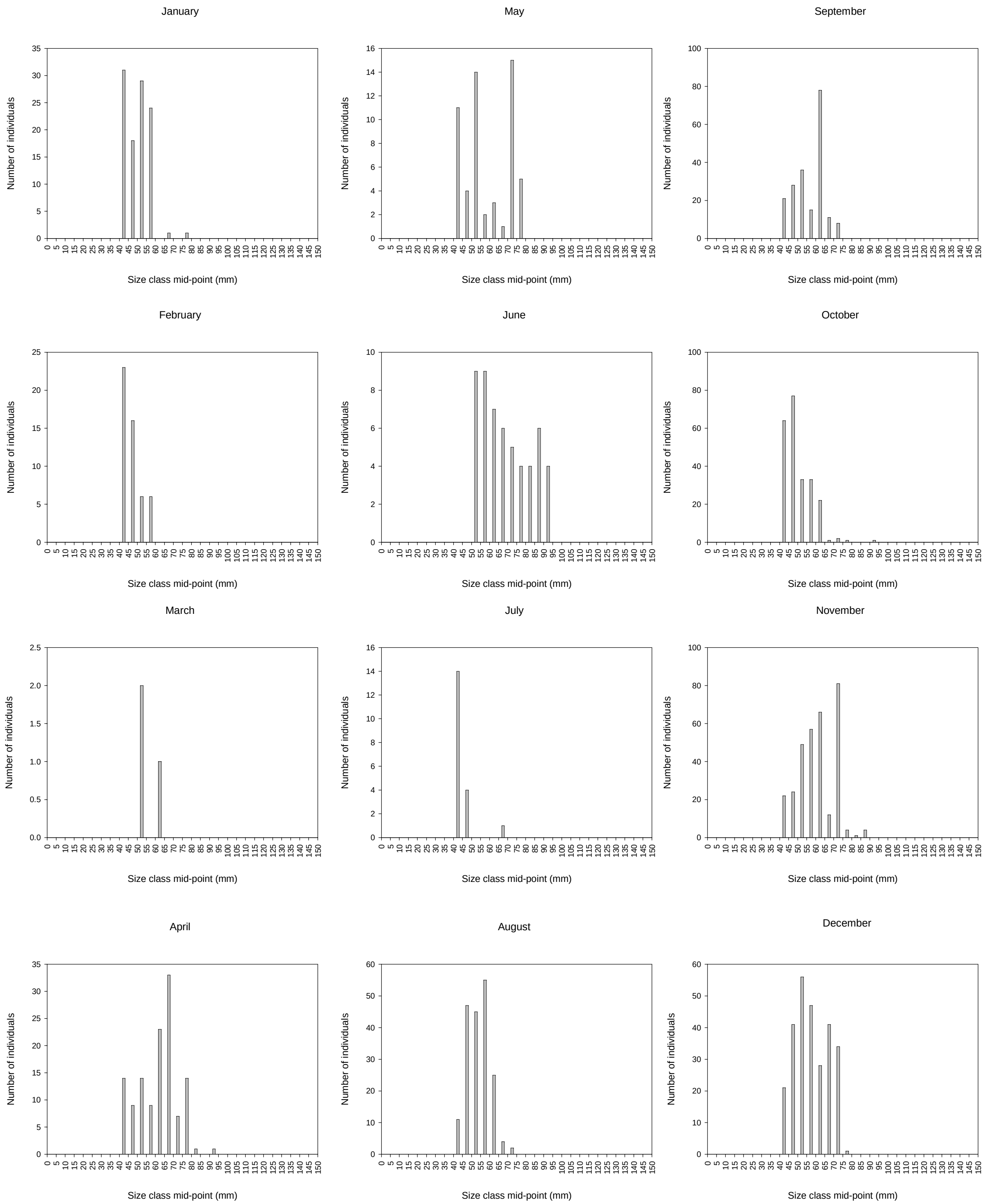


Fig. C15. Monthly length frequencies of Silver jenny collected in seines and trawls.

Eucinostomus harengulus (Tidewater mojarra)

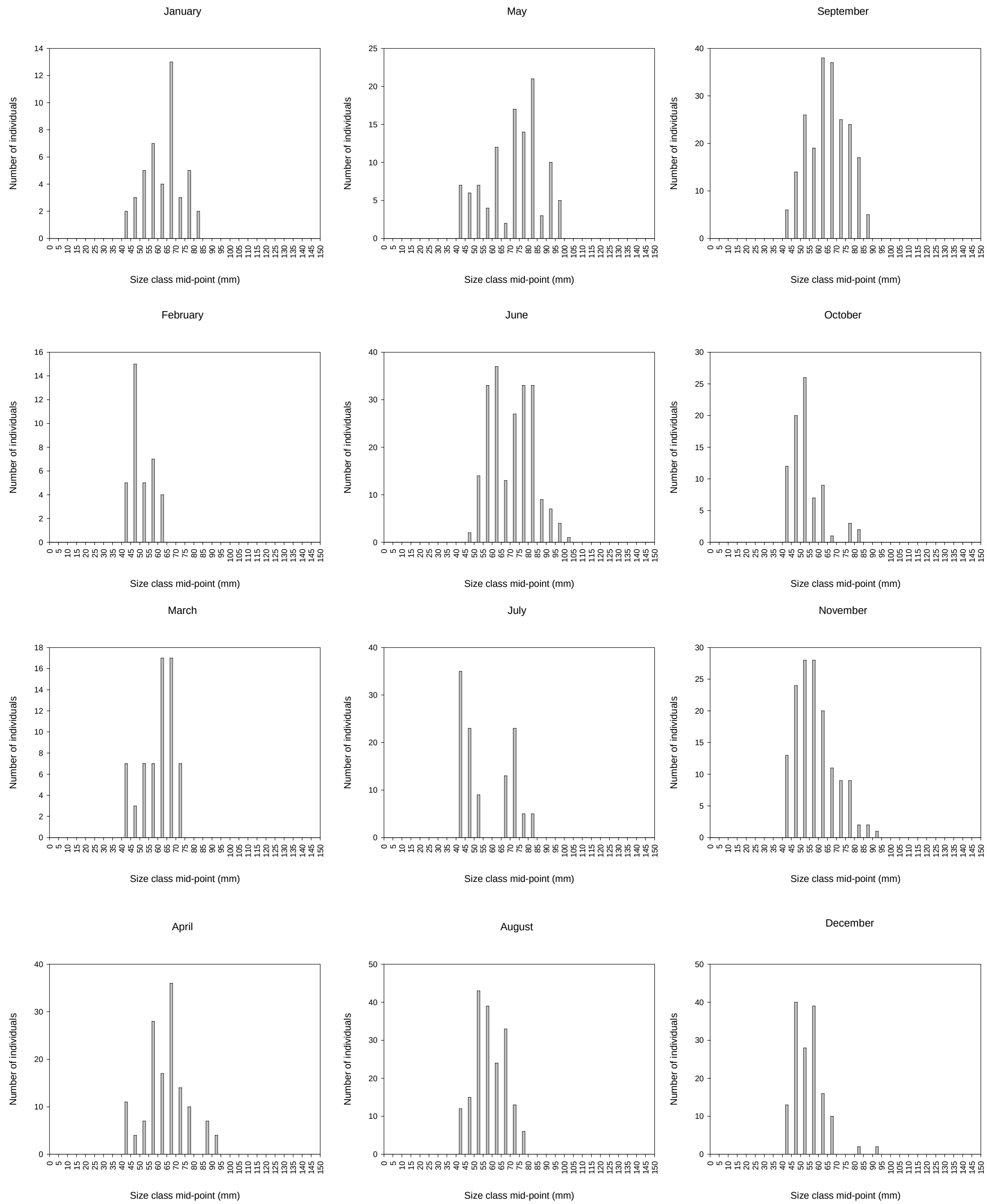


Fig. C16. Monthly length frequencies of Tidewater mojarra collected in seines and trawls.

Orthopristis chrysoptera (Pigfish)

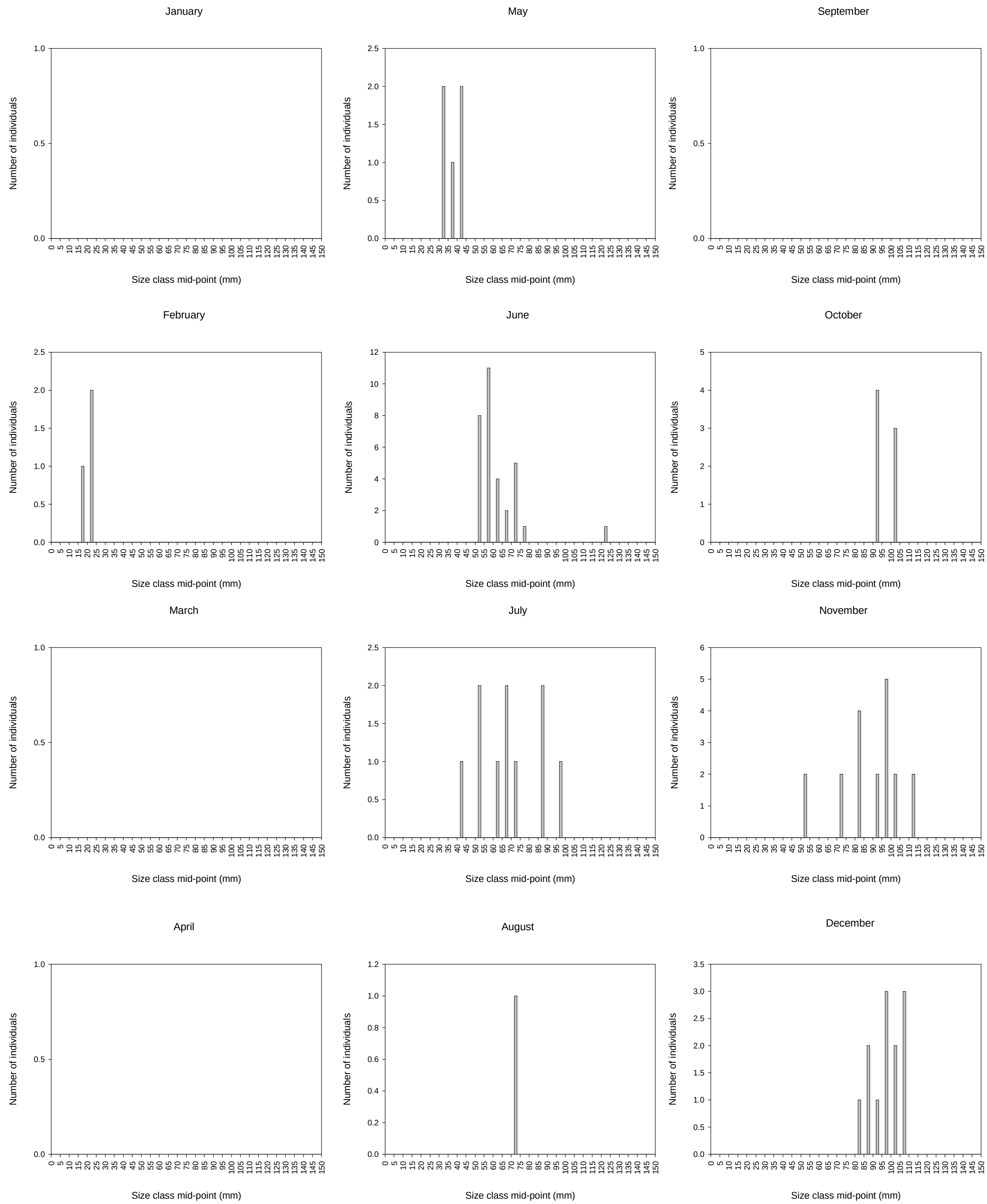


Fig. C17. Monthly length frequencies of Pigfish collected in seines and trawls.

Lagodon rhomboides (Pinfish)

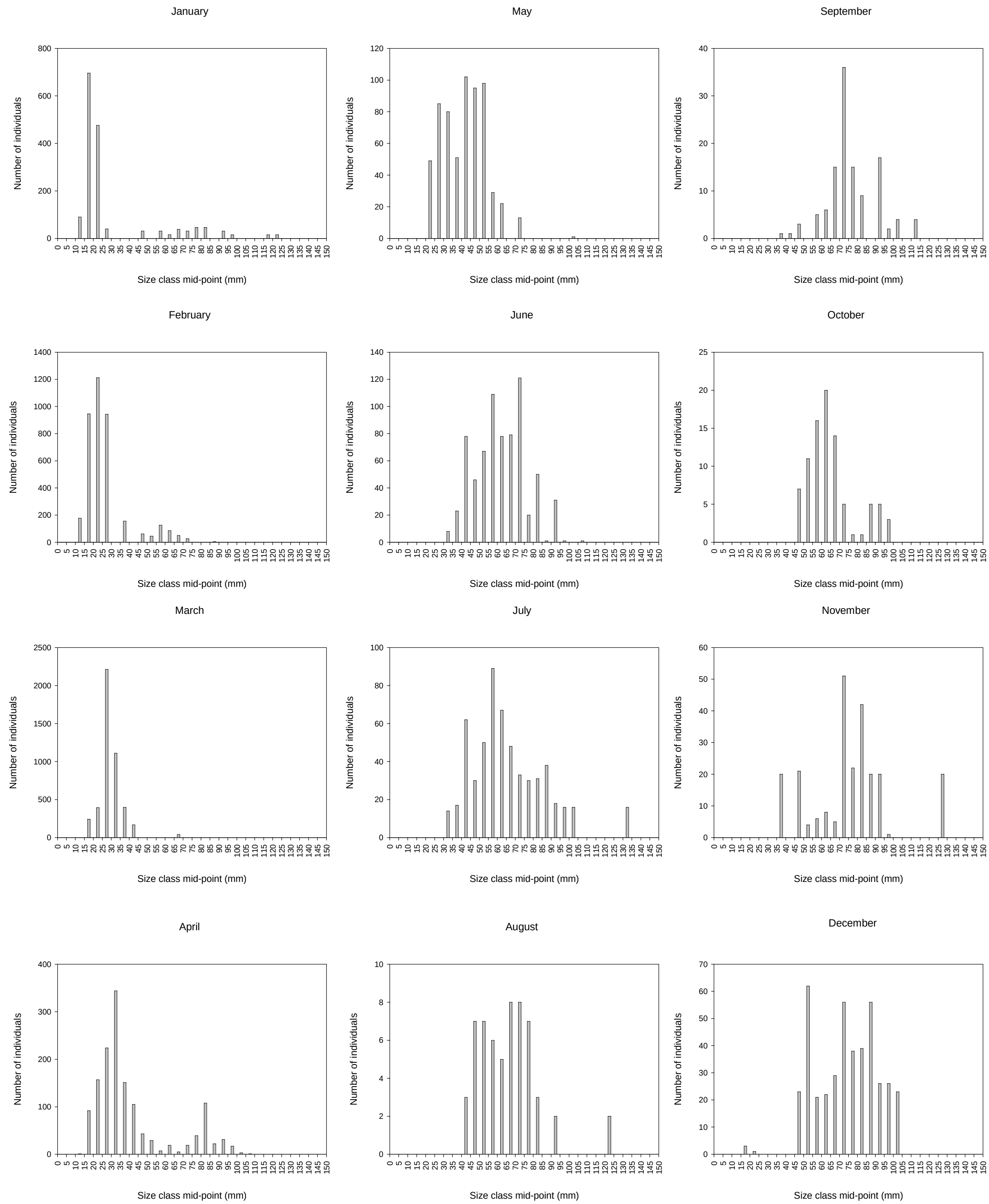


Fig. C18. Monthly length frequencies of Pinfish collected in seines and trawls.

Leiostomus xanthurus (Spot)

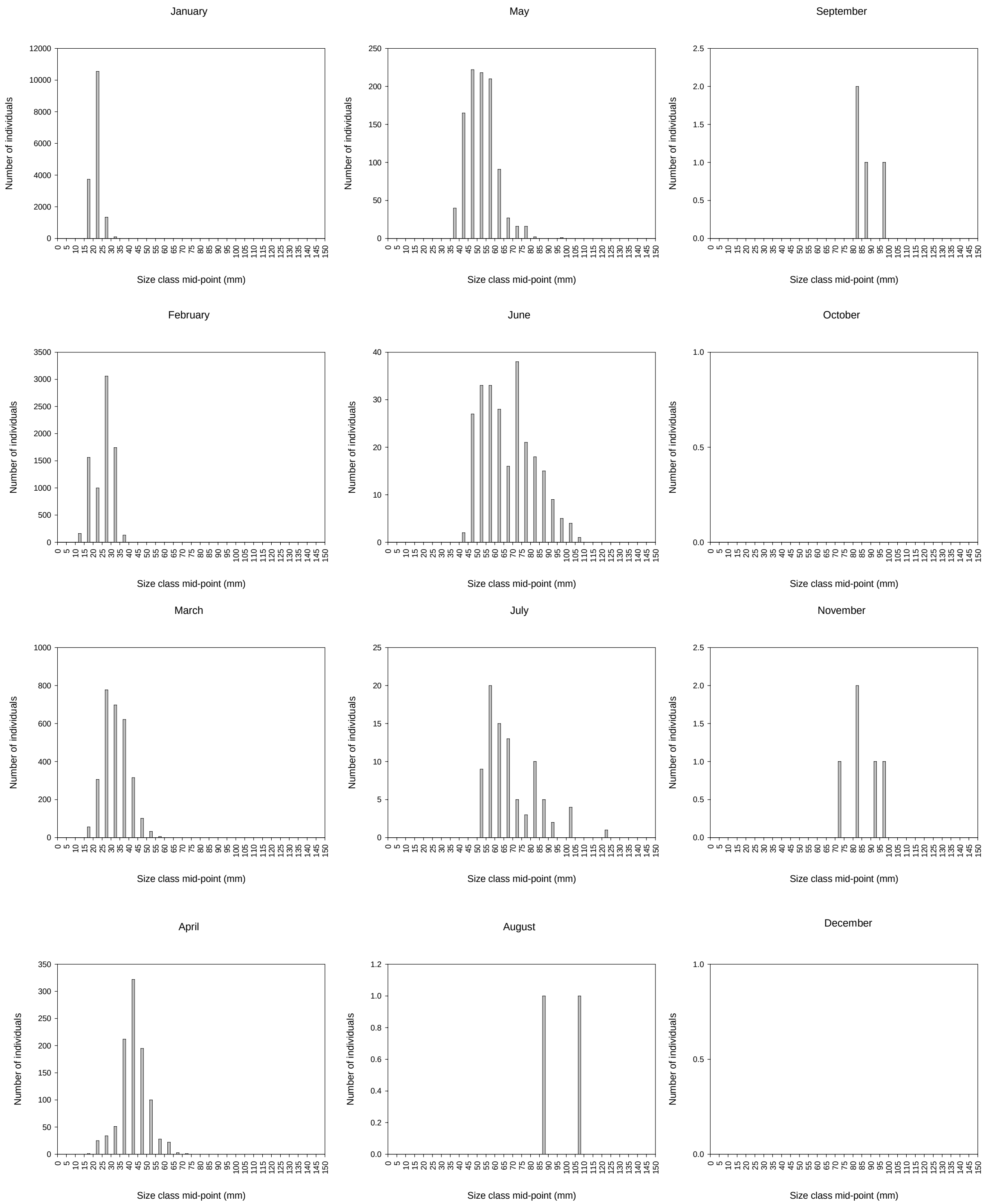


Fig. C19. Monthly length frequencies of Spot collected in seines and trawls.

Mugil cephalus (Striped mullet)

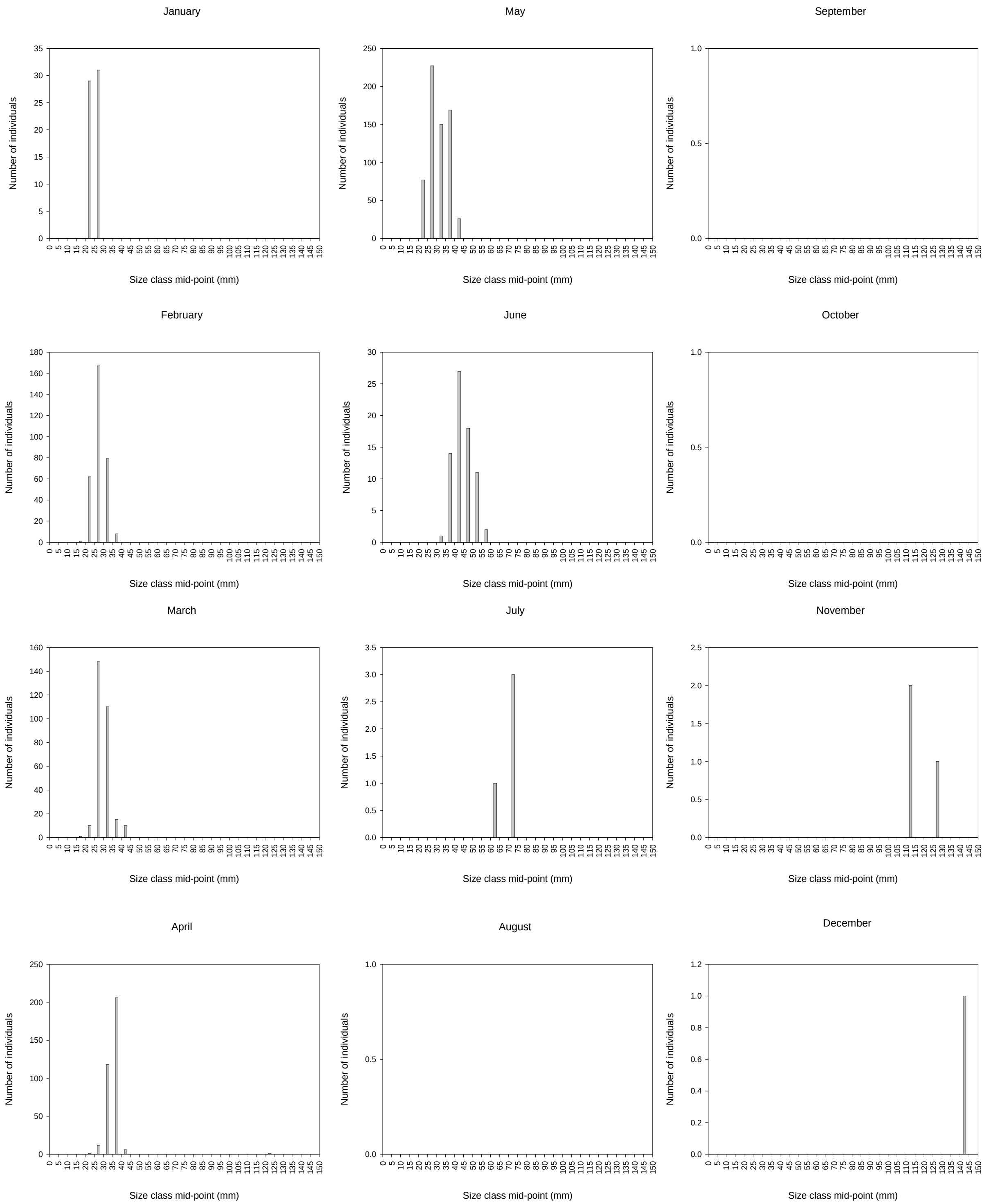


Fig. C20. Monthly length frequencies of Striped mullet collected in seines and trawls.

Microgobius gulosus (Clown goby)

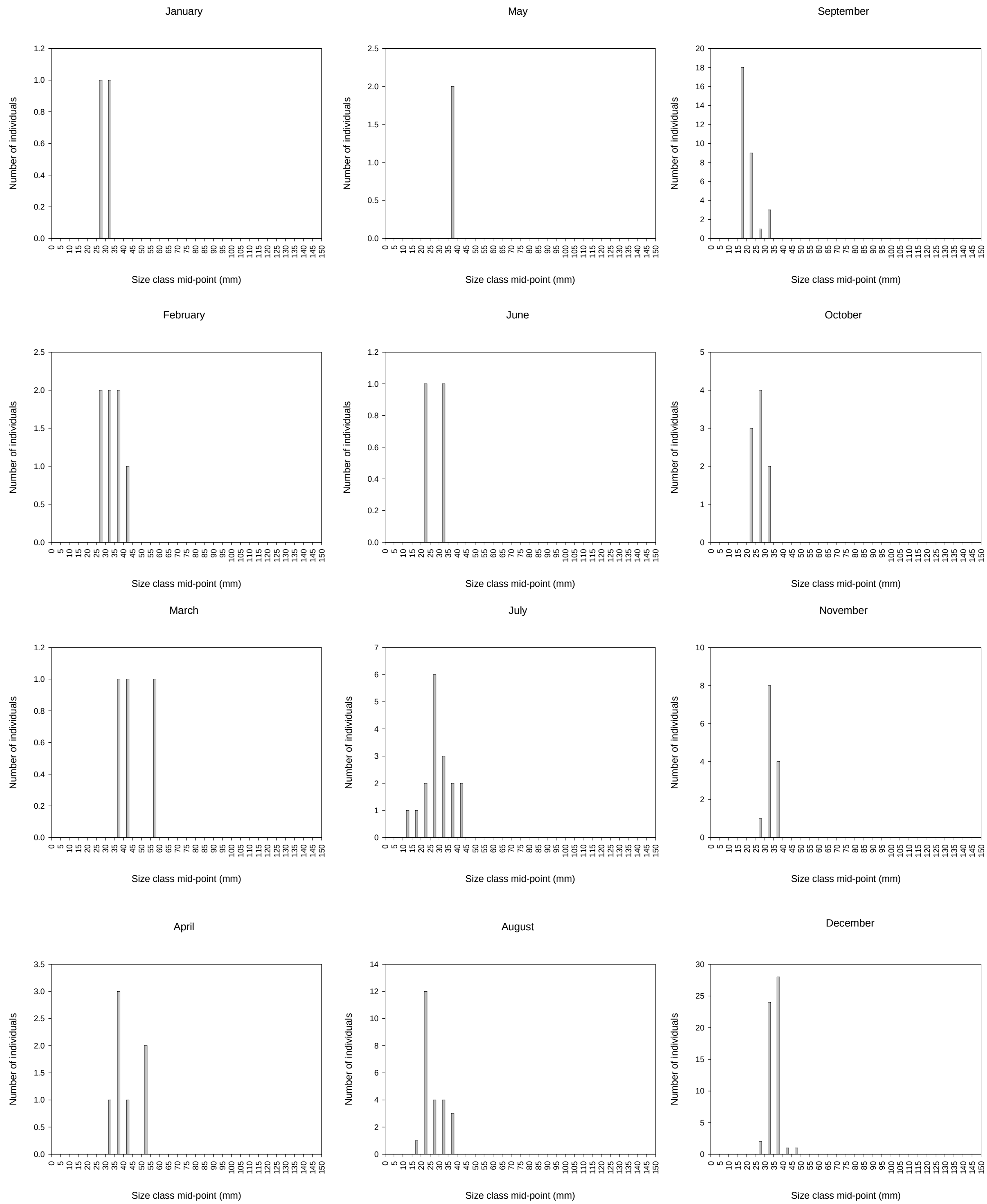


Fig. C21. Monthly length frequencies of Clown goby collected in seines and trawls.

Sphoeroides nephelus (Southern puffer)

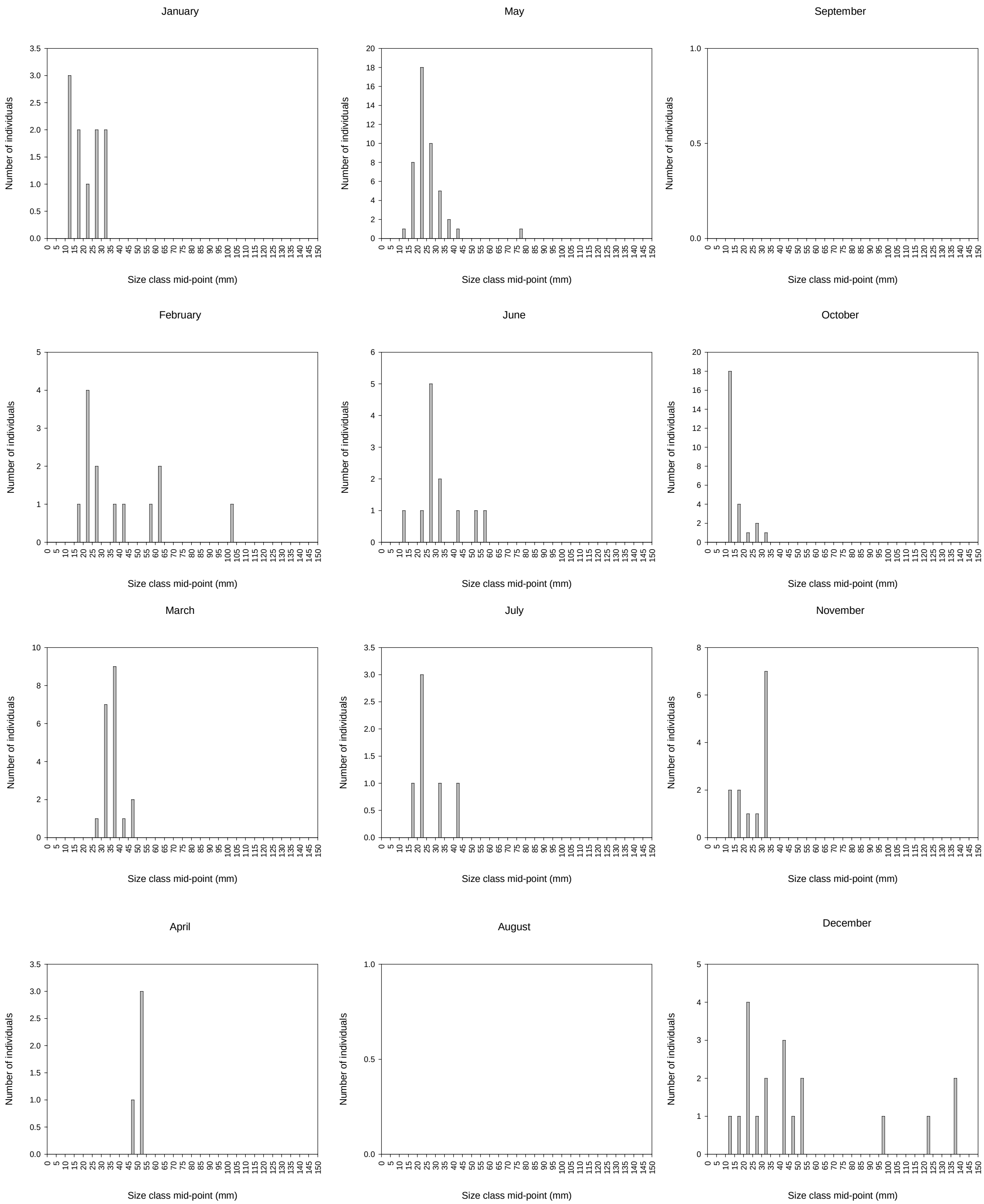


Fig. C22. Monthly length frequencies of Southern puffer collected in seines and trawls.

Appendix D:

Seine catch overview plots

Palaemonetes intermedius (Brackish grass shrimp), Seines

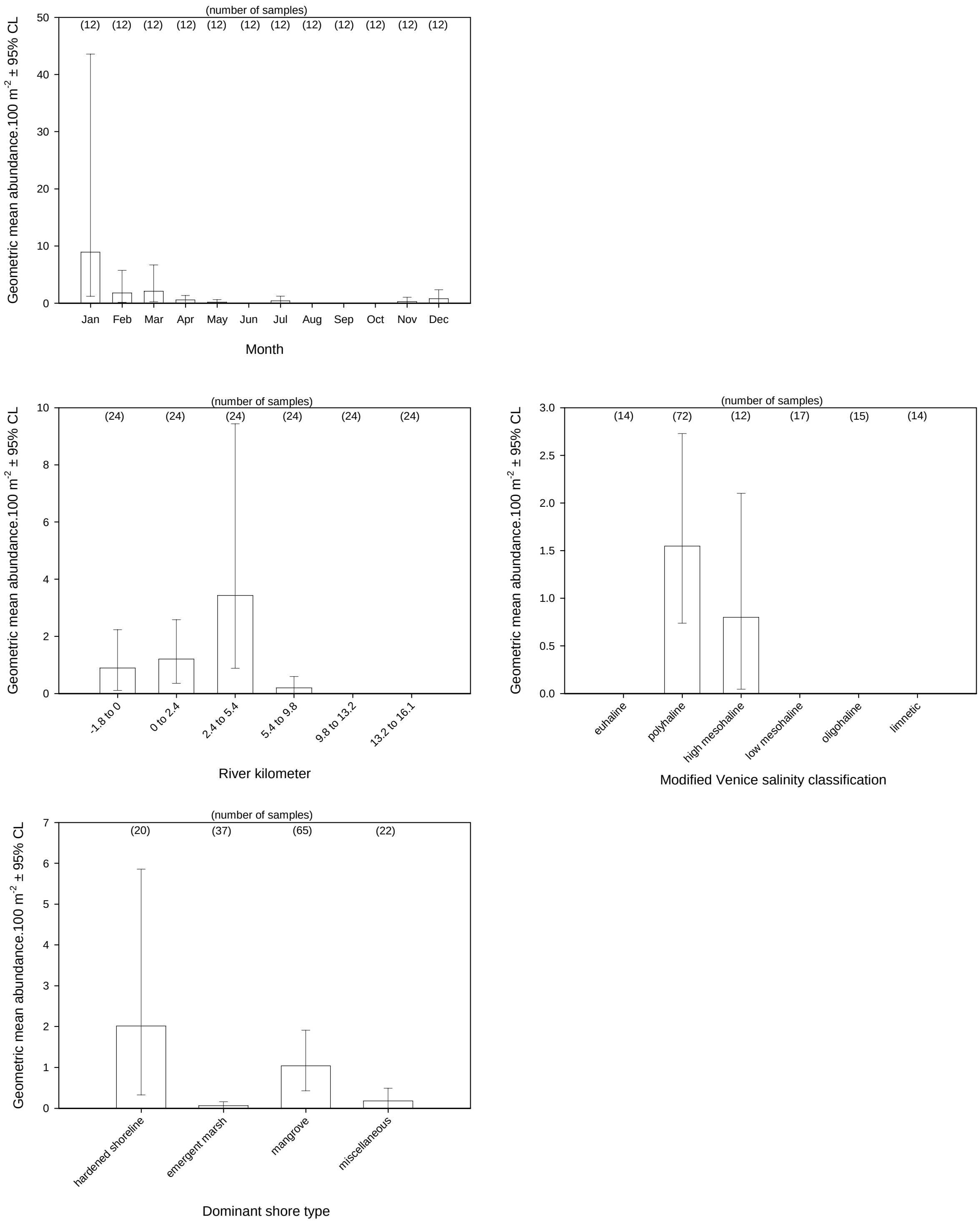


Fig. D1. Relative abundance of Brackish grass shrimp in shoreline (seined) habitats.

Palaemonetes pugio (Daggerblade grass shrimp), Seines

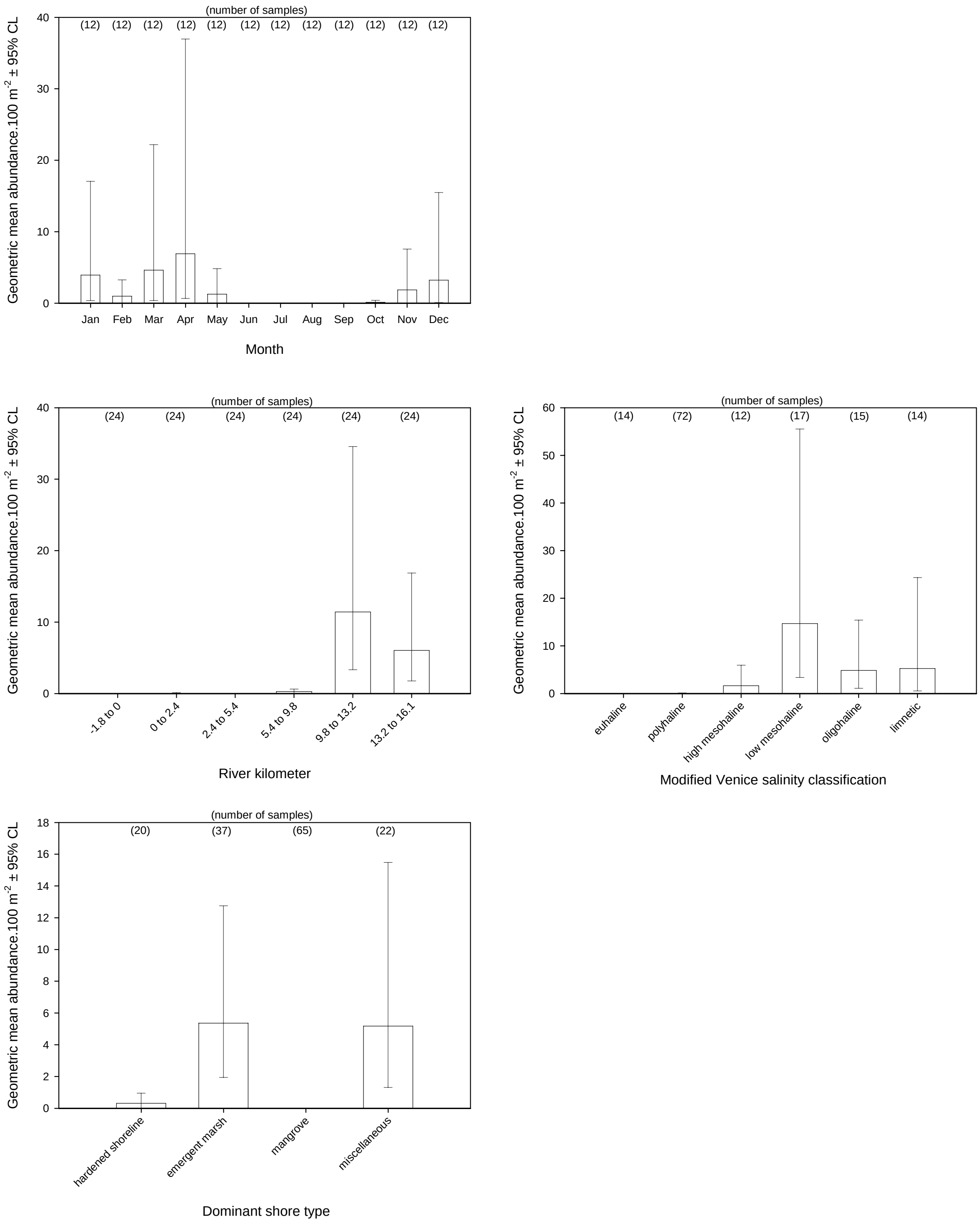


Fig. D2. Relative abundance of Daggerblade grass shrimp in shoreline (seined) habitats.

Callinectes sapidus (Blue crab), Seines

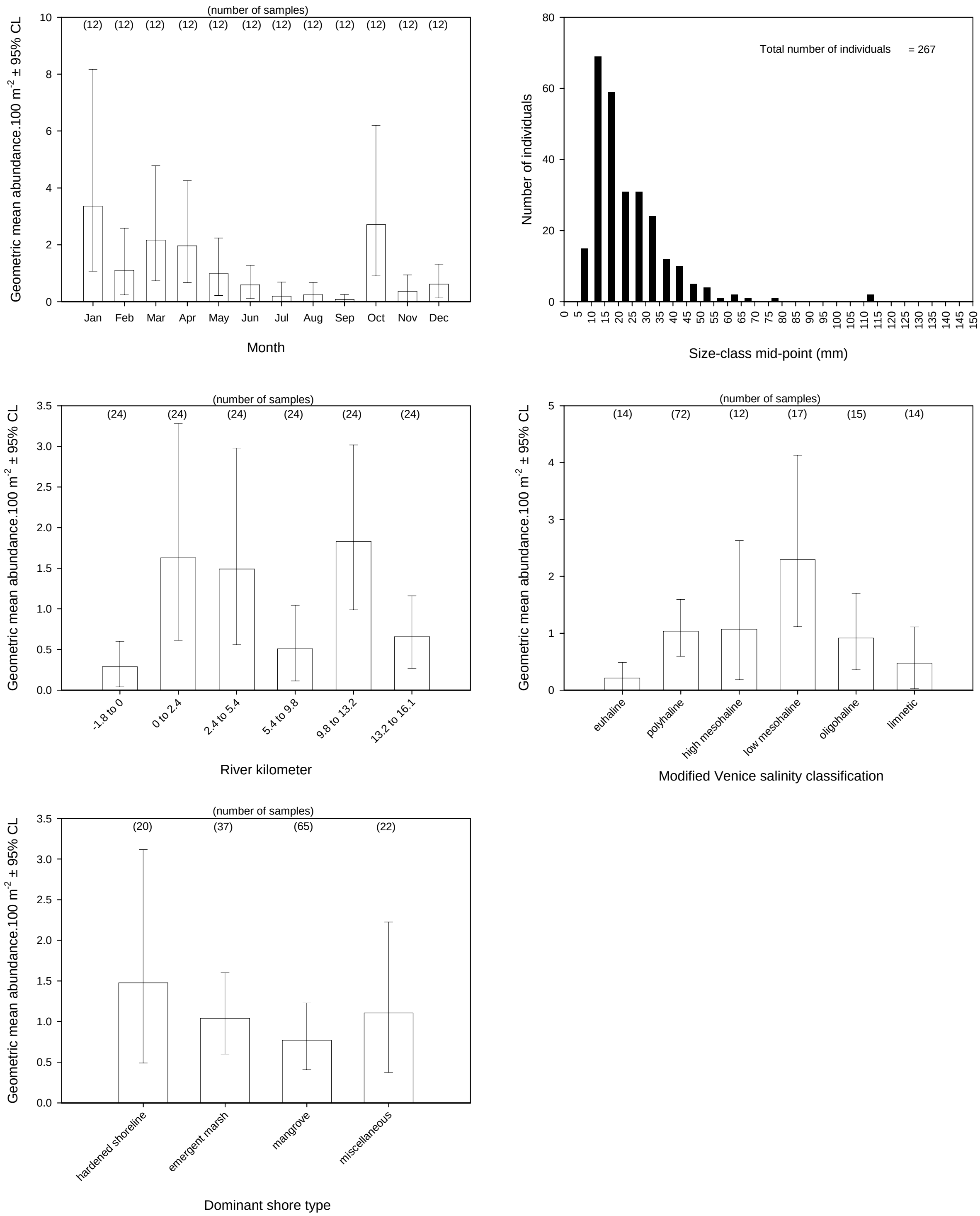


Fig. D3. Relative abundance of Blue crab in shoreline (seined) habitats.

Anchoa mitchilli (Bay anchovy), Seines

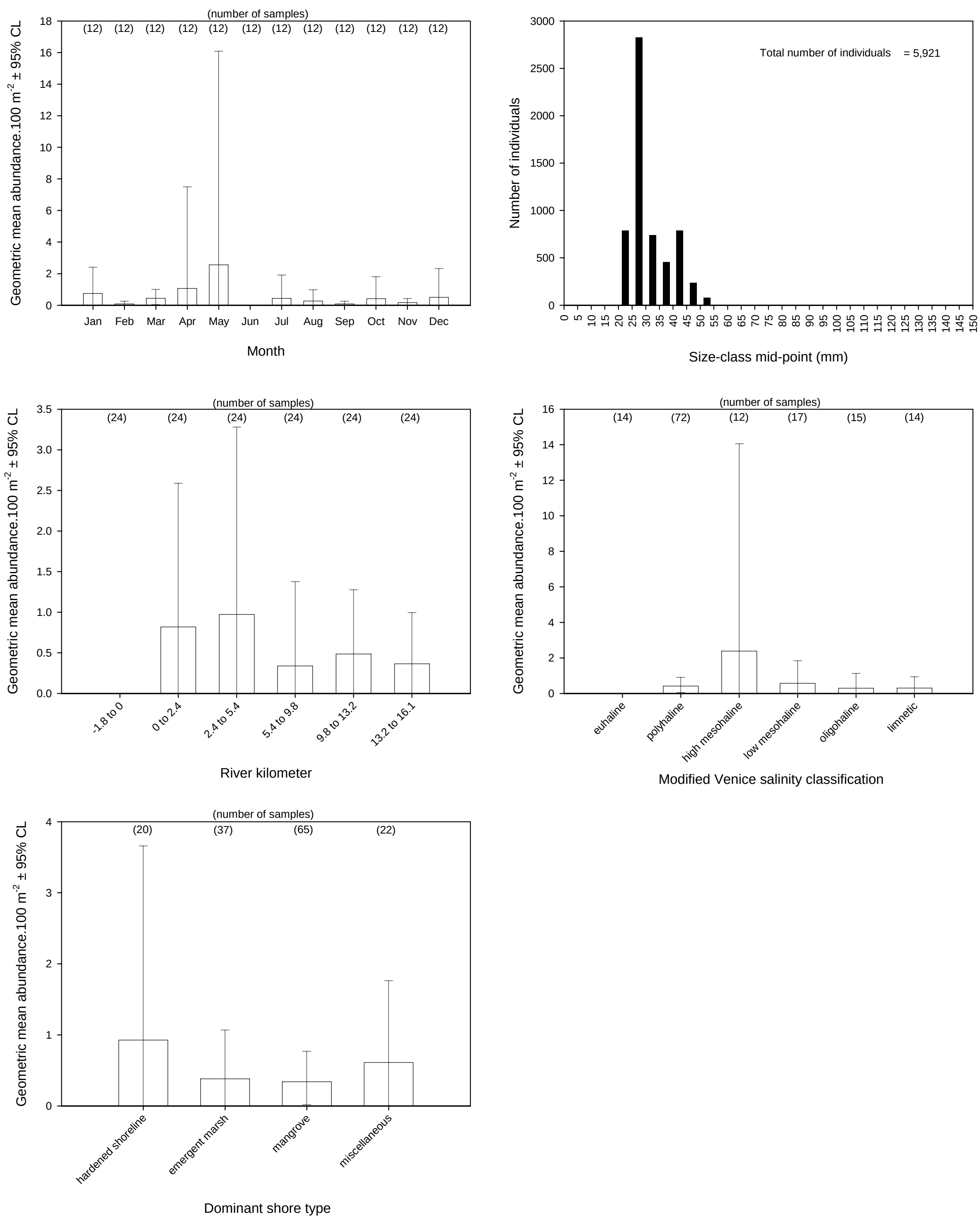


Fig. D4. Relative abundance of Bay anchovy in shoreline (seined) habitats.

Notropis petersoni (Coastal shiner), Seines

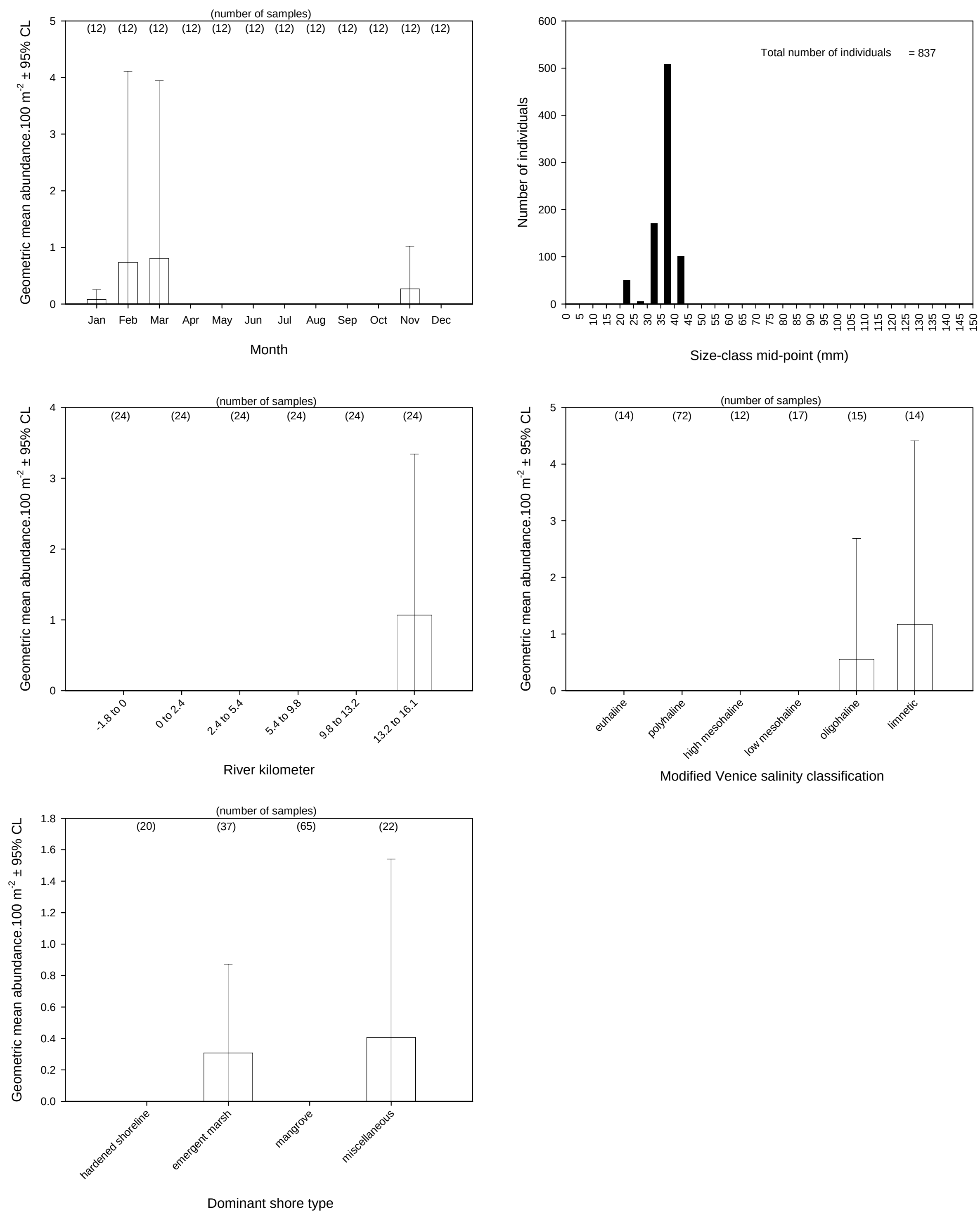


Fig. D5. Relative abundance of Coastal shiner in shoreline (seined) habitats.

Strongylura notata (Redfin needlefish), Seines

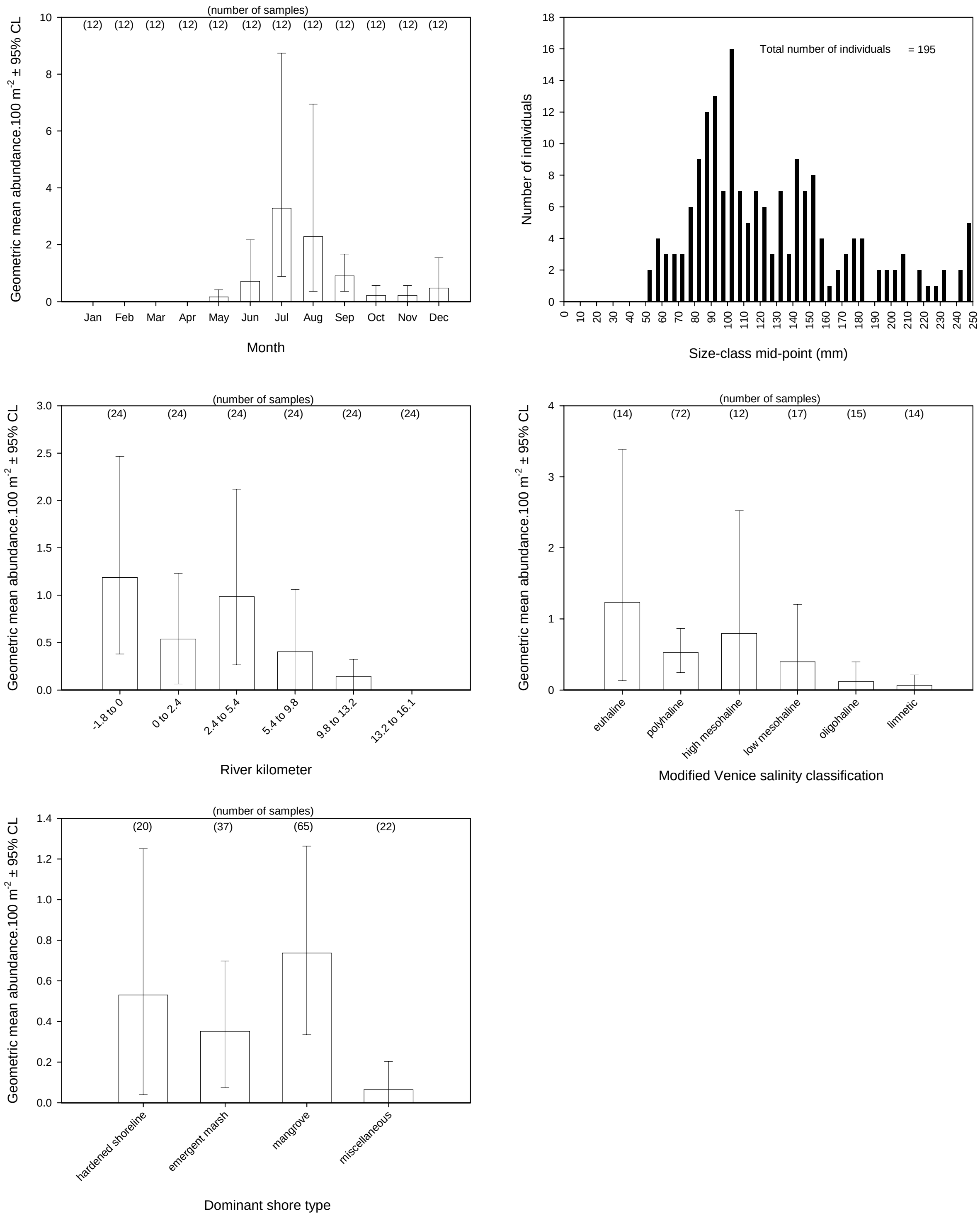


Fig. D6. Relative abundance of Redfin needlefish in shoreline (seined) habitats.

Lucania goodei (Bluefin killifish), Seines

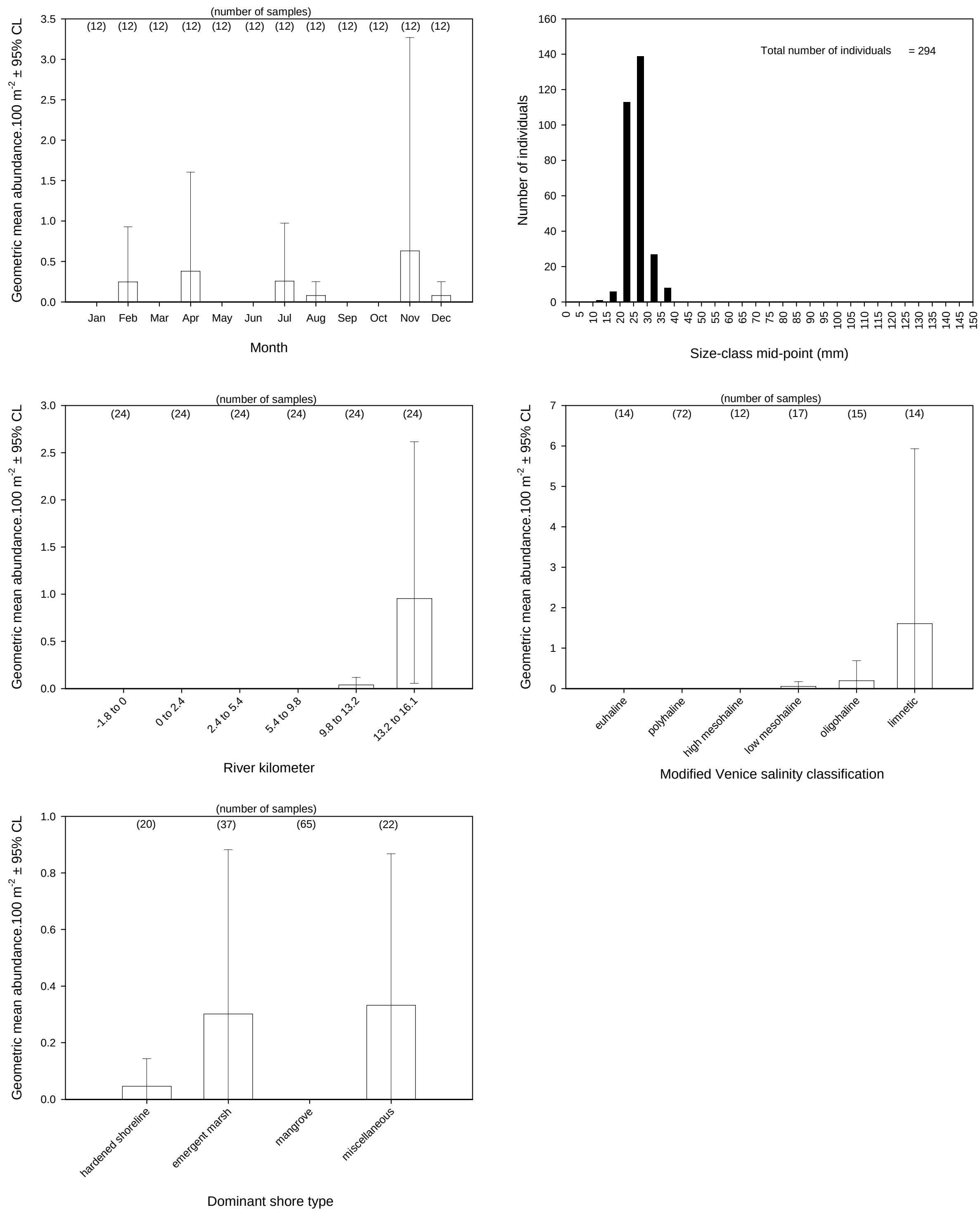


Fig. D7. Relative abundance of Bluefin killifish in shoreline (seined) habitats.

Floridichthys carpio (Goldspotted killifish), Seines

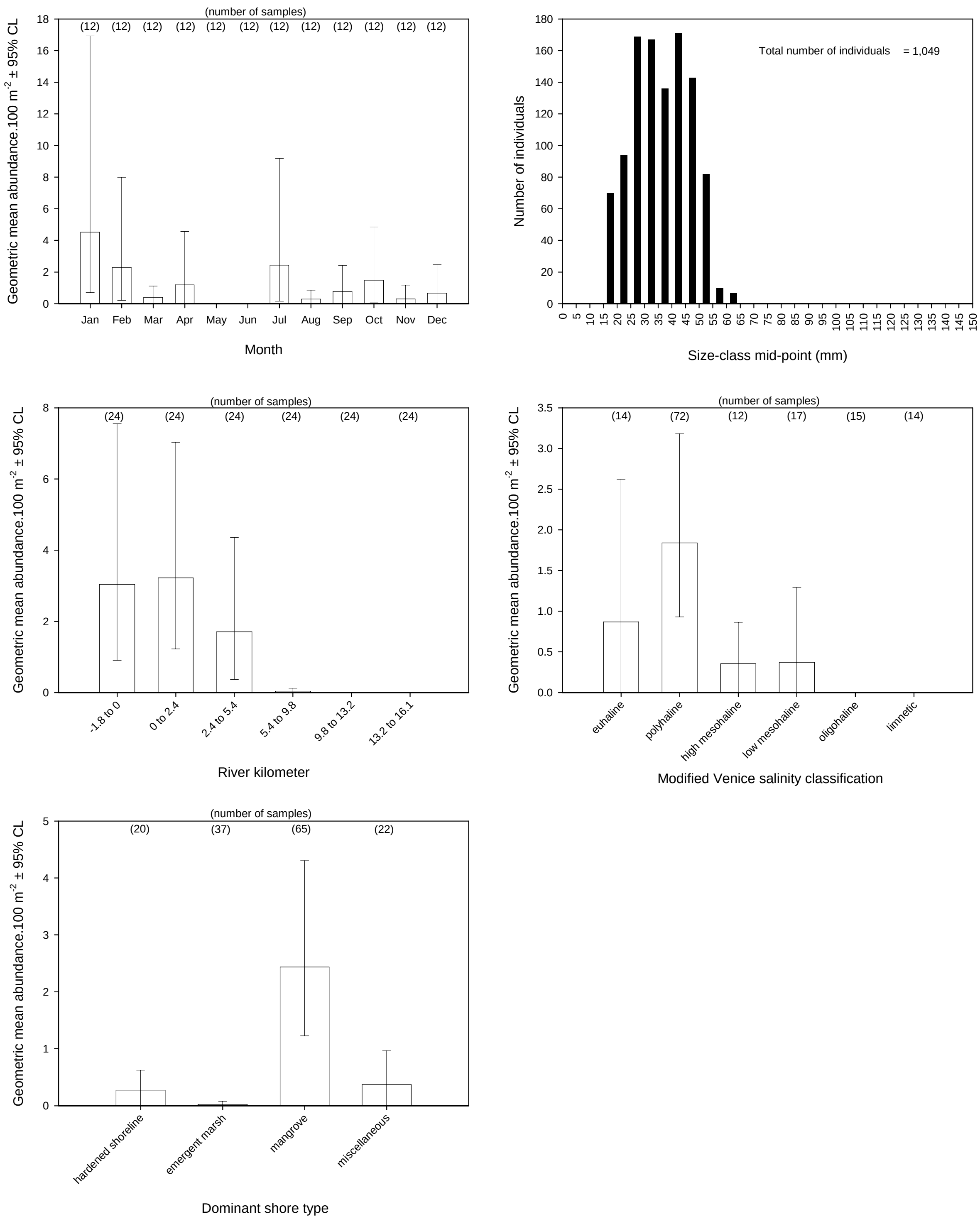


Fig. D8. Relative abundance of Goldspotted killifish in shoreline (seined) habitats.

Gambusia holbrooki (Eastern mosquitofish), Seines

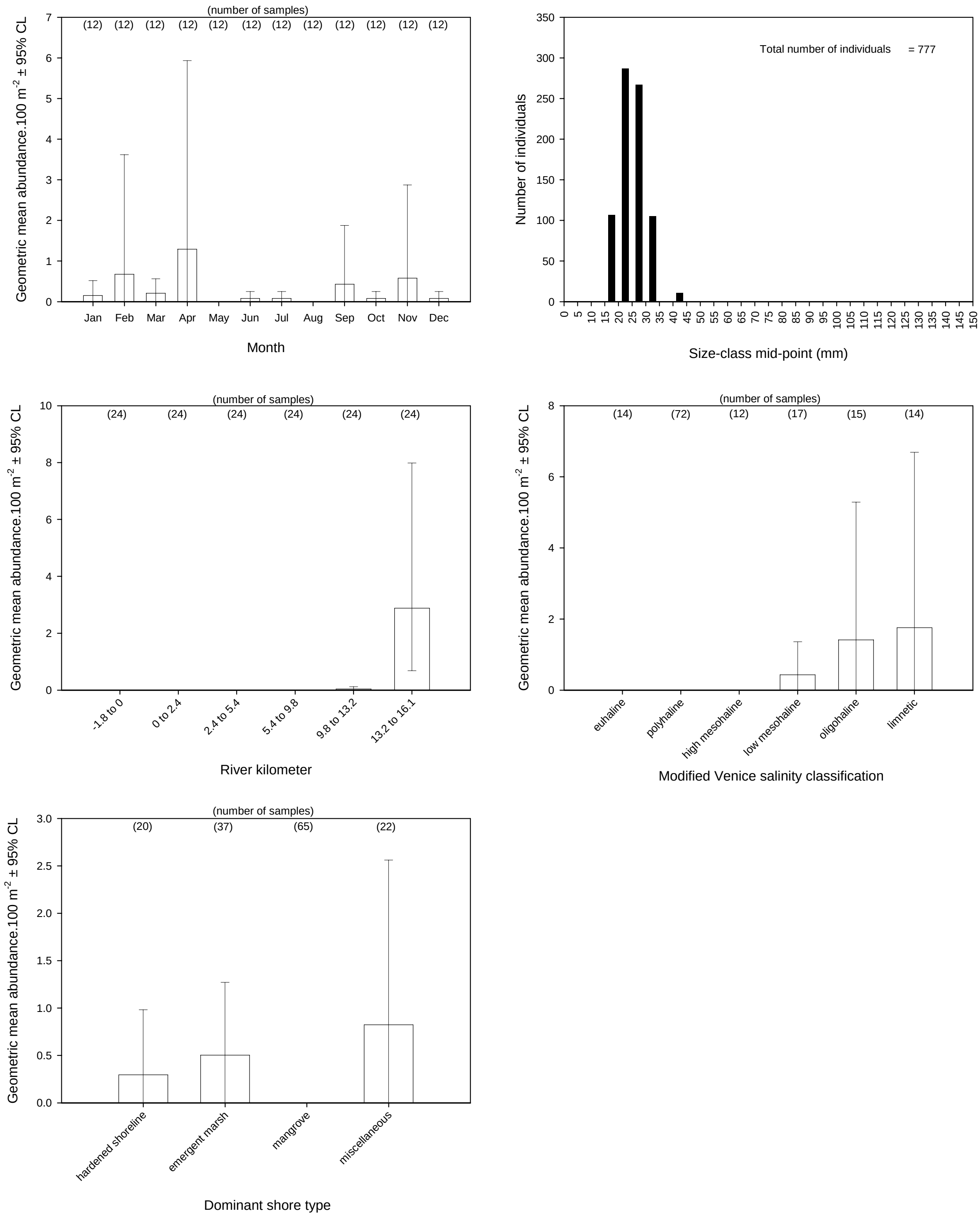


Fig. D9. Relative abundance of Eastern mosquitofish in shoreline (seined) habitats.

***Poecilia latipinna* (Sailfin molly), Seines**

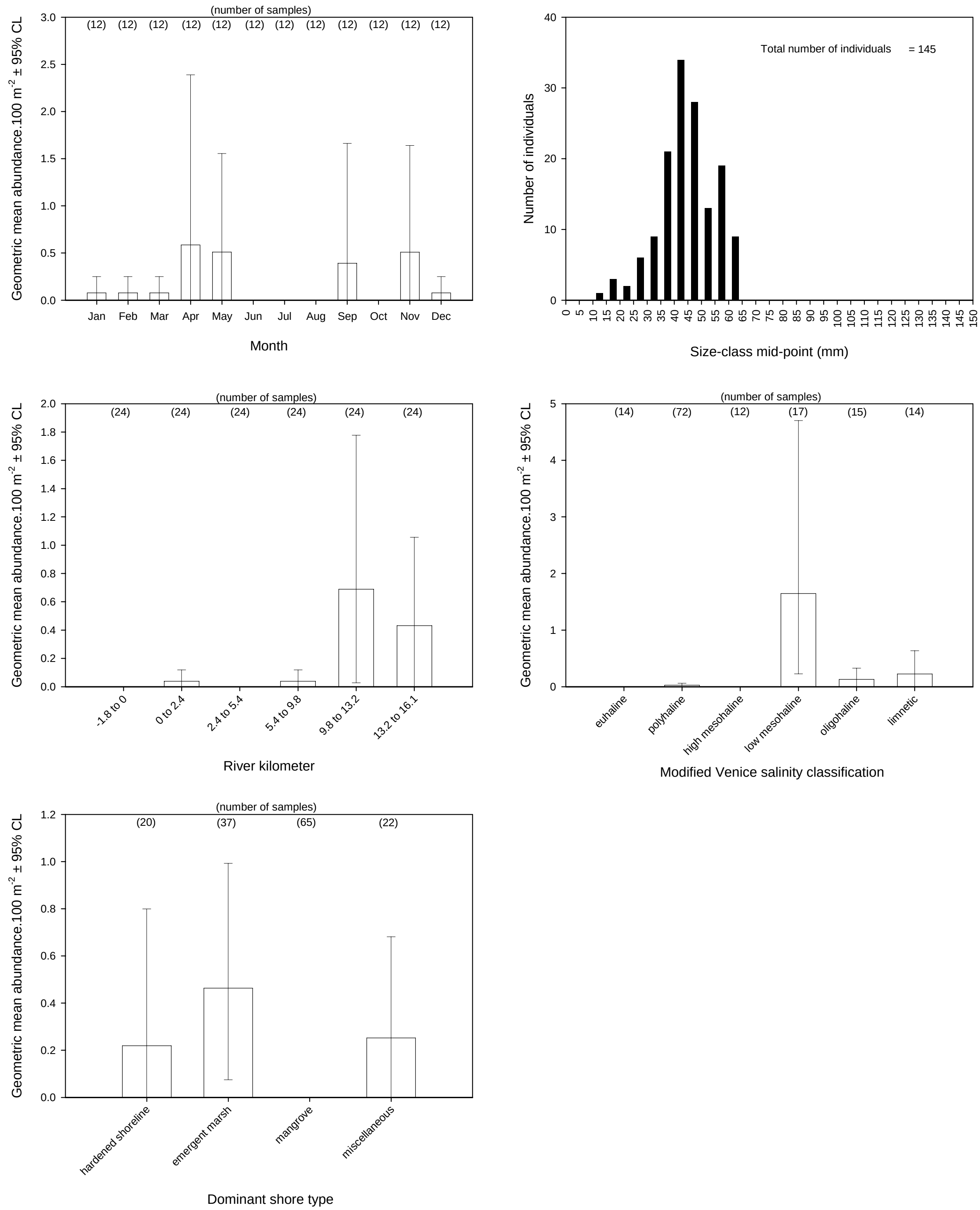


Fig. D10. Relative abundance of Sailfin molly in shoreline (seined) habitats.

Menidia spp. (Silversides), Seines

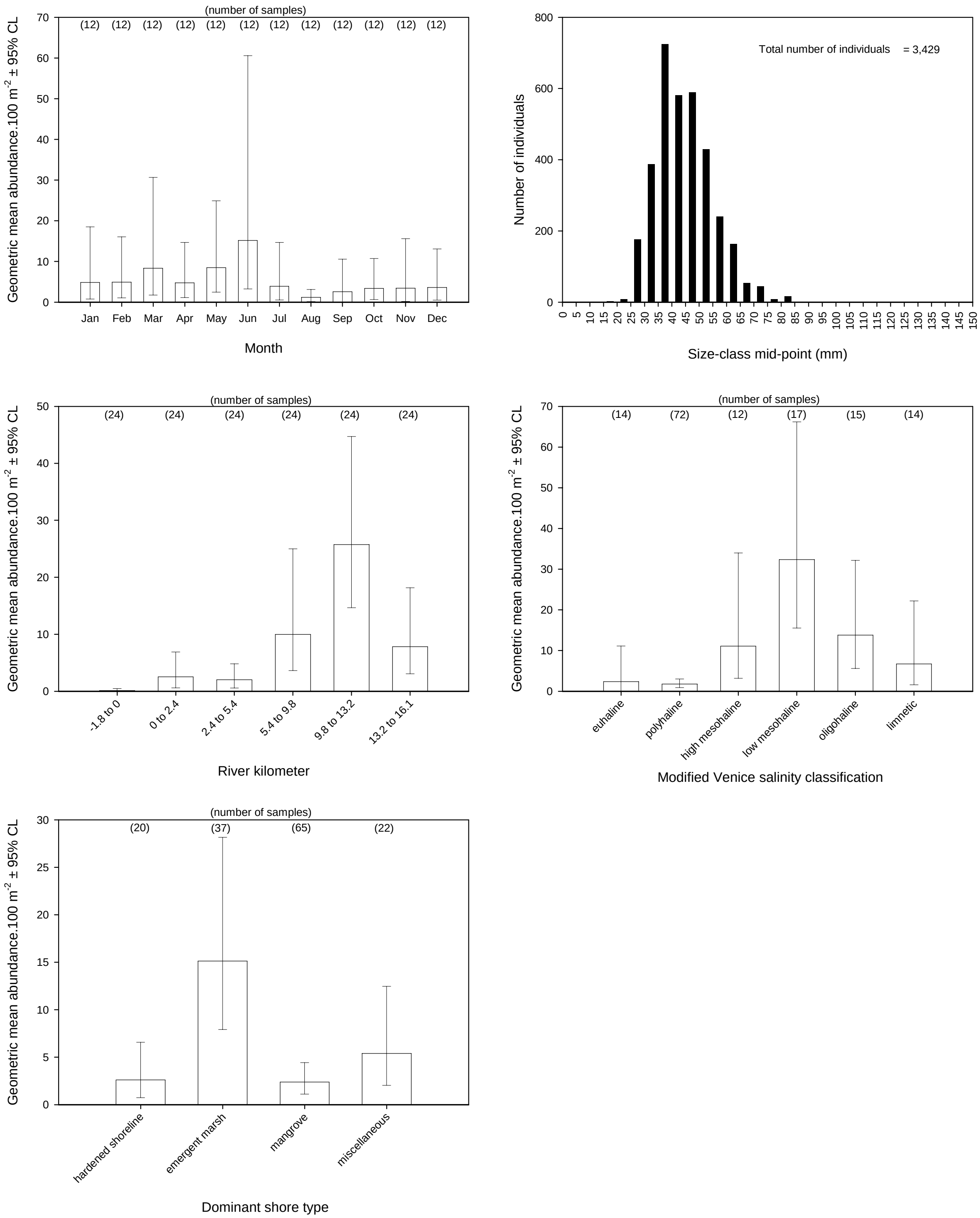


Fig. D11. Relative abundance of Silversides in shoreline (seined) habitats.

Labidesthes sicculus (Brook silverside), Seines

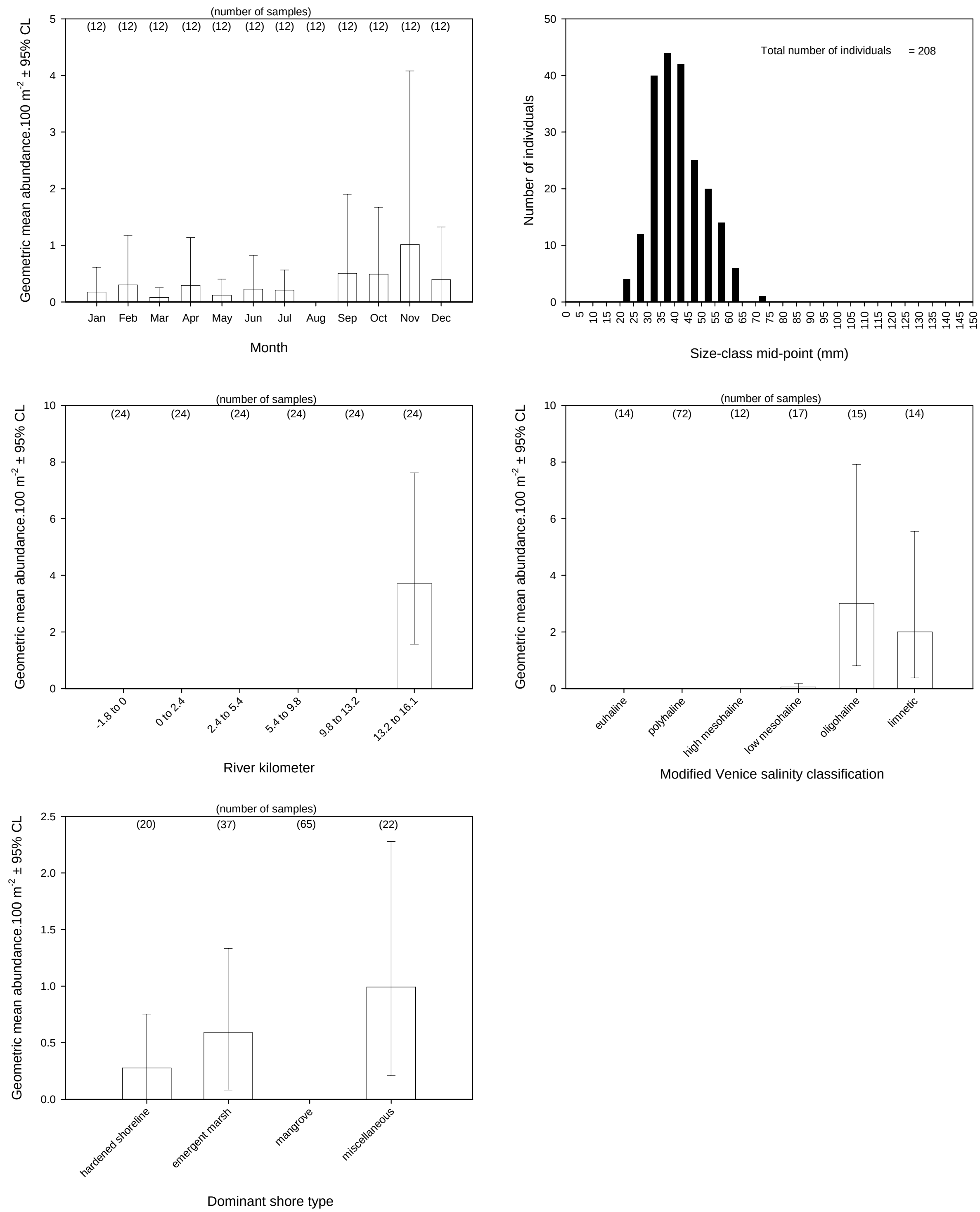


Fig. D12. Relative abundance of Brook silverside in shoreline (seined) habitats.

Lepomis macrochirus (Bluegill), Seines

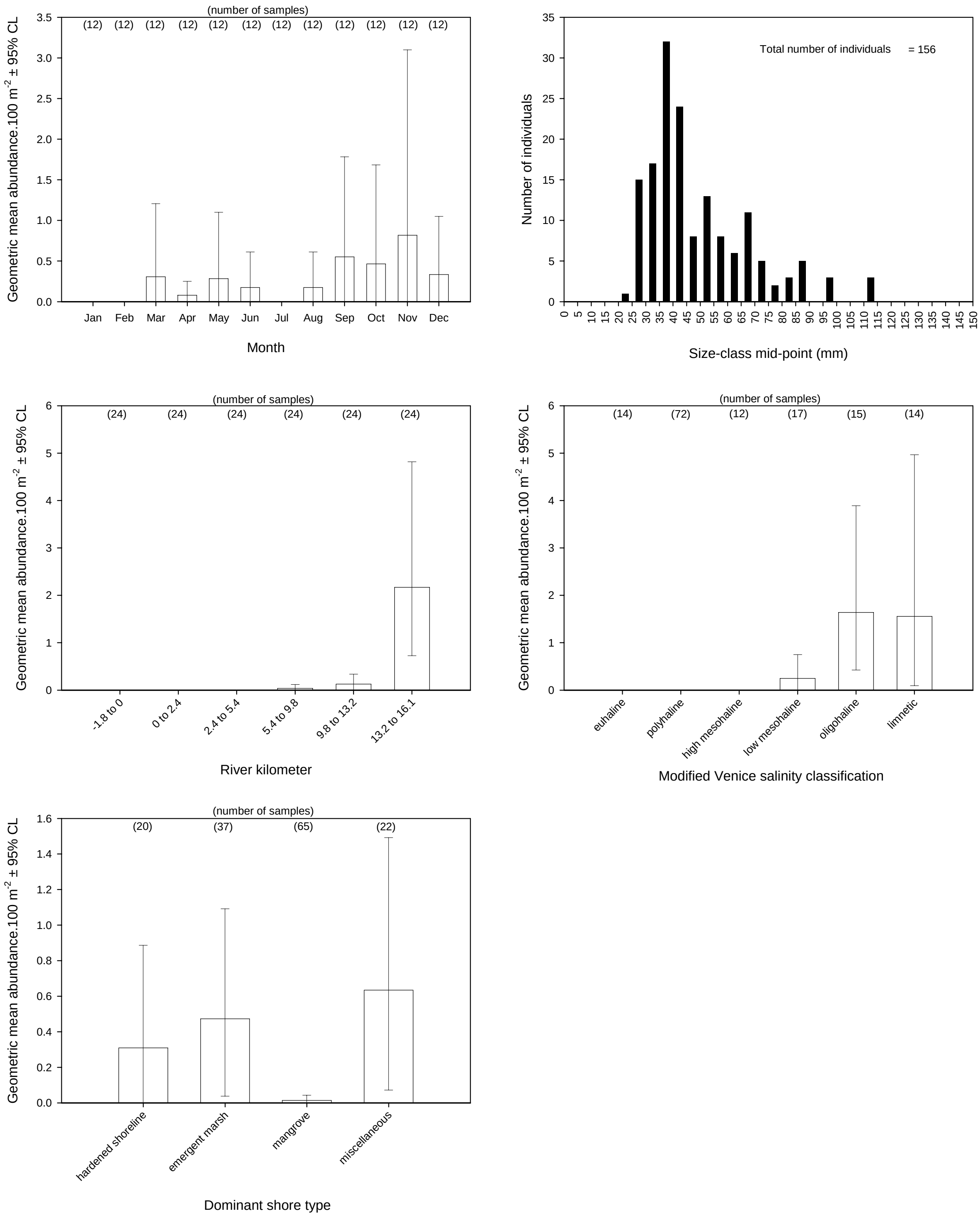


Fig. D13. Relative abundance of Bluegill in shoreline (seined) habitats.

Eucinostomus spp. (Eucinostomus mojarras), Seines

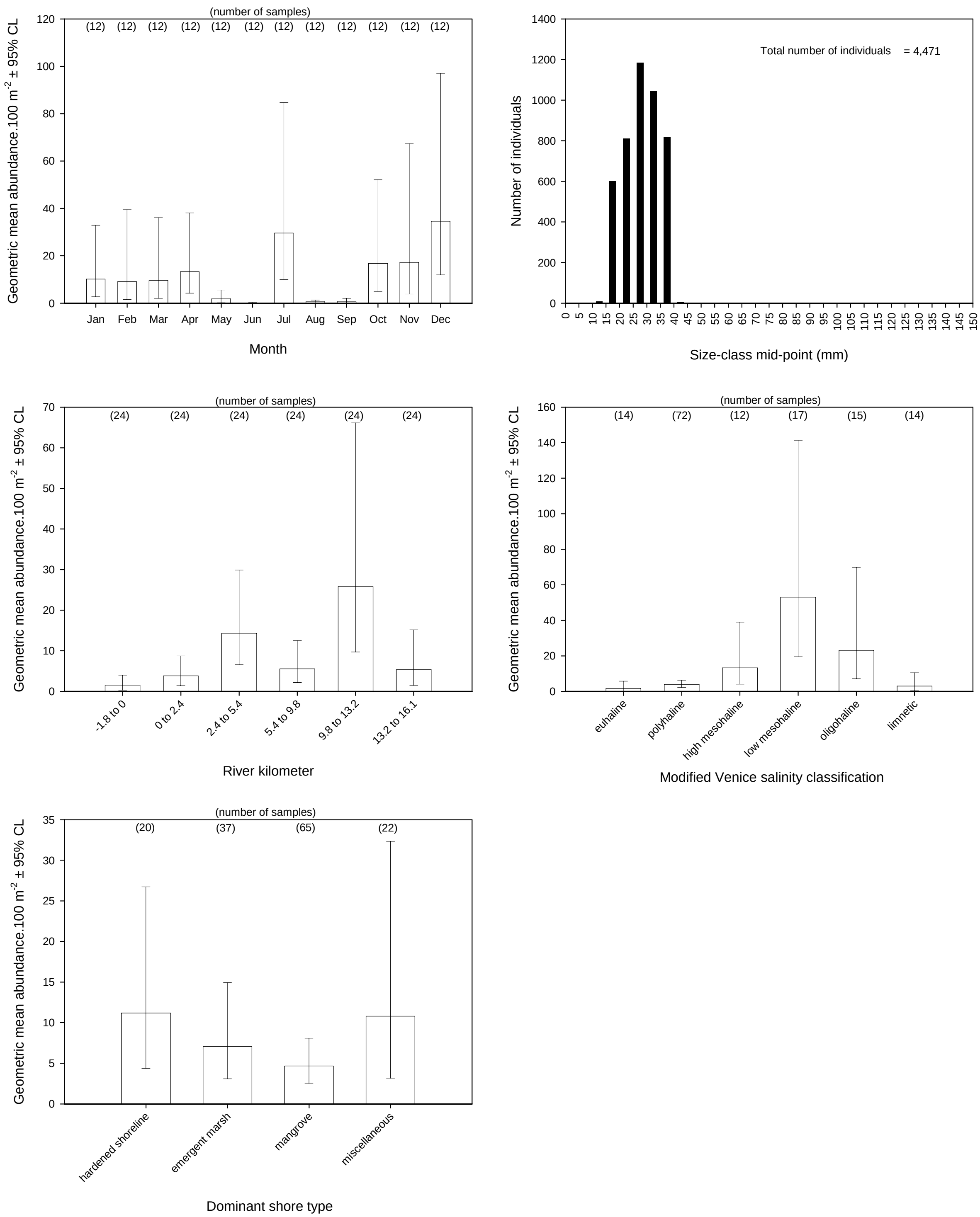


Fig. D14. Relative abundance of Eucinostomus mojarras in shoreline (seined) habitats.

Eucinostomus gula (Silver jenny), Seines

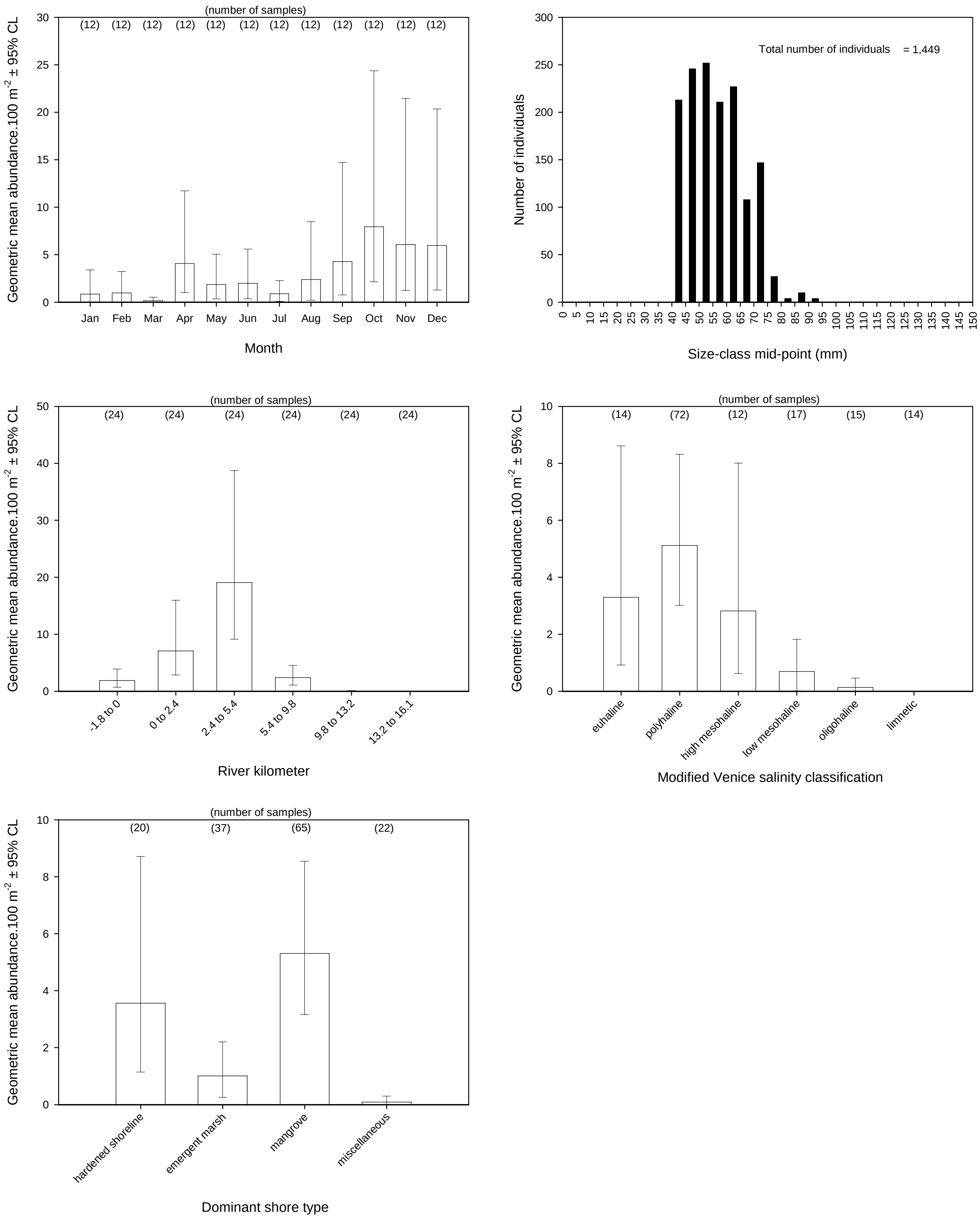


Fig. D15. Relative abundance of Silver jenny in shoreline (seined) habitats.

Eucinostomus harengulus (Tidewater mojarra), Seines

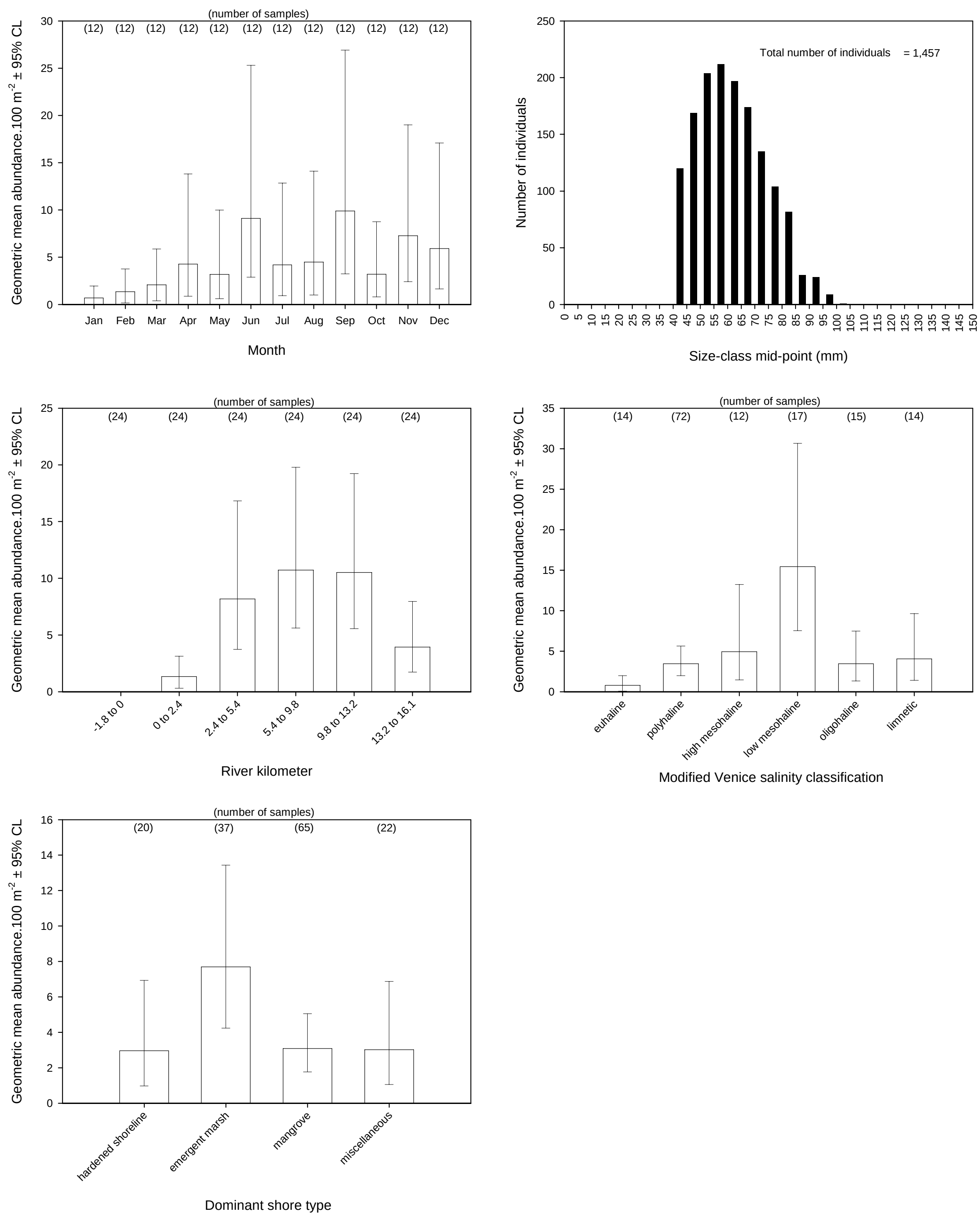


Fig. D16. Relative abundance of Tidewater mojarra in shoreline (seined) habitats.

Lagodon rhomboides (Pinfish), Seines

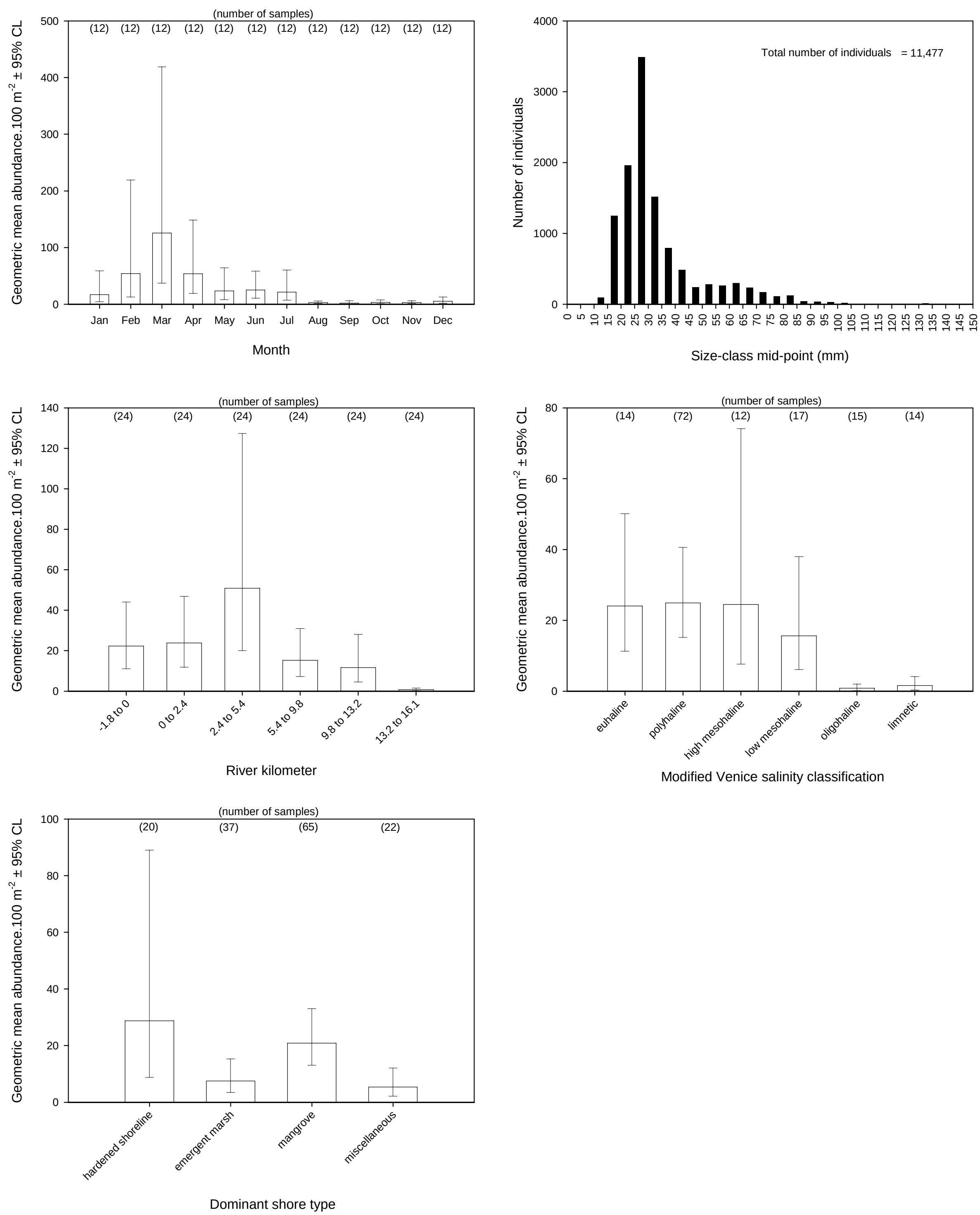


Fig. D17. Relative abundance of Pinfish in shoreline (seined) habitats.

***Leiostomus xanthurus* (Spot), Seines**

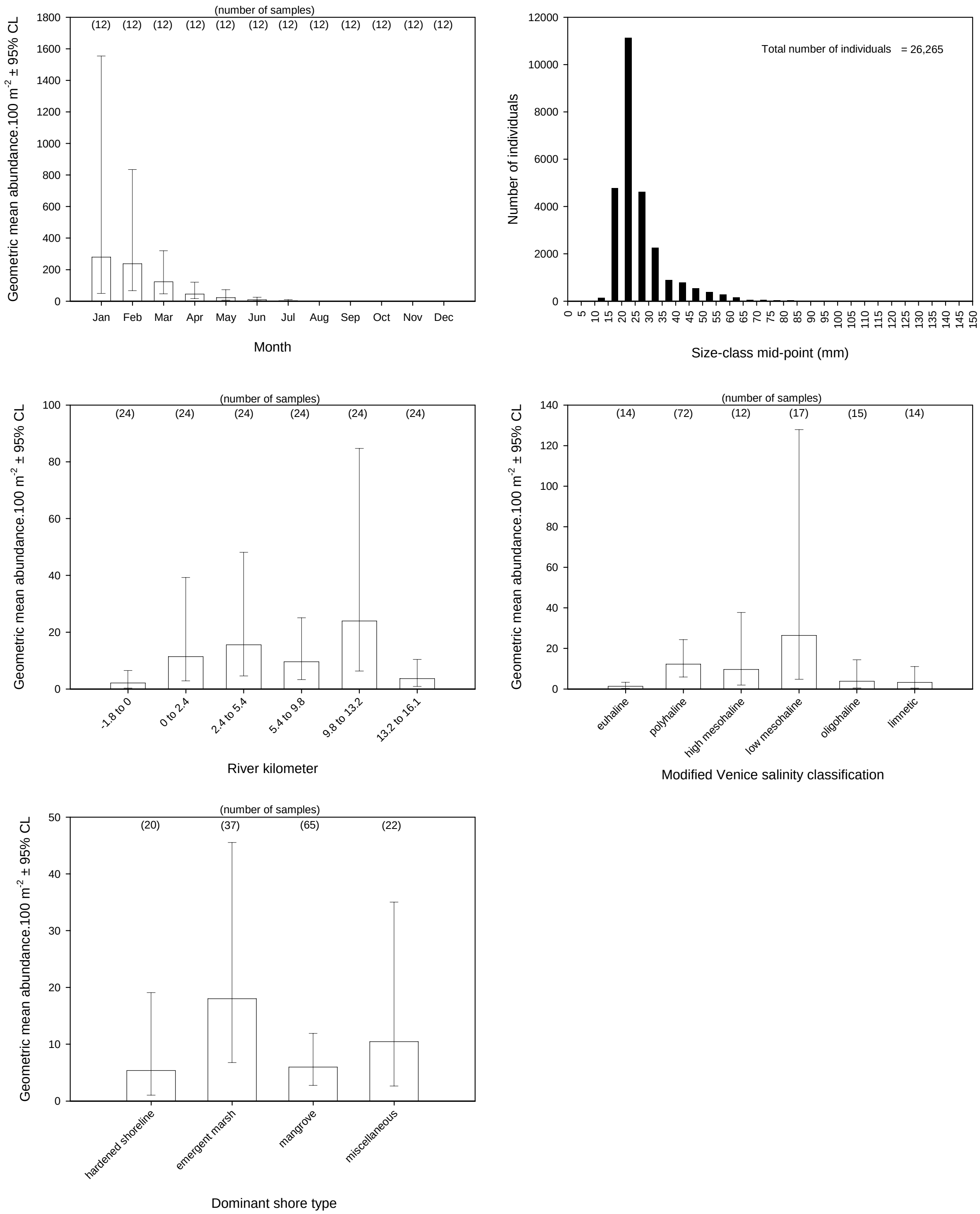


Fig. D18. Relative abundance of Spot in shoreline (seined) habitats.

Mugil cephalus (Striped mullet), Seines

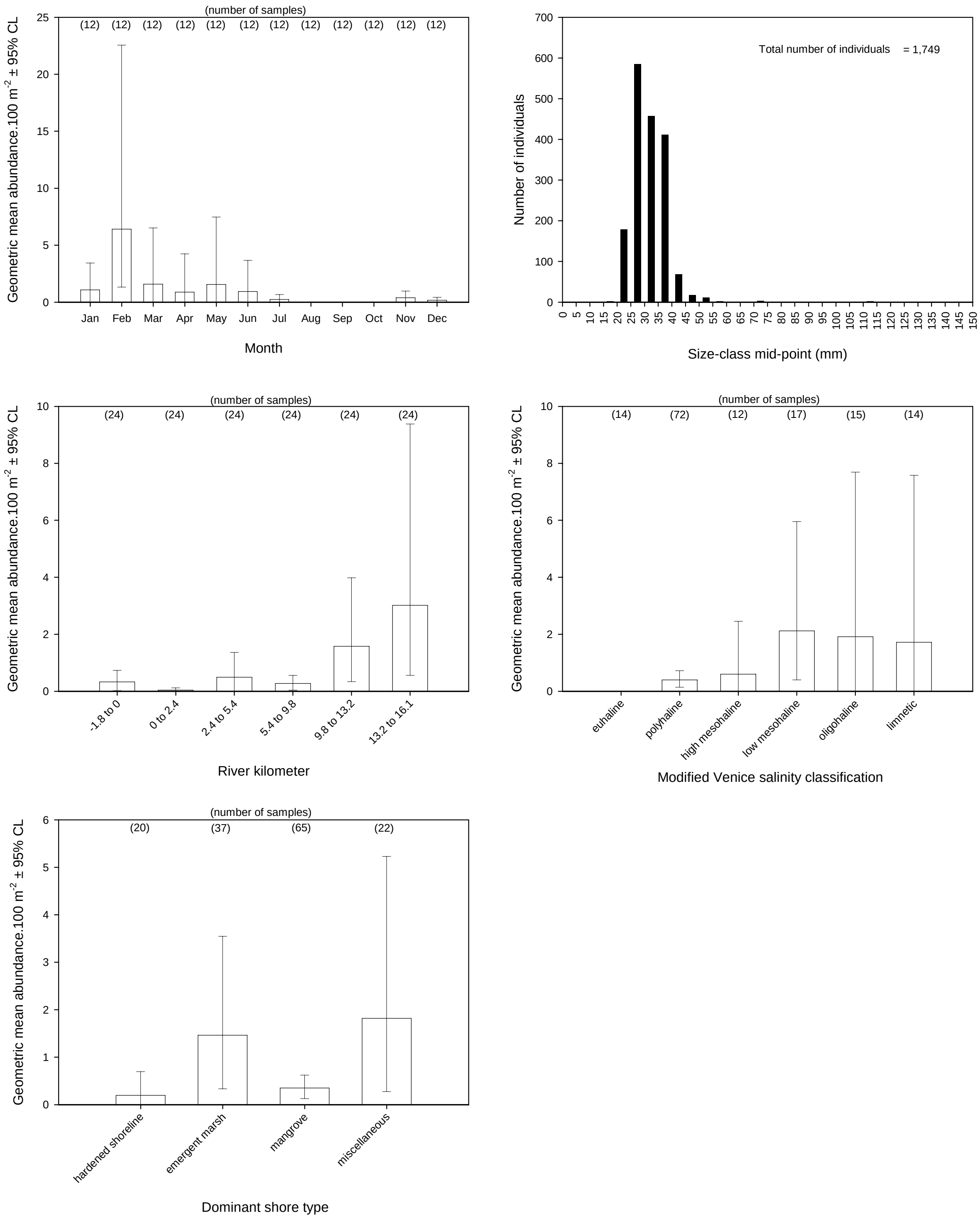


Fig. D19. Relative abundance of Striped mullet in shoreline (seined) habitats.

Microgobius gulosus (Clown goby), Seines

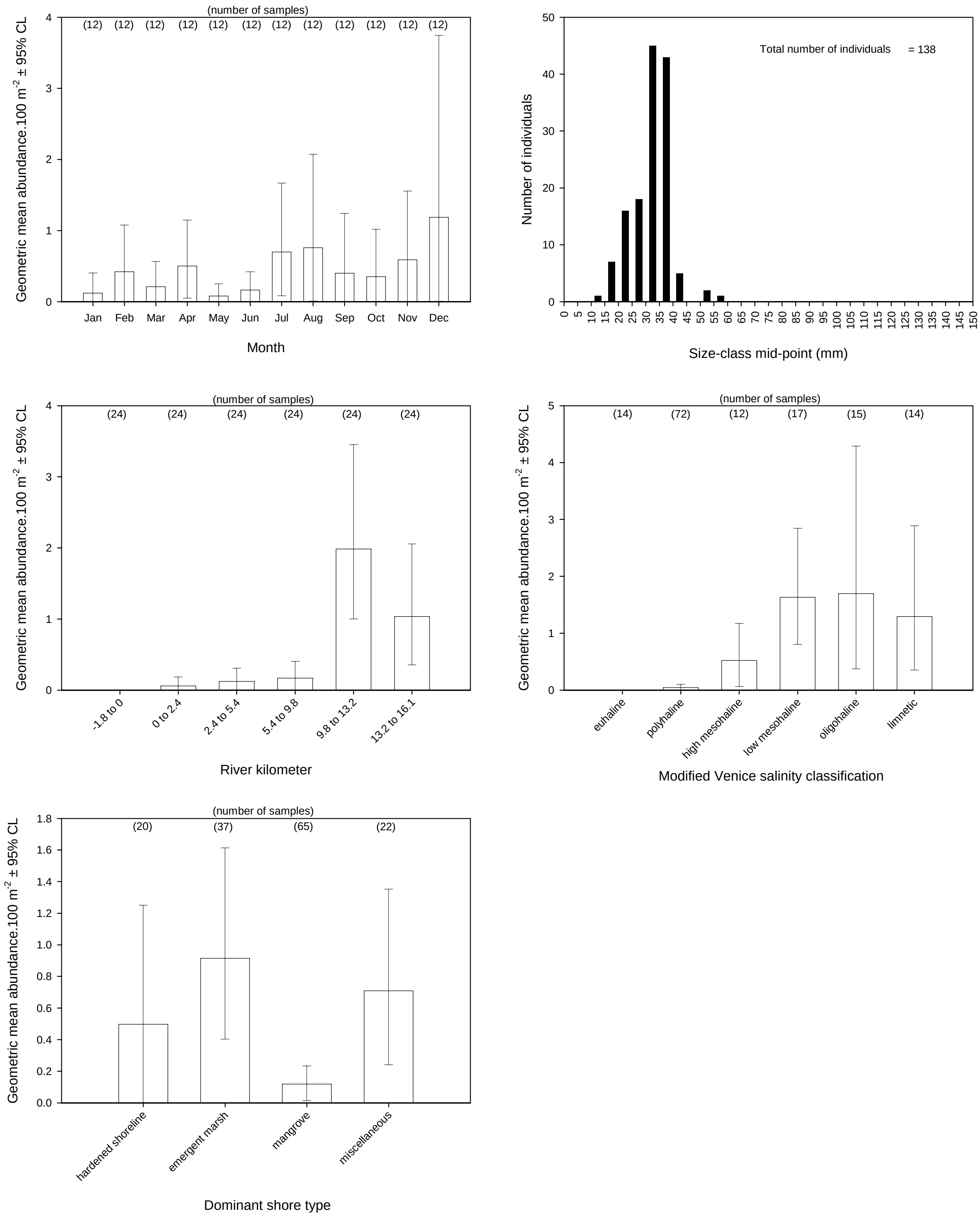


Fig. D20. Relative abundance of Clown goby in shoreline (seined) habitats.

Appendix E:

Trawl catch overview plots

Farfantepenaeus duorarum (Pink shrimp), Trawls

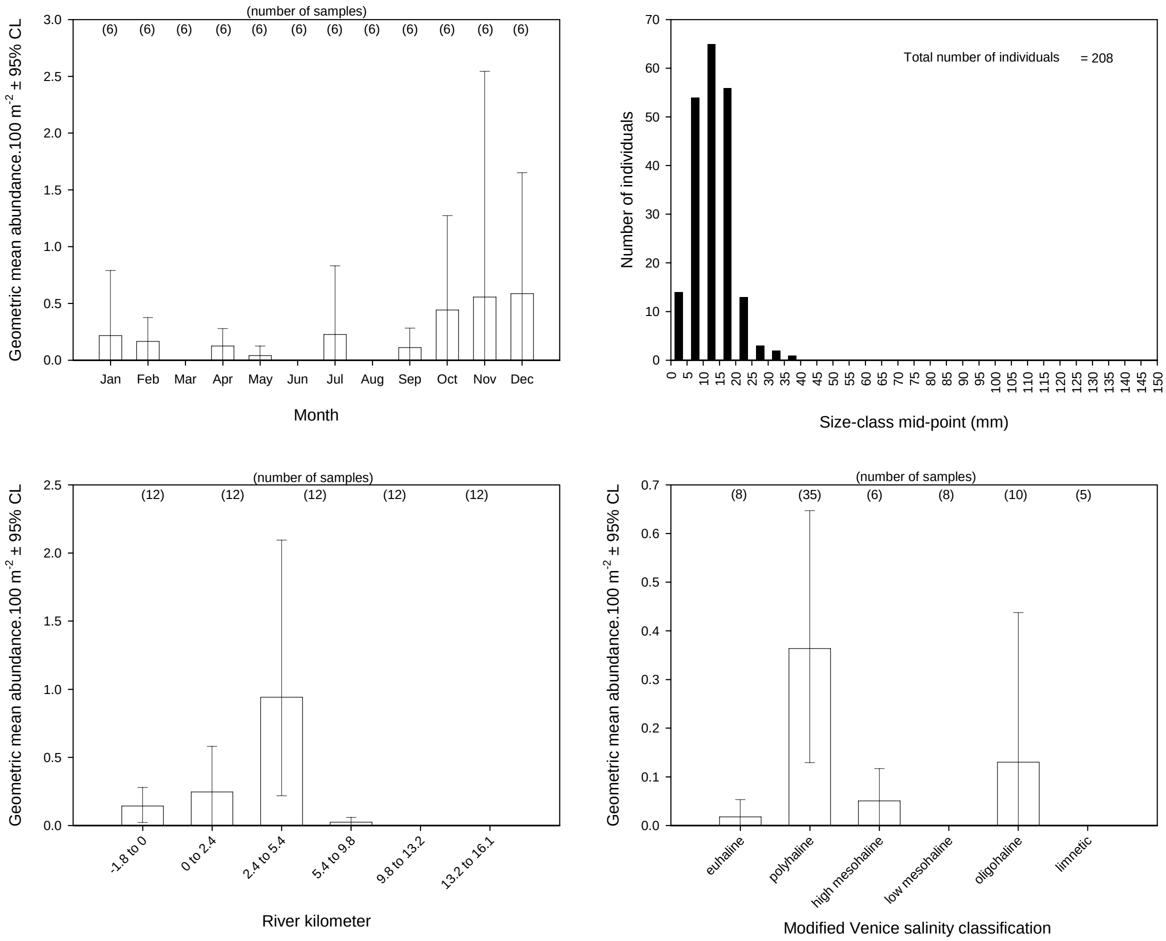


Fig. E1. Relative abundance of Pink shrimp in deeper (trawled) habitats.

Palaemonetes intermedius (Brackish grass shrimp), Trawls

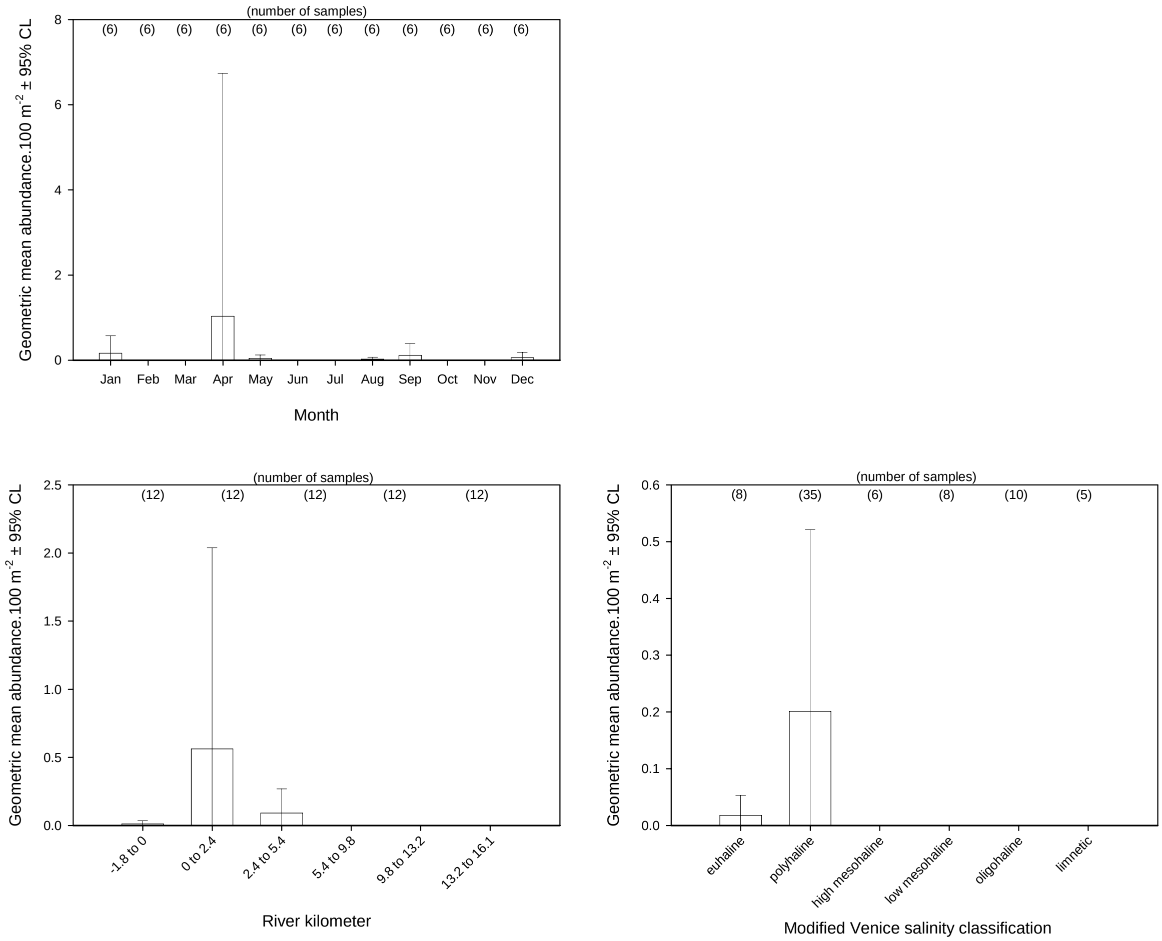


Fig. E2. Relative abundance of Brackish grass shrimp in deeper (trawled) habitats.

Periclimenes longicaudatus (Longtail grass shrimp), Trawls

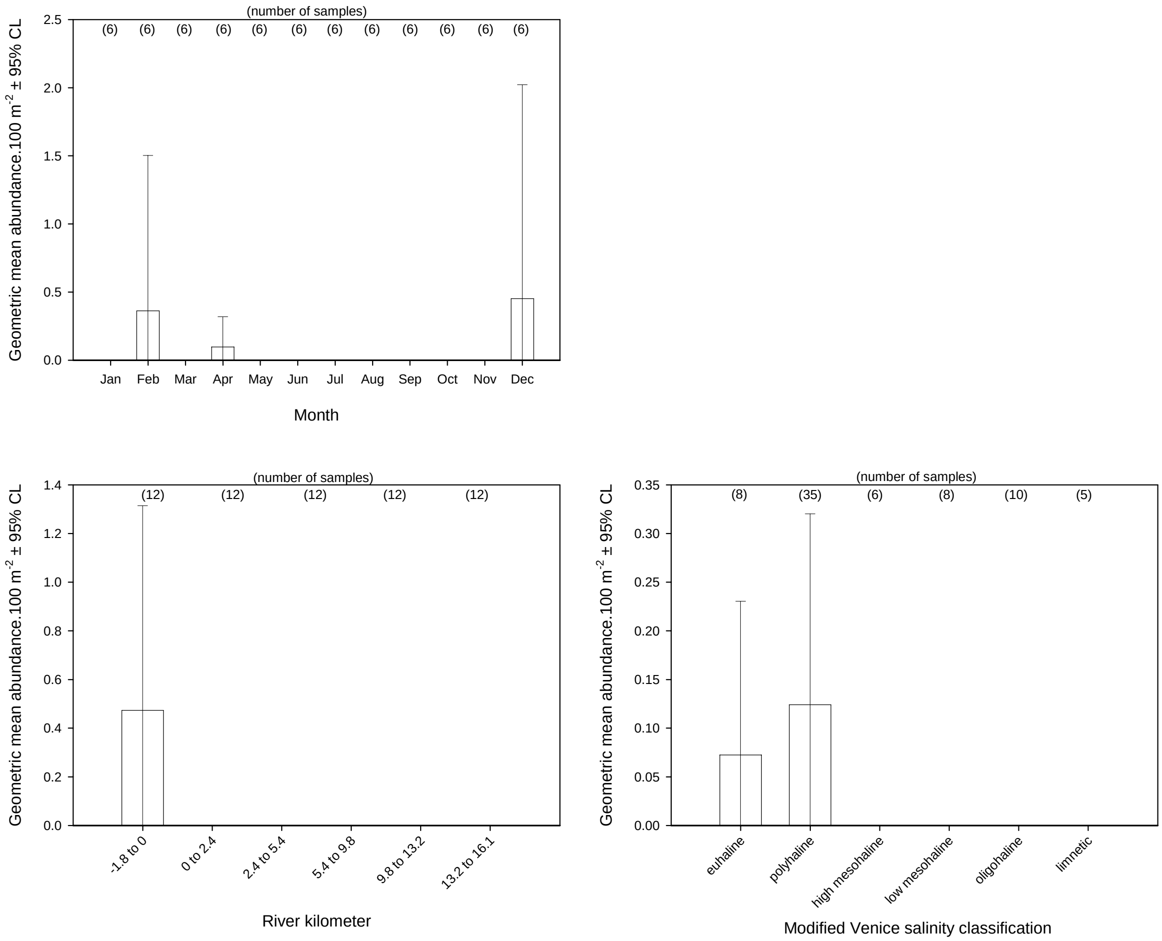


Fig. E3. Relative abundance of Longtail grass shrimp in deeper (trawled) habitats.

Tozeuma carolinense (Arrow shrimp), Trawls

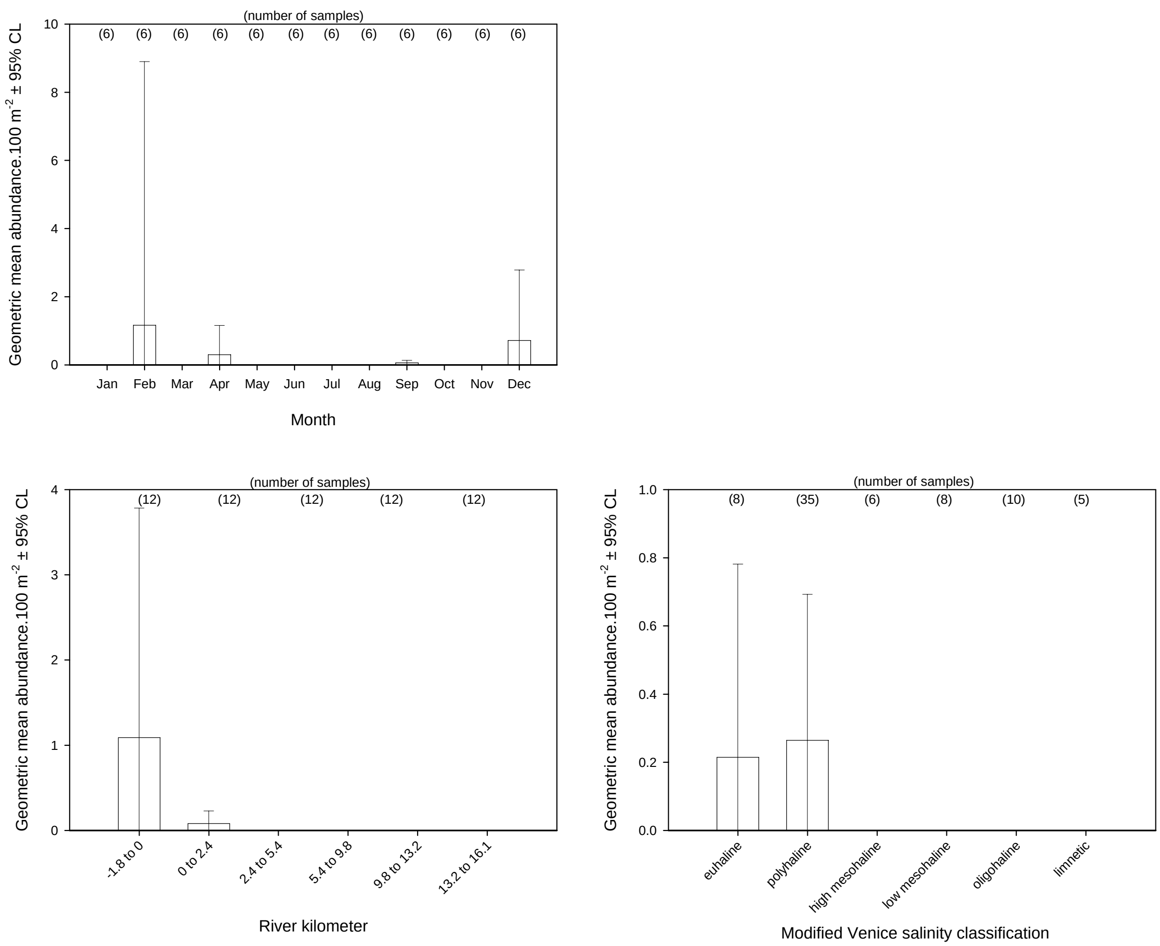


Fig. E4. Relative abundance of Arrow shrimp in deeper (trawled) habitats.

Callinectes sapidus (Blue crab), Trawls

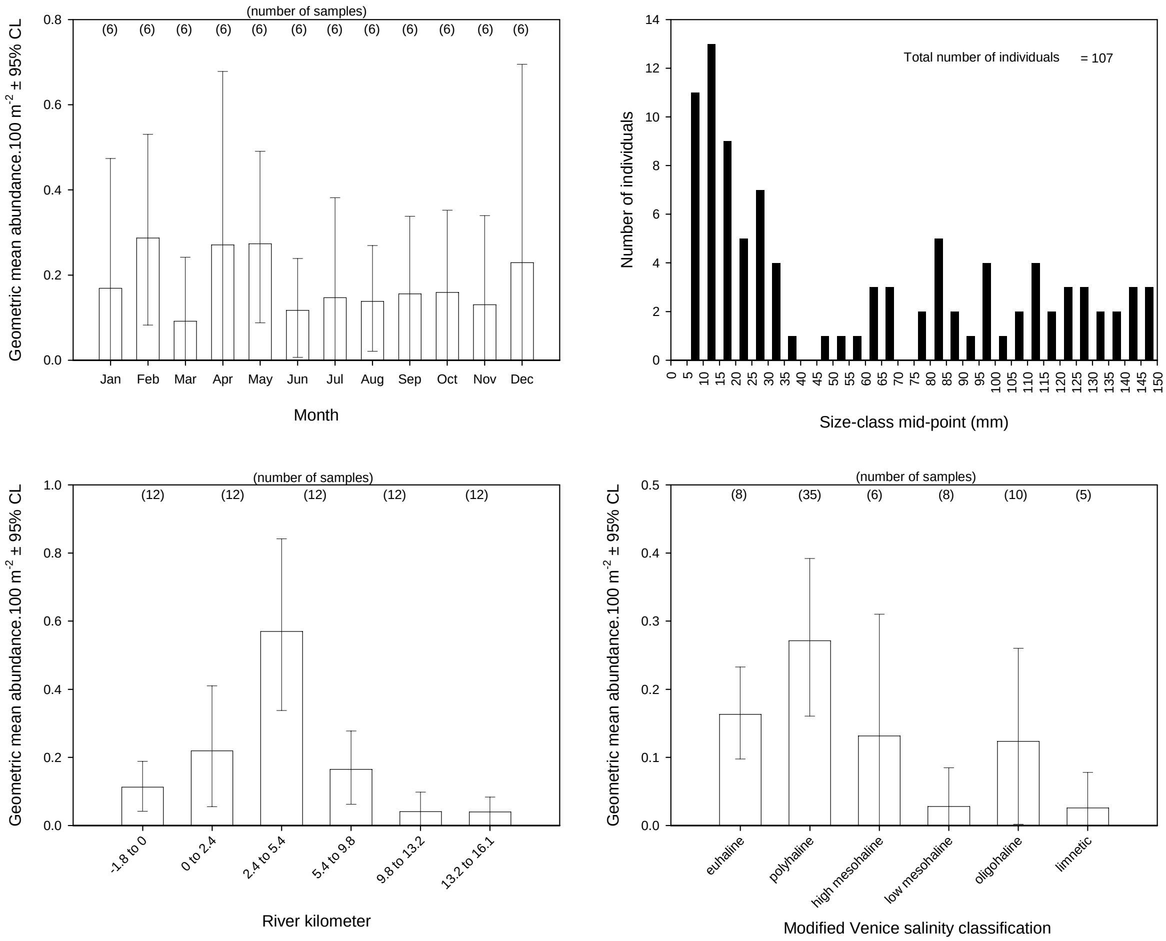


Fig. E5. Relative abundance of Blue crab in deeper (trawled) habitats.

Anchoa mitchilli (Bay anchovy), Trawls

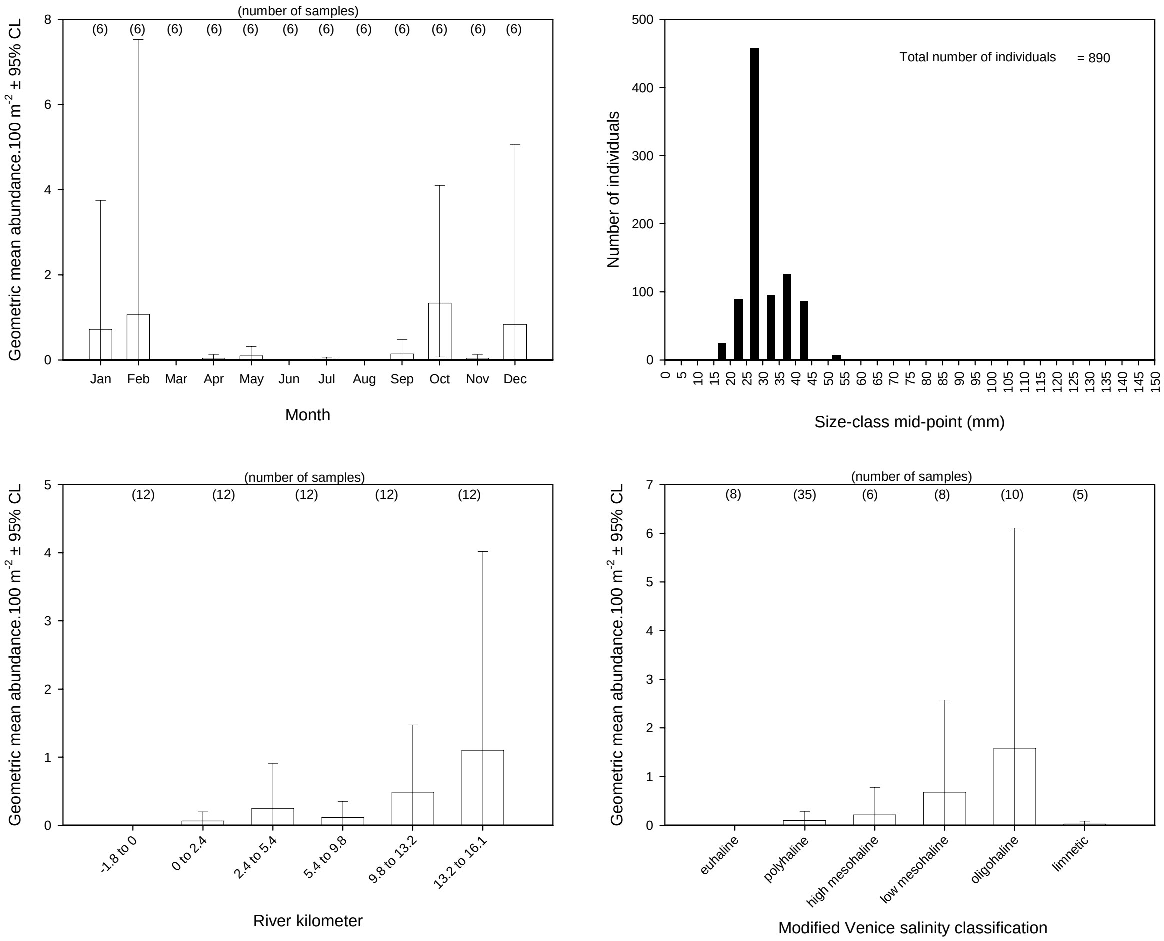


Fig. E6. Relative abundance of Bay anchovy in deeper (trawled) habitats.

Lucania parva (Rainwater killifish), Trawls

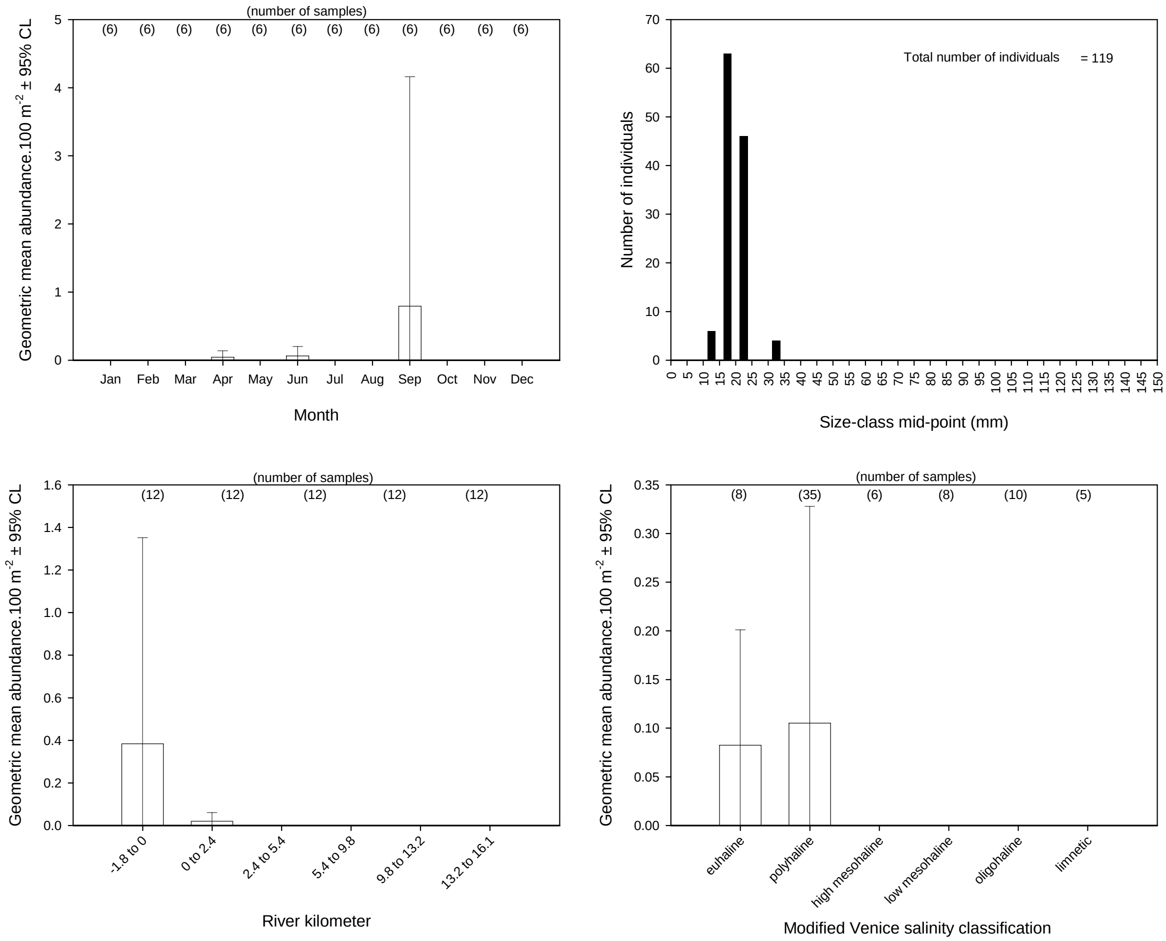


Fig. E7. Relative abundance of Rainwater killifish in deeper (trawled) habitats.

Eucinostomus spp. (Eucinostomus mojarras), Trawls

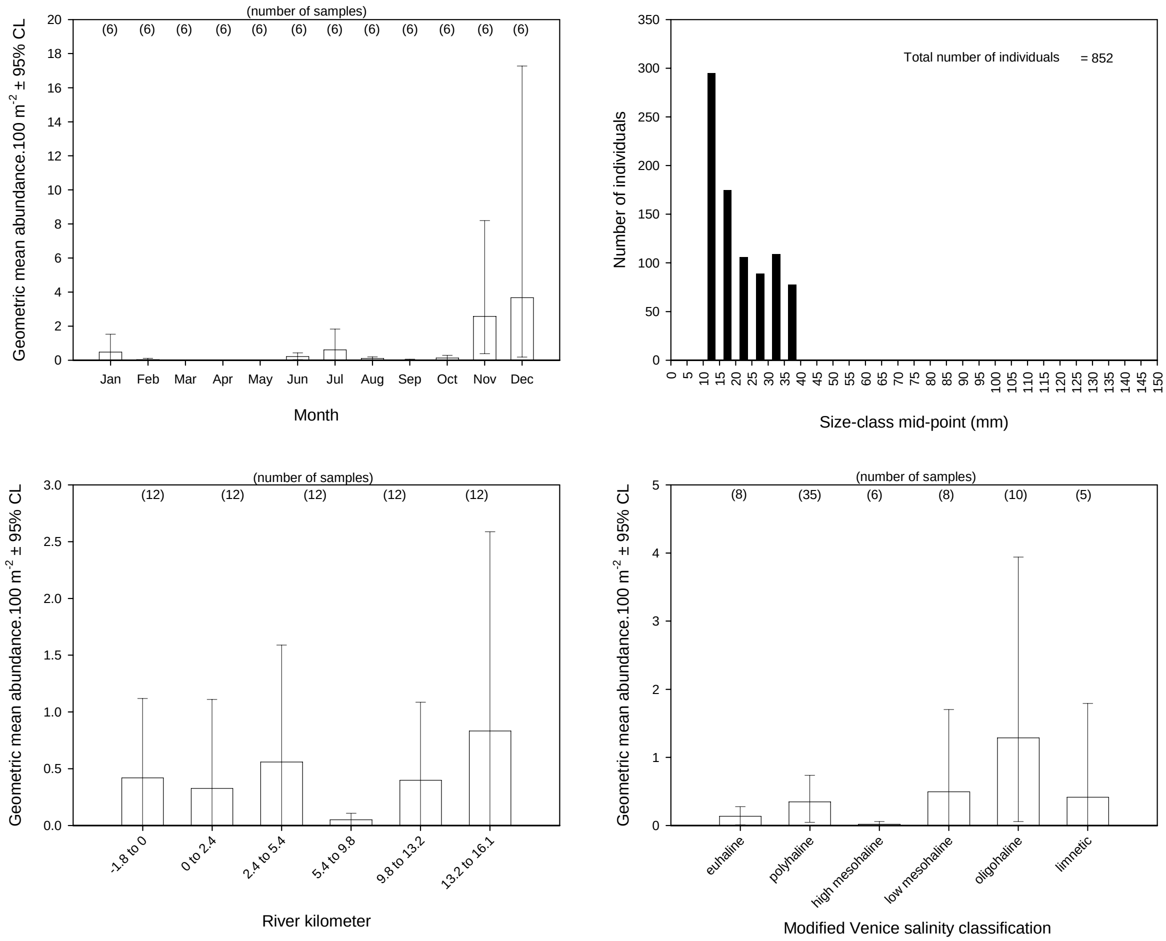


Fig. E8. Relative abundance of Eucinostomus mojarras in deeper (trawled) habitats.

Eucinostomus gula (Silver jenny), Trawls

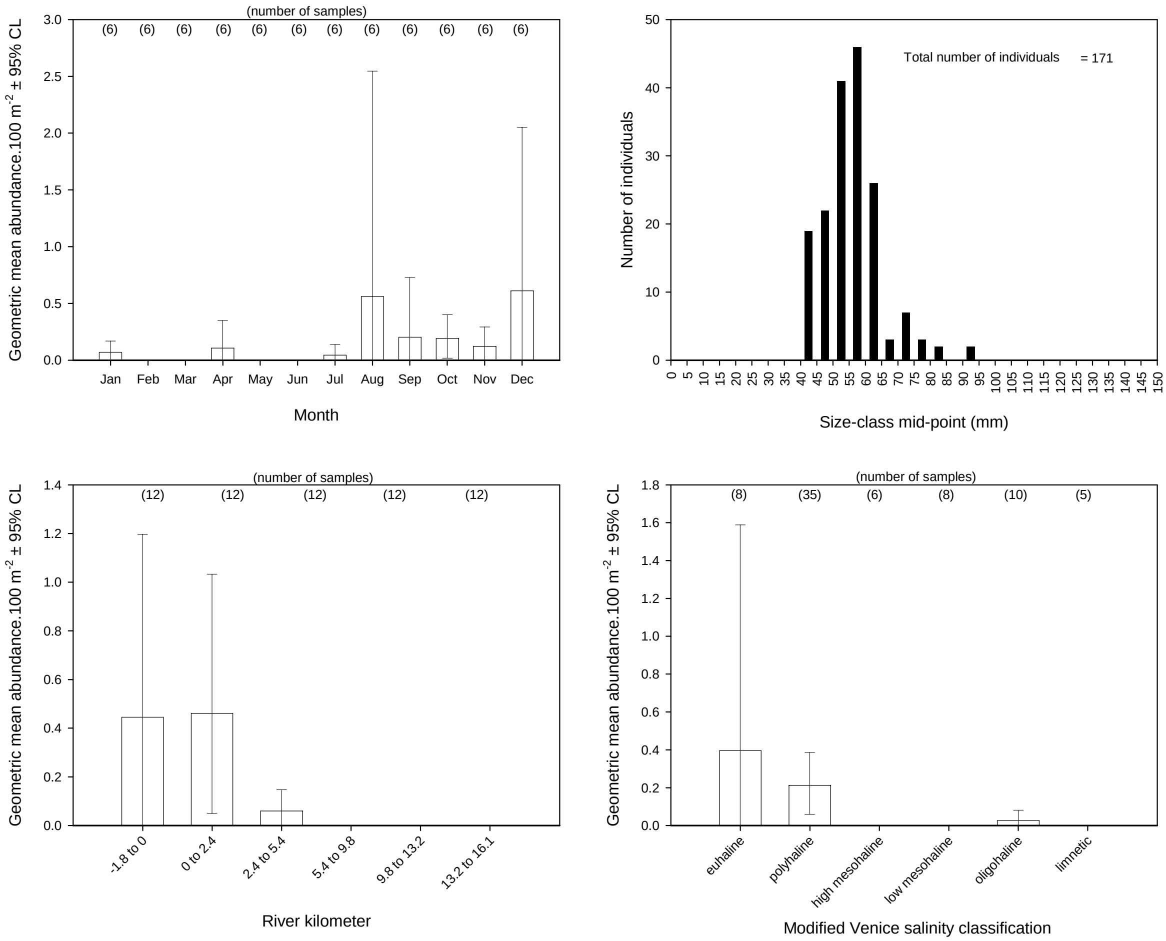


Fig. E9. Relative abundance of Silver jenny in deeper (trawled) habitats.

Orthopristis chrysoptera (Pigfish), Trawls

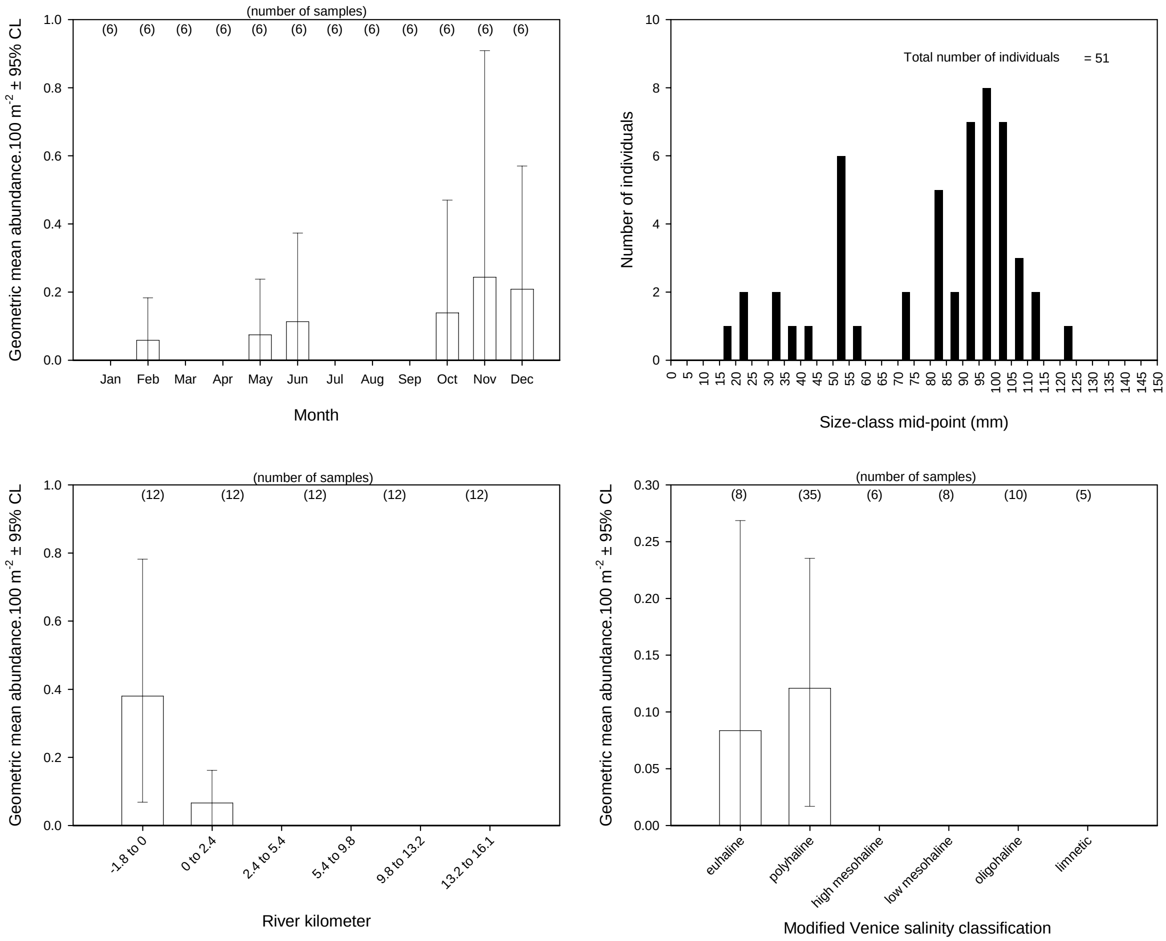


Fig. E10. Relative abundance of Pigfish in deeper (trawled) habitats.

Lagodon rhomboides **(Pinfish), Trawls**

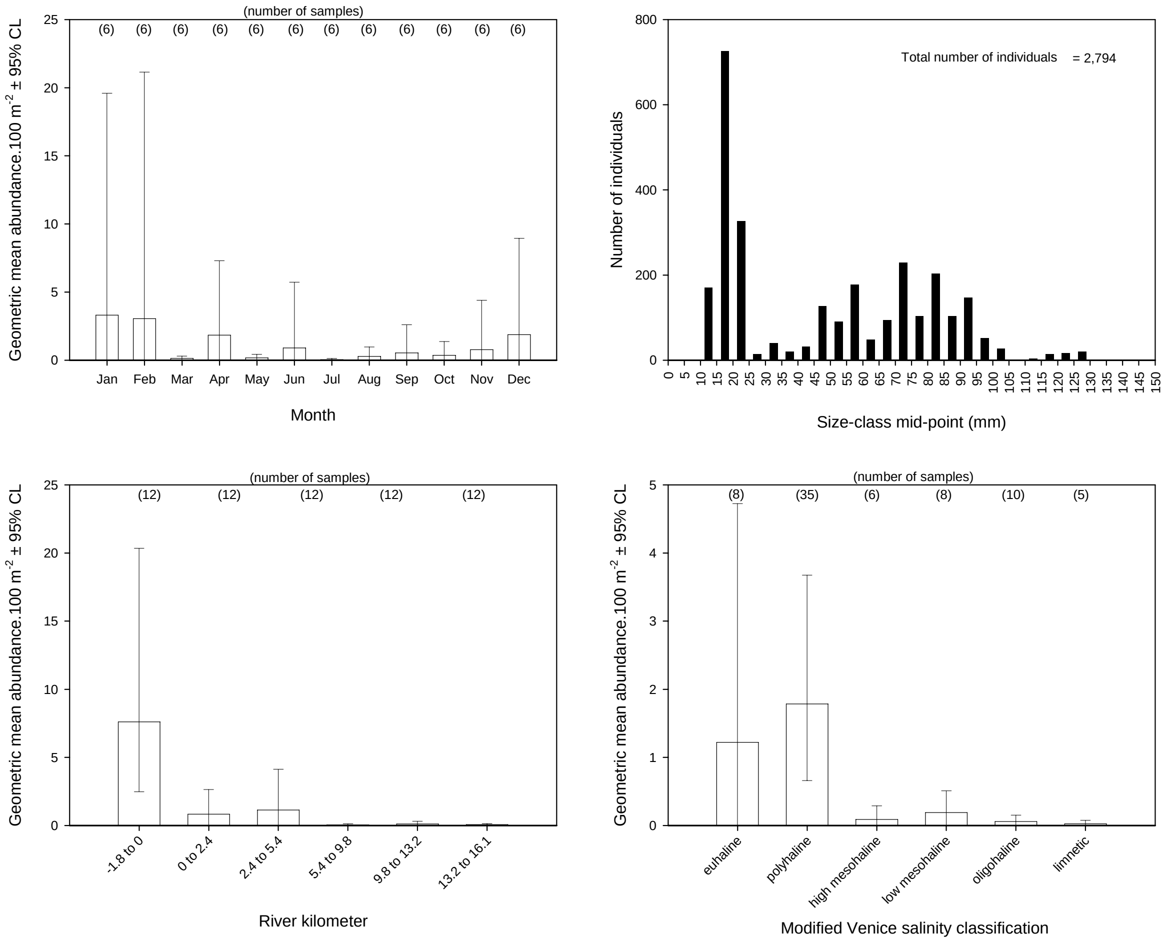


Fig. E11. Relative abundance of Pinfish in deeper (trawled) habitats.

Leiostomus xanthurus (Spot), Trawls

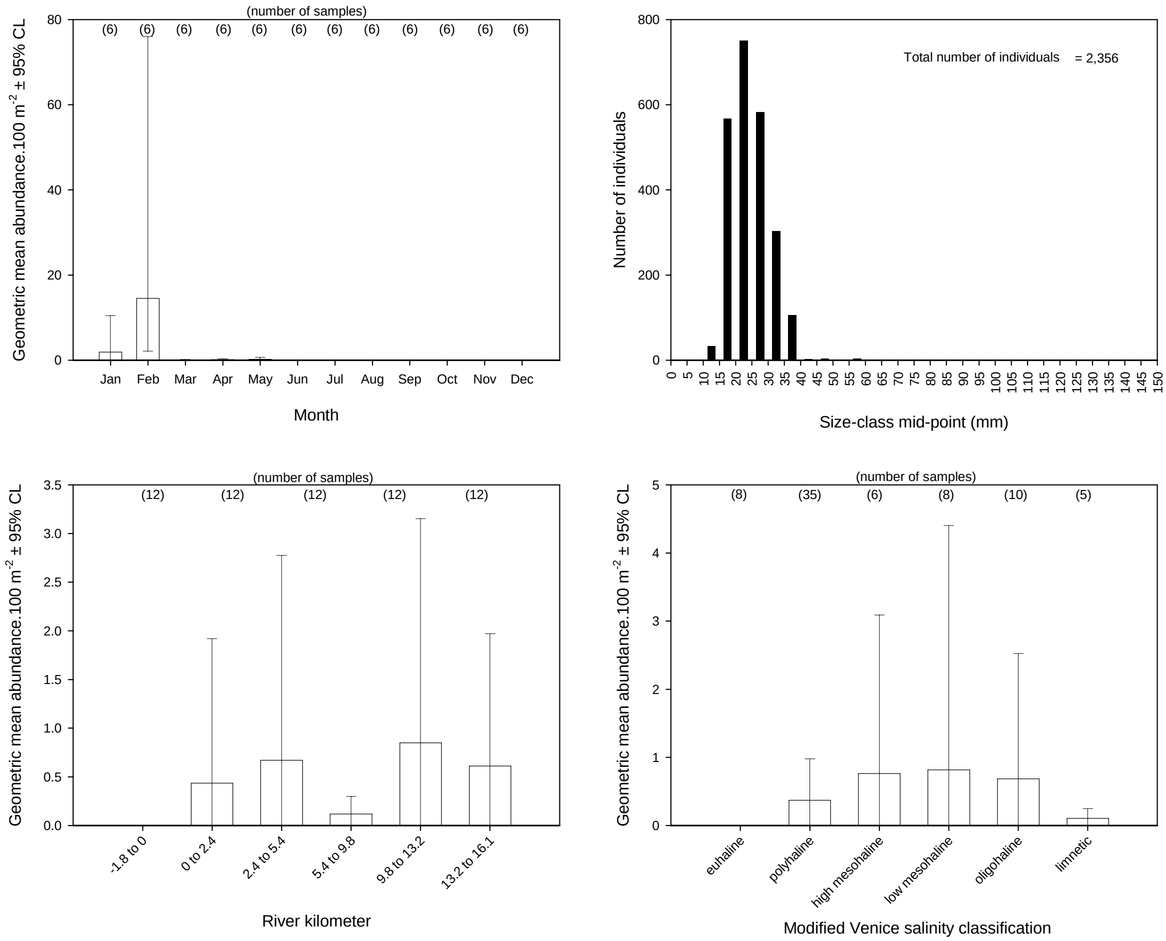


Fig. E12. Relative abundance of Spot in deeper (trawled) habitats.

***Sphoeroides nephelus* (Southern puffer), Trawls**

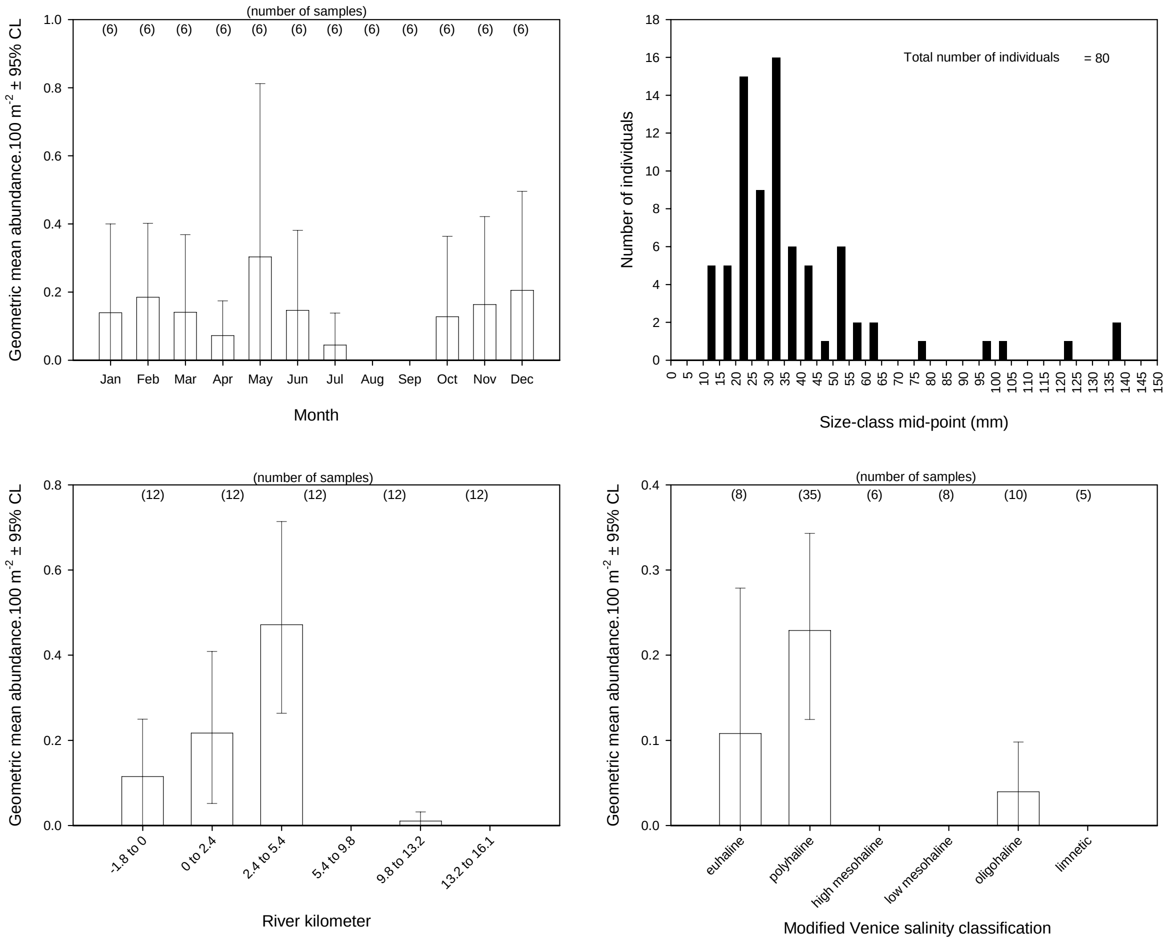
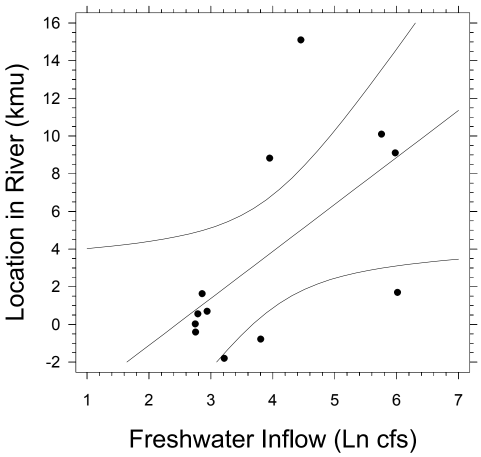


Fig. E13. Relative abundance of Southern puffer in deeper (trawled) habitats.

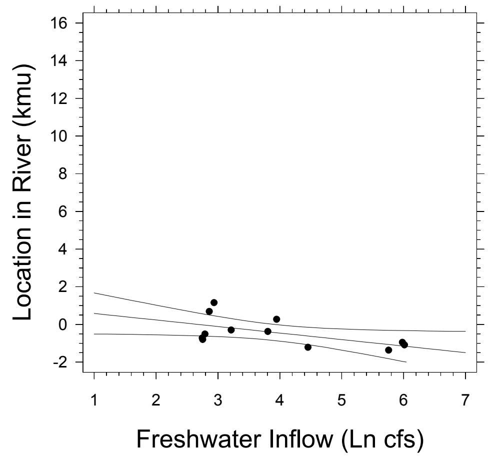
Appendix F:

Plots of the plankton-net distribution responses in Table 3.7.1.1

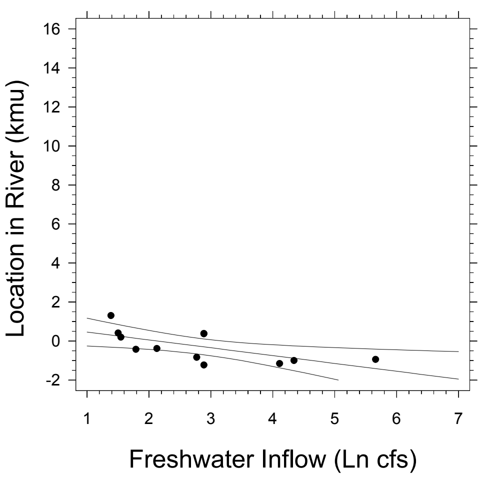
Pseudodiaptomus coronatus



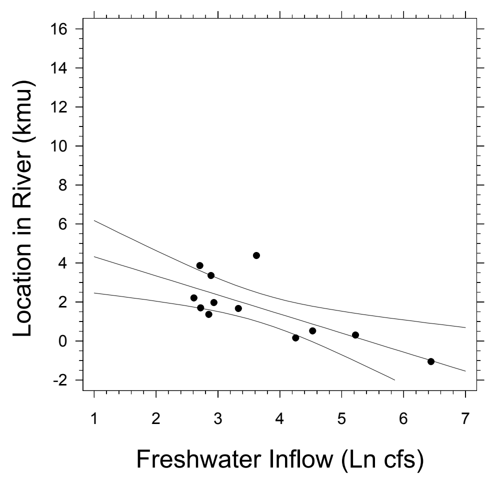
Labidocera aestiva



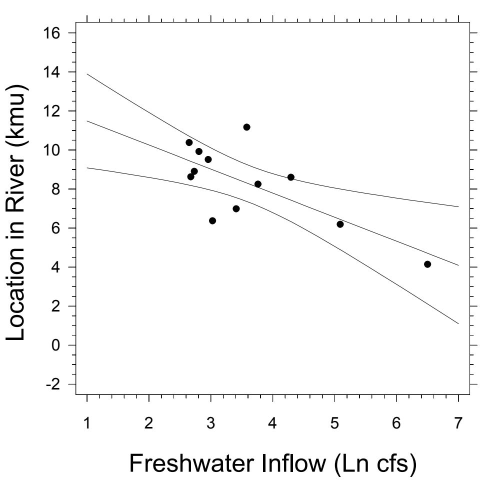
chaetognaths, sagittid



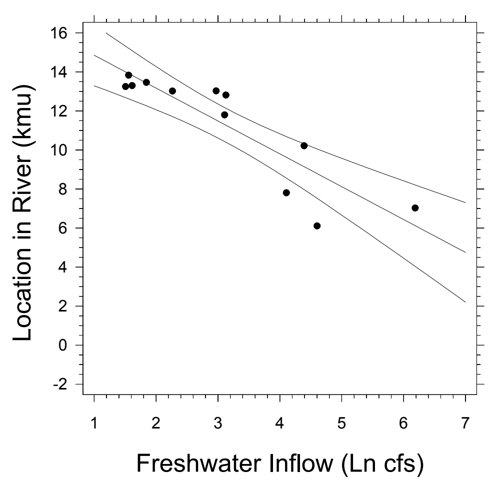
gastropods, opisthobranch



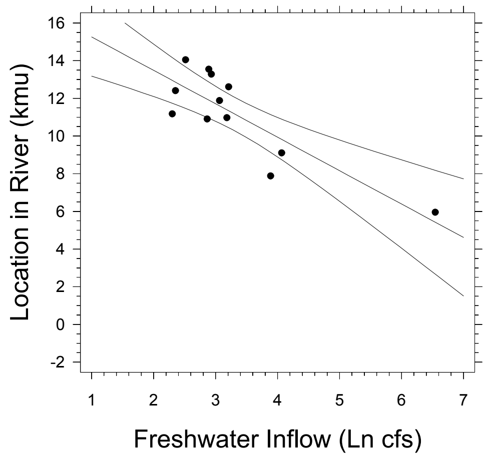
Edotea triloba



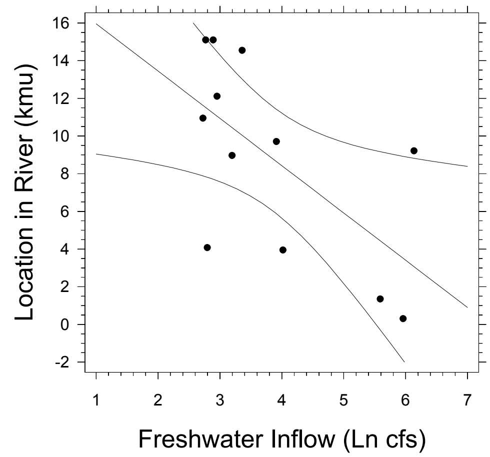
Anchoa mitchilli juveniles



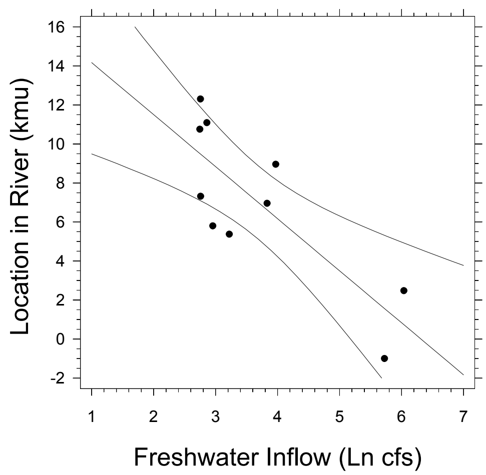
Americamysis almyra



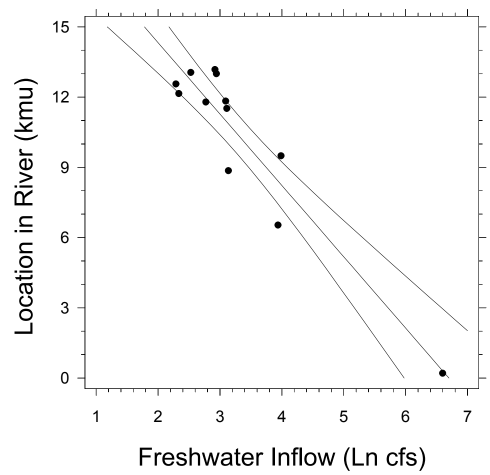
ostracods, podocopid



gobiid preflexion larvae



Americamysis juveniles



Appendix G:

Plots of the seine and trawl distribution responses in Table 3.7.2.1

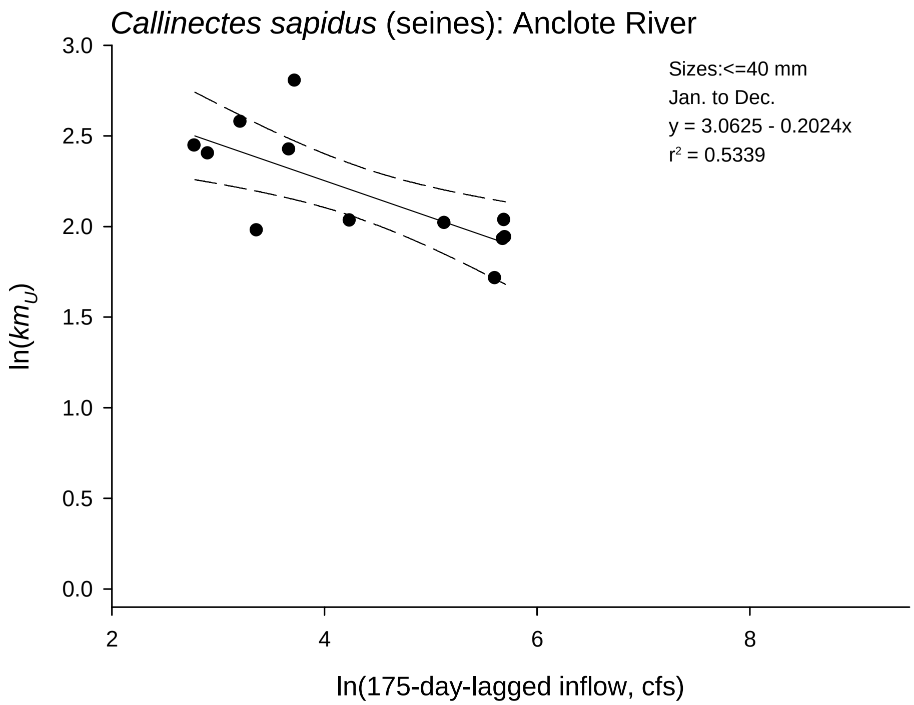


Fig. G1. Distribution response of Blue crab (<=40 mm) in the Anclote River estuary to 175-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

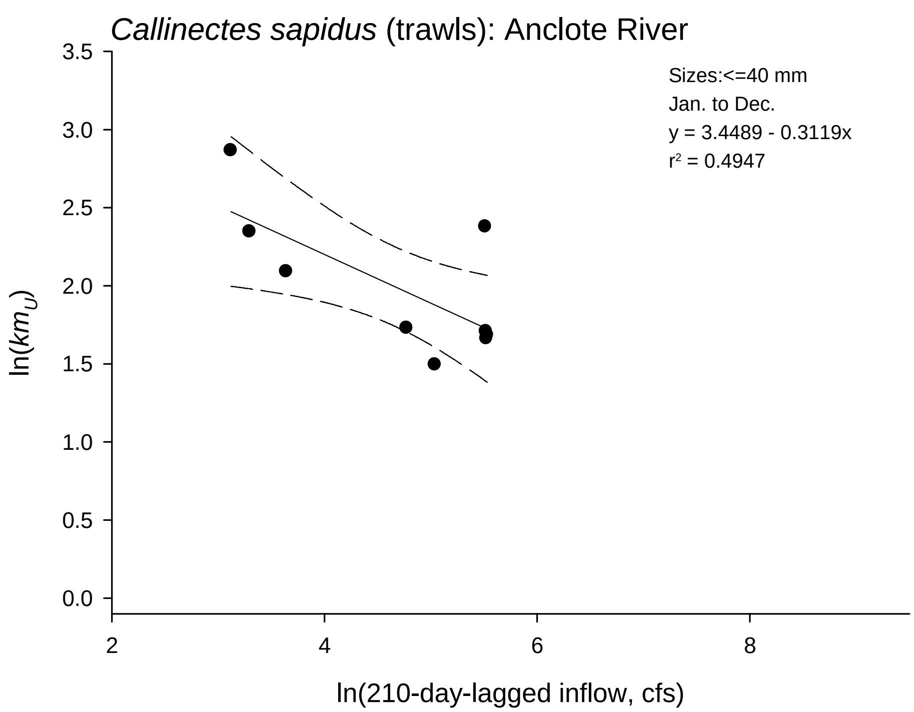


Fig. G2. Distribution response of Blue crab (<=40 mm) in the Anclote River estuary to 210-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

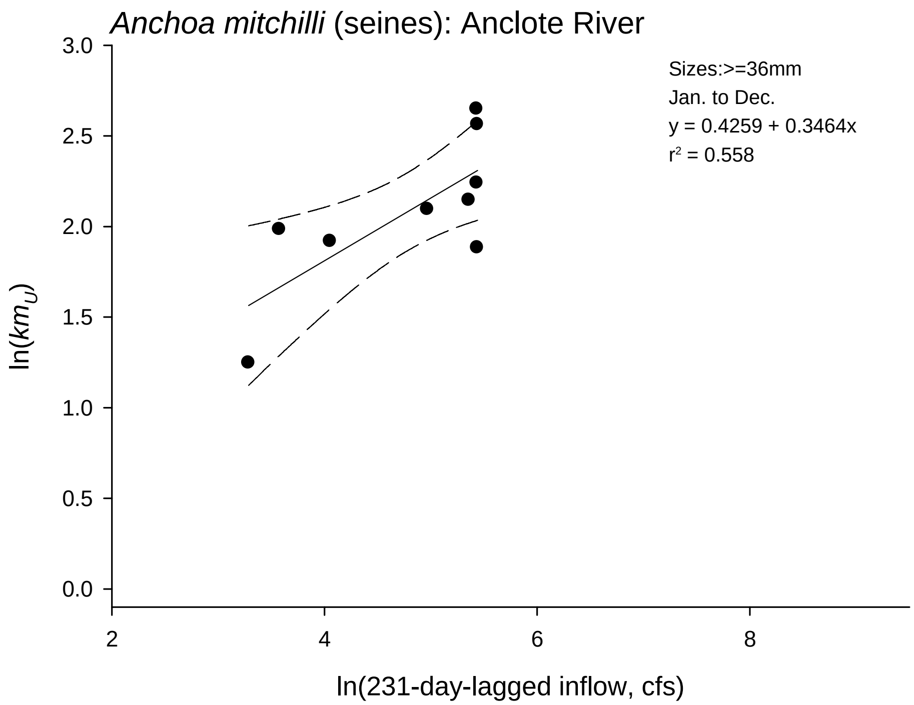


Fig. G3. Distribution response of Bay anchovy (>=36 mm) in the Anclote River estuary to 231-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

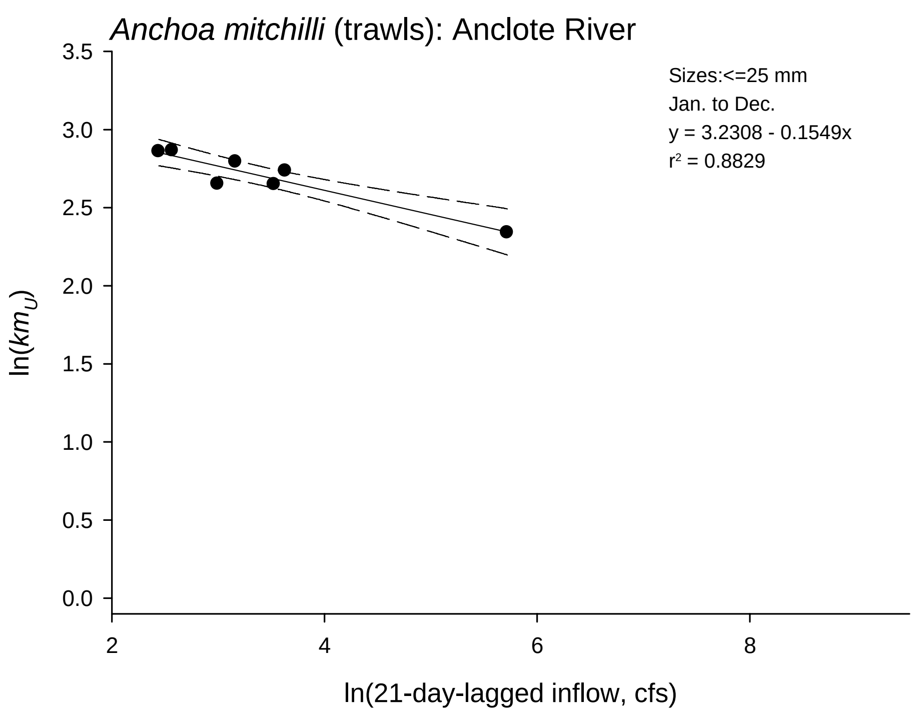


Fig. G4. Distribution response of Bay anchovy (<=25 mm) in the Anclote River estuary to 21-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

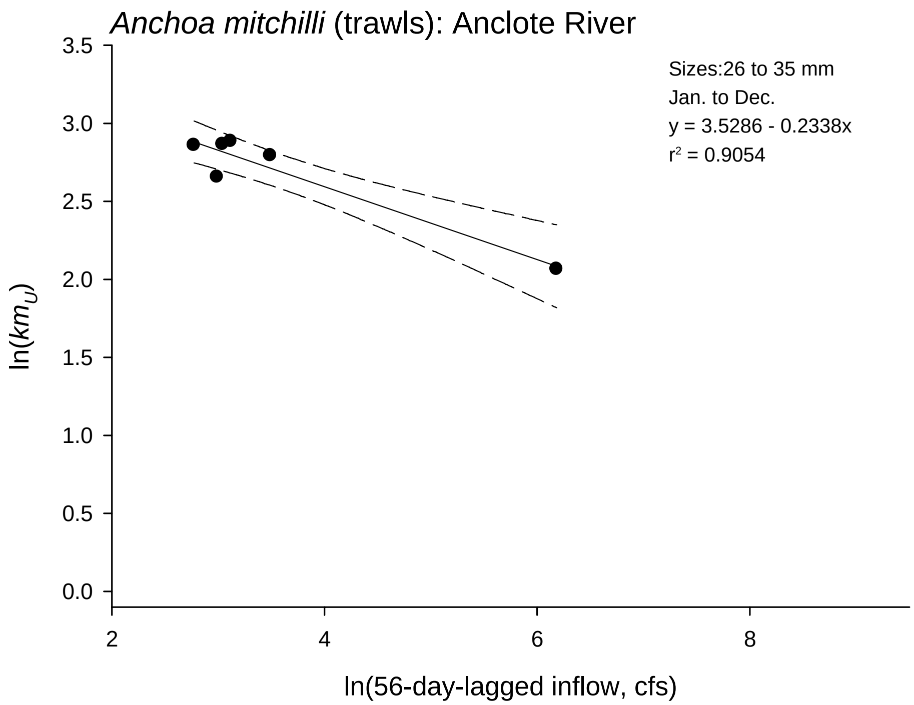


Fig. G5. Distribution response of Bay anchovy (26 to 35 mm) in the Anclote River estuary to 56-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

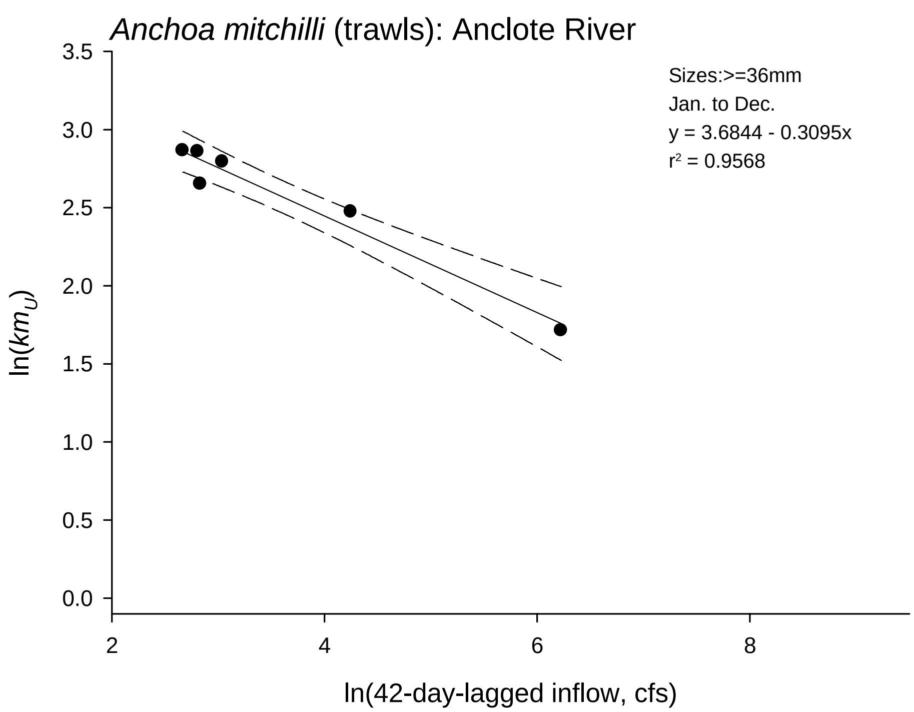


Fig. G6. Distribution response of Bay anchovy (>=36 mm) in the Anclote River estuary to 42-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

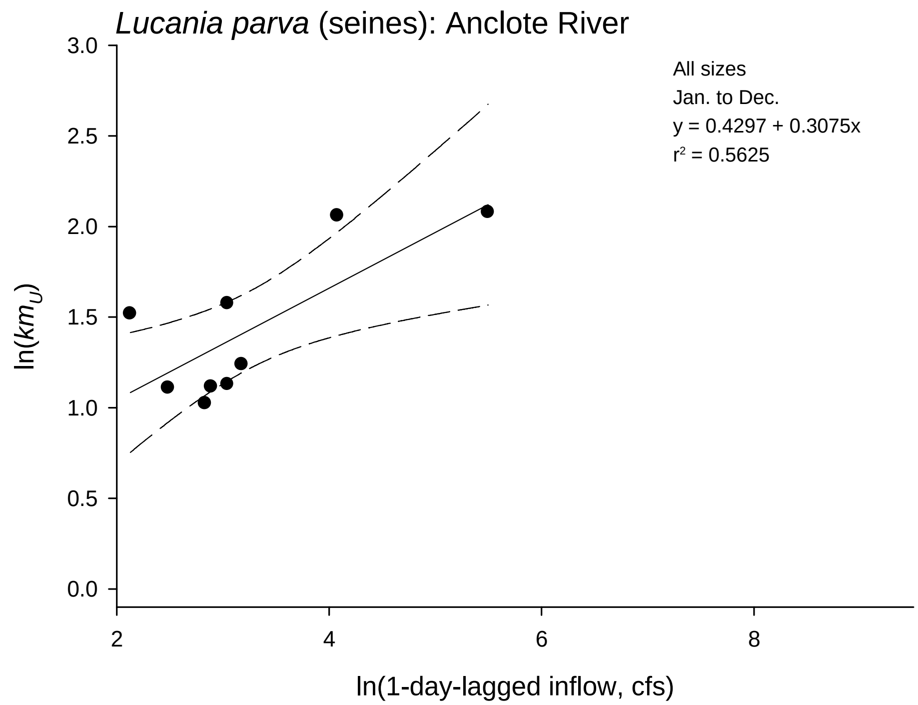


Fig. G7. Distribution response of Rainwater killifish (All sizes) in the Anclote River estuary to 1-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

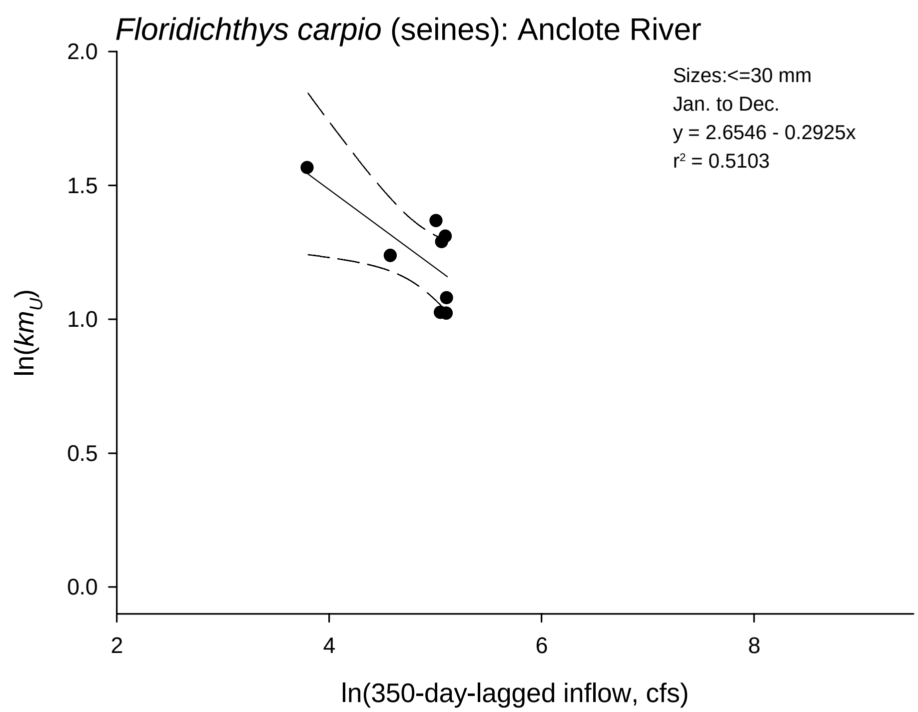


Fig. G8. Distribution response of Goldspotted killifish (<=30 mm) in the Anclote River estuary to 350-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

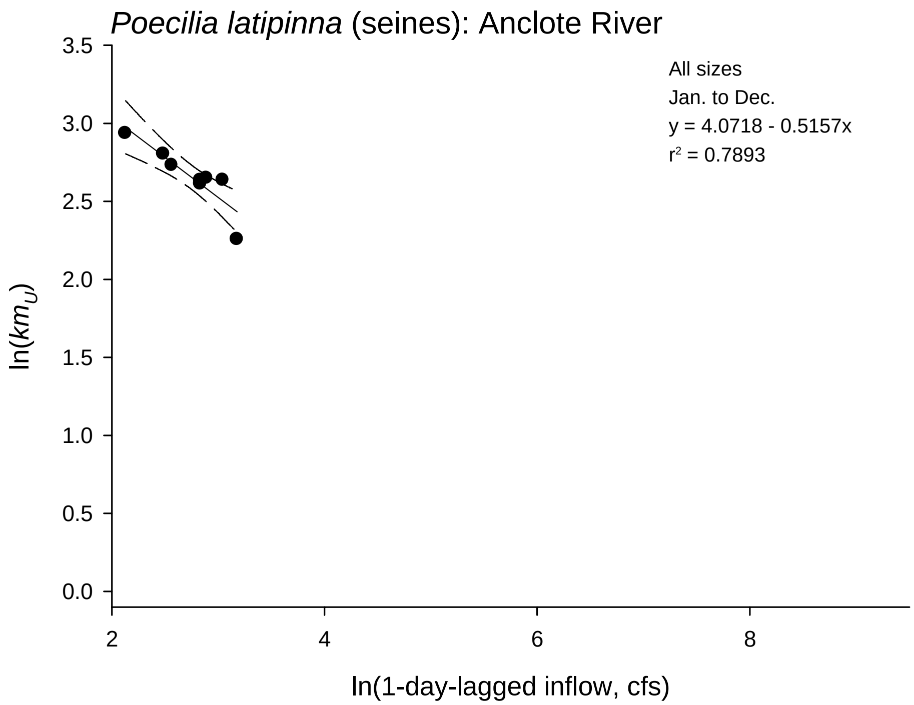


Fig. G9. Distribution response of Sailfin molly (All sizes) in the Anclote River estuary to 1-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

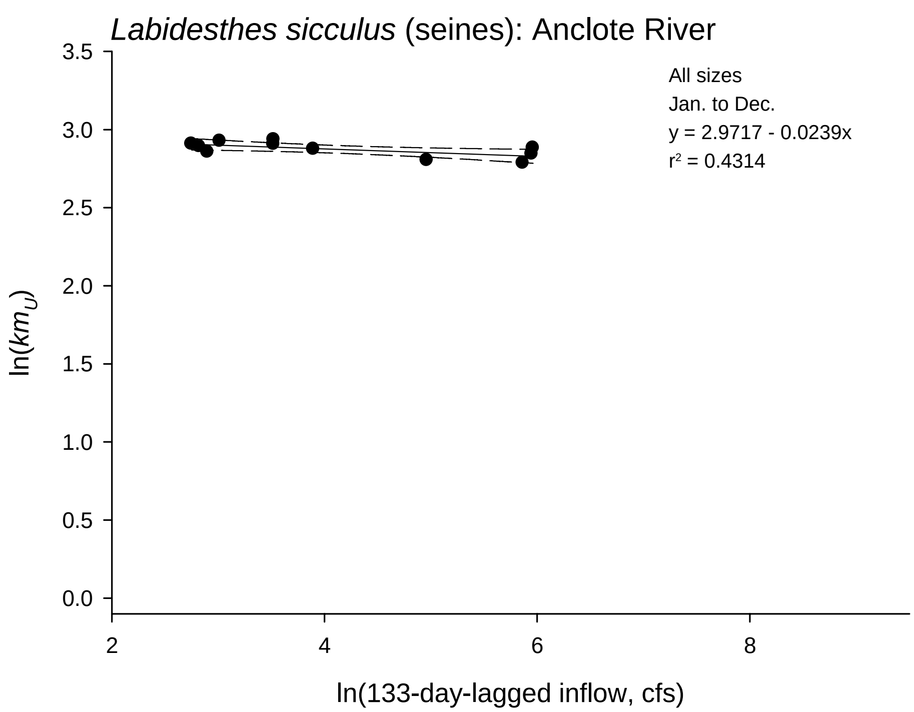


Fig. G10. Distribution response of Brook silverside (All sizes) in the Anclote River estuary to 133-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

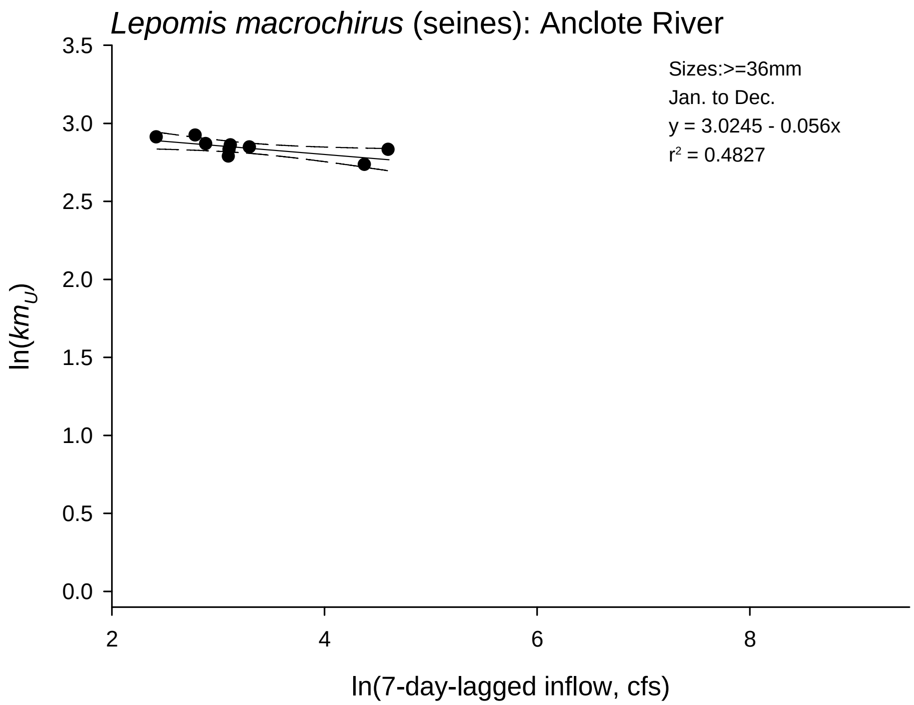


Fig. G11. Distribution response of Bluegill (>=36 mm) in the Anclote River estuary to 7-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

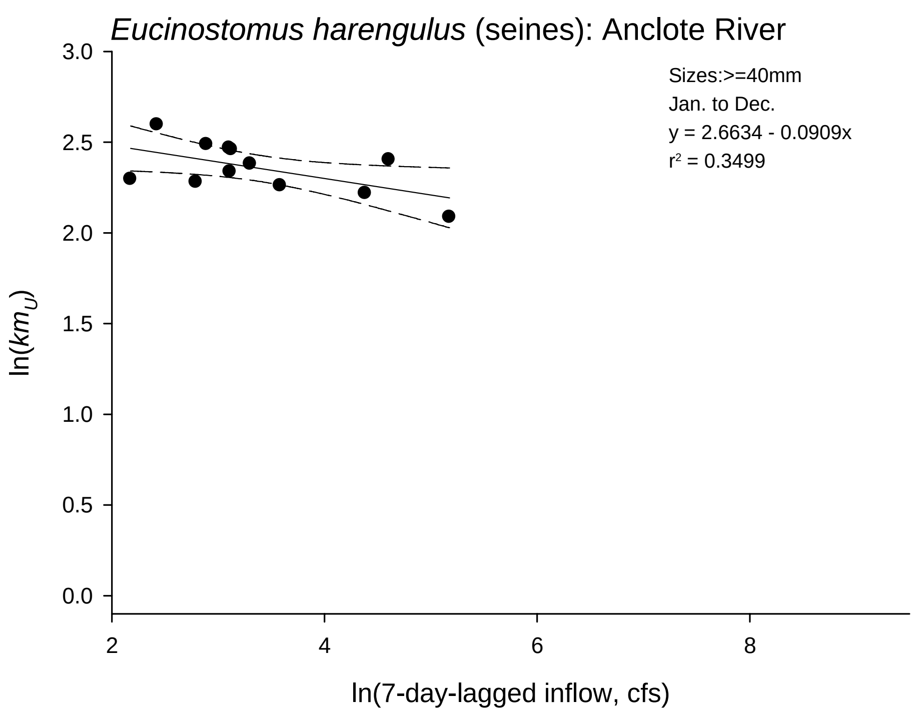


Fig. G12. Distribution response of Tidewater mojarra (>=40 mm) in the Anclote River estuary to 7-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

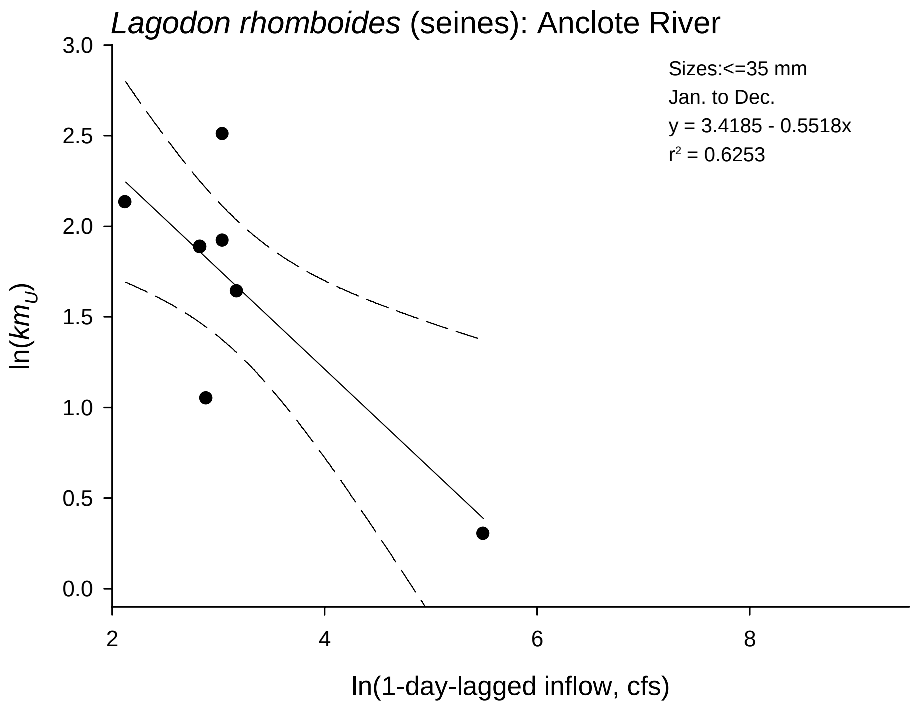


Fig. G13. Distribution response of Pinfish (<=35 mm) in the Anclote River estuary to 1-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

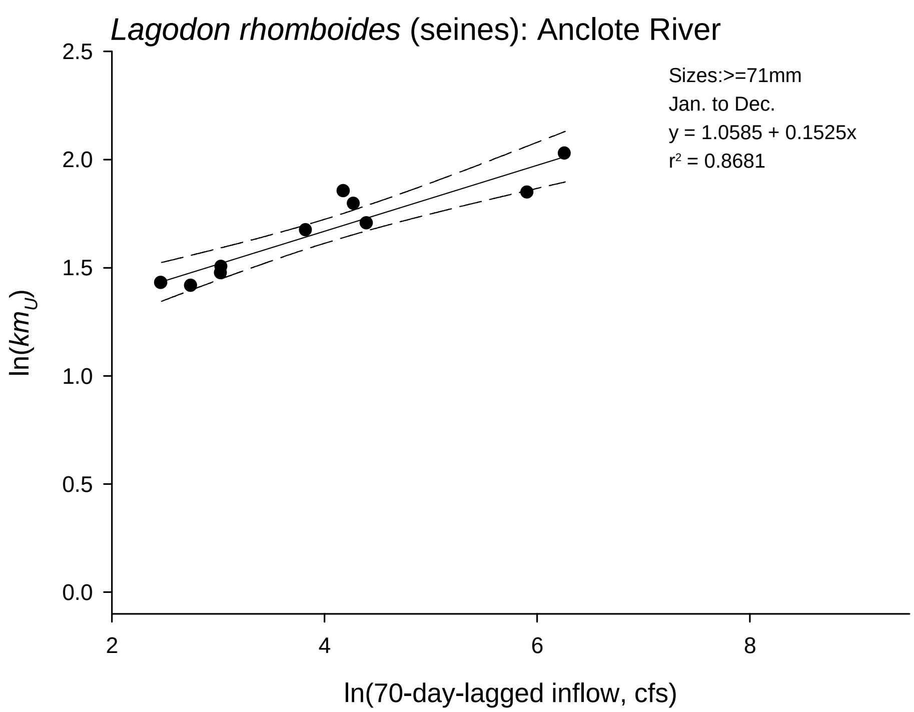


Fig. G14. Distribution response of Pinfish (>=71 mm) in the Anclote River estuary to 70-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

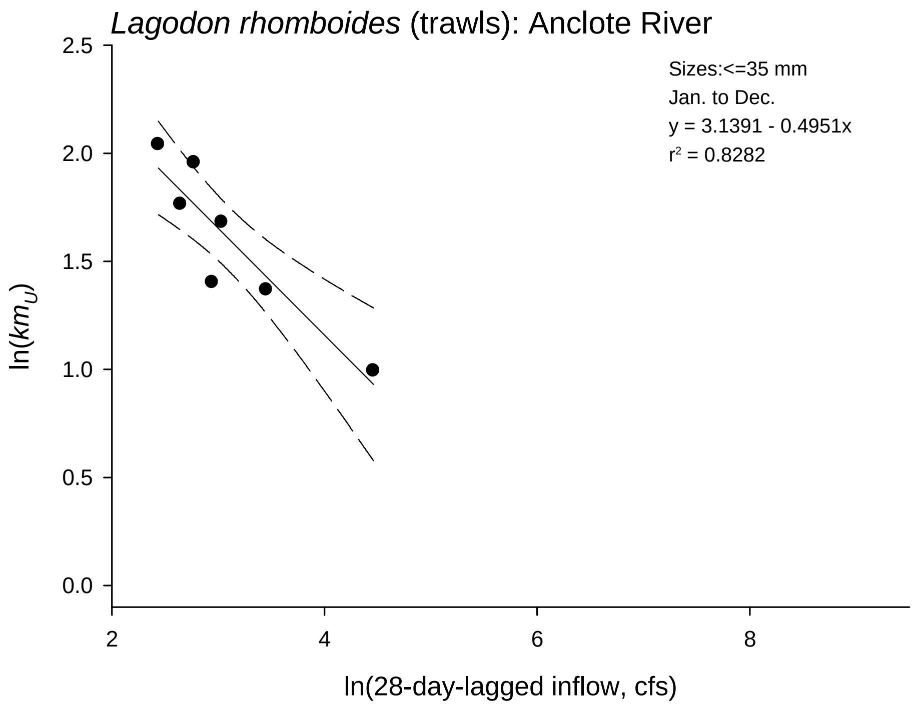


Fig. G15. Distribution response of Pinfish (<=35 mm) in the Anclote River estuary to 28-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

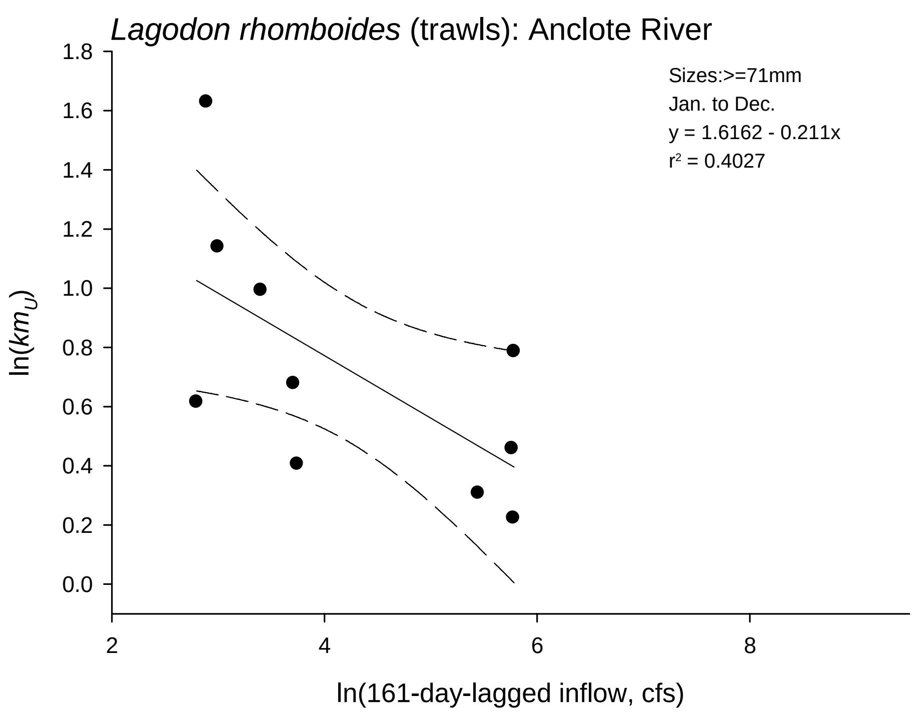


Fig. G16. Distribution response of Pinfish (>=71 mm) in the Anclote River estuary to 161-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

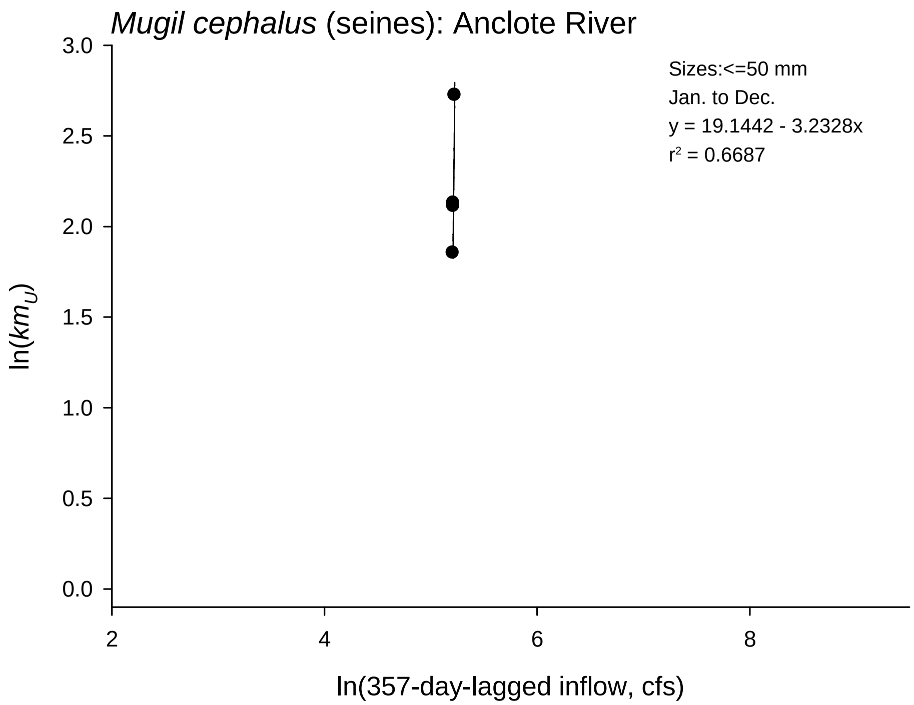


Fig. G17. Distribution response of Striped mullet (<=50 mm) in the Anclote River estuary to 357-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

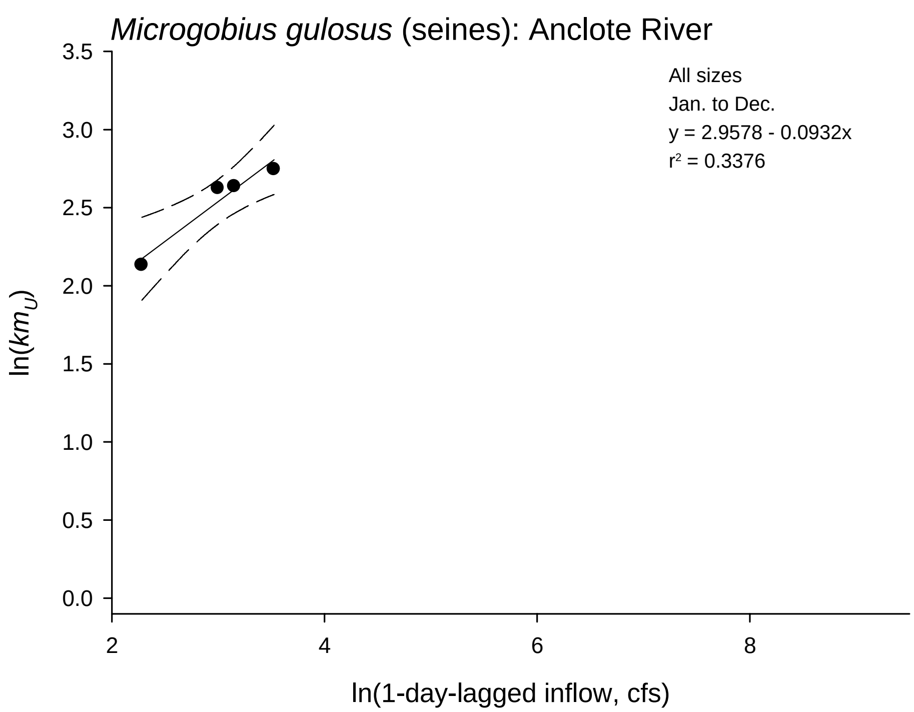
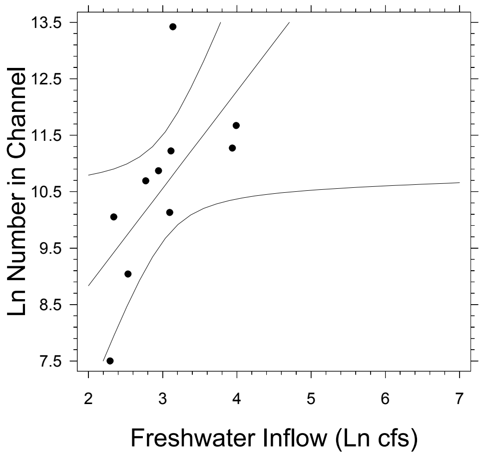


Fig. G18. Distribution response of Clown goby (All sizes) in the Anclote River estuary to 1-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

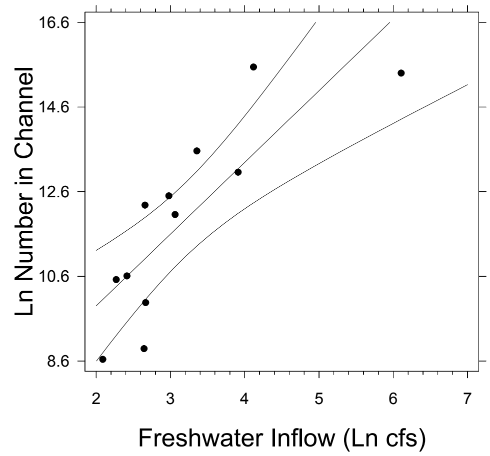
Appendix H:

Plots of the plankton-net abundance responses in Table 3.8.1.1

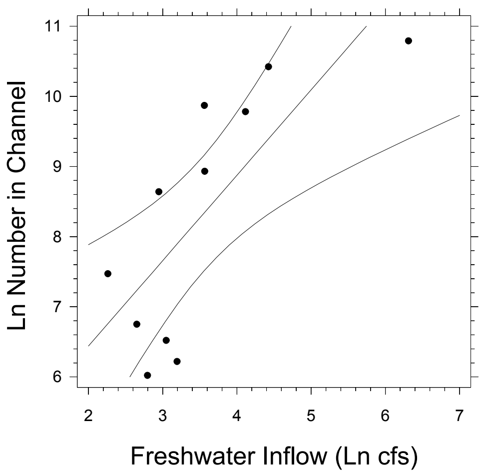
Sarsiella zostericola



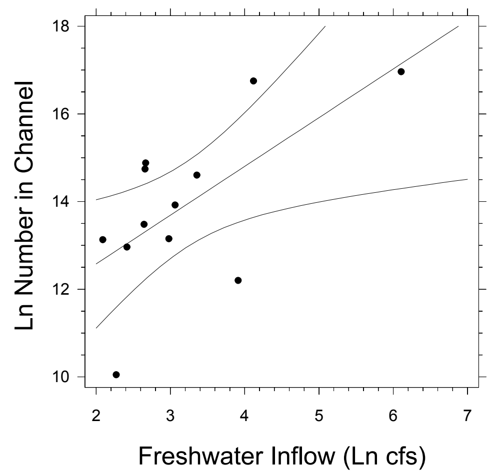
Americamysis almyra



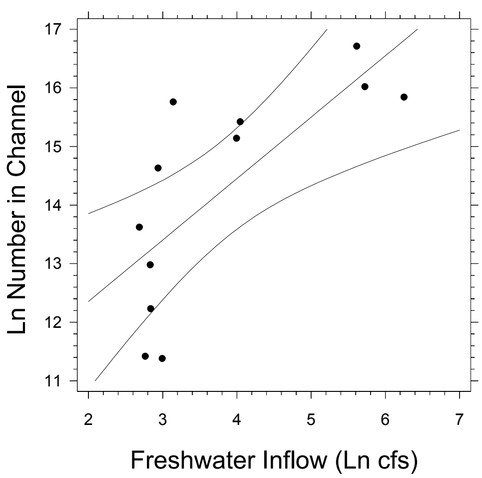
dipterans, pupae



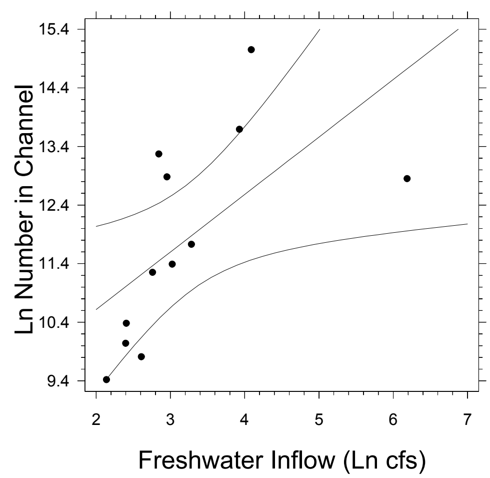
Labidocera aestiva



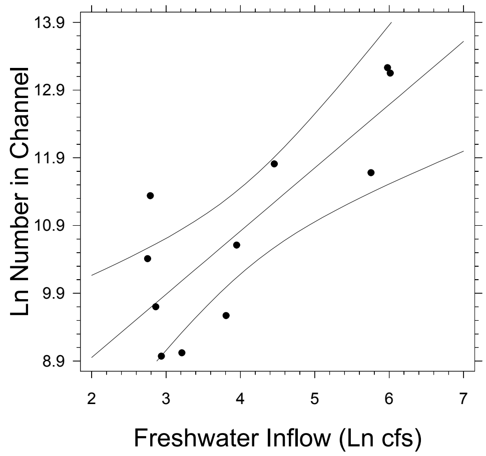
Hippolyte zostericola postlarvae



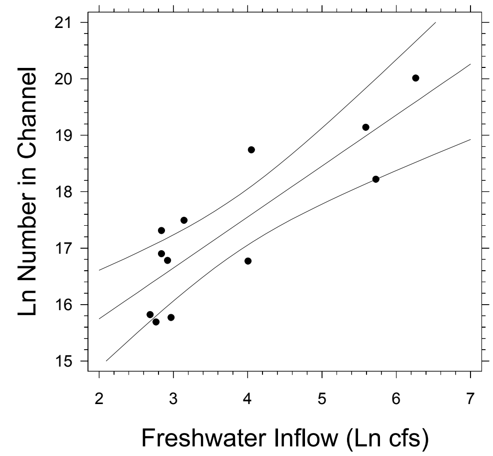
Americamysis juveniles



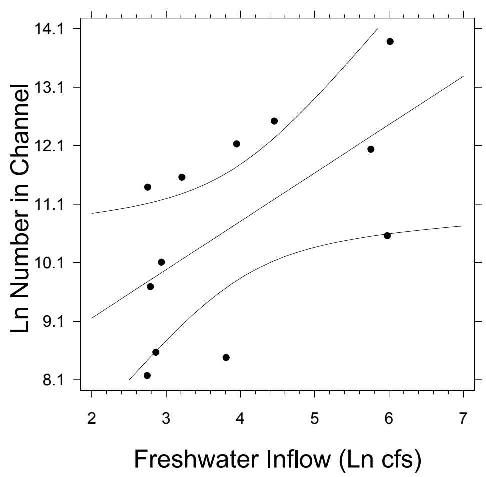
branchiurans, Argulus spp.



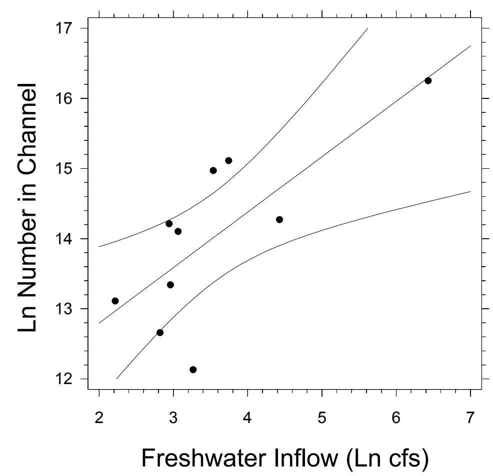
amphipods, gammaridean



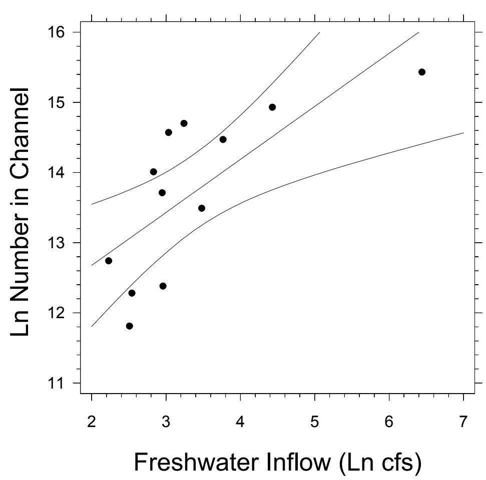
Anchoa mitchilli juveniles



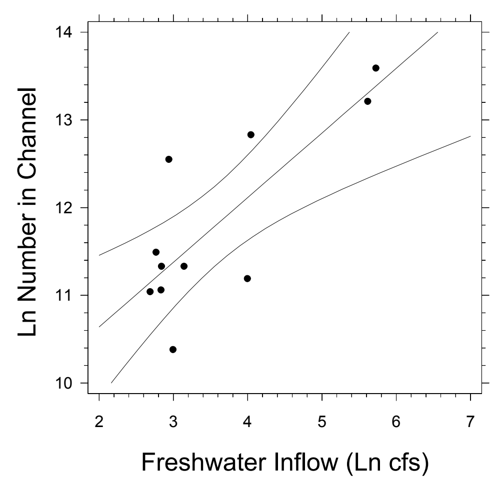
decapod megalopae

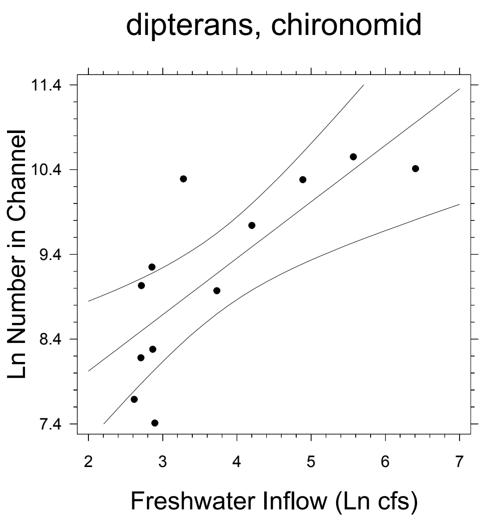


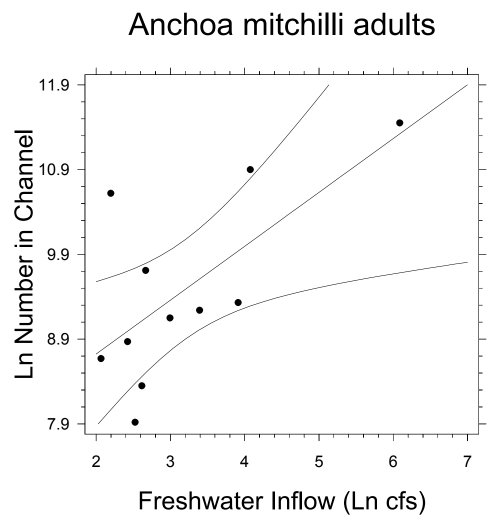
Bowmaniella dissimilis

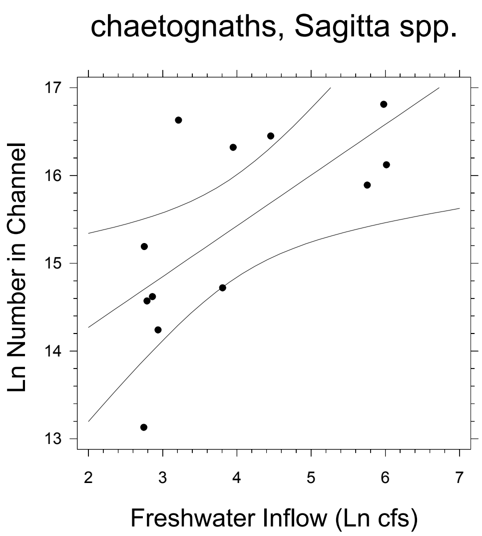


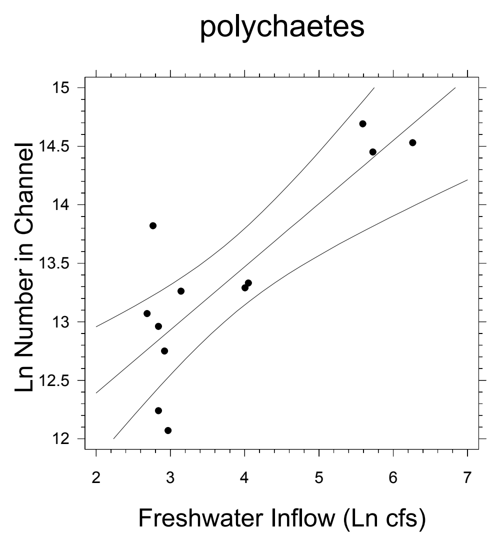
amphipods, caprellid




dipterans, chironomid
Ln Number in Channel
11.4
10.4
9.4
8.4
7.4
2
3
4
5
6
7
Freshwater Inflow (Ln cfs)


Anchoa mitchilli adults
Ln Number in Channel
11.9
10.9
9.9
8.9
7.9
2
3
4
5
6
7
Freshwater Inflow (Ln cfs)


chaetognaths, Sagitta spp.
Ln Number in Channel
17
16
15
14
13
2
3
4
5
6
7
Freshwater Inflow (Ln cfs)


polychaetes
Ln Number in Channel
15
14.5
14
13.5
13
12.5
12
2
3
4
5
6
7
Freshwater Inflow (Ln cfs)

Appendix I:

Plots of the seine and trawl abundance responses in Table 3.8.2.1

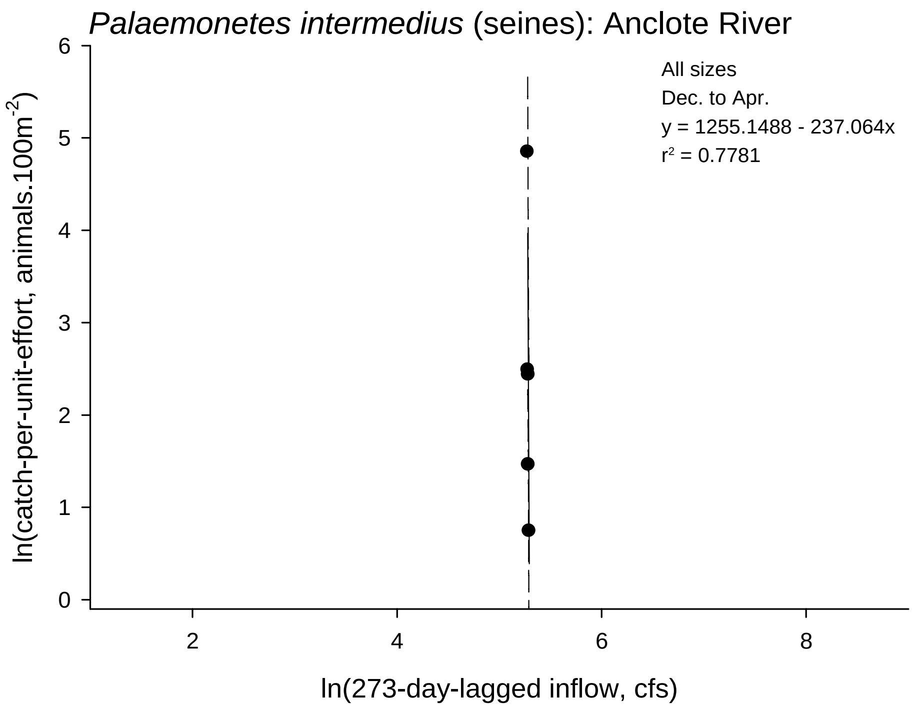


Fig. I1. Abundance response of Brackish grass shrimp (All sizes) in the Anclote River estuary to 273-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

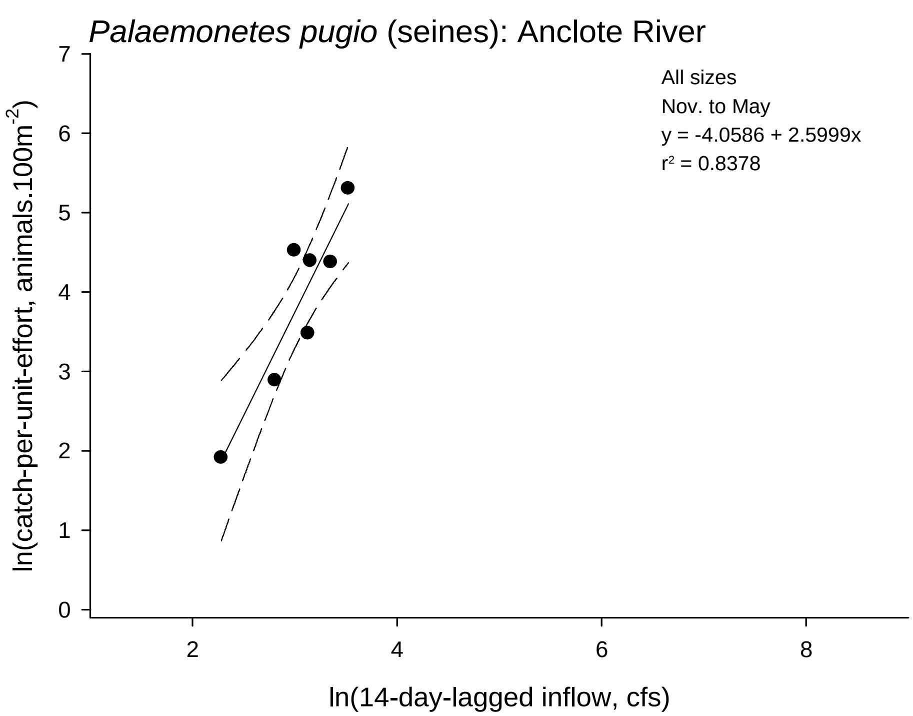


Fig. I2. Abundance response of Daggerblade grass shrimp (All sizes) in the Anclote River estuary to 14-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

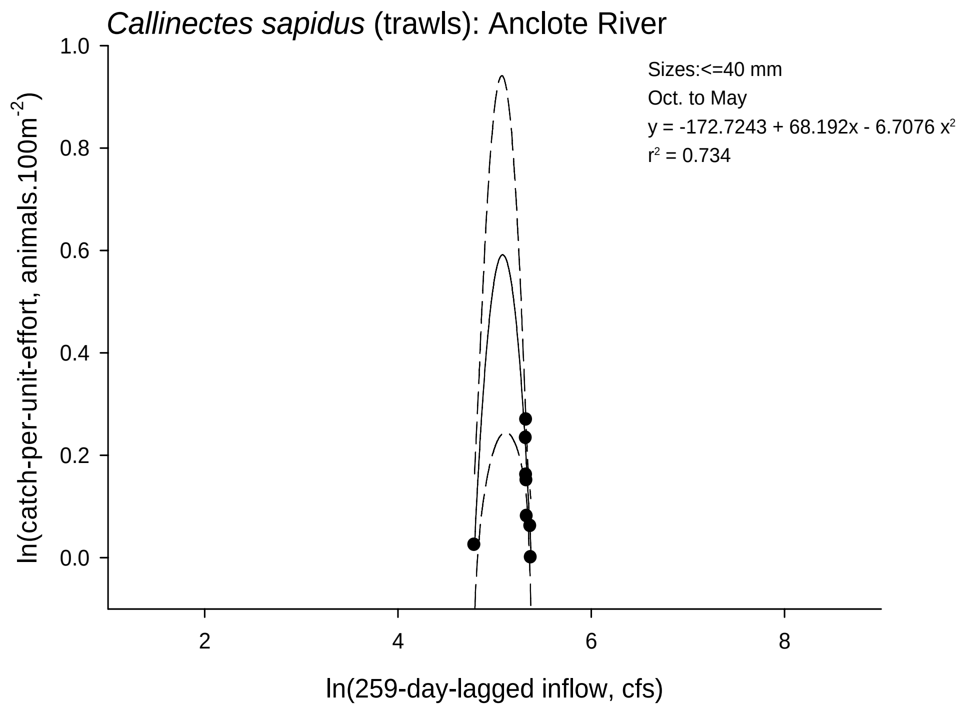


Fig. I3. Abundance response of Blue crab (<=40 mm) in the Anclote River estuary to 259-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

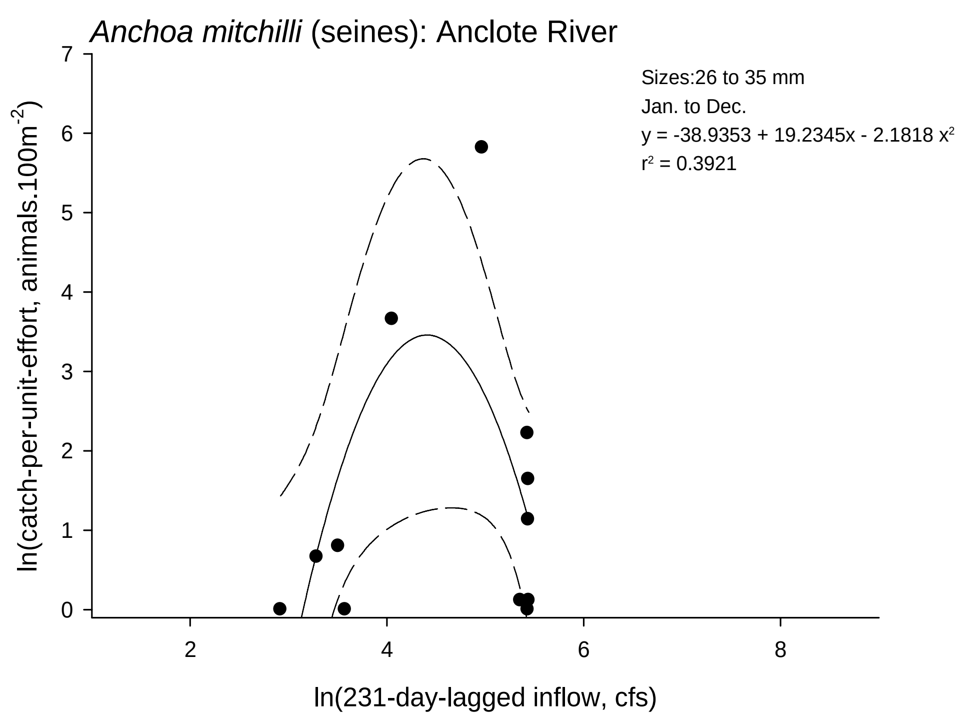


Fig. I4. Abundance response of Bay anchovy (26 to 35 mm) in the Anclote River estuary to 231-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

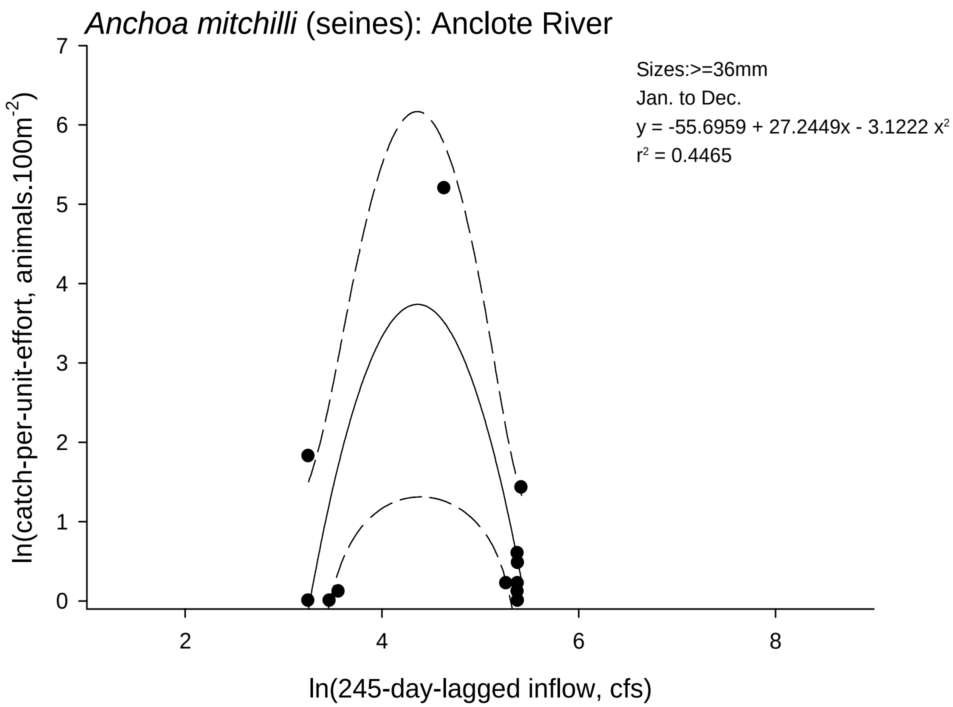


Fig. I5. Abundance response of Bay anchovy (>=36 mm) in the Anclote River estuary to 245-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

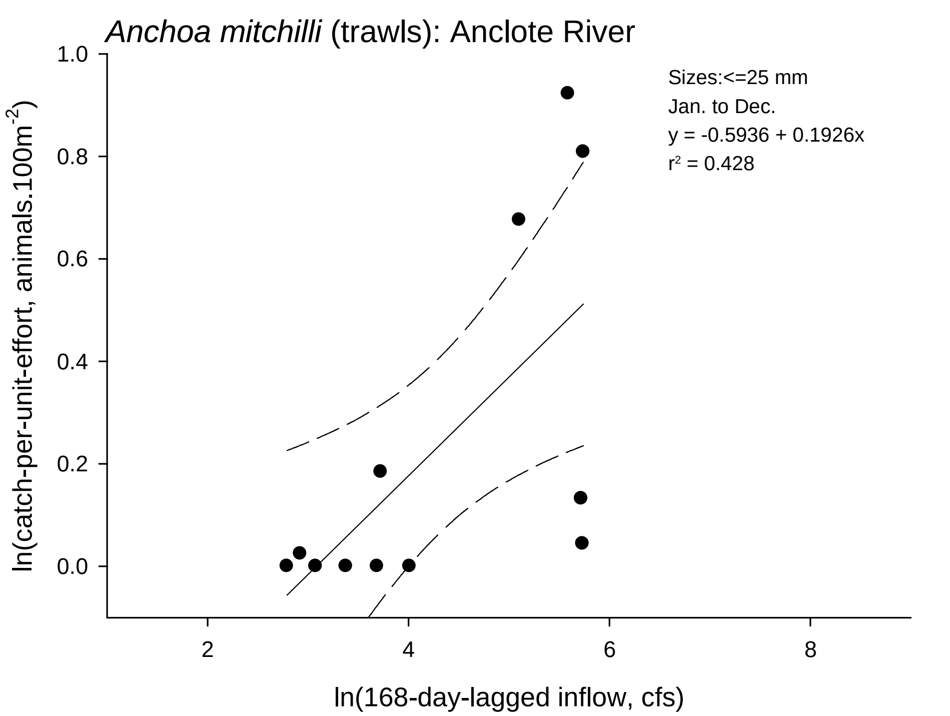


Fig. I6. Abundance response of Bay anchovy (<=25 mm) in the Anclote River estuary to 168-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

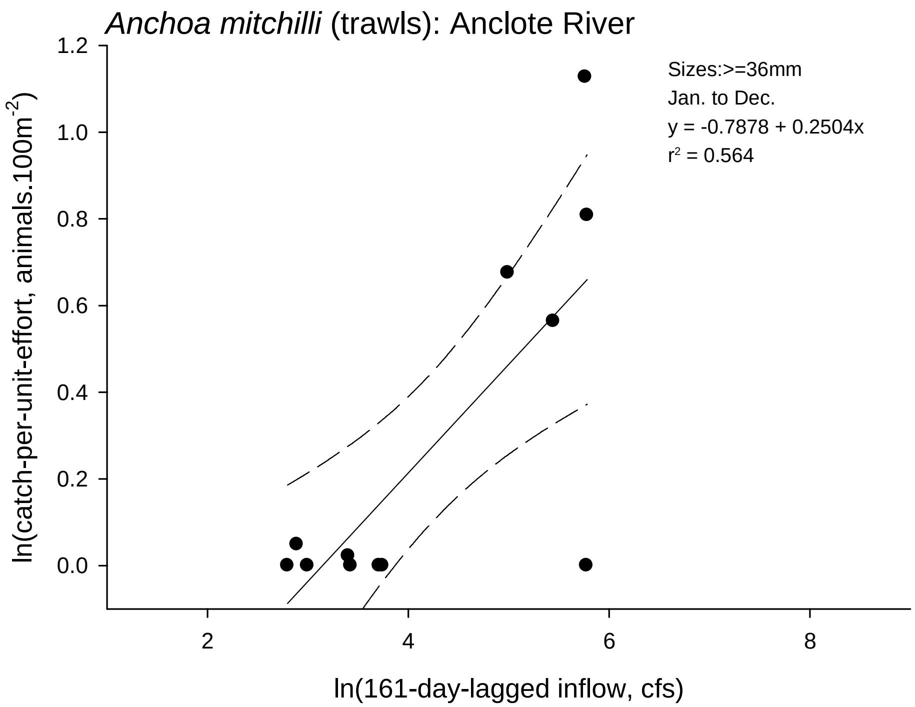


Fig. I7. Abundance response of Bay anchovy (>=36 mm) in the Anclote River estuary to 161-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

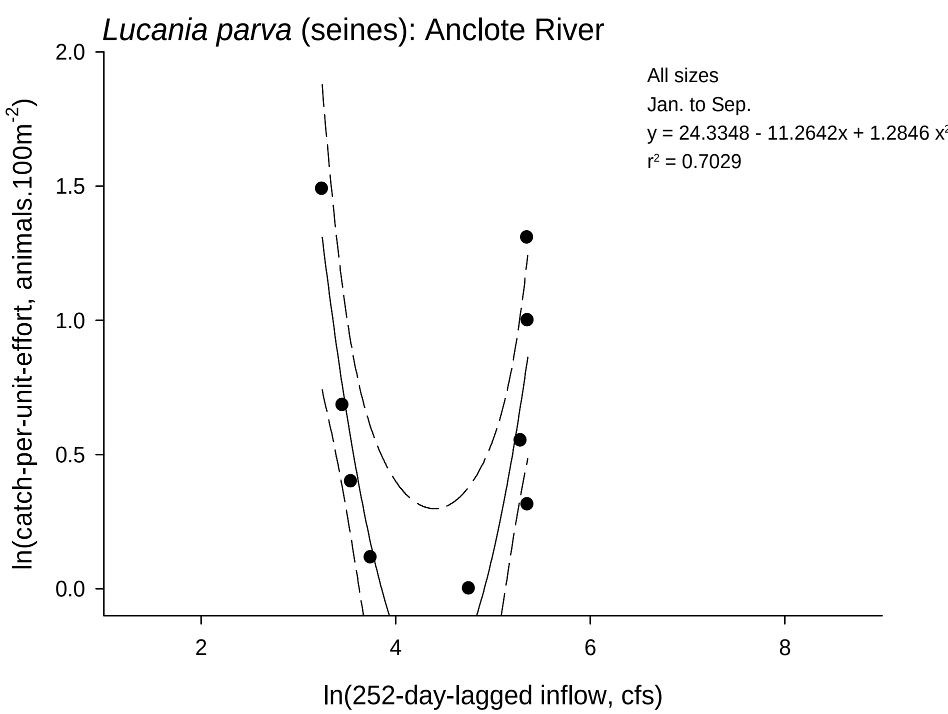


Fig. I8. Abundance response of Rainwater killifish (All sizes) in the Anclote River estuary to 252-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

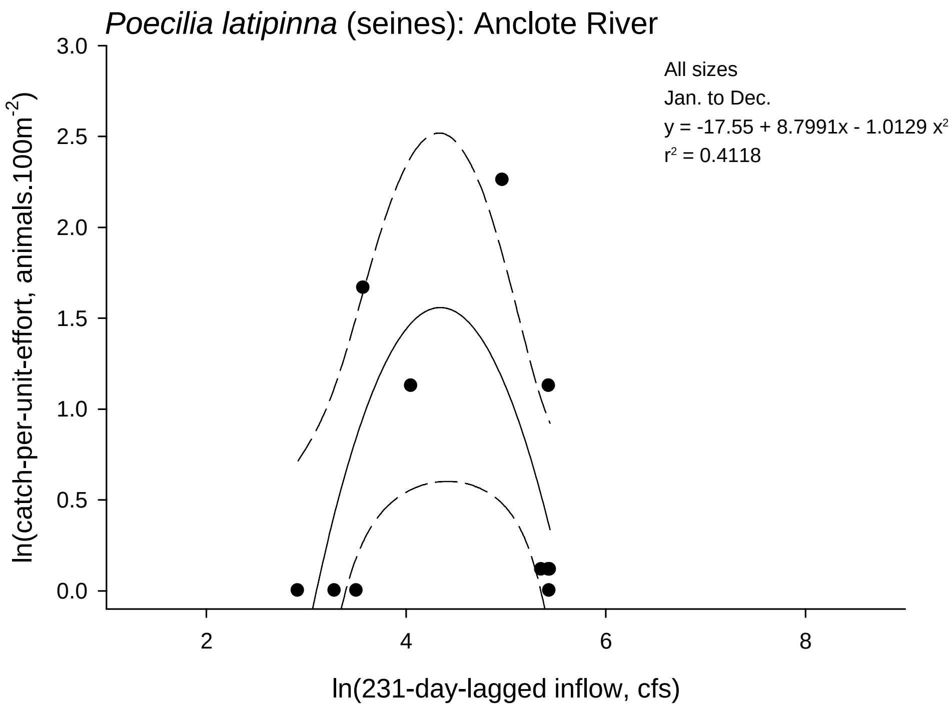


Fig. I9. Abundance response of Sailfin molly (All sizes) in the Anclote River estuary to 231-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

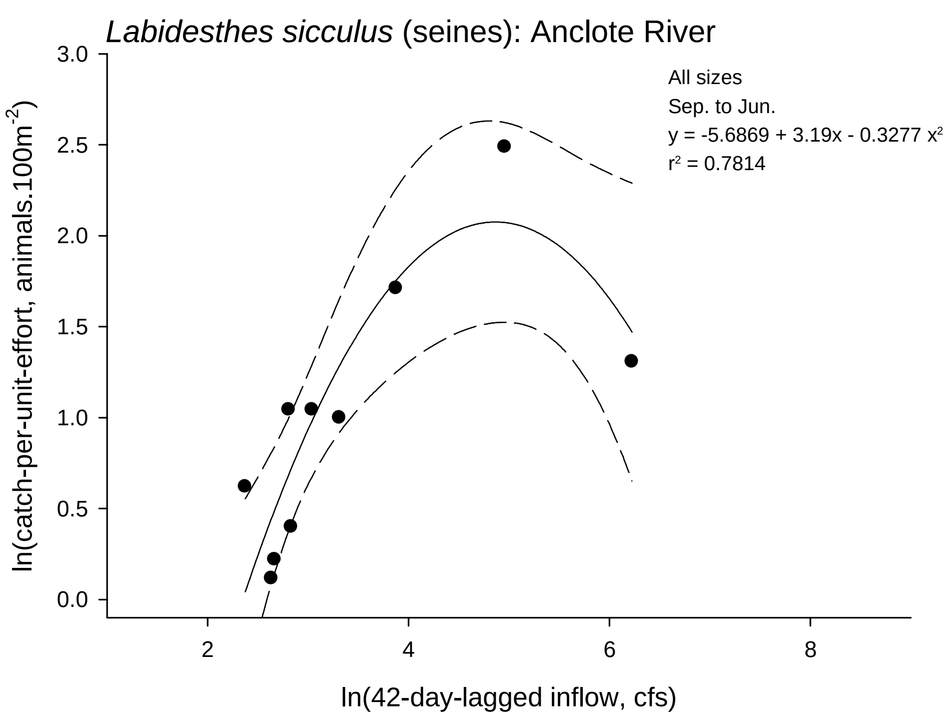


Fig. I10. Abundance response of Brook silverside (All sizes) in the Anclote River estuary to 42-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

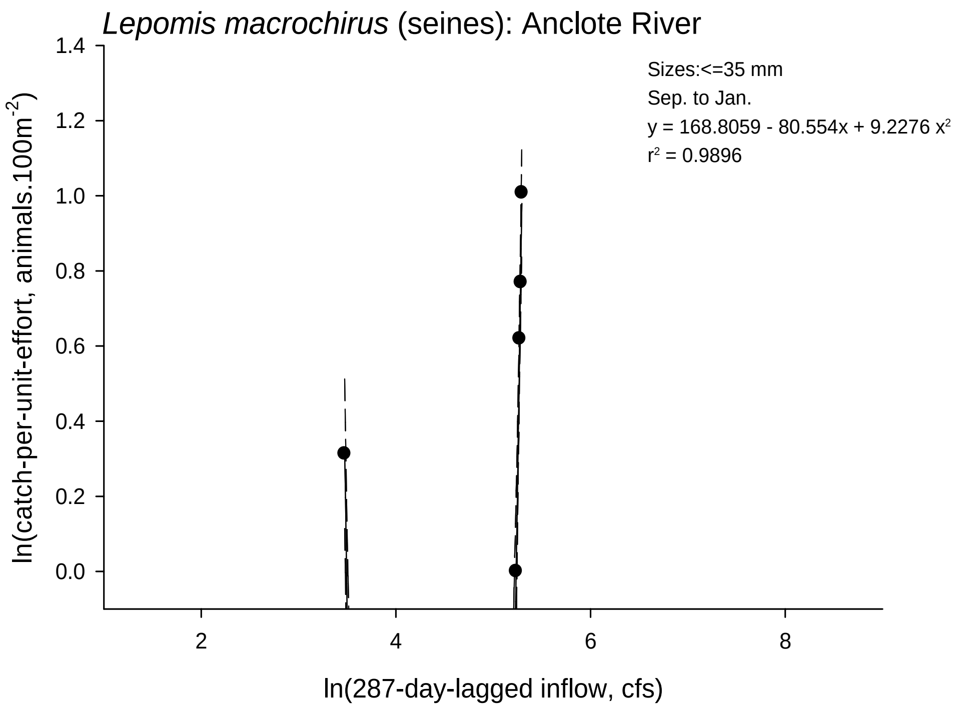


Fig. I11. Abundance response of Bluegill (<=35 mm) in the Anclote River estuary to 287-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

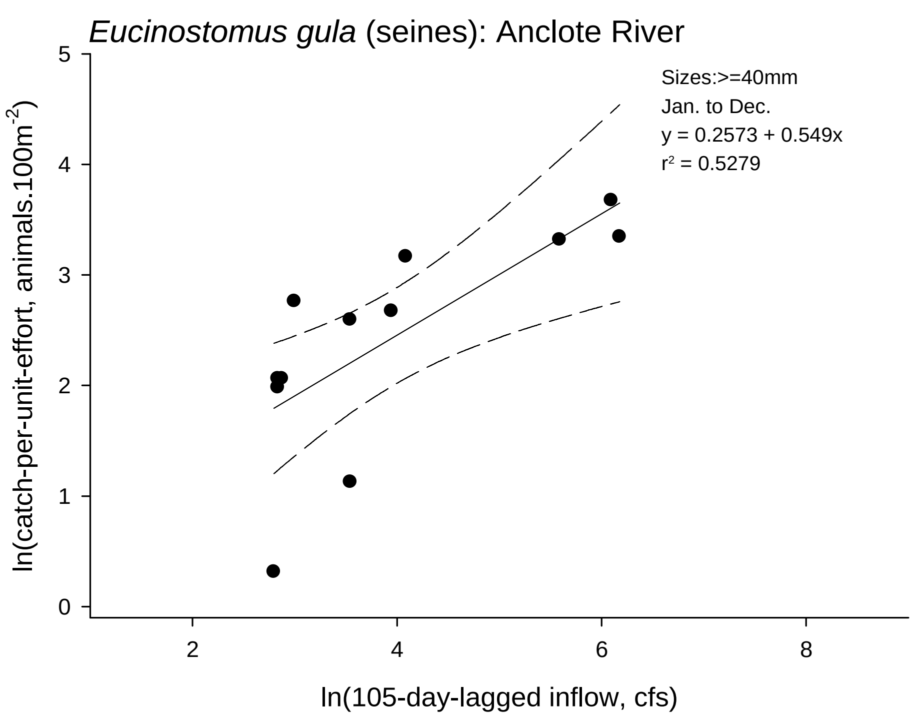


Fig. I12. Abundance response of Silver jenny (>= 40mm) in the Anclote River estuary to 105-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

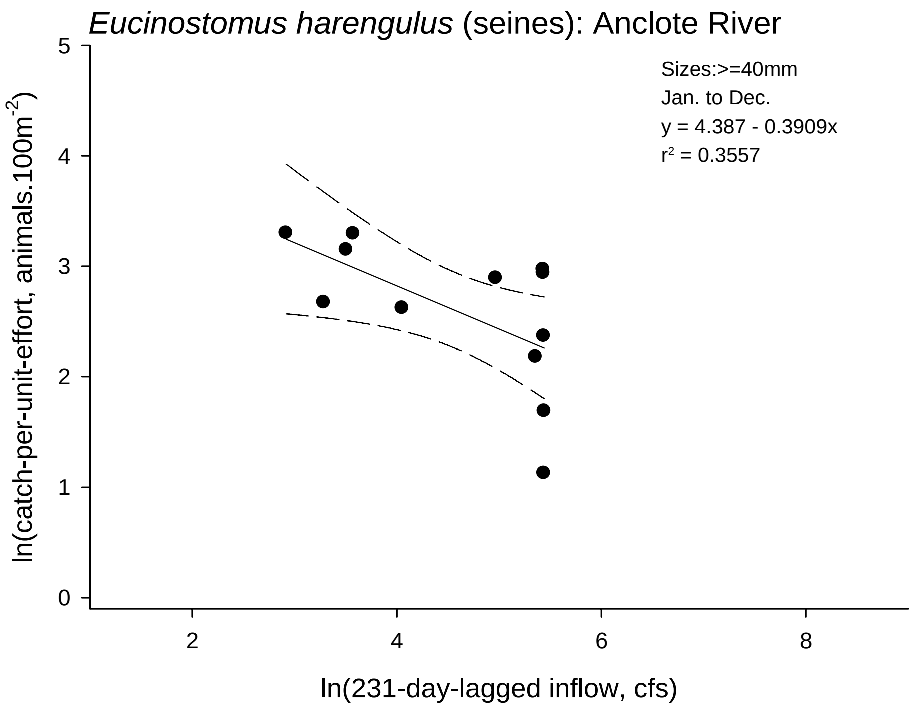


Fig. I13. Abundance response of Tidewater mojarra (>=40 mm) in the Anclote River estuary to 231-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

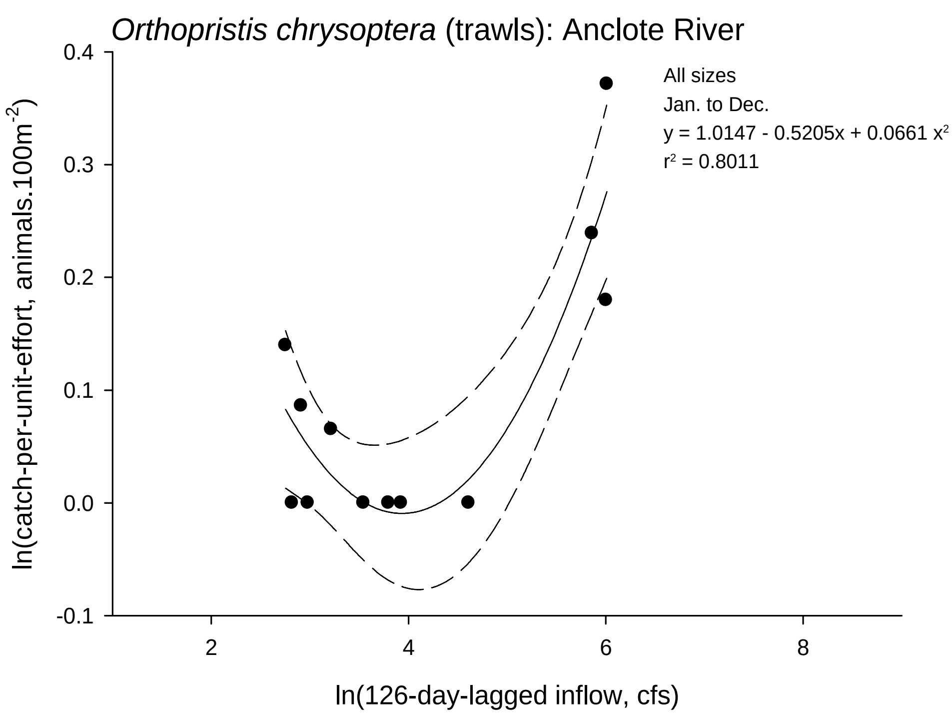


Fig. I14. Abundance response of Pigfish (All sizes) in the Anclote River estuary to 126-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

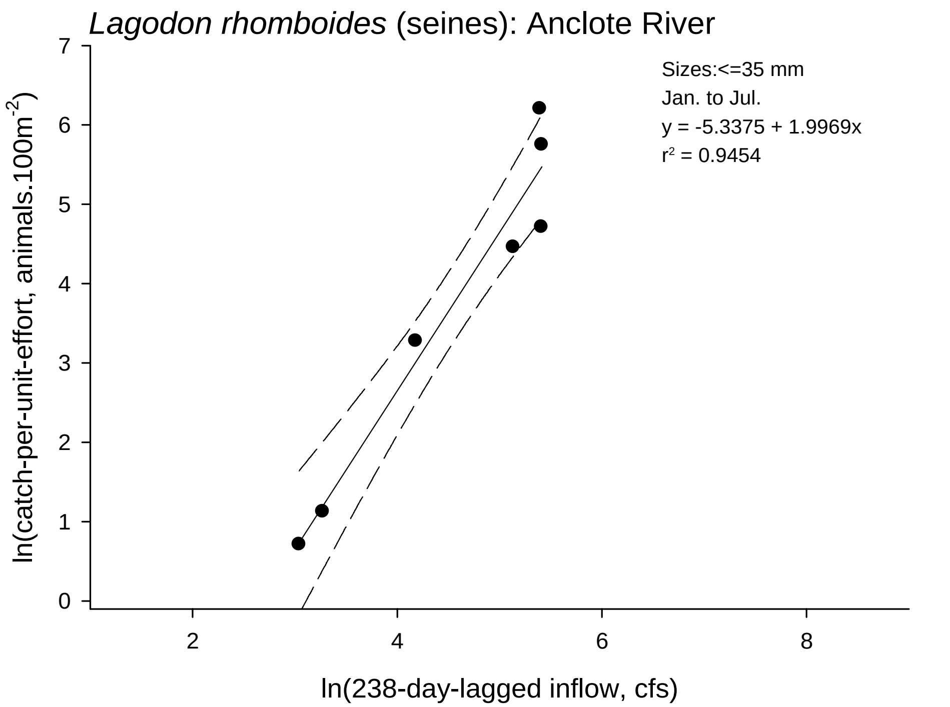


Fig. I15. Abundance response of Pinfish (<=35 mm) in the Anclote River estuary to 238-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

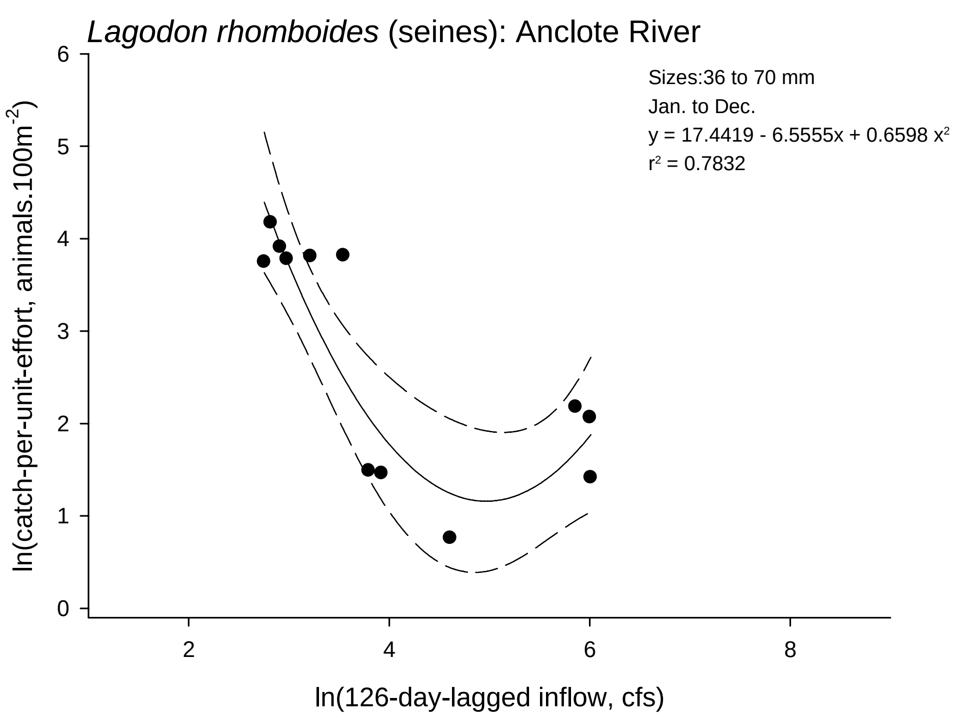


Fig. I16. Abundance response of Pinfish (36 to 70 mm) in the Anclote River estuary to 126-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

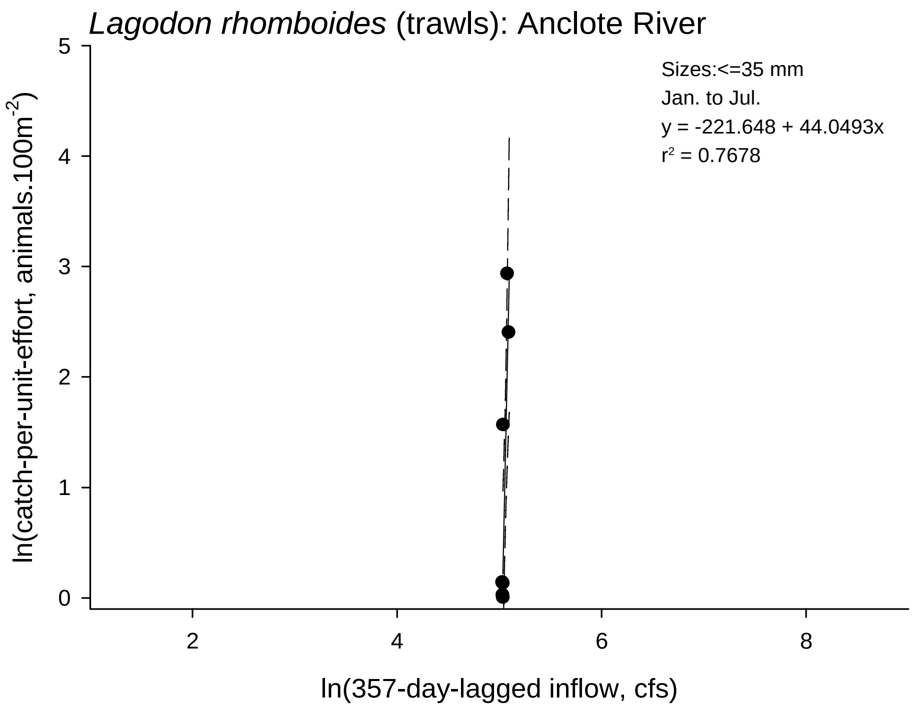


Fig. I17. Abundance response of Pinfish (<=35 mm) in the Anclote River estuary to 357-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

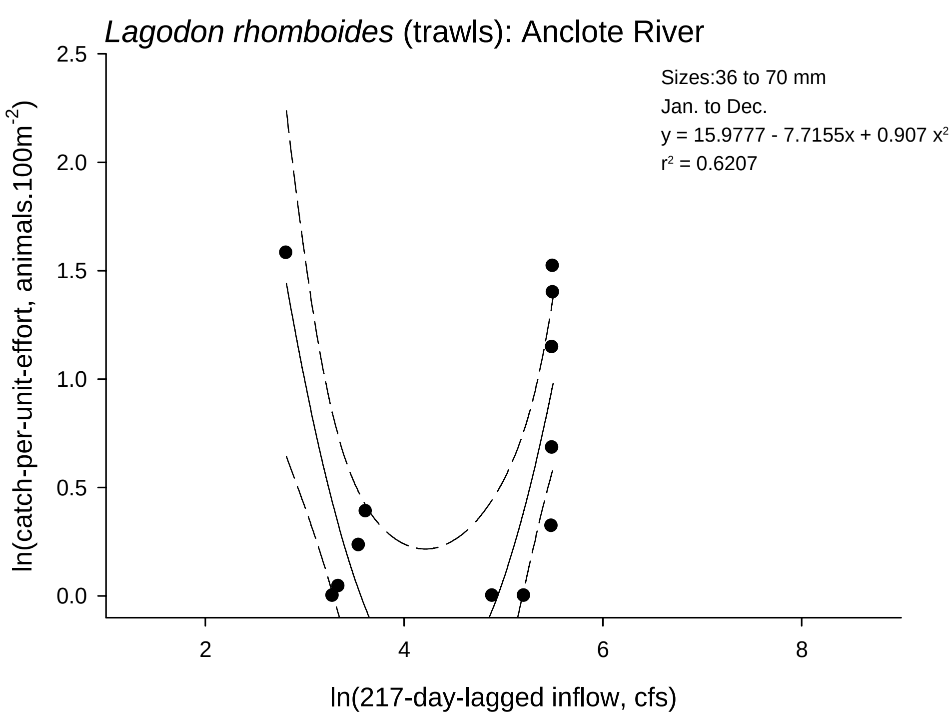


Fig. I18. Abundance response of Pinfish (36 to 70 mm) in the Anclote River estuary to 217-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

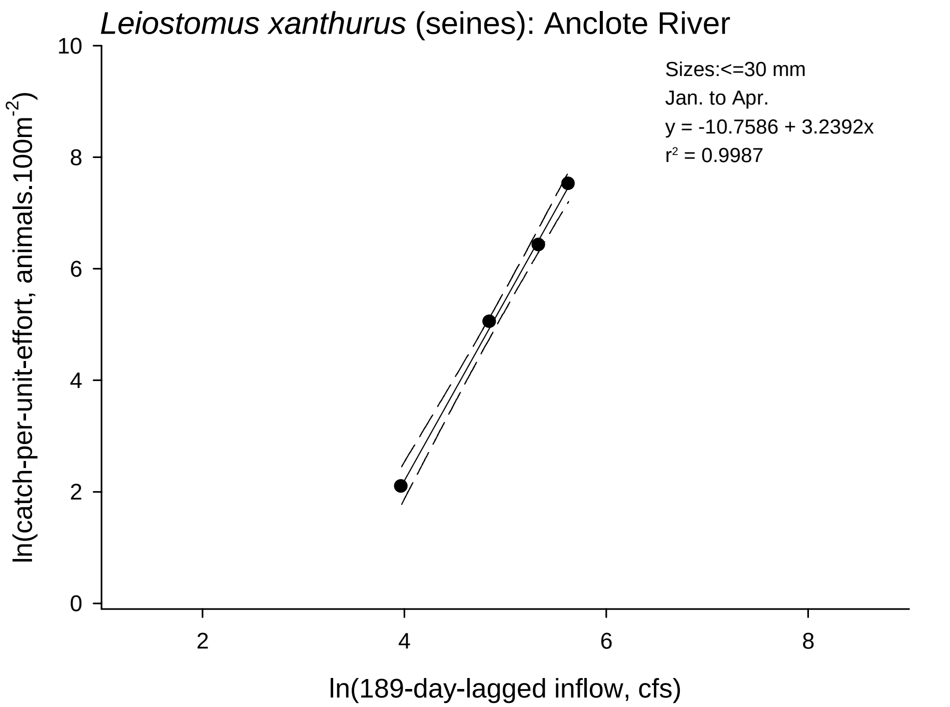


Fig. I19. Abundance response of Spot (<=30 mm) in the Anclote River estuary to 189-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

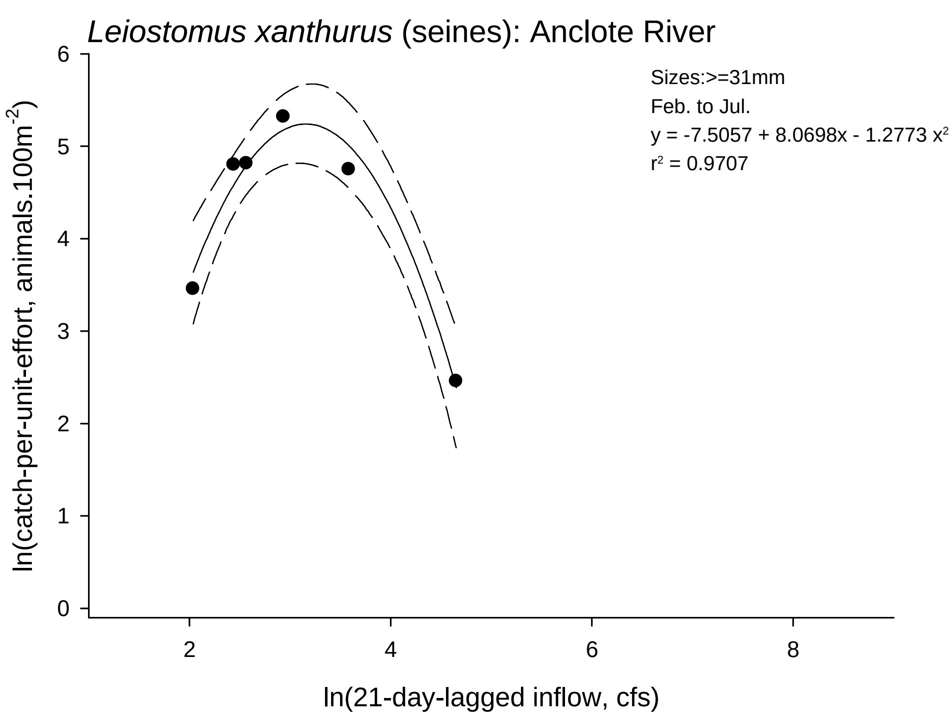


Fig. I20. Abundance response of Spot (>=31 mm) in the Anclote River estuary to 21-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

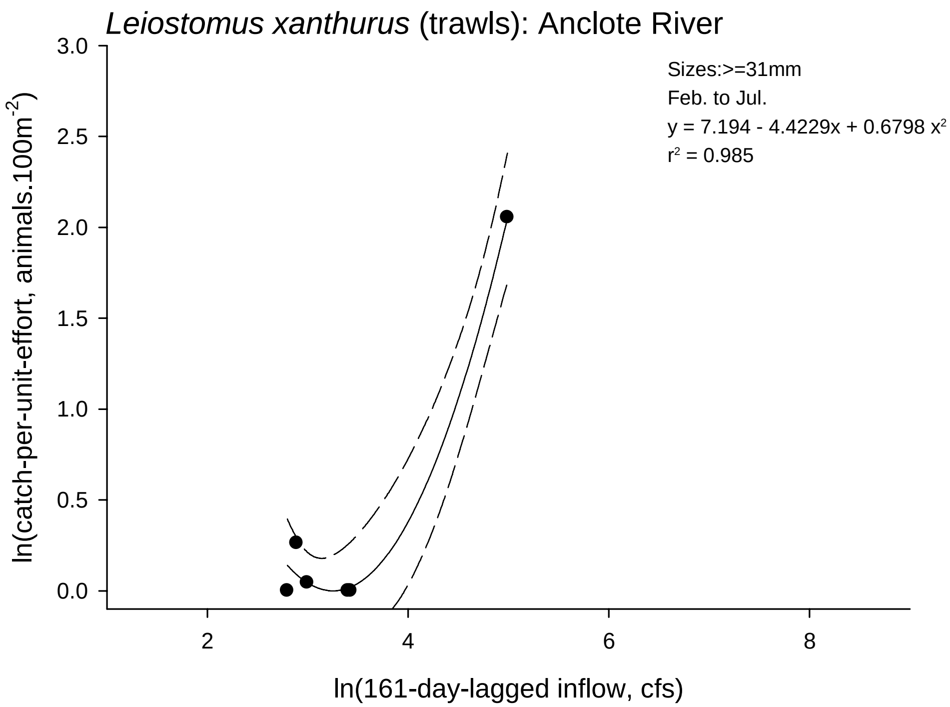


Fig. I21. Abundance response of Spot (>=31 mm) in the Anclote River estuary to 161-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

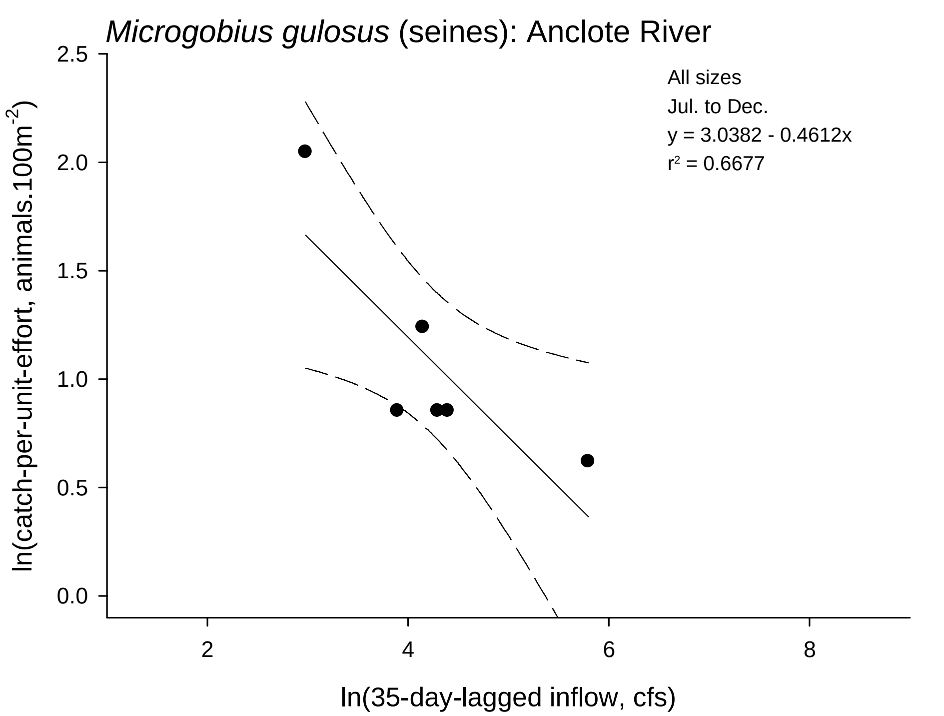


Fig. I22. Abundance response of Clown goby (All sizes) in the Anclote River estuary to 35-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.

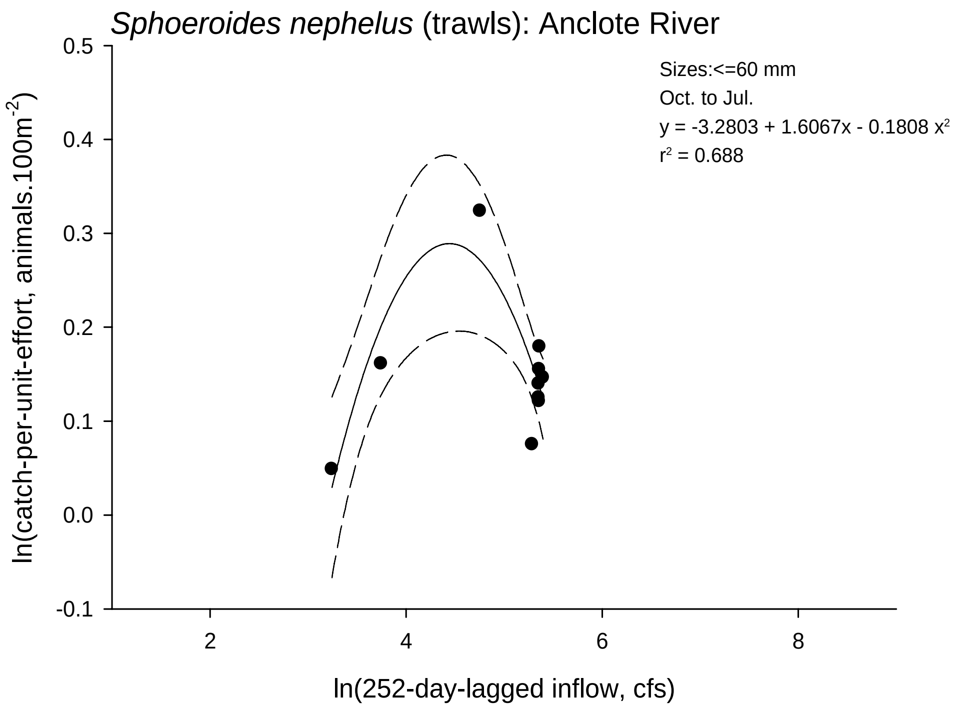


Fig. I23. Abundance response of Southern puffer (<=60 mm) in the Anclote River estuary to 252-day-lagged inflow. Solid lines: predicted values; dashed lines: 95% CI.