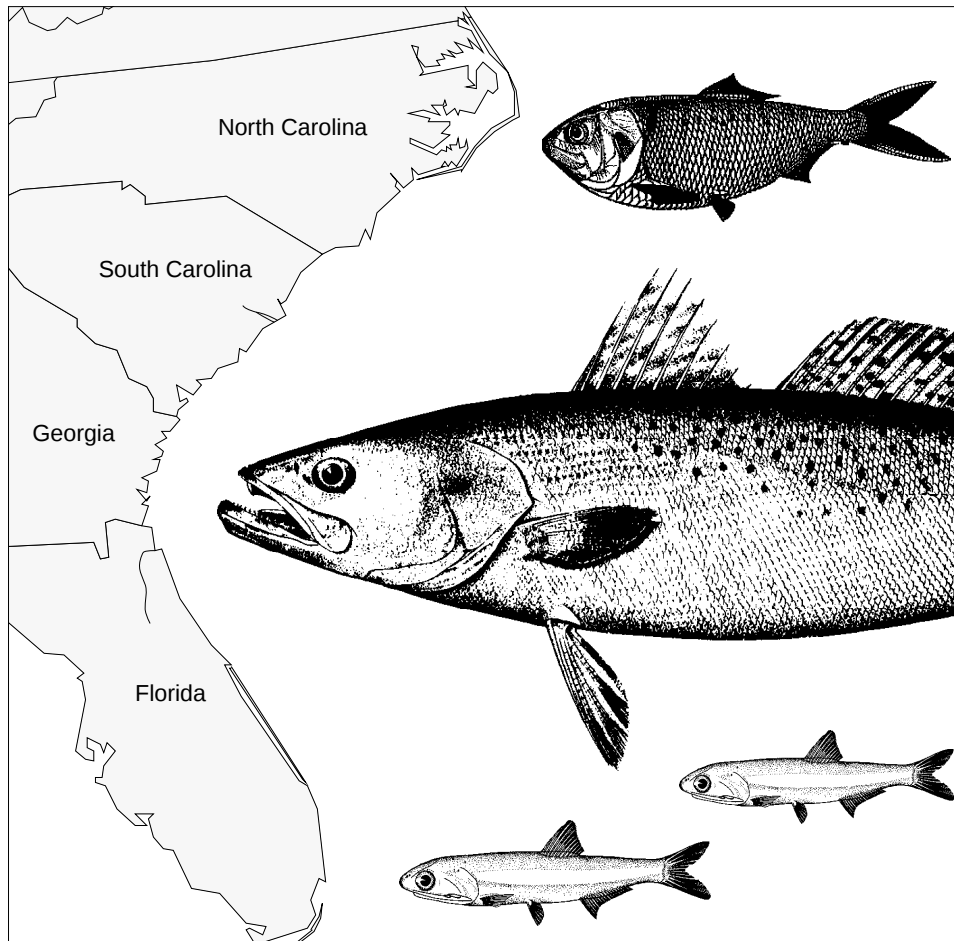


*Distribution and Abundance of Fishes and  
Invertebrates in Southeast Estuaries*



October 1991

*U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Ocean Service*

## NOAA's Estuarine Living Marine Resources Program

The Strategic Environmental Assessments (SEA) Division of NOAA's Office of Ocean Resources Conservation and Assessment (ORCA) was created in response to the need for comprehensive information on the effects of human activities on the Nation's coastal ocean. The SEA Division performs assessments of the estuarine and coastal environments and of the resources of the U.S. Exclusive Economic Zone (EEZ).

In June 1985, NOAA began a program to develop a comprehensive information base on the life history, relative abundance and distribution of fishes and invertebrates in estuaries throughout the nation. The Estuarine Living Marine Resources (ELMR) program has been conducted jointly by the SEA Division, the National Marine Fisheries Service (NMFS), and other agencies and institutions. Three salinity zones as defined in Volume 1 of NOAA's *National Estuarine Inventory Data Atlas* (NOAA 1985) provide the spatial framework for organizing information on species distribution and abundance within each estuary. These salinity zones are tidal fresh (0.0 to 0.5 ppt), mixing (0.5 to 25 ppt), and seawater (>25 ppt). The primary data developed for each species include spatial distribution by salinity zone, temporal distribution by month, and relative abundance by life stage, e.g., adults, spawning, juveniles, larvae, and eggs.

The nationwide ELMR data base was completed in January 1994, and includes data for 135 species found in 122 estuaries and coastal embayments. Nine reports and reprints are now available free upon request, and are listed below. This report, *Distribution and Abundance of Fishes and Invertebrates in Southeast Estuaries*, summarizes information on the distribution and abundance of 40 fish and invertebrate species in 20 estuaries along the Atlantic coast of North and South Carolina, Georgia, and Florida. This report was published in 1991, and reprinted with minor revision in November 1994; the introductory text was updated, and several appendices were omitted. A national report summarizing the data and results from the ELMR program will be published in 1995.

Additional information on this or other programs of NOAA's SEA Division is available from:

NOAA/NOS SEA Division, N/ORCA1  
1305 East-West Hwy., 9th Floor  
Silver Spring, Maryland 20910  
Phone (301) 713-3000  
Fax (301) 713-4384

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Selected reports and reprints available from NOAA's Estuarine Living Marine Resources program include:

Monaco, M.E., et al. 1990. Distribution and abundance of fishes and invertebrates in west coast estuaries, Vol. I: Data summaries. ELMR Rep. No. 4. NOAA/NOS Strategic Assessment Branch, Rockville, MD. 232 p.

Emmett, R.L., et al. 1991. Distribution and abundance of fishes and invertebrates in west coast estuaries, Vol. II: Species life history summaries. ELMR Rep. No. 8. NOAA/NOS Strategic Environmental Assessments Division, Rockville, MD. 329 p.

Nelson, D.M., et al. 1991. Distribution and abundance of fishes and invertebrates in southeast estuaries. ELMR Rep. No. 9. NOAA/NOS Strategic Environmental Assessments Division, Rockville, MD. 167 p.

Monaco, M.E., et al. 1992. Assemblages of U.S. west coast estuaries based on the distribution of fishes. *Journal of Biogeography* 19: 251-267.

Nelson, D.M. (ed.), et al. 1992. Distribution and abundance of fishes and invertebrates in Gulf of Mexico estuaries, Vol. I: Data summaries. ELMR Rep. No. 10. NOAA/NOS Strategic Environmental Assessments Division, Rockville, MD. 273 p.

Bulger, A.J., et al. 1993. Biologically-based salinity zones derived from a multivariate analysis. *Estuaries* 16: 311-322.

Pattillo, M.E., et al. 1994. Distribution and abundance of fishes and invertebrates in Gulf of Mexico estuaries, Vol. II: Species life history summaries. ELMR Rep. No. 11. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring, MD.

Stone, S.L., et al. 1994. Distribution and abundance of fishes and invertebrates in Mid-Atlantic estuaries. ELMR Rep. No. 12. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring, MD. 280 p.

Jury, S.H., et al. 1994. Distribution and abundance of fishes and invertebrates in North Atlantic estuaries. ELMR Rep. No. 13. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring, MD. 221 p.

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# *Distribution and Abundance of Fishes and Invertebrates in Southeast Estuaries*

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## Introduction

This report presents information on the spatial and temporal distribution, relative abundance, and life history characteristics of 40 fish and invertebrate species in 20 estuaries along the Atlantic coast of North Carolina, South Carolina, Georgia, and Florida. Its purpose is to disseminate data developed in the National Oceanic and Atmospheric Administration's (NOAA) Estuarine Living Marine Resources (ELMR) program (inside front cover). The ELMR program is conducted by the Biogeographic Characterization Branch of the Strategic Environmental Assessments Division, in cooperation with the National Marine Fisheries Service (NMFS) and other research institutions. The presence, distribution, and relative abundance of each species and the time period it utilizes each estuary are the primary data compiled. The data and framework presented in this report are illustrative of the nationwide ELMR program.

The objective of the ELMR program is to develop a consistent data base on the distribution, abundance, and life history characteristics of important fishes and invertebrates in the Nation's estuaries. The Nationwide data base is divided into five study regions (Figure 1). The data base contains the monthly relative abundance of each species' life stage by estuary for three salinity zones (seawater, mixing, and tidal fresh) identified in NOAA's National Estuarine Inventory (NEI) Data Atlas-Volume I (NOAA 1985). The Nationwide data base contains information for 135 fish and invertebrate species found in 122 U.S. estuaries.

## Rationale

Estuaries are among the most productive natural systems and are important nursery areas that provide food, refuge from predation, and valuable habitat for many species (Gunter 1967, Joseph 1973, Weinstein 1979, Mann 1982). Estuarine organisms that support important commercial and recreational fisheries include molluscs, crustaceans, and fishes. In spite of the well-documented importance of estuaries to fishes and invertebrates, few consistent and comprehensive data bases exist which allow examinations of the relationships between estuarine species found in or among groups of estuaries. Furthermore, much of the distribution and abundance information for estuarine-dependent species (i.e., species that require estuaries during their life cycle) is for offshore life stages and does not adequately describe estuarine distributions (Darnell et al. 1983, NOAA 1988).

Only a few comprehensive sampling programs collect fishes and invertebrates with identical methods across groups of estuaries within a region. Therefore, most existing estuarine fisheries data cannot be compared among estuaries because of the variable sampling strategies. In addition, existing research programs do not focus on how groups of estuaries may be important for regional fishery management, and few compile information for species having little or no economic value.

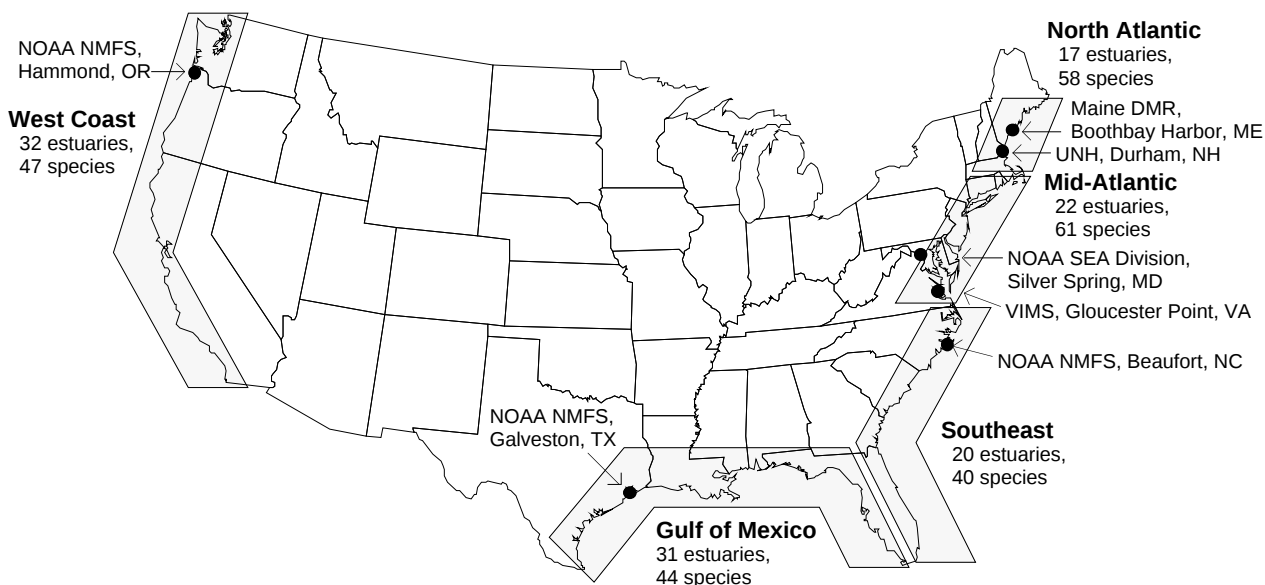


Figure 1. ELMR study regions and regional research institutions.

Because life stages of many species use both estuarine and marine habitats, information on distribution, abundance, temporal utilization, and life history characteristics are needed to understand the coupling of estuarine, nearshore, and offshore habitats. To date, a national, comprehensive, and consistent data base of this type does not exist. Consequently, there is a need to develop a program which integrates fragments of information on marine and estuarine species and their associated habitats into a useful, comprehensive, and consistent format. The ELMR program was designed to help fulfill this need by developing a uniform nationwide data base on selected estuarine species. Results will complement NOAA efforts to develop a national estuarine assessment capability (NOAA 1985), identify information gaps, and assess the content and quality of existing estuarine fisheries data.

### Data Collection and Organization

Figure 2 summarizes the major steps taken to collect and organize information on the distribution and abundance of fishes and invertebrates in Southeast estuaries. The initial steps were selection of the estuaries and species to be studied.

**Selection of estuaries.** Estuaries in the Southeast region were selected from the National Estuarine Inventory Data Atlas - Volume I (NOAA 1985). The 20 estuaries selected for the Southeast study are shown in Figure 3.

Data on spatial and temporal distributions of species were developed and organized by the tidal fresh (0.0 to 0.5 parts per thousand (ppt)), mixing (0.5 to 25.0 ppt), and seawater (>25.0 ppt) zones delineated for each estuary in the NEI. Each salinity zone is present in most of the Southeast estuaries, except that the seawater zone is absent from Albemarle Sound, Pamlico/Pungo Rivers, Neuse River, and North/South Santee River; and the tidal fresh zone is absent from Indian River and Biscayne Bay. A representative map and data table (Pamlico Sound) from the NEI Data Atlas is shown in Appendix 1, p. 117.

Compiling consistent data nationwide limits the amount of information that may be compiled for each species and estuary. Also, it would be time and cost prohibitive to map each species by life stage for each estuary (Monaco 1986). This framework enables a consistent compilation and organization of available information on the distribution of fishes and invertebrates in estuaries.

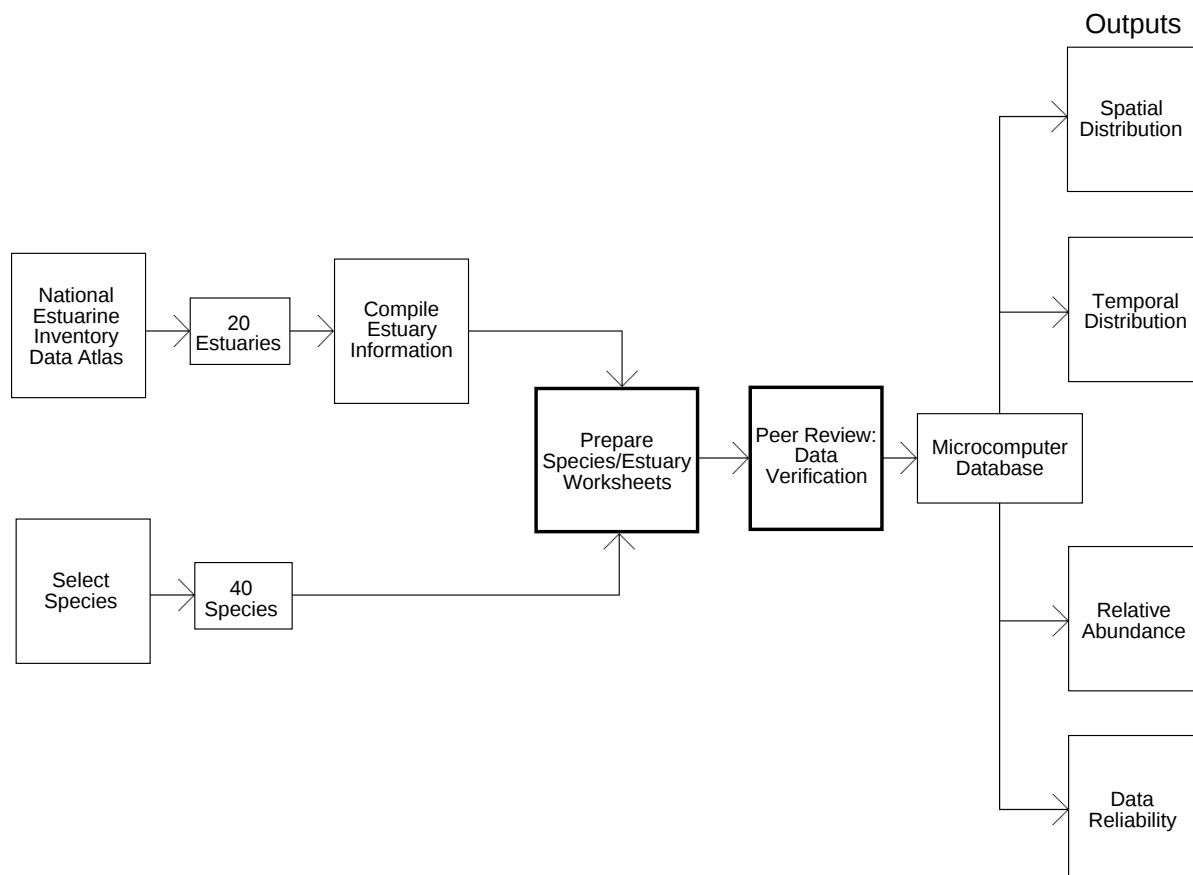


Figure 2. Major steps taken to complete the Southeast ELMR study.

**Selection of Species.** Four criteria were used to identify 40 species that had sufficient available information for inclusion in the ELMR data base. The four criteria were:

1) Commercial value - determined by review of catch data and value statistics from NMFS and state agencies, e.g., Atlantic menhaden (*Brevoortia tyrannus*) and blue crab (*Callinectes sapidus*).

2) Recreational value - defined as a species that recreational fishermen specifically try to catch, that may or may not be of commercial importance. Recreational species were determined by consulting regional experts and NMFS reports, e.g., spotted seatrout (*Cynoscion nebulosus*) and flounders (*Paralichthys* spp.).

3) Indicator species of environmental stress - identified from the literature, discussions with fisheries experts, and from monitoring programs such as NOAA's National Status and Trends Program (O'Connor 1990). These species (e.g., American oyster, *Crassostrea virginica*, and Atlantic croaker, *Micropogonias undulatus*) are molluscs or bottom fishes that consume benthic invertebrates or have a strong association with bottom sediments. Their physiological disorders, morphological abnormalities, and bioaccumulation of contaminants, such as heavy metals, indicate episodes of environmental pollution and/or stress.

4) Ecological value - based on several attributes, including trophic level, relative abundance and importance as a key predator or prey species, e.g., bay anchovy, *Anchoa mitchilli*.

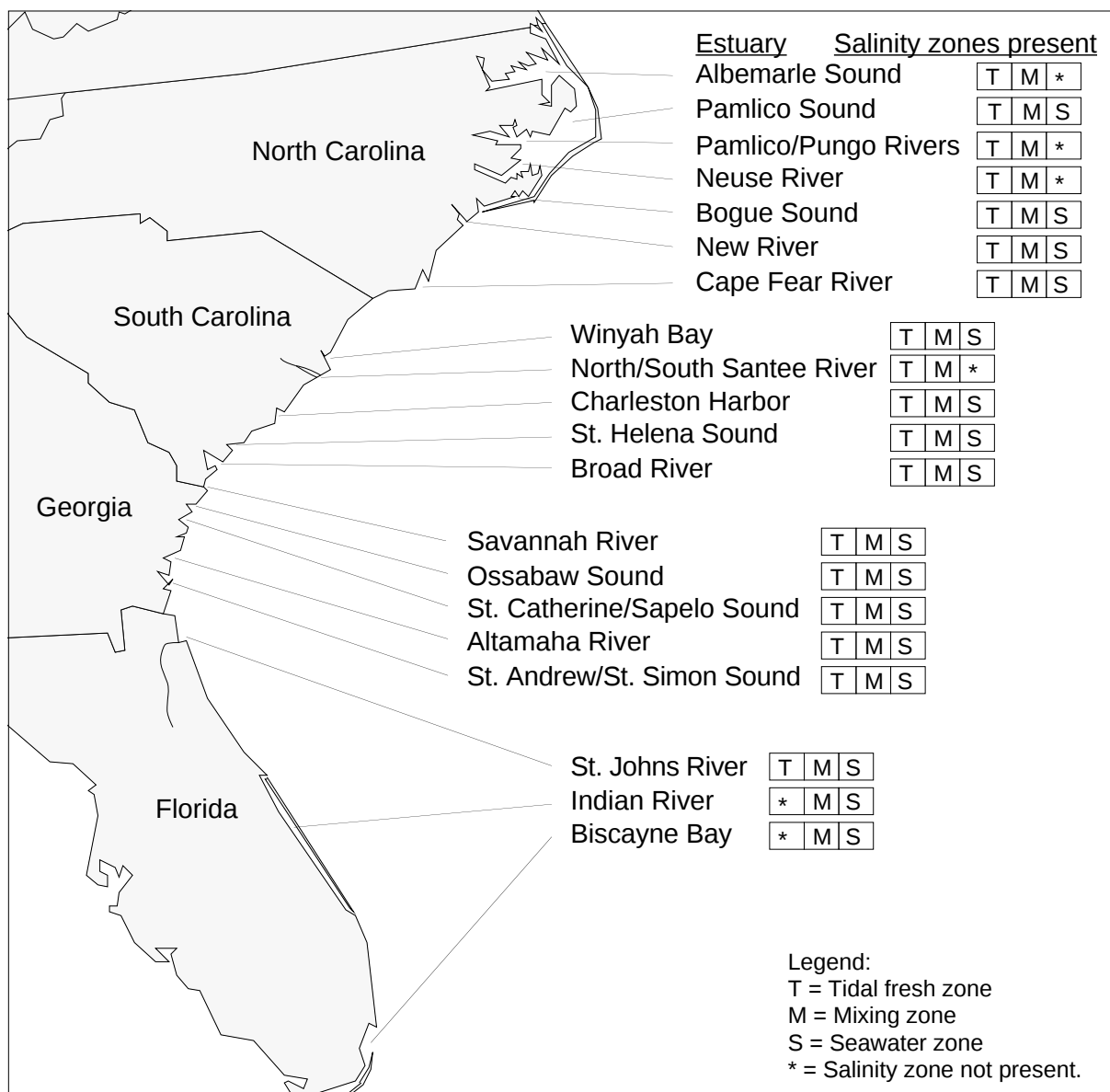


Figure 3. ELMR Southeast estuaries and associated salinity zones.

Table 1. ELMR southeast species (n=40)

| Common Name       | Scientific Name                    |
|-------------------|------------------------------------|
| Blue mussel       | <i>Mytilus edulis</i>              |
| Bay scallop       | <i>Argopecten irradians</i>        |
| American oyster   | <i>Crassostrea virginica</i>       |
| Common rangia     | <i>Rangia cuneata</i>              |
| Hard clam         | <i>Mercenaria</i> species          |
| Brown shrimp      | <i>Penaeus aztecus</i>             |
| Pink shrimp       | <i>Penaeus duorarum</i>            |
| White shrimp      | <i>Penaeus setiferus</i>           |
| Grass shrimp      | <i>Palaemonetes pugio</i>          |
| Blue crab         | <i>Callinectes sapidus</i>         |
| Atlantic sturgeon | <i>Acipenser oxyrinchus</i>        |
| Ladyfish          | <i>Elops saurus</i>                |
| American eel      | <i>Anguilla rostrata</i>           |
| Blueback herring  | <i>Alosa aestivalis</i>            |
| Alewife           | <i>Alosa pseudoharengus</i>        |
| American shad     | <i>Alosa sapidissima</i>           |
| Atlantic menhaden | <i>Brevoortia tyrannus</i>         |
| Bay anchovy       | <i>Anchoa mitchilli</i>            |
| Sheepshead minnow | <i>Cyprinodon variegatus</i>       |
| Mummichog         | <i>Fundulus heteroclitus</i>       |
| Silversides       | <i>Menidia</i> species             |
| White perch       | <i>Morone americana</i>            |
| Striped bass      | <i>Morone saxatilis</i>            |
| Bluefish          | <i>Pomatomus saltatrix</i>         |
| Cobia             | <i>Rachycentron canadum</i>        |
| Gray snapper      | <i>Lutjanus griseus</i>            |
| Sheepshead        | <i>Archosargus probatocephalus</i> |
| Pinfish           | <i>Lagodon rhomboides</i>          |
| Spotted seatrout  | <i>Cynoscion nebulosus</i>         |
| Weakfish          | <i>Cynoscion regalis</i>           |
| Spot              | <i>Leiostomus xanthurus</i>        |
| Southern kingfish | <i>Menticirrhus americanus</i>     |
| Atlantic croaker  | <i>Micropogonias undulatus</i>     |
| Black drum        | <i>Pogonias cromis</i>             |
| Red drum          | <i>Sciaenops ocellatus</i>         |
| Striped mullet    | <i>Mugil cephalus</i>              |
| Spanish mackerel  | <i>Scomberomorus maculatus</i>     |
| Gulf flounder     | <i>Paralichthys albigutta</i>      |
| Summer flounder   | <i>Paralichthys dentatus</i>       |
| Southern flounder | <i>Paralichthys lethostigma</i>    |

**Data Sheets.** A data sheet was developed for each species in each estuary to enable quick data compilation and presentation. Figure 4 depicts the data sheet for Atlantic menhaden (*Brevoortia tyrannus*) in Pamlico Sound. Data sheets were developed by project staff and reviewed by local experts. Data compiled for each species/life stage included: 1) the salinity zone it occupies (seawater, mixing, or tidal fresh), 2) its monthly distribution in those zones, and 3) its relative abundance in the zones. The ELMR data sheets were entered into a microcomputer data base management system.

The relative abundance of a species was classified using the following categories:

- Not present: species or life history stage not found, questionable data as to identification of species, and/or recent loss of habitat or environmental degradation suggests absence.
- No information available: no existing data available, and after expert review it was determined that not even an educated guess would be appropriate.
- Rare: species is definitely present but not frequently encountered.
- Common: species is frequently encountered but not in large numbers; does not imply a uniform distribution over a specific salinity zone.
- Abundant: species is often encountered in substantial numbers relative to other species.
- Highly abundant: species is numerically dominant relative to other species.

Adults were defined as reproductively mature individuals, juveniles as immature but otherwise similar to adults, and spawning adults as those releasing eggs and sperm. There were a few exceptions to these defined life stages, such as mating in crabs.

For well-studied species such as Atlantic croaker, quantitative data were used to estimate abundance levels. For many species, however, reliable quantitative data were limited. Therefore, regional and local experts were consulted to estimate relative abundances based on the above criteria. Several reference or "guide" species with abundance levels corresponding to the above criteria were identified for each estuary. These guide species typified fishes and invertebrates belonging to a particular life mode (e.g., pelagic, demersal) or occupying similar habitats. Once guide species were selected, other species were then placed into the appropriate abundance categories relative to them. These data represent relative abundance levels within a specific estuary only; relative abundance levels across southeast estuaries could not be determined.

The final level of abundance assigned to a species was determined by asking regional and local biologists for expert opinions based on their knowledge of individual species within an estuary. This effort complemented quantitative studies, the ELMR relative abundance categories, and greatly increased reliability of abundance information. The quality of relative abundance information varied between estuaries as well as spe-

cies. As a result, temporal resolution was greater in well-studied estuaries. Nevertheless, the relative abundance data shown in the data summaries are the best that could be synthesized from agency reports, academic studies, and expert reviews.

**Data Verification.** Approximately two years were required to develop the 800 data sheets (Figure 4) and consult with regional and local experts for the 20 estuaries studied. Nearly all of the data sheets were carefully reviewed during consultations or by mail. These consultations complemented the literature and published data sets compiled by NOAA. Sixty-four scientists and managers at 24 institutions were consulted. Local experts were especially helpful in providing estuary/species-specific information. They also provided additional references and contacts, and identified additional species to be included in the ELMR data base. The names and affiliations of these experts are listed in Appendix 3, p. 138-140.

## Results

**Data summaries.** The information compiled for each species and estuary (800 data sheets) was organized in four data summaries (p. 17-113). Tables 2 and 3 provide graphic presentations of the spatial and temporal distribution and relative abundance by life stage for each species and estuary. The information shown represents the usual spatial and temporal distribution of a species in a particular estuary. Table 4 ranks the relative reliability of the information presented for each species and estuary.

**Spatial distribution and relative abundance.** Table 2 (p. 19-40) summarizes the distribution and relative abundance for each species by life stage, in each estuary by salinity zone. The highest level of abundance during the year in each estuary is depicted.

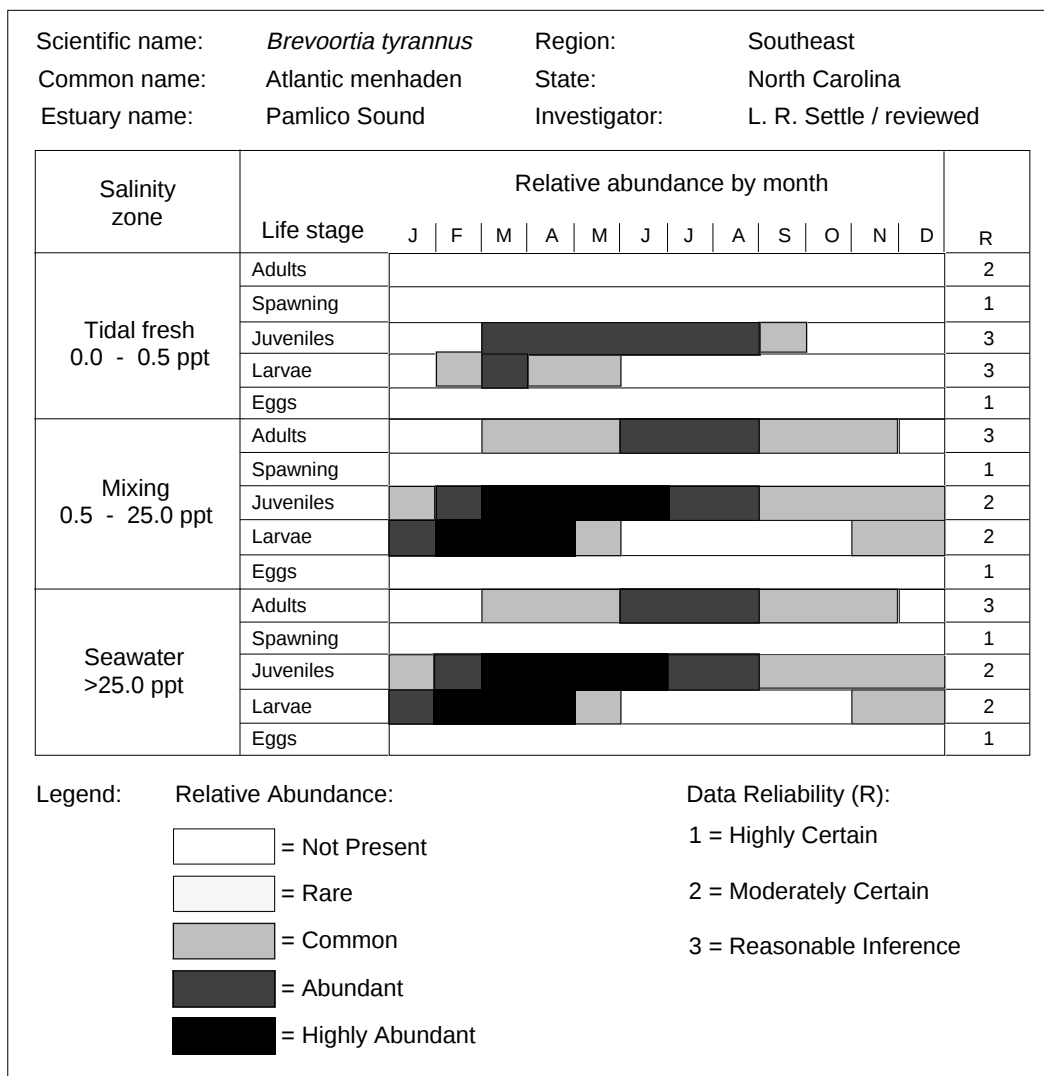


Figure 4. Example of a species/estuary data sheet: Atlantic menhaden in Pamlico Sound.

*Temporal distribution.* Table 3 (p. 41-90) summarizes the temporal distribution of each species by month and life stage for each estuary. This table combines data over the three salinity zones, showing the highest level of abundance for a particular life stage by month.

*Occurrence of 40 species in 20 southeast estuaries* Table 5 (p. 113) was developed to quickly determine the occurrence (as adults or juveniles) of each of the 40 ELMR species in each of the 20 southeast estuaries. The highest level of abundance over a year of the adult or juvenile life stages is depicted. The spawning, egg, and larval life stages are not included. This table suggests the relative abundance and zoogeographic distribution of species across southeast estuaries.

**Seasonal Comparisons.** To examine general seasonal abundance patterns, the numbers of species ranked as “common” or greater were counted for each life stage by month and by salinity zone. In Figure 5, the number of species was averaged across estuaries and plotted by month. In Figure 6, the number of species was plotted by estuary. Although these summaries are not statistical analyses, they do provide insights into the seasonal distribution of selected species in the estuaries:

- Estuarine utilization by all life stages is highest in the summer, and lowest in the winter (Figure 5).
- The number of species present as larvae reaches a peak in April (Figure 5).
- In any given month, more species utilize these estuaries as juveniles than as any other life stage (Figures 5 and 6).
- The number of species appears to be lowest in the tidal fresh zone (Figures 5 and 6). However, this may be because the selected ELMR species are primarily estuarine, not freshwater. Also, few studies exist for a large number of estuaries and species in tidal fresh waters, so any true patterns are difficult to define.
- The number of species appears to be lowest in the south Florida estuaries, Indian River and Biscayne Bay (Figure 6). However, this is probably because the selected species list does not adequately represent the south Florida estuarine fauna. The selected ELMR species are representative of the temperate Carolinian biogeographic province (Briggs 1974), whereas the south Florida estuaries include species from the tropical Caribbean biogeographic province.
- Many east coast estuarine-dependent species spawn in marine waters, thus, of the five life stages, the fewest species were present as eggs and for spawn-

ing. The paucity of these life stages may also be a result of limited studies on spawning and ichthyoplankton in estuaries.

### Data Content and Quality

An important aspect of the ELMR program, especially since it is based primarily on published and unpublished literature and consultations, is to determine the quality of available data. For many species, gear selectivity, difficulty in identifying larvae, and difficulty in sampling various habitats has limited the amount of reliable information. Therefore, a deliberate effort was made to assess the overall reliability of the data base so that it could be used appropriately.

Estimates of the reliability of the distribution and abundance information organized by species, life stage, and estuary are presented in Table 4 (p. 15-116) of the Data Summary Tables section. Data reliability was classified using the following categories:

Highly certain: Considerable sampling data available. Distribution, behavior, and preferred habitats well documented within an estuary.

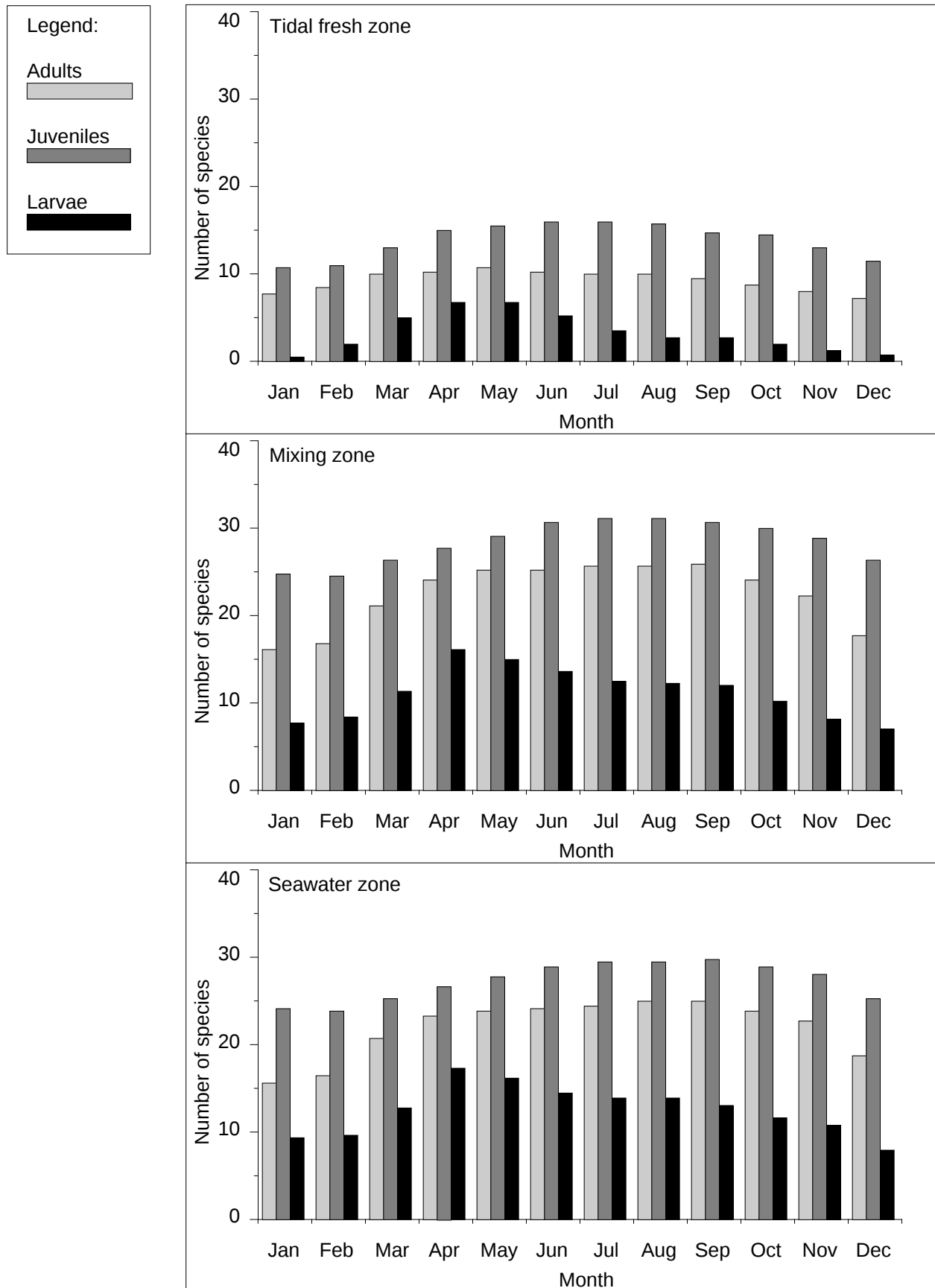
Moderately certain: Some sampling data available for an estuary. Distribution, preferred habitat, and behavior well documented in similar estuaries.

Reasonable inference: Little or no sampling data available. Information on distributions, ecology, and preferred habitats documented in similar estuaries.

The quality and quantity of available data vary by species, life stage, and estuary. For example, a large amount of information is available on blue crab because they are highly valued both commercially and recreationally. The least amount of information available and poorest quality of data occur for the spawning, egg, and larval life stages. Except for a few species (e.g., blue crab), very little data has been generated on particular habitat preferences and environmental tolerances. This is particularly true for the smaller forage and/or non-commercial fishes and invertebrates. Gear selectivity, inability to correctly identify larval stages, and difficulty of sampling various habitats limits the development and reliability of this information. In addition, life history data are lacking on some of the commercially important sciaenid and pelagic species.

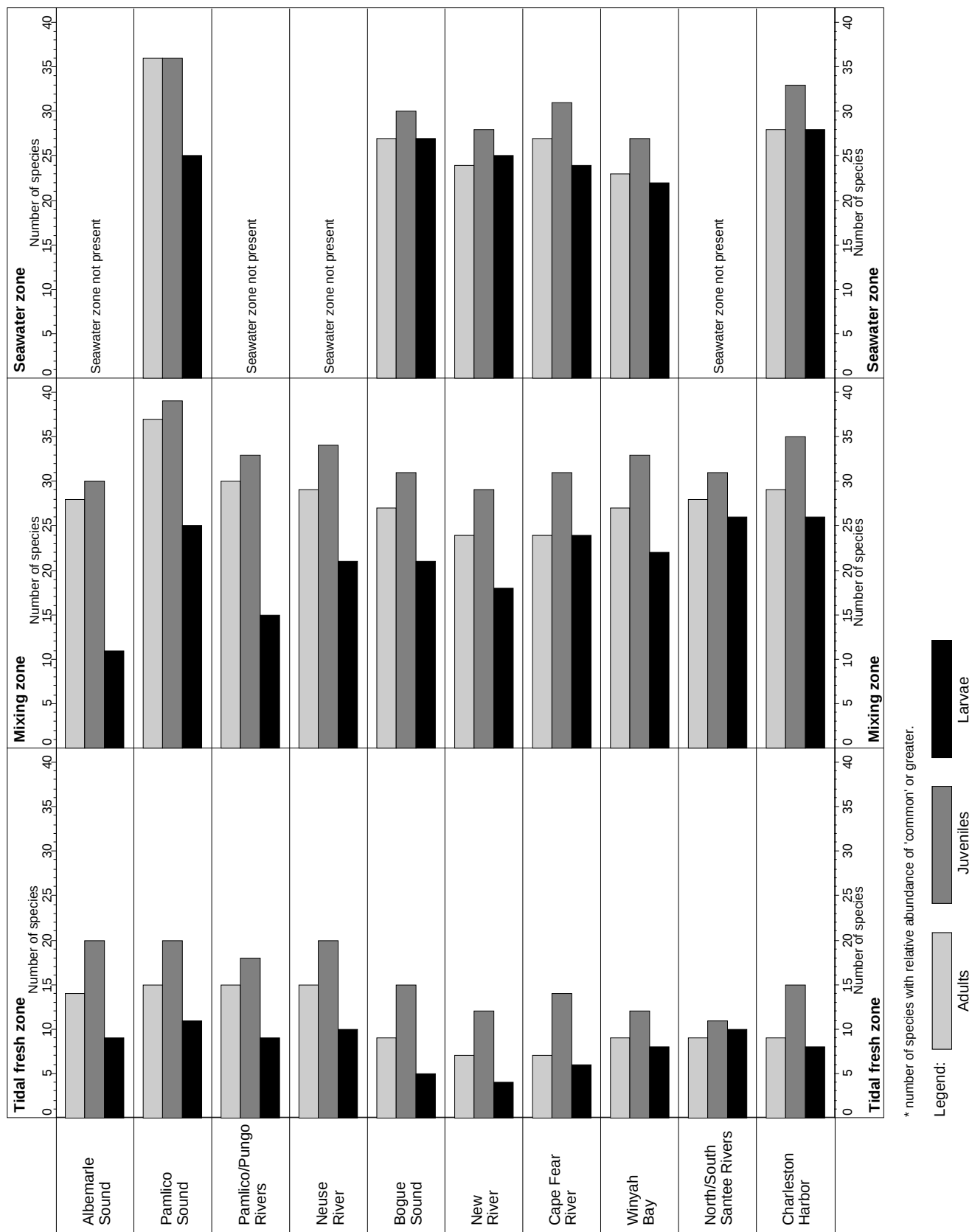
Data reliability was also based on experimental design and whether the studies were relatively recent. In the case of limited studies, information was occasionally inferred. An opportunity exists to refine the data presented based on additional reviews.

Figure 5. Number of species\* in Southeast estuaries, by salinity zone, life stage, and month.



\* number of species with relative abundance of 'common' or greater, averaged across estuaries.

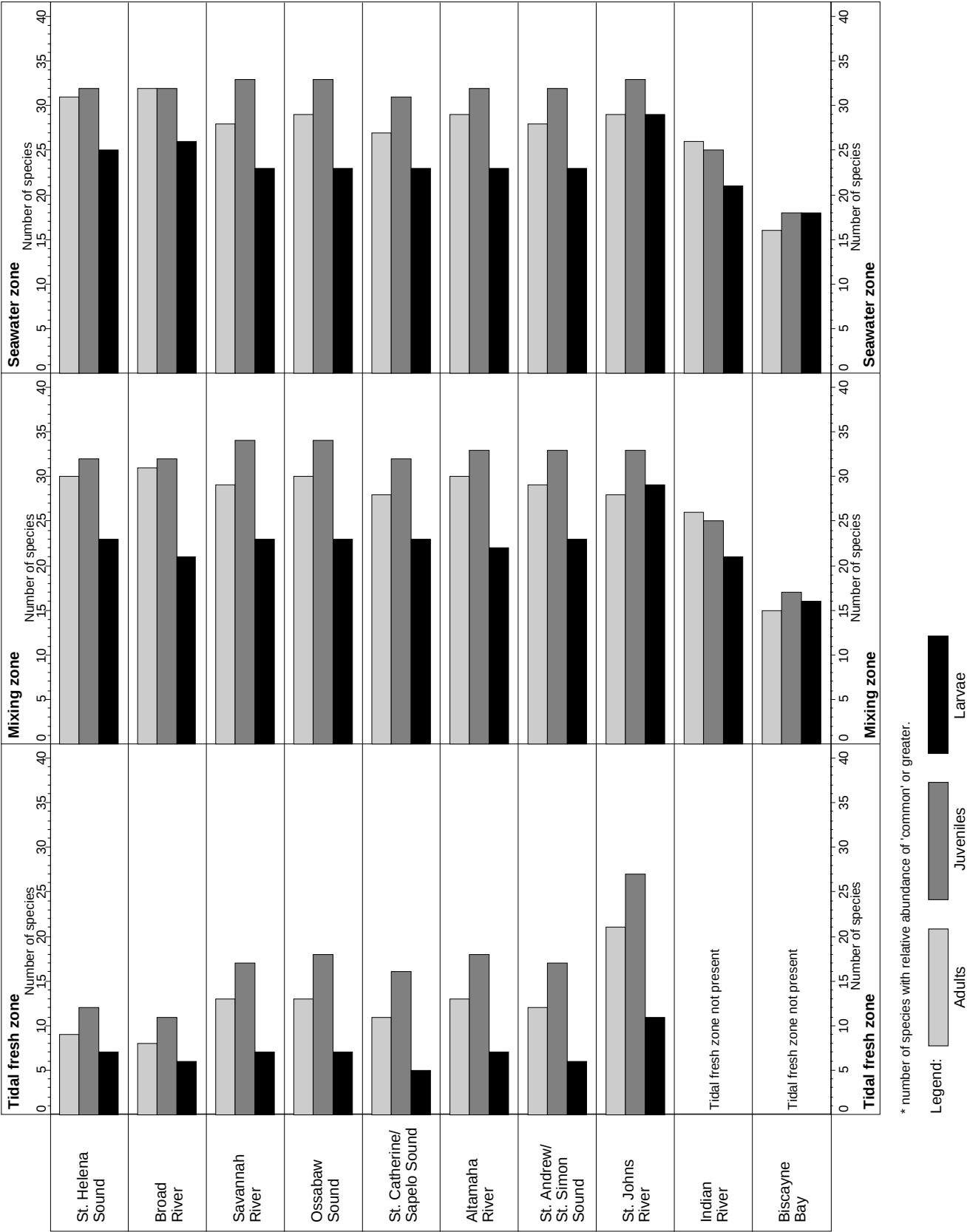
Figure 6. Numbers of ELMR species\* in Southeast estuaries, by estuary, salinity zone, and life stage.



\* number of species with relative abundance of 'common' or greater.

Legend: Adults Juveniles Larvae

Figure 6, continued. Numbers of ELMR species\* in Southeast estuaries, by estuary, salinity zone, and life stage.



\* number of species with relative abundance of 'common' or greater.

Legend: Adults Juveniles Larvae

Given that the amount and quality of available information varies by species, by life stage, between estuaries, and even within an estuary, considerable scientific judgment is required to derive or infer spatial and temporal distributions from existing data and available literature. Unfortunately, even the most informed judgment is far from perfect due to the complexity of estuarine systems. Consequently, information on the level of certainty associated with each data element must be presented when synthesizing multiple data sets (Table 4). Appendices 6, 7, and 8 provide a complete summary of the personal communications and primary references used so that readers can track and obtain additional information efficiently.

**Analysis of Data Content and Quality.** To assess the overall certainty of the ELMR southeast data, mean data reliability was calculated by estuary, salinity zone, species, and life stage. In this analysis, “highly certain” = 3, “moderately certain” = 2, and “reasonable inference” = 1. Mean data reliability was calculated using data reliability values for only those species and life stages that were known to occur within an estuary. This allowed comparisons between estuaries and species, because species and life stages known to be absent were typically recorded as highly certain.

This analysis identified estuaries, species, and life stages that have the most reliable information and those with the least. This information suggests the ELMR species, life stages, and estuaries that could be the focus of research efforts. Future research should include a comprehensive and consistent sampling program to quantify species distributions and abundances within and across estuaries. In addition, life history data (Appendices 4 and 5) needs to be compiled, especially for those species that may not have economic value, but are ecologically important.

Mean data reliability of fish and invertebrate data for southeast estuaries ranged from a high of 2.27 for Cape Fear River to a low of 1.25 for Ossabaw Sound, with an overall average of 1.70 (Figure 7). In general, the reliability estimates reflect the amount of fisheries research that has been conducted within an estuary. These data reveal that large estuaries (Albemarle and Pamlico Sounds) have been relatively well-studied, while many small bays and estuaries have not. Developed estuaries (i.e., with port facilities and nearby urbanization) and their drainages typically have been the focus of numerous research studies, for example, Cape Fear River and Charleston Harbor. In contrast, some of the least-developed estuaries (e.g., the southern Georgia estuaries) appear to be less-studied. Hence, there appears to be a need to collect baseline fish and invertebrate distribution and abundance data from relatively undeveloped estuaries.

When averaged across estuaries and analyzed by salinity zone, data reliability was lower in the tidal fresh zone than in the mixing and seawater zones. This is possibly because the selected species are primarily estuarine, not freshwater, and may also be due to fewer studies of tidal fresh waters.

When averaged across salinity zones and life stages and analyzed by species (Figure 8), data reliability was relatively high for most of the invertebrate species, including bay scallop, American oyster, hard clam, blue crab, and brown, pink, and white shrimp. This reflects the economic value of these species and consequently the large number of research studies that have focused on them. It was relatively low for blue mussel and common rangia, neither of which are commercially important in the southeast. Of the fish species, data reliability was relatively high for American eel, bay anchovy, white perch, bluefish, spot, and Atlantic croaker. It was relatively low for Atlantic sturgeon, sheepshead minnow, southern kingfish, black drum, and gulf flounder.

When analyzed by life stage, data for juvenile and adult life stages were most reliable, while data pertaining to spawning adults, larvae, and eggs were less certain. This reflects the number of research studies which have concentrated on adult and juvenile life stages. Species-specific studies of spawning adults, larvae, and eggs, have not been conducted in most estuaries. Thus, some of the information for these life stages was inferred from life history studies and data from similar estuaries.

**Variability in Space and Time.** Species data were organized according to the salinity zone boundaries developed for each estuary in the NEI data atlas—Volume 1 (NOAA 1985). However, division of an estuary on the basis of salinity is highly variable due to the many interacting factors that affect salinity, such as variations in freshwater inflow, wind, and tides. To compile information on species distribution according to these zones, it is assumed that if a particular salinity zone expands or contracts, the distribution of a mobile species in that zone will correspond to the shift. For example, if increased freshwater inflow shifts the tidal fresh zone further down the estuary, the distribution of a species confined to that zone increases to include the new area. If a species exhibits a wide range of salinity tolerance, a shift may or may not occur. The placement of species in a salinity zone was ultimately determined by where they have been observed or captured.

Species temporal distributions are often dependent on annual climatic conditions and water currents. Monthly distributional patterns were derived based on the consistent presence of a life stage within a particular

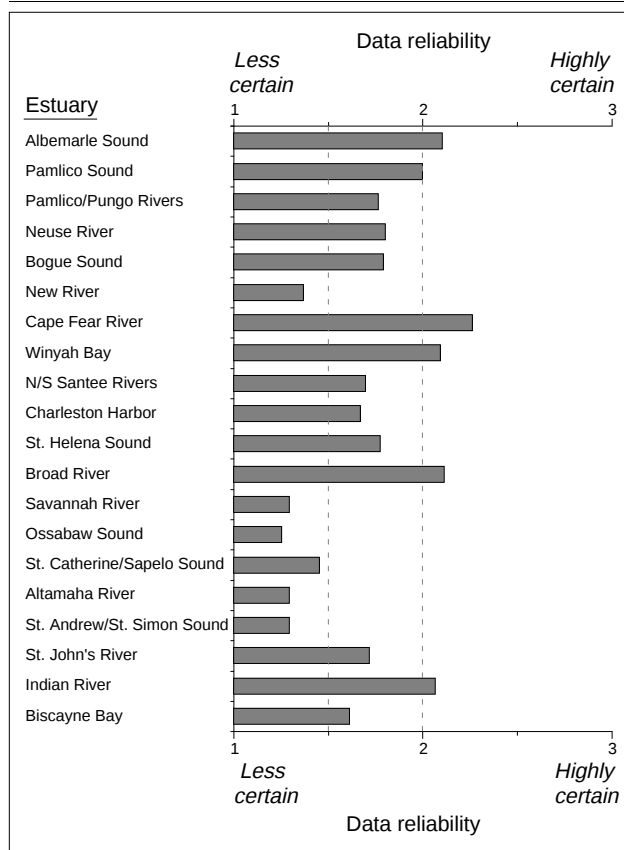


Figure 7. Mean data reliability by estuary.

month. If a species is only present in an estuary in unusual years (e.g., drought), it was not portrayed as part of that species' spatial or temporal distribution. However, if a species is usually there, even during a restricted time period, it was considered present for the specific month(s). Greater temporal resolution, such as on a biweekly rather than on a monthly basis, was not possible.

**Life History Notes.** Because of the complex life histories of some species, the following comments are provided below to clarify and supplement information presented in the data summary tables.

**Invertebrates.** Sessile invertebrates, such as clams and oysters, usually have a patchy rather than a uniform distribution. Therefore, the areal distribution of these organisms may be overestimated, but the salinity zones of colonization are identified. Specific areas may contain acceptable salinity regimes, but suitable bottom habitat for colonization may not exist. Specific habitat requirements and life history characteristics of a number of invertebrate species are provided below:

- Blue mussel: Not common south of Cape Hatteras. Larvae may be transported southward of Cape Hatteras,

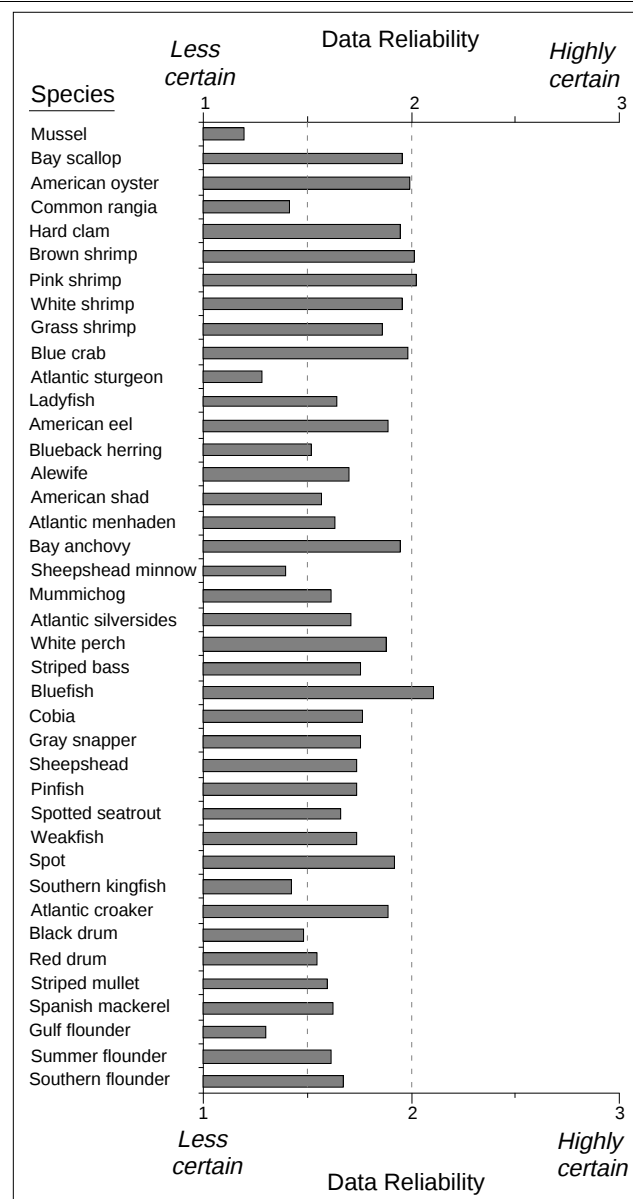


Figure 8. Mean data reliability by species.

and juveniles occur in some North Carolina estuaries. However, these mussels generally don't survive to adulthood.

- Bay scallop: Usually associated with seagrass beds and salinities greater than 25 ppt.
- American oyster: Populations tend to be intertidal south of Cape Lookout, North Carolina, and subtidal from Cape Lookout northward.
- Rangia: All life stages occur in salinities below 25 ppt. Not common in the south Florida estuaries.
- Hard clam: Most life stages occur in salinities above 20 ppt.

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- Penaeid shrimp: Postlarvae and juveniles are the main life stages utilizing the estuaries. Adults generally move to nearshore spawning grounds, where spawning, egg development, and most of the larval development occur.

- Grass shrimp: Fertilized eggs are held on the female's pleopods until hatching.

- Blue crab: Mating usually takes place in the low salinities of the tidal fresh to the upper region of the mixing zone. After mating, females move to the seawater zone, while males often remain in the upper reaches of the estuary. Females brood the eggs (sponge females), and larvae are released in higher salinities. Development through the late zoeal stages occurs offshore. Megalopae are transported back into the estuary and disperse throughout the salinity zones. As they approach maturity, blue crabs seek lower salinities.

*Fishes.* Aggregating species by salinity zone uses a single fundamental habitat parameter. However, a combination of habitat characteristics, such as bottom type, water temperature, and bathymetry, would more accurately indicate species spatial and temporal distributions. Specific habitat requirements and life history characteristics of a number of fishes are presented here:

- Atlantic sturgeon: Spawning occurs in freshwater rivers or low-salinity tidal waters. Eggs are demersal and adhesive, larvae drift downstream, and juveniles migrate seaward. Adults are iteroparous, i.e., they may return to spawn more than once. Not present south of the St. John's River, Florida.

- Ladyfish: Spawning occurs offshore. Juveniles are euryhaline, and are found in a variety of estuarine and coastal habitats. Not abundant north of Cape Hatteras.

- American eel: Spawning occurs in the Sargasso Sea in the spring, and the pelagic larvae (leptocephali) may spend over a year in marine waters before being transported shoreward. As leptocephali reach the continental shelf, they metamorphose into transparent "glass eels". As glass eels migrate into estuaries and fresh water, they develop pigment and are considered "elvers", which then grow into the "yellow eel" stage. Yellow eels inhabit estuarine and fresh waters for years before maturing into the "silver eel" stage and migrating seaward. For the purposes of this study, silver eels are considered adults, elvers and yellow eels are considered juveniles, and glass eels and leptocephali are considered larvae.

- Blueback herring: Spawning is in the spring, primarily in fresh water above and below head-of-tide. Adults typically return to sea after spawning, and may spawn repeatedly in their natal river. Not present in the southern Florida estuaries. Blueback herring and alewife are often referred to collectively as "river herring".

- Alewife: Spawning is in the spring, in fresh water above and below head-of-tide, and in low salinity estuarine waters. After spawning, adults typically move seaward. Not abundant south of Bogue Sound, North Carolina.

- American shad: An anadromous species with a fairly strong natal homing tendency. Adults spawn in freshwater rivers and die afterwards. Juveniles use low-salinity estuarine waters as a nursery area, then move offshore in the fall. Does not occur south of the St. John's River, Florida.

- Atlantic menhaden: Major winter spawning areas are offshore of Cape Hatteras and Cape Lookout, North Carolina. Larvae move inshore and into estuaries, and juveniles are often highly abundant in estuarine waters. May hybridize with yellowfin menhaden (*B. smithi*) in southern Florida.

- Bay anchovy: All life stages occur in estuaries, although adults may move offshore. A key forage species that is one of the most abundant fishes in east coast estuarine waters.

- Sheepshead minnow: The entire life cycle is completed within the estuary, and all life stages are euryhaline and eurythermal. Tends to prefer open bottom to heavily vegetated areas.

- Mummichog: The entire life cycle is completed within the estuary, and all life stages are euryhaline. One of the most abundant fishes in east coast estuarine marsh habitats. Not common south of St. John's River, Florida.

- Silversides: Large schools spawn in the intertidal zone at high tide. Spawning behavior is periodic, and may be affected by tidal cycle, lunar phase, and daylight. Silversides are often one of the most abundant fish species in an estuary.

- White perch: Spawning occurs in fresh water above and below head of tide, and in low-salinity estuarine waters. Eggs are demersal. Juveniles and adults typically remain within the estuary. Not common south of Charleston, South Carolina. Landlocked freshwater populations also exist.

- **Striped bass:** Spawning occurs in the spring in freshwater rivers, and in tidal low-salinity waters where there is sufficient current. Eggs are non-adhesive and semi-buoyant. Juveniles tend to form schools and remain in estuarine waters. Adults may move offshore, or stay within the estuary.
- **Bluefish:** Juveniles and adults are the principal life stages found in estuaries. Adults may ascend rivers into brackish waters. Spawning, egg and larval development occur offshore.
- **Cobia:** Adults are often attracted to large floating objects such as buoys or anchored boats. Cobia migrate to warmer tropical marine waters in the winter.
- **Gray snapper:** Juveniles are typically associated with vegetation in estuaries, particularly seagrass beds and mangroves. Adults, spawning, eggs, and larvae are usually offshore.
- **Sheepshead:** Spawning occurs in nearshore and inlet waters. Larvae are transported towards the estuaries, but typically enter as juveniles.
- **Pinfish:** Juveniles and adults are the predominant life stage within estuaries. Spawning and eggs occur offshore. Larvae are transported into estuaries, but may attain juvenile size before they enter.
- **Sciaenids:** Most sciaenids move to nearshore or offshore waters for spawning, although some may spawn in passes. Larvae may be transported toward estuaries, but typically attain juvenile size before they enter. Juveniles develop in the nursery habitats of the bays, then migrate out as subadults. Since some of these species have rather long life spans, several years may be spent in the estuaries as juveniles. As temperatures drop in the winter, they move into deeper waters.
- **Striped mullet:** Estuarine habitat is primarily used by juveniles and adults. They spawn offshore or near passes, and larvae move inshore and into estuaries.
- **Spanish mackerel:** Juveniles and adults occur in estuaries, but other life stages are pelagic and primarily in coastal waters.
- **Flounders:** Spawning, eggs, and larvae are in nearshore waters. Juveniles and larvae migrate into bays for growth and development. Gulf flounder appear to be more restricted in their ascent into fresher water, typically remaining in salinities greater than 20 ppt. Southern flounder are more generally distributed. Juveniles and adults migrate according to temperature, creating "fall runs" to the offshore waters.

**Hurricane Hugo.** In September, 1989, Hurricane Hugo came ashore, affecting 90 miles of the South Carolina coast, from Charleston to Myrtle Beach. The storm surge and heavy rainfall produced low salinity and low dissolved oxygen conditions in the Charleston Harbor estuary, resulting in extensive mortality and downstream displacement of the estuarine fauna (Knott and Martore 1991). As water quality parameters in Charleston Harbor returned to normal in the following months, grass shrimp, juvenile Atlantic croaker, and other estuarine species returned to the affected estuarine habitat in relatively high abundance (Knott and Martore 1991). At North Inlet, a tide-dominated high-salinity estuary about 50 miles north of Charleston Harbor, fishes, shrimps, and crabs were displaced toward the ocean following the retreat of a 13 foot storm surge. No significant mortality was observed, and rapid reoccupation of high marsh habitats occurred within a month (Ogburn et al. 1990, Service et al. 1990). Although it is too early to discern any long-term effects, it appears that the estuarine fauna of South Carolina are recovering to typical levels and patterns of abundance. The information presented in this volume is based on pre-Hugo conditions.

### Coupling of Estuarine and Marine Ecosystems

**Classifying and comparing estuaries** Although the qualitative nature of the data presented precludes statistical analysis of species abundances among estuaries, comparisons can be made using data on the presence/absence of species in salinity zones. This information, combined with the spatial and temporal distribution data, is the strength of the ELMR data base. Estuaries can be loosely categorized by their physical and chemical characteristics and their associated species assemblages. The relative importance of individual estuaries to specific species may also be determined.

The species found in an estuary are sensitive indicators of both the mean and extreme environmental conditions within that estuary. Estuaries can be classified by the number of species present and by whether the fauna are primarily marine, estuarine, or freshwater. Species assemblages may correlate with physical characteristics, such as bottom substrate, vegetation, and spatial/temporal characteristics of salinity zones. Thus, information on species presence/absence or other attributes may be used to determine the similarities and differences among estuaries. Alternately, a comparison of estuaries and associated species can help elucidate ecological variables that might account for shifts in species distribution and community structure. For example, a species may show differing salinity tolerances among estuaries, suggesting that some other factor such as temperature, competition, or pre-

dition may be regulating its distribution.

**Linkages to marine ecosystems.** Many species inhabit estuaries year-round; however, a large number of species only use estuaries for specific parts of their life histories. Most of these latter species fall into four general categories: 1) diadromous species, which use estuaries as migration corridors and, in some instances, nursery areas; 2) species that use estuaries for spawning, often at specific salinities; 3) species that spawn in marine waters near the mouths of estuaries and depend on tidal- and wind-driven currents to carry eggs, larvae, or early juveniles into estuarine nursery areas; and 4) species that enter estuaries during certain times of year to feed on abundant prey and/or utilize preferred habitats. The biological importance of an estuary can be assessed both by the number of species present and the density, and/or abundance, of specific life stages in the system relative to offshore habitats. Since many offshore species use estuaries as nursery areas or feeding grounds, these data may assist in identifying adverse effects of estuarine degradation on offshore populations.

**East Coast of North America Strategic Assessment Project.** Development of a diagnostic capability to link estuaries to marine ecosystems is a component of the *East Coast of North America Strategic Assessment Project* (ECNASAP) (NOAA 1991). This project is defining the major biological, physical, chemical, and economic characteristics of the East Coast of North America to address multiple resource-use conflicts. The study area begins at the head of tide in estuaries and encompasses the continental shelf as defined by the 200-m isobath and epipelagic waters. The ELMR distribution and abundance data are the primary source of fish and invertebrate information for U.S. East Coast estuaries. These data will be integrated with the coastal and offshore living resource information to develop a consistent GIS data base on species found from the head of tide to past the continental shelf. This will enable the development of a capability to define the coupling of estuarine and marine ecosystems based on species' spatial and temporal distributions, life history strategies, and physical and hydrological habitat requirements.

The ECNASAP complements other Federal marine environmental programs, e.g., National Status and Trends (O'Connor 1990), and will support regional environmental assessments of anthropogenic effects on living marine resources. Integration of biological and physical data will significantly improve our ability to identify and define the biological linkages and physical interchanges between estuarine and shelf habitats. As it becomes apparent that the cumulative effects of small alterations in estuaries have a systemic impact

on coastal ocean resources, it is more important than ever to compile consistent information on the nation's estuarine fishes and invertebrates. Although the knowledge available to effectively conserve and manage living resources is limited, the ELMR program provides an important tool for assessing the status of estuarine fauna and examining their relationships with other species and their environment. The ELMR data base provides the best available baseline information on the zoogeography and ecology of estuarine fishes and invertebrates, and identifies gaps in our knowledge of these resources.

### Acknowledgements

We thank those individuals that provided information and reviewed the data in this report. Without their efforts a study of this magnitude and complexity would not be possible. In addition, we thank the many other scientists and managers who provided contacts and references. A special thanks is due to Ginger Ogburn-Matthews and David M. Knott for their comments on Hurricane Hugo. Fish illustrations on the cover are from Shipp 1988.

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## *Data Summary Tables*

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Table 2. Spatial distribution and relative abundance

Table 3. Temporal distribution

Table 4. Data reliability

Table 5. Occurrence of 40 species in 20 southeast estuaries

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In each data summary table, species are listed in phylogenetic order, as in Table 1. Estuaries are listed in a north to south order, from Albemarle Sound, NC, to Biscayne Bay, FL. At the beginning of each data summary is an index table showing the page location of each species and estuary within the data summary.



**Table 2. Spatial distribution and relative abundance**

Index to Table 2. Page location of spatial distribution table for each species and estuary.

| Common and Scientific Name                                                                                                                                                                                                                                                           | Estuary                                                                                                                                                                                                                                                                                                                                                          |       |       |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--|
|                                                                                                                                                                                                                                                                                      | Albemarle Sound<br>Pamlico Sound<br>Pamlico/Pungo Rivers<br>Neuse River<br>Bogue Sound<br>New River<br>Cape Fear River<br>Winyah Bay<br>N/S Santee River<br>Charleston Harbor<br>St. Helena Sound<br>Broad River<br>Savannah River<br>Ossabaw Sound<br>St. Catharine/Sapelo Sound<br>Altamaha River<br>St. Andrew/St. Sim. Sound<br>Indian River<br>Biscayne Bay |       |       |  |
| Mussel ( <i>Mytilus edulis</i> )<br>Bay scallop ( <i>Argopecten irradians</i> )<br>American oyster ( <i>Crassostrea virginica</i> )<br>Common rangia ( <i>Rangia cuneata</i> )<br>Hard clam ( <i>Mercenaria</i> species)<br>Brown shrimp ( <i>Penaeus aztecus</i> )                  | p. 20                                                                                                                                                                                                                                                                                                                                                            | p. 21 | p. 22 |  |
| Pink shrimp ( <i>Penaeus duorarum</i> )<br>White shrimp ( <i>Penaeus setiferus</i> )<br>Grass shrimp ( <i>Palaemonetes pugio</i> )<br>Blue crab ( <i>Callinectes sapidus</i> )<br>Atlantic sturgeon ( <i>Acipenser oxyrinchus</i> )<br>Ladyfish ( <i>Elops saurus</i> )              | p. 23                                                                                                                                                                                                                                                                                                                                                            | p. 24 | p. 25 |  |
| American eel ( <i>Anguilla rostrata</i> )<br>Blueback herring ( <i>Alosa aestivalis</i> )<br>Alewife ( <i>Alosa pseudoharengus</i> )<br>American shad ( <i>Alosa sapidissima</i> )<br>Atlantic menhaden ( <i>Brevoortia tyrannus</i> )<br>Bay anchovy ( <i>Anchoa mitchilli</i> )    | p. 26                                                                                                                                                                                                                                                                                                                                                            | p. 27 | p. 28 |  |
| Sheepshead minnow ( <i>Cyprinodon variegatus</i> )<br>Mummichog ( <i>Fundulus heteroclitus</i> )<br>Atlantic silversides ( <i>Menidia</i> species)<br>White perch ( <i>Morone americana</i> )<br>Striped bass ( <i>Morone saxatilis</i> )<br>Bluefish ( <i>Pomatomus saltatrix</i> ) | p. 29                                                                                                                                                                                                                                                                                                                                                            | p. 30 | p. 31 |  |
| Cobia ( <i>Rachycentron canadum</i> )<br>Gray snapper ( <i>Lutjanus griseus</i> )<br>Sheepshead ( <i>Archosargus probatocephalus</i> )<br>Pinfish ( <i>Lagodon rhomboides</i> )<br>Spotted seatrout ( <i>Cynoscion nebulosus</i> )<br>Weakfish ( <i>Cynoscion regalis</i> )          | p. 32                                                                                                                                                                                                                                                                                                                                                            | p. 33 | p. 34 |  |
| Spot ( <i>Leiostomus xanthurus</i> )<br>Southern kingfish ( <i>Menticirrhus americanus</i> )<br>Atlantic croaker ( <i>Micropogonias undulatus</i> )<br>Black drum ( <i>Pogonias cromis</i> )<br>Red drum ( <i>Sciaenops ocellatus</i> )<br>Striped mullet ( <i>Mugil cephalus</i> )  | p. 35                                                                                                                                                                                                                                                                                                                                                            | p. 36 | p. 37 |  |
| Spanish mackerel ( <i>Scomberomorus maculatus</i> )<br>Gulf flounder ( <i>Paralichthys albigutta</i> )<br>Summer flounder ( <i>Paralichthys dentatus</i> )<br>Southern flounder ( <i>Paralichthys lethostigma</i> )                                                                  | p. 38                                                                                                                                                                                                                                                                                                                                                            | p. 39 | p. 40 |  |

Table 2. Spatial distribution and relative abundance

|                              |   | Southeast Estuaries |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|------------------------------|---|---------------------|---|---|---------------|---|---|----------------------|---|---|-------------|---|---|-------------|---|---|-----------|---|---|-----------------|---|---|
|                              |   | Albemarle Sound     |   |   | Pamlico Sound |   |   | Pamlico/Pungo Rivers |   |   | Neuse River |   |   | Bogue Sound |   |   | New River |   |   | Cape Fear River |   |   |
| Species/Life Stage           |   | T                   | M | * | T             | M | S | T                    | M | * | T           | M | * | T           | M | S | T         | M | S | T               | M | S |
| Mussel                       | A |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                              | S |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
| <i>Mytilus edulis</i>        | J |                     |   |   |               |   | √ |                      |   |   |             |   |   |             |   | √ |           |   | √ |                 |   | √ |
|                              | L |                     |   |   |               |   | √ |                      |   |   |             |   |   |             |   | √ |           |   | √ |                 |   | √ |
|                              | E |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
| Bay scallop                  | A |                     |   |   |               | ● | ● |                      |   |   |             |   |   |             | ○ | ● |           | ○ | ● |                 |   | √ |
|                              | S |                     |   |   |               |   | ● |                      |   |   |             |   |   |             | ○ | ● |           | ○ | ● |                 |   | √ |
| <i>Argopecten irradians</i>  | J |                     |   |   |               | ● | ● |                      |   |   |             |   |   |             | ○ | ● |           | ○ | ● |                 |   | √ |
|                              | L |                     |   |   |               | ● | ● |                      |   |   |             |   |   |             | ○ | ● |           | ○ | ● |                 |   | √ |
|                              | E |                     |   |   |               |   | ● |                      |   |   |             |   |   |             | ○ | ● |           | ○ | ● |                 |   | √ |
| American oyster              | A |                     | ○ |   |               | ● | ● |                      | ● |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ○ | ● |
|                              | S |                     | ○ |   |               | ● | ● |                      | ● |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ○ | ● |
| <i>Crassostrea virginica</i> | J |                     | ○ |   |               | ● | ● |                      | ● |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ○ | ● |
|                              | L |                     | ○ |   |               | ● | ● |                      | ● |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ○ | ● |
|                              | E |                     | ○ |   |               | ● | ● |                      | ● |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ○ | ● |
| Common rangia                | A | ●                   | ● |   | ●             | ● |   | ●                    | ● |   | ●           | ● |   | ○           | ○ |   | ○         | ○ |   | ○               | ○ |   |
|                              | S | ●                   | ● |   | ●             | ● |   | ●                    | ● |   | ●           | ● |   | ○           | ○ |   | ○         | ○ |   | ○               | ○ |   |
| <i>Rangia cuneata</i>        | J | ●                   | ● |   | ●             | ● |   | ●                    | ● |   | ●           | ● |   | ○           | ○ |   | ○         | ○ |   | ○               | ○ |   |
|                              | L | ●                   | ● |   | ●             | ● |   | ●                    | ● |   | ●           | ● |   | ○           | ○ |   | ○         | ○ |   | ○               | ○ |   |
|                              | E | ●                   | ● |   | ●             | ● |   | ●                    | ● |   | ●           | ● |   | ○           | ○ |   | ○         | ○ |   | ○               | ○ |   |
| Hard clam                    | A |                     |   |   |               | ● | ● |                      |   |   |             |   |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                              | S |                     |   |   |               | ● | ● |                      |   |   |             |   |   |             | ● | ● |           | ● | ● |                 | ● | ● |
| <i>Mercenaria</i> species    | J |                     |   |   |               | ● | ● |                      |   |   |             |   |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                              | L |                     |   |   |               | ● | ● |                      |   |   |             |   |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                              | E |                     |   |   |               | ● | ● |                      |   |   |             |   |   |             | ● | ● |           | ● | ● |                 | ● | ● |
| Brown shrimp                 | A |                     | ○ |   |               | ● | ● |                      | ● |   |             | ● |   |             |   |   |           |   |   |                 |   |   |
|                              | S |                     |   |   |               | ● | ● |                      | ● |   |             | ● |   |             |   |   |           |   |   |                 |   |   |
| <i>Penaeus aztecus</i>       | J | √                   | ○ |   |               | ● | ● |                      | ● |   | ○           | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                              | L |                     |   |   |               | ○ | ○ |                      |   |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                              | E |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                              |   | T                   | M | * | T             | M | S | T                    | M | * | T           | M | * | T           | M | S | T         | M | S | T               | M | S |
|                              |   | Albemarle Sound     |   |   | Pamlico Sound |   |   | Pamlico/Pungo Rivers |   |   | Neuse River |   |   | Bogue Sound |   |   | New River |   |   | Cape Fear River |   |   |
|                              |   | Southeast Estuaries |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |

## Relative Abundance

- Highly Abundant
- Abundant
- Common
- √ Rare
- Blank Not Present

## Salinity Zone

- T - Tidal Fresh
- M - Mixing
- S - Seawater
- \* - Seawater zone not present.

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Table 2, continued. Spatial distribution and relative abundance

| Species/Life Stage           |   | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|------------------------------|---|---------------------|---|---|---------------------|---|---|-------------------|---|---|------------------|---|---|-------------|---|---|----------------|---|---|---------------|---|---|
|                              |   | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |
|                              |   | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |
| Mussel                       | A |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| <i>Mytilis edulis</i>        | S |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                              | J |                     |   | √ |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                              | L |                     |   | √ |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                              | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| Bay scallop                  | A |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| <i>Argopecten irradians</i>  | S |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                              | J |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                              | L |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                              | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| American oyster              | A |                     | ● | ● |                     | ○ |   |                   | ⊗ | ⊗ |                  | ● | ⊗ |             | ● | ● |                | ○ | ○ |               | ⊗ | ⊗ |
| <i>Crassostrea virginica</i> | S |                     | ● | ● |                     | ○ |   |                   | ⊗ | ⊗ |                  | ● | ⊗ |             | ● | ● |                | ○ | ○ |               | ⊗ | ⊗ |
|                              | J |                     | ● | ● |                     | ○ |   |                   | ⊗ | ⊗ |                  | ● | ⊗ |             | ● | ● |                | ○ | ○ |               | ⊗ | ⊗ |
|                              | L |                     | ● | ● |                     | ○ |   |                   | ⊗ | ⊗ |                  | ● | ⊗ |             | ● | ● |                | ○ | ○ |               | ● | ● |
|                              | E |                     | ● | ● |                     | ○ |   |                   | ⊗ | ⊗ |                  | ● | ⊗ |             | ● | ● |                | ○ | ○ |               | ● | ● |
| Common rangia                | A | √                   | ○ |   | ○                   | ○ |   | √                 | √ |   | √                | √ |   | √           |   |   | ○              | ○ |   | ○             | ○ |   |
| <i>Rangia cuneata</i>        | S |                     | ○ |   | ○                   | ○ |   |                   | √ |   |                  | √ |   |             |   |   | ○              | ○ |   | ○             | ○ |   |
|                              | J | √                   | ○ |   | ○                   | ○ |   | √                 | √ |   | √                | √ |   | √           |   |   | ○              | ○ |   | ○             | ○ |   |
|                              | L | √                   | ○ |   | ○                   | ○ |   | √                 | √ |   | √                | √ |   | √           |   |   | ○              | ○ |   | ○             | ○ |   |
|                              | E |                     | ○ |   | ○                   | ○ |   |                   | √ |   |                  | √ |   | √           |   |   | ○              | ○ |   | ○             | ○ |   |
| Hard clam                    | A |                     | ⊗ | ⊗ |                     | ○ |   |                   | ⊗ | ⊗ |                  | ○ | ○ |             | ○ | ⊗ |                | ○ | ○ |               | ○ | ○ |
| <i>Mercenaria</i> species    | S |                     | ⊗ | ⊗ |                     | ○ |   |                   | ⊗ | ⊗ |                  | ○ | ○ |             | ○ | ⊗ |                | ⊗ | ⊗ |               | ⊗ | ⊗ |
|                              | J |                     | ⊗ | ⊗ |                     | ○ |   |                   | ⊗ | ⊗ |                  | ○ | ○ |             | ○ | ⊗ |                | ○ | ○ |               | ○ | ○ |
|                              | L |                     | ⊗ | ⊗ |                     | ○ |   |                   | ⊗ | ⊗ |                  | ○ | ○ |             | ○ | ⊗ |                | ⊗ | ⊗ |               | ⊗ | ⊗ |
|                              | E |                     | ⊗ | ⊗ |                     | ○ |   |                   | ⊗ | ⊗ |                  | ○ | ○ |             | ○ | ⊗ |                | ⊗ | ⊗ |               | ⊗ | ⊗ |
| Brown shrimp                 | A |                     | ⊗ | ⊗ |                     | ○ |   |                   | ⊗ | ⊗ |                  | √ | √ |             | ○ | ○ |                | ○ | ○ |               | ⊗ | ⊗ |
| <i>Penaeus aztecus</i>       | S |                     | √ | √ |                     |   |   |                   |   |   |                  |   |   |             | ○ | ○ |                |   |   |               |   |   |
|                              | J |                     | ⊗ | ⊗ |                     | ⊗ |   |                   | ● | ● |                  | ● | ● |             | ⊗ | ⊗ |                | ○ | ○ |               | ⊗ | ⊗ |
|                              | L |                     | ⊗ | ⊗ |                     | ○ |   |                   | ● | ● |                  | ● | ● |             | ⊗ | ⊗ |                |   |   |               | ⊗ | ⊗ |
|                              | E |                     | √ | √ |                     |   |   |                   |   |   |                  |   |   |             | ⊗ | ⊗ |                |   |   |               |   |   |
|                              |   | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |
|                              |   | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |
|                              |   | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |

## Relative Abundance

- Highly Abundant
- ⊗ Abundant
- Common
- √ Rare
- Blank Not Present

## Salinity Zone

- T - Tidal Fresh
- M - Mixing
- S - Seawater
- \* - Salinity zone not present.

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                              |   | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|------------------------------|---|--------------------------------|---|---|-------------------|---|---|-----------------------------------|---|---|--------------------|---|---|-----------------|---|---|-----------------|---|---|
|                              |   | St. Cathe./<br>Sapelo<br>Sound |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
| Species/Life Stage           |   | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
| Mussel                       | A |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                              | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| <i>Mytilis edulis</i>        | J |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                              | L |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                              | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| Bay scallop                  | A |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   | √ |                 |   | ○ |
|                              | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   | √ |                 |   | ○ |
| <i>Argopecten irradians</i>  | J |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   | √ |                 |   | ○ |
|                              | L |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   | √ |                 |   | ○ |
|                              | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   | √ |                 |   | ○ |
| American oyster              | A |                                | ● | ● |                   | ○ | ○ |                                   | ● | ● |                    | ● | ● |                 | ○ | ○ |                 | ○ | ○ |
|                              | S |                                | ● | ● |                   | ○ | ○ |                                   | ● | ● |                    | ● | ● |                 | ○ | ○ |                 | ○ | ○ |
| <i>Crassostrea virginica</i> | J |                                | ● | ● |                   | ○ | ○ |                                   | ● | ● |                    | ● | ● |                 | ○ | ○ |                 | ○ | ○ |
|                              | L |                                | ● | ● |                   | ○ | ○ |                                   | ● | ● |                    | ● | ● |                 | ○ | ○ |                 | ○ | ○ |
|                              | E |                                | ● | ● |                   | ○ | ○ |                                   | ● | ● |                    | ● | ● |                 | ○ | ○ |                 | ○ | ○ |
| Common rangia                | A | ○                              | ○ |   | ○                 | ○ |   | ○                                 | ○ |   | ○                  | ○ |   |                 | √ |   |                 |   |   |
|                              | S | ○                              | ○ |   | ○                 | ○ |   | ○                                 | ○ |   | ○                  | ○ |   |                 | √ |   |                 |   |   |
| <i>Rangia cuneata</i>        | J | ○                              | ○ |   | ○                 | ○ |   | ○                                 | ○ |   | ○                  | ○ |   |                 | √ |   |                 |   |   |
|                              | L | ○                              | ○ |   | ○                 | ○ |   | ○                                 | ○ |   | ○                  | ○ |   |                 | √ |   |                 |   |   |
|                              | E | ○                              | ○ |   | ○                 | ○ |   | ○                                 | ○ |   | ○                  | ○ |   |                 | √ |   |                 |   |   |
| Hard clam                    | A |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                              | S |                                | ● | ● |                   | ● | ● |                                   | ● | ● |                    | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
| <i>Mercenaria</i><br>species | J |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                              | L |                                | ● | ● |                   | ● | ● |                                   | ● | ● |                    | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                              | E |                                | ● | ● |                   | ● | ● |                                   | ● | ● |                    | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
| Brown shrimp                 | A |                                | ● | ● |                   | ○ | ○ |                                   | ● | ● |                    |   |   |                 | √ | √ |                 | √ | √ |
|                              | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| <i>Penaeus aztecus</i>       | J |                                | ● | ● |                   | ○ | ○ |                                   | ● | ● | √                  | ● | ● |                 | ○ | ○ |                 | √ | √ |
|                              | L |                                |   |   |                   |   |   |                                   |   |   |                    | ● | ● |                 | ○ | ○ |                 | √ | √ |
|                              | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 | ○ | ○ |                 |   |   |
|                              |   | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
|                              |   | St. Cath./<br>Sapelo<br>Sound  |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
|                              |   | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |

## Relative Abundance

- Highly Abundant
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- Common
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## Salinity Zone

- T - Tidal Fresh
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- \* - Salinity zone not present.

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                                                   |   | Southeast Estuaries |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|---------------------------------------------------|---|---------------------|---|---|---------------|---|---|----------------------|---|---|-------------|---|---|-------------|---|---|-----------|---|---|-----------------|---|---|
|                                                   |   | Albemarle Sound     |   |   | Pamlico Sound |   |   | Pamlico/Pungo Rivers |   |   | Neuse River |   |   | Bogue Sound |   |   | New River |   |   | Cape Fear River |   |   |
| Species/Life Stage                                |   | T                   | M | * | T             | M | S | T                    | M | * | T           | M | * | T           | M | S | T         | M | S | T               | M | S |
| Pink shrimp<br><i>Penaeus duorarum</i>            | A |                     | ○ |   |               | ● | ● |                      | ○ |   |             | ○ |   |             |   |   |           |   |   |                 |   |   |
|                                                   | S |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                                   | J |                     | ○ |   |               | ● | ● |                      | ○ |   |             | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                                                   | L |                     |   |   |               |   |   |                      |   |   |             |   |   |             | ● | ● |           | ● | ● |                 | ● | ● |
| White shrimp<br><i>Penaeus setiferus</i>          | A |                     | ○ |   |               | ○ | ○ |                      | ○ |   |             | ○ |   |             |   |   |           |   |   |                 |   |   |
|                                                   | S |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                                   | J | ○                   | ● |   | √             | ● | ○ |                      | ○ |   |             | ○ |   |             | ○ | ○ |           | ○ | ○ | √               | ○ | ● |
|                                                   | L | ○                   | ● |   |               | ● | ○ |                      |   |   |             | ○ |   |             | ○ | ○ |           | ○ | ○ |                 | ○ | ○ |
| Grass shrimp<br><i>Palaemonetes pugio</i>         | A | ○                   | ○ |   |               | ● | ● |                      | ● |   |             | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                                                   | S |                     | ○ |   |               | ● | ● |                      | ● |   |             | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                                                   | J |                     | ○ |   |               | ● | ● |                      | ● |   |             | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                                                   | L |                     | ○ |   |               | ● | ● |                      | ● |   |             | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
| Blue crab<br><i>Callinectes sapidus</i>           | A | ○                   | ○ |   | ○             | ● | ● |                      | ○ | ● |             | ○ | ● |             | ○ | ● | ●         | ○ | ● | ○               | ● | ● |
|                                                   | M | ○                   | ○ |   | ○             | ● |   |                      | ○ | ● |             | ○ | ● |             |   | ○ | ○         | ○ | ○ |                 | ○ | ● |
|                                                   | J | ○                   | ● |   |               | ● | ● |                      |   | ● |             |   | ● |             | ○ | ● | ○         | ○ | ○ |                 | ○ | ● |
|                                                   | L |                     | √ |   |               | √ | ● |                      | √ |   |             | √ |   |             | ○ | ● |           | ○ | ○ |                 | ● | ● |
| Atlantic sturgeon<br><i>Acipenser oxyrhynchus</i> | A | ○                   | ○ |   | ○             | ○ | ○ |                      | ○ | ○ |             | ○ | ○ |             |   |   |           |   |   | ○               | ○ | ○ |
|                                                   | S | ○                   |   |   | ○             | ○ |   |                      | ○ | ○ |             | ○ | ○ |             |   |   |           |   |   | ○               | ○ |   |
|                                                   | J | ○                   | ○ |   | ○             | ○ | ○ |                      | ○ | ○ |             | ○ | ○ |             |   |   | √         | √ |   | ○               | ○ | ○ |
|                                                   | L | ○                   |   |   | ○             | ○ |   |                      | ○ | ○ |             | ○ | ○ |             |   |   |           |   |   | ○               | ○ |   |
| Ladyfish<br><i>Elops saurus</i>                   | A |                     |   |   |               | ○ | ○ |                      |   |   |             |   |   |             |   |   |           |   |   | ○               | ○ | ○ |
|                                                   | S |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                                   | J | ○                   | ○ |   | ○             | ○ | ○ |                      | ○ |   | ○           | ○ |   |             | √ | √ |           | √ | √ | ○               | ○ | ○ |
|                                                   | L |                     |   |   |               | ○ | ○ |                      |   |   |             |   |   |             |   | √ |           | √ | √ | ○               | ○ | ○ |
|                                                   |   | T                   | M | * | T             | M | S | T                    | M | * | T           | M | * | T           | M | S | T         | M | S | T               | M | S |
|                                                   |   | Albemarle Sound     |   |   | Pamlico Sound |   |   | Pamlico/Pungo Rivers |   |   | Neuse River |   |   | Bogue Sound |   |   | New River |   |   | Cape Fear River |   |   |
|                                                   |   | Southeast Estuaries |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |

## Relative Abundance

- Highly Abundant
- Abundant
- Common
- √ Rare
- Blank Not Present

## Salinity Zone

- T - Tidal Fresh
- M - Mixing
- S - Seawater
- \* - Salinity zone not present.

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs
- M - Mating

Table 2, continued. Spatial distribution and relative abundance

|                              |   | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|------------------------------|---|---------------------|---|---|---------------------|---|---|-------------------|---|---|------------------|---|---|-------------|---|---|----------------|---|---|---------------|---|---|
|                              |   | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |
| Species/Life Stage           |   | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |
| Pink shrimp                  | A |                     | √ | ○ |                     | ○ |   |                   | √ | √ |                  | √ | √ |             | ○ | ○ |                | √ | √ |               | √ | √ |
| <i>Penaeus duorarum</i>      | S |                     |   |   |                     | ⊙ |   |                   | ○ | ○ |                  | √ | √ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                              | J |                     | ○ | ○ |                     | ○ |   |                   | ○ | ○ |                  | √ | √ |             | ○ | ○ |                |   | √ |               |   | √ |
|                              | L |                     | ○ | ○ |                     | ○ |   |                   | ○ | ○ |                  | √ | √ |             | ○ | ○ |                |   |   |               |   | √ |
|                              | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| White shrimp                 | A | √                   | ○ | ○ |                     | ⊙ |   |                   | ● | ● |                  | ⊙ | ⊙ |             | ○ | ○ |                | ● | ● |               | ● | ● |
| <i>Penaeus setiferus</i>     | S |                     |   |   |                     |   |   |                   | √ | √ |                  |   |   |             |   |   |                |   |   |               |   |   |
|                              | J | √                   | ⊙ | ⊙ |                     | ● |   |                   | ● | ● |                  | ● | ● |             | ● | ● |                | ● | ● |               | ● | ● |
|                              | L |                     | ⊙ | ⊙ |                     | ● |   |                   | ● | ● |                  | ● | ● |             | ⊙ | ⊙ |                | ○ | ○ |               | ○ | ○ |
|                              | E |                     |   |   |                     |   |   |                   | √ | √ |                  |   |   |             |   |   |                |   |   |               |   |   |
| Grass shrimp                 | A |                     | ● | ● |                     | ⊙ |   |                   | ● | ● |                  | ⊙ | ⊙ |             | ⊙ | ⊙ |                | ⊙ | ⊙ |               | ⊙ | ⊙ |
| <i>Palaemonetes pugio</i>    | S |                     | ● | ● |                     | ⊙ |   |                   | ● | ● |                  | ⊙ | ⊙ |             | ⊙ | ⊙ |                | ⊙ | ⊙ |               | ⊙ | ⊙ |
|                              | J |                     | ● | ● |                     | ⊙ |   |                   | ● | ● |                  | ⊙ | ⊙ |             | ⊙ | ⊙ |                | ⊙ | ⊙ |               | ⊙ | ⊙ |
|                              | L |                     | ● | ● |                     | ⊙ |   |                   | ● | ● |                  | ⊙ | ⊙ |             | ⊙ | ⊙ |                | ⊙ | ⊙ |               | ⊙ | ⊙ |
|                              | E |                     | ● | ● |                     | ⊙ |   |                   | ● | ● |                  | ⊙ | ⊙ |             | ⊙ | ⊙ |                | ⊙ | ⊙ |               | ⊙ | ⊙ |
| Blue crab                    | A | ○                   | ⊙ | ⊙ | ○                   | ⊙ |   | ⊙                 | ⊙ | ⊙ | ⊙                | ● | ● | ⊙           | ● | ● | ⊙              | ⊙ | ⊙ | ⊙             | ○ | ○ |
| <i>Callinectes sapidus</i>   | M |                     | ⊙ |   |                     | ⊙ |   |                   | ⊙ |   |                  | ⊙ | ○ |             | ⊙ | ○ | ○              | ○ |   |               | ○ |   |
|                              | J | ○                   | ● | ● | ○                   | ⊙ |   | ○                 | ⊙ | ○ | ○                | ● | ⊙ | ○           | ● | ⊙ | ⊙              | ⊙ | ⊙ | ⊙             | ⊙ | ⊙ |
|                              | L |                     | √ | ⊙ |                     | ⊙ |   |                   | ● | ● |                  | ⊙ | ⊙ |             |   | ⊙ |                | √ | ● |               | √ | ● |
|                              | E |                     |   | ⊙ |                     | ○ |   |                   |   | ⊙ |                  |   | ⊙ |             | ⊙ |   | √              | ● |   | √             | ● | ● |
| Atlantic sturgeon            | A | √                   | √ | √ | √                   | √ |   | √                 | √ | √ | ○                | ○ | ○ | ○           | ○ | ○ | ○              | ○ | ○ | ○             | ○ | ○ |
| <i>Acipenser oxyrhynchus</i> | S | ○                   | ○ |   | √                   | √ |   | √                 | √ |   | ○                | ○ |   | ○           | ○ |   | ○              | ○ |   | ○             | ○ |   |
|                              | J | ○                   | ○ | √ | √                   | √ |   | √                 | √ | √ | ○                | ○ | ○ | ○           | ○ | ○ | ○              | ○ | ○ | ○             | ○ | ○ |
|                              | L | ○                   | ○ |   | √                   | √ |   | √                 | √ |   | ○                | ○ |   | ○           | ○ |   | ○              | ○ |   | ○             | ○ |   |
|                              | E | ○                   | ○ |   | √                   | √ |   | √                 | √ |   | ○                | ○ |   | ○           | ○ |   | ○              | ○ |   | ○             | ○ |   |
| Ladyfish                     | A |                     | √ | √ |                     |   |   |                   | √ | √ |                  | ○ | ○ |             | ○ | ○ | √              | ○ | ○ | √             | ○ | ○ |
| <i>Elops saurus</i>          | S |                     |   |   |                     |   |   |                   |   |   |                  | ○ | ○ |             |   |   |                |   |   |               |   |   |
|                              | J | √                   | ○ | ○ | √                   | √ |   | √                 | ○ | ○ | ○                | ○ | ○ | ○           | ○ | ○ | ○              | ○ | ○ | ○             | ○ | ○ |
|                              | L |                     | √ | ○ |                     | √ |   |                   | √ | ○ |                  | ○ | ○ |             |   |   |                | ○ | ○ |               | ○ | ○ |
|                              | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                              |   | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |
|                              |   | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |
|                              |   | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |

## Relative Abundance

- Highly Abundant
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## Salinity Zone

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## Life Stage

- A - Adults
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- L - Larvae
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Table 2, continued. Spatial distribution and relative abundance

|                     |   | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|---------------------|---|--------------------------------|---|---|-------------------|---|---|-----------------------------------|---|---|--------------------|---|---|-----------------|---|---|-----------------|---|---|
|                     |   | St. Cathe./<br>Sapelo<br>Sound |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
| Species/Life Stage  |   | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
| Pink shrimp         | A |                                | √ | √ |                   |   |   |                                   | √ | √ |                    |   |   |                 | ○ | ○ |                 |   |   |
| <i>Penaeus</i>      | S |                                |   |   |                   |   |   |                                   | √ |   |                    |   |   |                 | ○ | ○ |                 |   |   |
| <i>duorarum</i>     | J | ○                              | ○ |   | √                 | √ |   | ○                                 | ○ |   | ○                  | ○ | ○ |                 | ● | ● |                 | ● | ● |
|                     | L |                                | √ |   |                   |   |   |                                   | √ |   |                    | ○ | ○ |                 | ● | ● |                 | ● | ● |
|                     | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| White shrimp        | A |                                | ● | ● |                   | ○ | ○ |                                   | ● | ● |                    |   |   |                 | √ | √ |                 | √ | √ |
| <i>Penaeus</i>      | S |                                |   |   |                   |   |   |                                   | ● | ● |                    |   |   |                 | ○ | ○ |                 | √ | √ |
| <i>setiferus</i>    | J | ●                              | ● |   | ○                 | ○ |   | ●                                 | ● | ○ | ●                  | ● | ○ |                 | ○ | ○ |                 | √ | √ |
|                     | L | ○                              | ○ |   | ○                 | ○ |   | ○                                 | ○ |   |                    | ● | ● |                 | ○ | ○ |                 | √ | √ |
|                     | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| Grass shrimp        | A |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ●                  | ● | ● |                 | ○ | ○ |                 | ○ | ○ |
| <i>Palaemonetes</i> | S |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ○                  | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
| <i>pugio</i>        | J | ○                              | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ○                  | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                     | L | ○                              | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ○                  | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                     | E | ○                              | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ○                  | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
| Blue crab           | A | ○                              | ○ | ○ | ○                 | ○ |   | ○                                 | ○ | ○ | ○                  | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
| <i>Callinectes</i>  | M | ○                              | ○ |   | ○                 | ○ |   | ○                                 | ○ |   | ○                  | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
| <i>sapidus</i>      | J | ○                              | ○ | ○ | ○                 | ○ |   | ○                                 | ○ | ○ | ○                  | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                     | L |                                | √ | ● |                   | √ | ● |                                   | √ | ● |                    | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                     | E |                                | √ | ● |                   | √ | ● |                                   | √ | ● |                    | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
| Atlantic sturgeon   | A | ○                              | ○ | ○ | ○                 | ○ |   | ○                                 | ○ | ○ | √                  | √ | √ |                 |   |   |                 |   |   |
| <i>Acipenser</i>    | S | ○                              | ○ |   | ○                 |   |   | ○                                 | ○ |   | √                  | √ | √ |                 |   |   |                 |   |   |
| <i>oxyrhynchus</i>  | J | ○                              | ○ | ○ | ○                 | ○ |   | ○                                 | ○ | ○ | √                  | √ | √ |                 |   |   |                 |   |   |
|                     | L | ○                              |   |   | ○                 |   |   | ○                                 |   |   | √                  | √ | √ |                 |   |   |                 |   |   |
|                     | E | ○                              |   |   | ○                 |   |   | ○                                 |   |   | √                  | √ |   |                 |   |   |                 |   |   |
| Ladyfish            | A | √                              | ○ | ○ | √                 | ○ | ○ | √                                 | ○ | ○ | ○                  | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
| <i>Elops</i>        | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| <i>saurus</i>       | J | ○                              | ○ | ○ | ○                 | ○ | ○ | ○                                 | ○ | ○ | ○                  | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                     | L |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                     | E |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                     |   | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
|                     |   | St. Cath./<br>Sapelo<br>Sound  |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
|                     |   | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |

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Table 2, continued. Spatial distribution and relative abundance

|                                                 |  | Southeast Estuaries   |                       |                       |               |                       |                       |                       |                       |   |                       |                       |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|-------------------------------------------------|--|-----------------------|-----------------------|-----------------------|---------------|-----------------------|-----------------------|-----------------------|-----------------------|---|-----------------------|-----------------------|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                                 |  | Albemarle Sound       |                       |                       | Pamlico Sound |                       |                       | Pamlico/Pungo Rivers  |                       |   | Neuse River           |                       |   | Bogue Sound           |                       |                       | New River             |                       |                       | Cape Fear River       |                       |                       |
| Species/Life Stage                              |  | T                     | M                     | *                     | T             | M                     | S                     | T                     | M                     | * | T                     | M                     | * | T                     | M                     | S                     | T                     | M                     | S                     | T                     | M                     | S                     |
| American eel**<br><i>Anguilla rostrata</i>      |  | A<br>S<br>J<br>L<br>E | ○<br>●<br>●<br>○<br>○ | ○<br>●<br>●<br>○<br>○ |               | ○<br>●<br>●<br>○<br>○ | ○<br>●<br>●<br>○<br>○ | ○<br>●<br>●<br>○<br>○ | ○<br>●<br>●<br>○<br>○ |   | ○<br>●<br>●<br>○<br>○ | ○<br>●<br>●<br>○<br>○ |   | ○<br>●<br>●<br>○<br>○ | ○<br>●<br>●<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |
| Blueback herring<br><i>Alosa aestivalis</i>     |  | A<br>S<br>J<br>L<br>E | ●<br>●<br>○<br>●<br>● | ○<br>○<br>○<br>○<br>○ |               | ●<br>●<br>○<br>●<br>● | ○<br>√<br>○<br>√<br>√ | ○<br>○<br>○<br>○<br>○ | ●<br>●<br>○<br>●<br>○ |   | ●<br>○<br>○<br>●<br>● | ○<br>○<br>○<br>√<br>○ |   | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>○<br>○ | √<br>√<br>√<br>○<br>○ | √<br>√<br>√<br>○<br>○ | √<br>√<br>○<br>○<br>○ | ●<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |
| Alewife<br><i>Alosa pseudoharengus</i>          |  | A<br>S<br>J<br>L<br>E | ●<br>○<br>○<br>●<br>● | ○<br>○<br>○<br>○<br>○ |               | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>√<br>○ |   | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>○<br>○ | √<br>√<br>√<br>○<br>○ | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>√<br>√ |
| American shad<br><i>Alosa sapidissima</i>       |  | A<br>S<br>J<br>L<br>E | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |               | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>○<br>○ | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>○<br>○ | √<br>√<br>√<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i> |  | A<br>S<br>J<br>L<br>E |                       |                       |               | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   |                       | ○<br>○<br>○<br>○<br>○ |   |                       | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |
| Bay anchovy<br><i>Anchoa mitchilli</i>          |  | A<br>S<br>J<br>L<br>E | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |               | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |
|                                                 |  | T                     | M                     | *                     | T             | M                     | S                     | T                     | M                     | * | T                     | M                     | * | T                     | M                     | S                     | T                     | M                     | S                     | T                     | M                     | S                     |
|                                                 |  | Albemarle Sound       |                       |                       | Pamlico Sound |                       |                       | Pamlico/Pungo Rivers  |                       |   | Neuse River           |                       |   | Bogue Sound           |                       |                       | New River             |                       |                       | Cape Fear River       |                       |                       |
|                                                 |  | Southeast Estuaries   |                       |                       |               |                       |                       |                       |                       |   |                       |                       |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |

## Relative Abundance

- Highly Abundant
- Abundant
- Common
- √ Rare
- Blank Not Present

## Salinity Zone

- T - Tidal Fresh
- M - Mixing
- S - Seawater
- \* - Salinity zone not present.

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Table 2, continued. Spatial distribution and relative abundance

| abundance                                       |  | Southeast Estuaries   |                       |                       |                       |                       |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |   |
|-------------------------------------------------|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|
|                                                 |  | Winyah Bay            |                       |                       | N & S Santee Rivers   |                       |   | Charleston Harbor     |                       |                       | St. Helena Sound      |                       |                       | Broad River           |                       |                       | Savannah River        |                       |                       | Ossabaw Sound         |                       |                       |   |
| Species/Life Stage                              |  | T                     | M                     | S                     | T                     | M                     | * | T                     | M                     | S                     | T                     | M                     | S                     | T                     | M                     | S                     | T                     | M                     | S                     | T                     | M                     | S                     |   |
| American eel**<br><i>Anguilla rostrata</i>      |  | A<br>S<br>J<br>L<br>E | ○<br>○<br>●<br>○<br>○ | ○<br>○<br>●<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>●<br>○<br>○ | ○<br>○<br>●<br>○<br>○ | ○<br>○<br>●<br>○<br>○ | ○<br>○<br>●<br>○<br>○ | ○<br>○<br>●<br>○<br>○ |   |
| Blueback herring<br><i>Alosa aestivalis</i>     |  | A<br>S<br>J<br>L<br>E | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | √<br>○<br>√<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>√<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   |
| Alewife<br><i>Alosa pseudoharengus</i>          |  | A<br>S<br>J<br>L<br>E | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>√<br>√ |                       |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |   |
| American shad<br><i>Alosa sapidissima</i>       |  | A<br>S<br>J<br>L<br>E | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | √<br>○<br>√<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>√<br>√ | √<br>√<br>√<br>√<br>√ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i> |  | A<br>S<br>J<br>L<br>E | √<br>○<br>○<br>√<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   |                       | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |                       | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |                       | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |                       | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ | ○<br>○<br>○<br>○<br>○ |   |
| Bay anchovy<br><i>Anchoa mitchilli</i>          |  | A<br>S<br>J<br>L<br>E |                       | ●<br>●<br>●<br>●<br>● | ●<br>●<br>●<br>●<br>● | ●<br>●<br>●<br>●<br>● |   | ○<br>○<br>○<br>○<br>○ | ●<br>●<br>●<br>●<br>● | ●<br>●<br>●<br>●<br>● |                       | ●<br>●<br>●<br>●<br>● | ●<br>●<br>●<br>●<br>● |                       | ●<br>●<br>●<br>●<br>● | ●<br>●<br>●<br>●<br>● |                       | ○<br>○<br>○<br>○<br>○ | ●<br>●<br>●<br>●<br>● | ●<br>●<br>●<br>●<br>● | ○<br>○<br>○<br>○<br>○ | ●<br>●<br>●<br>●<br>● |   |
|                                                 |  |                       | T                     | M                     | S                     | T                     | M | *                     | T                     | M                     | S                     | T                     | M                     | S                     | T                     | M                     | S                     | T                     | M                     | S                     | T                     | M                     | S |
|                                                 |  |                       | Winyah Bay            |                       |                       | N & S Santee Rivers   |   |                       | Charleston Harbor     |                       |                       | St. Helena Sound      |                       |                       | Broad River           |                       |                       | Savannah River        |                       |                       | Ossabaw Sound         |                       |   |
|                                                 |  |                       | Southeast Estuaries   |                       |                       |                       |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |   |

Relative Abundance

- Highly Abundant
- Abundant
- Common
- √ Rare
- Blank Not Present

Salinity

- Total Fresh
- M - Mixing
- S - Seawater
- \* - Salinity zone not present.

Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Table 2, continued. Spatial distribution and relative abundance

| abundance                                               |   | Southeast Estuaries           |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|---------------------------------------------------------|---|-------------------------------|---|---|-------------------|---|---|-----------------------------------|---|---|--------------------|---|---|-----------------|---|---|-----------------|---|---|
|                                                         |   | St. Cath./<br>Sapelo<br>Sound |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
| Species/Life Stage                                      |   | T                             | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
| American eel**<br><br><i>Anguilla<br/>rostrata</i>      | A | ○                             | ○ | ○ | ○                 | ○ | ○ | ○                                 | ○ | ○ | ○                  | ○ | ○ |                 | ○ | ○ |                 | ○ | ○ |
|                                                         | S |                               |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                         | J | ●                             | ● | ● | ●                 | ● | ● | ●                                 | ● | ● | ●                  | ● | ● |                 | ○ | ○ |                 | ○ | ○ |
|                                                         | L | ●                             | ● | ● | ●                 | ● | ● | ●                                 | ● | ● | ●                  | ● | ● |                 | ○ | ○ |                 | ○ | ○ |
|                                                         | E |                               |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| Blueback herring<br><br><i>Alosa<br/>aestivalis</i>     | A | ○                             | ○ | ○ | ○                 | ○ | ○ | ○                                 | ○ | ○ | ○                  | ○ | ○ |                 |   |   |                 |   |   |
|                                                         | S | ○                             | √ |   | ○                 | √ |   | ○                                 | √ |   | ○                  |   |   |                 |   |   |                 |   |   |
|                                                         | J | ○                             | ○ | ○ | ○                 | ○ | ○ | ○                                 | ○ | ○ | ○                  | ○ | ○ |                 |   |   |                 |   |   |
|                                                         | L | ○                             | √ |   | ○                 | √ |   | ○                                 | √ |   | ○                  |   |   |                 |   |   |                 |   |   |
|                                                         | E | ○                             | √ |   | ○                 | √ |   | ○                                 | √ |   | ○                  |   |   |                 |   |   |                 |   |   |
| Alewife<br><br><i>Alosa<br/>pseudoharengus</i>          | A |                               |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                         | S |                               |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                         | J |                               |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                         | L |                               |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                         | E |                               |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| American shad<br><br><i>Alosa<br/>sapidissima</i>       | A | √                             | √ | √ | ●                 | ● | ● | ○                                 | ○ | ○ | ○                  | ○ | ○ |                 |   |   |                 |   |   |
|                                                         | S | √                             |   |   | ○                 |   |   | ○                                 |   |   | ○                  |   |   |                 |   |   |                 |   |   |
|                                                         | J | √                             | √ | √ | ●                 | ● | ● | ○                                 | ○ | ○ | ○                  | ○ | ○ |                 |   |   |                 |   |   |
|                                                         | L | √                             |   |   | ○                 |   |   | ○                                 |   |   | ○                  |   |   |                 |   |   |                 |   |   |
|                                                         | E | √                             |   |   | ○                 |   |   | ○                                 |   |   | ○                  |   |   |                 |   |   |                 |   |   |
| Atlantic menhaden<br><br><i>Brevoortia<br/>tyrannus</i> | A |                               | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ● | ● |                 | ○ | ○ |                 |   |   |
|                                                         | S |                               |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                         | J | ○                             | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ○ | ○ |                 | ○ | ○ |                 |   |   |
|                                                         | L |                               | ● | ● |                   | ● | ● |                                   | ● | ● | ○                  | ○ | ○ |                 | ○ | ○ |                 |   |   |
|                                                         | E |                               |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| Bay anchovy<br><br><i>Anchoa<br/>mitchilli</i>          | A | ○                             | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ● | ● |                 | ● | ● |                 | ● | ● |
|                                                         | S |                               | ● | ● |                   | ● | ● |                                   | ● | ● |                    | ● | ● |                 | ● | ● |                 | ● | ● |
|                                                         | J | ○                             | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ● | ● |                 | ● | ● |                 | ● | ● |
|                                                         | L |                               | ● | ● |                   | ● | ● |                                   | ● | ● |                    | ● | ● |                 | ● | ● |                 | ● | ● |
|                                                         | E |                               | ● | ● |                   | ● | ● |                                   | ● | ● |                    | ● | ● |                 | ● | ● |                 | ● | ● |
|                                                         |   | T                             | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
|                                                         |   | St. Cath./<br>Sapelo<br>Sound |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
|                                                         |   | Southeast Estuaries           |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |

Relative Abundance

- Highly Abundant
- Abundant
- Common
- √ Rare
- Blank Not Present

Salinity

- Zone: T - Total Fresh
- M - Mixing
- S - Seawater
- \* - Salinity zone not present.

Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                                                   |   | Southeast Estuaries |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|---------------------------------------------------|---|---------------------|---|---|---------------|---|---|----------------------|---|---|-------------|---|---|-------------|---|---|-----------|---|---|-----------------|---|---|
|                                                   |   | Albemarle Sound     |   |   | Pamlico Sound |   |   | Pamlico/Pungo Rivers |   |   | Neuse River |   |   | Bogue Sound |   |   | New River |   |   | Cape Fear River |   |   |
| Species/Life Stage                                |   | T                   | M | * | T             | M | S | T                    | M | * | T           | M | * | T           | M | S | T         | M | S | T               | M | S |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A |                     | √ |   | ○             | ● | ● | ○                    | ○ |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● | √               | ● | ● |
|                                                   | S |                     | √ |   | ○             | ● | ● |                      | ○ |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● |                 | ● | ● |
|                                                   | J |                     | √ |   | ○             | ● | ● | ○                    | ○ |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● | √               | ● | ● |
|                                                   | L |                     | √ |   | ○             | ● | ● |                      | ○ |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● |                 | ● | ● |
|                                                   | E |                     | √ |   | ○             | ● | ● |                      | ○ |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● |                 | ● | ● |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A | √                   | ○ |   | ○             | ● | ● | ○                    | ● |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● |                 | ● | ● |
|                                                   | S | √                   | ○ |   | ○             | ● | ● | ○                    | ● |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● |                 | ● | ● |
|                                                   | J | √                   | ○ |   | ○             | ● | ● | ○                    | ● |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● |                 | ● | ● |
|                                                   | L | √                   | ○ |   | ○             | ● | ● | ○                    | ● |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● |                 | ● | ● |
|                                                   | E | √                   | ○ |   | ○             | ● | ● | ○                    | ● |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● |                 | ● | ● |
| Atlantic silversides<br><i>Menidia</i> species    | A | ○                   | ● |   | ○             | ● | ● | ○                    | ○ |   | ○           | ● |   | ○           | ● | ● | √         | ● | ● | √               | ● | ● |
|                                                   | S |                     | ● |   |               | ● | ● |                      | ○ |   |             | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                                                   | J | ○                   | ● |   | ○             | ● | ● | ○                    | ○ |   | ○           | ● |   | ○           | ● | ● | √         | ● | ● | √               | ● | ● |
|                                                   | L |                     | ● |   |               | ● | ● |                      | ○ |   |             | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                                                   | E |                     | ● |   |               | ● | ● |                      | ○ |   |             | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
| White perch<br><i>Morone americana</i>            | A | ●                   | ● |   | ○             | ○ | ○ | ○                    | ○ |   | ○           | ○ |   |             | ○ |   | √         | √ |   |                 |   |   |
|                                                   | S | ●                   | ● |   | ○             | ○ |   | ○                    | ○ |   | ○           | ○ |   |             | ○ |   | √         | √ |   |                 |   |   |
|                                                   | J | ●                   | ● |   | ○             | ○ |   | ○                    | ○ |   | ○           | ○ |   |             | ○ |   | √         | √ |   |                 |   |   |
|                                                   | L | ●                   | ● |   | ○             | ○ |   | ○                    | ○ |   | ●           | ○ |   |             | ○ |   | √         | √ |   |                 |   |   |
|                                                   | E | ●                   | ● |   | ○             | ○ |   | ○                    | ○ |   | ●           | ○ |   |             | ○ |   | √         | √ |   |                 |   |   |
| Striped bass<br><i>Morone saxatilis</i>           | A | ○                   | ○ |   | ○             | ○ | √ | ○                    | ○ |   | ○           | ○ |   | √           | √ |   | √         | √ |   | √               | √ | √ |
|                                                   | S | ○                   |   |   | ○             |   |   | ○                    |   |   | ○           |   |   | √           |   |   | √         |   |   | √               | √ |   |
|                                                   | J | ○                   | ○ |   | ○             | ○ |   | ○                    | ○ |   | ○           | ○ |   | √           | √ |   | √         | √ |   | √               | √ | √ |
|                                                   | L | ○                   | ○ |   | ○             |   |   | ○                    | ○ |   | ○           | ○ |   | √           | √ |   | √         |   |   | √               | √ |   |
|                                                   | E | ●                   |   |   | ○             |   |   | ○                    |   |   | ○           |   |   | √           |   |   | √         |   |   | √               | √ |   |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A |                     | ○ |   |               | ● | ● |                      | ○ |   |             | √ |   |             |   | ○ |           | √ | √ |                 |   | ○ |
|                                                   | S |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   | ○ |           |   |   |                 |   |   |
|                                                   | J | ○                   | ○ |   | √             | ● | ● | √                    | ○ |   |             | ○ |   |             | ○ | ○ | √         | ○ | ○ | √               | ● | ○ |
|                                                   | L |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                                   | E |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                                   |   | T                   | M | * | T             | M | S | T                    | M | * | T           | M | * | T           | M | S | T         | M | S | T               | M | S |
|                                                   |   | Albemarle Sound     |   |   | Pamlico Sound |   |   | Pamlico/Pungo Rivers |   |   | Neuse River |   |   | Bogue Sound |   |   | New River |   |   | Cape Fear River |   |   |
|                                                   |   | Southeast Estuaries |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |

## Relative Abundance

- Highly Abundant  
 ● Abundant  
 ○ Common  
 √ Rare  
 Blank Not Present

## Salinity Zone

- T - Tidal Fresh  
 M - Mixing  
 S - Seawater  
 \* - Salinity zone not present.

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs  
 M - Mating

Table 2, continued. Spatial distribution and relative abundance

|                                                   |   | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|---------------------------------------------------|---|---------------------|---|---|---------------------|---|---|-------------------|---|---|------------------|---|---|-------------|---|---|----------------|---|---|---------------|---|---|
|                                                   |   | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |
| Species/Life Stage                                |   | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A | ○                   | ○ | √ | ○                   | ○ |   | ○                 | ○ | ○ | ○                | ● | ● | ○           | ○ | ○ | ○              | ● | ● | ○             | ● | ● |
|                                                   | S | ○                   | ○ | √ | ○                   | ○ |   | ○                 | ○ | ○ | ○                | ○ | ○ | ○           | ○ | ○ | ○              | ● | ● | ○             | ● | ● |
|                                                   | J | ○                   | ○ | √ | ○                   | ○ |   | ○                 | ○ | ○ | ○                | ● | ● | ○           | ○ | ○ | ○              | ● | ● | ○             | ● | ● |
|                                                   | L | ○                   | ○ | √ | ○                   | ○ |   | ○                 | ○ | ○ | ○                | ○ | ○ | ○           | ○ | ○ | ○              | ● | ● | ○             | ● | ● |
|                                                   | E | ○                   | ○ | √ | ○                   | ○ |   | ○                 | ○ | ○ | ○                | ○ | ○ | ○           | ○ | ○ | ○              | ○ | ● | ●             | ○ | ● |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A | ●                   | ● | ● | ●                   | ● |   | ●                 | ● | ● | ●                | ● | ● | ●           | ● | ● | ○              | ● | ● | ○             | ● | ● |
|                                                   | S | ●                   | ● | ● | ●                   | ● |   | ●                 | ● | ● | ●                | ● | ● | ●           | ● | ● | ○              | ● | ● | ○             | ● | ● |
|                                                   | J | ●                   | ● | ● | ●                   | ● |   | ●                 | ● | ● | ●                | ● | ● | ●           | ● | ● | ○              | ● | ● | ○             | ● | ● |
|                                                   | L | ●                   | ● | ● | ●                   | ● |   | ●                 | ● | ● | ●                | ● | ● | ●           | ● | ● | ○              | ● | ● | ○             | ● | ● |
|                                                   | E | ●                   | ● | ● | ●                   | ● |   | ●                 | ● | ● | ●                | ● | ● | ●           | ● | ● | ○              | ● | ● | ○             | ● | ● |
| Atlantic silversides<br><i>Menidia</i> species    | A | √                   | ○ | ● |                     | ● |   | √                 | ○ | ○ |                  | ● | ● |             | ● | ● | ○              | ● | ● | ○             | ● | ● |
|                                                   | S |                     |   | ● |                     | ● |   |                   |   | ○ |                  | ● | ● |             | ● | ● | ○              | ○ | ● |               | ○ | ● |
|                                                   | J | √                   | ○ | ● |                     | ● |   | √                 | ○ | ○ |                  | ● | ● |             | ● | ● | ○              | ● | ● | ○             | ● | ● |
|                                                   | L |                     |   | ● |                     | ● |   |                   |   | ○ |                  | ● | ● |             | ● | ● |                | ○ | ● |               | ○ | ● |
|                                                   | E |                     |   | ● |                     | ● |   |                   |   | ○ |                  | ● | ● |             | ● | ● |                | ○ | ● |               | ○ | ● |
| White perch<br><i>Morone americana</i>            | A | ●                   | ● |   | ○                   | ○ |   | ○                 | ○ |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                                   | S | ●                   | ● |   | ○                   | ○ |   | ○                 | ○ |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                                   | J | ●                   | ● | √ | ○                   | ○ |   | ○                 | ○ |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                                   | L | ●                   | ● |   | ○                   | ○ |   | ○                 | ○ |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                                   | E | ●                   | ● |   | ○                   | ○ |   | ○                 | ○ |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| Striped bass<br><i>Morone saxatilis</i>           | A | ○                   | ○ |   | ○                   | ○ |   | ○                 | ○ |   | ○                | ○ | ○ | ○           | ● | ○ | ○              | ○ | ○ | ○             | ● | ○ |
|                                                   | S | ○                   |   |   | ○                   |   |   | ○                 |   |   | ○                |   |   | ○           |   | ○ | ○              | ○ | √ | ○             | ○ |   |
|                                                   | J | ○                   | ○ |   | ○                   | ○ |   | ○                 | ○ |   | ○                | ○ | ○ | ○           | ○ | ○ | ○              | ○ | ○ | ○             | ○ | ○ |
|                                                   | L | ○                   |   |   | ○                   |   |   | ○                 |   |   | ○                |   |   | ○           |   |   | ○              | √ |   | ○             | √ |   |
|                                                   | E | ○                   |   |   | ○                   |   |   | ○                 |   |   | ○                |   |   | ○           |   |   | ○              | √ |   | ○             | √ |   |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A |                     |   | √ |                     | √ |   |                   |   |   |                  |   | ○ |             |   | ○ |                |   |   |               |   |   |
|                                                   | S |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                                   | J |                     | ○ | ● |                     | ○ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                                   | L |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                                   | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                                   |   | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |
|                                                   |   | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |
|                                                   |   | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |

## Relative Abundance

- Highly Abundant  
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## Salinity Zone

- T - Tidal Fresh  
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## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                                                       |   | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|-------------------------------------------------------|---|--------------------------------|---|---|-------------------|---|---|-----------------------------------|---|---|--------------------|---|---|-----------------|---|---|-----------------|---|---|
|                                                       |   | St. Cathe./<br>Sapelo<br>Sound |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
| Species/Life Stage                                    |   | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
| Sheepshead minnow<br><br><i>Cyprinodon variegatus</i> | A | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                                       | S | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                                       | J | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                                       | L | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                                       | E | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
| Mummichog<br><br><i>Fundulus heteroclitus</i>         | A | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ● | ● |                 | √ | √ |                 |   |   |
|                                                       | S | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ● | ● |                 | √ | √ |                 |   |   |
|                                                       | J | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ● | ● |                 | √ | √ |                 |   |   |
|                                                       | L | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ● | ● |                 | √ | √ |                 |   |   |
|                                                       | E | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ● | ● |                 | √ | √ |                 |   |   |
| Atlantic silversides<br><br><i>Menidia</i><br>species | A | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ● | ● |                 | ● | ● |                 | ● | ● |
|                                                       | S |                                | ○ | ● |                   | ○ | ● |                                   | ○ | ● | ○                  | ● | ● |                 | ● | ● |                 | ● | ● |
|                                                       | J | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ○                  | ● | ● |                 | ● | ● |                 | ● | ● |
|                                                       | L |                                | ○ | ● |                   | ○ | ● |                                   | ○ | ● | ○                  | ● | ● |                 | ● | ● |                 | ● | ● |
|                                                       | E |                                | ○ | ● |                   | ○ | ● |                                   | ○ | ● | ○                  | ● | ● |                 | ● | ● |                 | ● | ● |
| White perch<br><br><i>Morone americana</i>            | A |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                       | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                       | J |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                       | L |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                       | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| Striped bass<br><br><i>Morone saxatilis</i>           | A | √                              | √ | √ | ○                 | ○ | ○ | √                                 | √ | √ | ○                  |   |   |                 |   |   |                 |   |   |
|                                                       | S | √                              | √ |   | ○                 | √ |   | √                                 | √ |   | ○                  |   |   |                 |   |   |                 |   |   |
|                                                       | J | √                              | √ | √ | ○                 | ○ | ○ | √                                 | √ | √ | ○                  |   |   |                 |   |   |                 |   |   |
|                                                       | L | √                              | √ |   | ○                 | √ |   | √                                 | √ |   | ○                  |   |   |                 |   |   |                 |   |   |
|                                                       | E | √                              | √ |   | ○                 | √ |   | √                                 | √ |   | ○                  |   |   |                 |   |   |                 |   |   |
| Bluefish<br><br><i>Pomatomus saltatrix</i>            | A |                                |   |   |                   |   |   |                                   |   |   |                    |   | ○ |                 | ● | ● |                 |   |   |
|                                                       | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                       | J |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 | √ | √ |                 | √ | √ |
|                                                       | L |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                       | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                       |   | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
|                                                       |   | St. Cath./<br>Sapelo<br>Sound  |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
|                                                       |   | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |

## Relative Abundance

- Highly Abundant  
 ● Abundant  
 ○ Common  
 √ Rare  
 Blank Not Present

## Salinity Zone

- T - Tidal Fresh  
 M - Mixing  
 S - Seawater  
 \* - Salinity zone not present.

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                                    |   | Southeast Estuaries |    |   |               |    |    |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|------------------------------------|---|---------------------|----|---|---------------|----|----|----------------------|---|---|-------------|---|---|-------------|---|---|-----------|---|---|-----------------|---|---|
|                                    |   | Albemarle Sound     |    |   | Pamlico Sound |    |    | Pamlico/Pungo Rivers |   |   | Neuse River |   |   | Bogue Sound |   |   | New River |   |   | Cape Fear River |   |   |
| Species/Life Stage                 |   | T                   | M  | * | T             | M  | S  | T                    | M | * | T           | M | * | T           | M | S | T         | M | S | T               | M | S |
| Cobia                              | A |                     |    |   |               | ○  | ○  |                      |   |   |             |   |   |             | ○ | ○ |           | ○ | ○ |                 | √ | ○ |
| <i>Rachycentron canadum</i>        | S |                     |    |   |               |    | na |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                    | J |                     |    |   |               | ○  | ○  |                      |   |   |             |   |   |             | ○ | ○ |           | ○ | ○ |                 | ○ | ○ |
|                                    | L |                     |    |   |               | na | na |                      |   |   |             |   |   |             |   | ○ |           |   | ○ |                 |   |   |
|                                    | E |                     |    |   |               | na | na |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
| Gray snapper                       | A |                     |    |   |               |    |    |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
| <i>Lutjanus griseus</i>            | S |                     |    |   |               |    |    |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                    | J |                     | √  |   |               | ○  | ○  |                      | √ |   |             | √ |   |             | √ | √ |           | √ | √ |                 | √ | √ |
|                                    | L |                     |    |   |               |    |    |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                    | E |                     |    |   |               |    |    |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
| Sheepshead                         | A |                     | √  |   |               | ○  | ○  |                      | √ |   |             | √ |   |             | ● | ● |           | ● | ● |                 | ○ | ● |
| <i>Archosargus probatocephalus</i> | S |                     |    |   |               |    |    |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                    | J |                     | √  |   |               | ○  | ●  |                      | √ |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ○ | ● |
|                                    | L |                     |    |   |               |    | ○  |                      |   |   |             |   |   |             | ○ | ● |           |   | ● |                 |   | ○ |
|                                    | E |                     |    |   |               |    |    |                      |   |   |             |   |   |             |   | ● |           |   | ● |                 |   |   |
| Pinfish                            | A |                     | ○  |   |               | ●  | ●  |                      | ● |   |             | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
| <i>Lagodon rhomboides</i>          | S |                     |    |   |               |    |    |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                    | J | √                   | ○  |   |               | ○  | ●  | ●                    | ○ | ● |             | ○ | ● |             | ● | ● |           | ● | ● | ○               | ● | ● |
|                                    | L |                     |    |   |               | ●  | ●  |                      | ○ |   |             |   | ● |             | ● | ● |           | ● | ● |                 | √ | ○ |
|                                    | E |                     |    |   |               |    |    |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
| Spotted seatrout                   | A |                     | ○  |   |               | ●  | ●  |                      | ○ |   |             | ○ |   |             | ○ | ● |           | ● | ● | √               | ○ | ○ |
| <i>Cynoscion nebulosus</i>         | S |                     |    |   |               | ○  | ○  |                      |   |   |             |   |   |             |   | √ |           | √ | √ |                 |   | ● |
|                                    | J | ○                   | ●  |   |               | ○  | ●  | ●                    | √ | ○ |             | √ | ○ |             | ○ | ○ | ○         | ○ | ○ | √               | ○ | ● |
|                                    | L |                     |    |   |               | ●  | ●  |                      |   |   |             |   |   |             |   | √ |           | √ | √ |                 | √ | ● |
|                                    | E |                     |    |   |               | ●  | ●  |                      |   |   |             |   |   |             |   | √ |           | √ | √ |                 |   | ● |
| Weakfish                           | A |                     | ○  |   |               | ●  | ●  |                      | ○ |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ○ | ● |
| <i>Cynoscion regalis</i>           | S |                     |    |   |               | ●  | ●  |                      | ○ |   |             | ○ |   |             |   | ○ |           |   | √ |                 |   | ● |
|                                    | J | √                   | ○  |   | √             | ●  | ●  | √                    | ● |   |             | ○ |   | ○           | ● | ● | √         | ● | ● |                 | ● | ● |
|                                    | L |                     | na |   |               | ●  | ●  |                      | ○ |   |             | ○ |   |             | √ | ○ |           | √ |   |                 | ○ | ● |
|                                    | E |                     | na |   |               | ●  | ●  |                      | ○ |   |             | ○ |   |             |   | ○ |           | √ |   |                 |   | ● |
|                                    |   | T                   | M  | * | T             | M  | S  | T                    | M | * | T           | M | * | T           | M | S | T         | M | S | T               | M | S |
|                                    |   | Albemarle Sound     |    |   | Pamlico Sound |    |    | Pamlico/Pungo Rivers |   |   | Neuse River |   |   | Bogue Sound |   |   | New River |   |   | Cape Fear River |   |   |
|                                    |   | Southeast Estuaries |    |   |               |    |    |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |

## Relative Abundance

- Highly Abundant
- Abundant
- Common
- √ Rare
- Blank Not Present
- na No data available

## Salinity Zone

- T - Tidal Fresh
- M - Mixing
- S - Seawater
- \* - Salinity zone not present.

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs
- M - Mating

Table 2, continued. Spatial distribution and relative abundance

|                                    |   | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|------------------------------------|---|---------------------|---|---|---------------------|---|---|-------------------|---|---|------------------|---|---|-------------|---|---|----------------|---|---|---------------|---|---|
|                                    |   | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |
| Species/Life Stage                 |   | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |
| Cobia                              | A |                     | √ | √ |                     | ○ |   |                   | ○ | ○ |                  | ○ | ○ |             | ● | ● |                | √ | √ |               | √ | √ |
| <i>Rachycentron canadum</i>        | S |                     |   |   |                     |   |   |                   | ○ | ○ |                  | ○ | ○ |             | ● | ● |                | ○ | ○ |               | ○ | ○ |
|                                    | J |                     | √ | √ |                     | ○ |   |                   | ○ | ○ |                  | ○ | ○ |             |   |   |                | ○ | ○ |               | ○ | ○ |
|                                    | L |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                    | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| Gray snapper                       | A |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| <i>Lutjanus griseus</i>            | S |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                    | J |                     | √ | √ |                     | ○ |   | ○                 | ○ | ○ | √                | √ | √ | √           | √ | √ | √              | √ | √ | √             | √ | √ |
|                                    | L |                     |   | √ |                     | √ |   |                   |   | ○ |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                    | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| Sheepshead                         | A |                     | ○ | ○ |                     | ○ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
| <i>Archosargus probatocephalus</i> | S |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                    | J |                     | ○ | ○ |                     | ○ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    | L |                     | √ | √ |                     | ○ |   |                   | ○ | ○ |                  |   | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| Pinfish                            | A |                     | ● | ● |                     | ○ |   |                   | ○ | ○ |                  | ● | ● |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
| <i>Lagodon rhomboides</i>          | S | √                   | ● | ● |                     | ○ |   | √                 | ○ | ○ |                  | ● | ● |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    | J |                     | ● | ● |                     | ○ |   |                   | ○ | ○ |                  | ● | ● |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    | L |                     | ● | ● |                     | ○ |   |                   | ○ | ○ |                  | ○ | ● |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| Spotted seatrout                   | A | √                   | ○ | ○ | √                   | ○ |   | √                 | ○ | ○ |                  | ● | ● |             | ● | ● |                | ● | ● |               | ● | ● |
| <i>Cynoscion nebulosus</i>         | S |                     |   | ○ |                     |   |   |                   |   | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    | J | √                   | ○ | ○ | √                   | ○ |   | √                 | ○ | ○ |                  | ○ | ○ |             | ○ | ○ | √              | ○ | ○ | ○             | ○ | ○ |
|                                    | L |                     | ○ | ○ |                     | √ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    | E |                     |   | ○ |                     |   |   |                   |   | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
| Weakfish                           | A |                     | ○ | ○ |                     | ● |   |                   | ● | ● |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
| <i>Cynoscion regalis</i>           | S |                     |   |   |                     | ○ |   |                   | ○ | ○ |                  |   | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    | J |                     | ○ | ○ |                     | ● |   | √                 | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    | L |                     | ○ | ○ |                     | ○ |   |                   | ○ | ○ |                  |   | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    | E |                     | ○ | ○ |                     | ○ |   |                   | ○ | ○ |                  |   | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                    |   | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |
|                                    |   | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |
|                                    |   | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |

## Relative Abundance

- Highly Abundant
- Abundant
- Common
- √ Rare
- Blank Not Present

## Salinity Zone

- T - Tidal Fresh
- M - Mixing
- S - Seawater
- \* - Salinity zone not present.

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                                        |   | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|----------------------------------------|---|--------------------------------|---|---|-------------------|---|---|-----------------------------------|---|---|--------------------|---|---|-----------------|---|---|-----------------|---|---|
|                                        |   | St. Cathe./<br>Sapelo<br>Sound |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
| Species/Life Stage                     |   | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
| Cobia                                  | A |                                | √ | √ |                   | √ | √ |                                   | √ | √ |                    | ○ | ○ |                 |   |   |                 |   |   |
|                                        | S |                                |   |   |                   |   |   |                                   |   |   |                    | ○ | ○ |                 |   |   |                 |   |   |
| <i>Rachycentron<br/>canadum</i>        | J |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 |   |   |                 |   |   |
|                                        | L |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                        | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| Gray snapper                           | A |                                |   |   |                   |   |   |                                   |   |   | ○                  | ○ | ○ |                 | ● | ● |                 | ● | ● |
|                                        | S |                                |   |   |                   |   |   |                                   |   |   |                    | ○ | ○ | ○               |   | ● | ●               |   | ● |
| <i>Lutjanus<br/>griseus</i>            | J | √                              | √ | √ | √                 | √ | √ | √                                 | √ | √ | ○                  | ○ | ○ |                 | ● | ● |                 | ● | ● |
|                                        | L |                                |   |   |                   |   |   |                                   |   |   |                    | ○ | ○ |                 |   |   |                 | ○ | ○ |
|                                        | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| Sheepshead                             | A |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ○                  | ○ | ○ |                 | ● | ● |                 | √ | √ |
|                                        | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 | ● | ● |                 | √ | √ |
| <i>Archosargus<br/>probatocephalus</i> | J |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ○                  | ○ | ○ |                 | ● | ● |                 | √ | √ |
|                                        | L |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 |   |   |                 | √ | √ |
|                                        | E |                                |   |   |                   |   |   |                                   |   |   |                    |   | ○ |                 |   |   |                 | √ | √ |
| Pinfish                                | A |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ○                  | ○ | ○ |                 | ● | ● |                 | ● | ● |
|                                        | S |                                |   |   |                   |   |   |                                   |   |   |                    | ○ | ○ |                 | ○ | ○ |                 |   |   |
| <i>Lagodon<br/>rhomboides</i>          | J |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ○                  | ○ | ○ |                 | ● | ● |                 | ● | ● |
|                                        | L |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 | ● | ● |                 | ● | ● |
|                                        | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 | ○ | ○ |                 |   |   |
| Spotted seatrout                       | A |                                | ● | ● |                   | ● | ● |                                   | ● | ● | ○                  | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                        | S |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    |   |   |                 | ● | ● |                 | ○ | ○ |
| <i>Cynoscion<br/>nebulosus</i>         | J | ○                              | ○ | ○ | ○                 | ○ | ○ | ○                                 | ○ | ○ | ○                  | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                        | L |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                        | E |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    |   | ○ |                 | ● | ● |                 | ○ | ○ |
| Weakfish                               | A |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 | ○ | ○ |                 | √ | √ |
|                                        | S |                                | √ | √ |                   | √ | √ |                                   | √ | ○ |                    |   |   |                 |   |   |                 | √ | √ |
| <i>Cynoscion<br/>regalis</i>           | J |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ○                  | ○ | ○ |                 |   |   |                 | √ | √ |
|                                        | L |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 |   |   |                 | √ | √ |
|                                        | E |                                | √ | √ |                   | √ | √ |                                   | √ | ○ |                    |   | ○ |                 |   |   |                 | √ | √ |
|                                        |   | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
|                                        |   | St. Cath./<br>Sapelo<br>Sound  |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
|                                        |   | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |

## Relative Abundance

- Highly Abundant
- Abundant
- Common
- √ Rare
- Blank Not Present

## Salinity Zone

- T - Tidal Fresh
- M - Mixing
- S - Seawater
- \* - Salinity zone not present.

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                                |   | Southeast Estuaries |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|--------------------------------|---|---------------------|---|---|---------------|---|---|----------------------|---|---|-------------|---|---|-------------|---|---|-----------|---|---|-----------------|---|---|
|                                |   | Albemarle Sound     |   |   | Pamlico Sound |   |   | Pamlico/Pungo Rivers |   |   | Neuse River |   |   | Bogue Sound |   |   | New River |   |   | Cape Fear River |   |   |
| Species/Life Stage             |   | T                   | M | * | T             | M | S | T                    | M | * | T           | M | * | T           | M | S | T         | M | S | T               | M | S |
| Spot                           | A |                     | ● |   |               | ● | ● |                      | ○ |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ● | ● |
| <i>Leiostomus xanthurus</i>    | S |                     | ● |   |               | ● | ● |                      |   |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                                | J | ○                   | ● |   | ●             | ● | ● | ●                    | ● |   | ●           | ● |   | ●           | ● |   | ○         | ● | ● | ●               | ● | ● |
|                                | L |                     | √ |   |               | ● | ● |                      | √ |   |             | √ |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                                | E |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
| Southern kingfish              | A |                     | ○ |   |               | ○ | ○ |                      | ○ |   |             | ○ |   |             | ○ | ● |           | ○ | ● |                 | ○ | ○ |
| <i>Menticirrhus americanus</i> | S |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                | J |                     | ○ |   |               | ○ | ○ |                      | ○ |   |             | ○ |   |             | ○ | ○ |           | ○ | ○ |                 | ○ | ○ |
|                                | L |                     |   |   |               | ○ | ○ |                      |   |   |             | ○ |   |             |   | ○ |           |   |   |                 | ○ | ○ |
|                                | E |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
| Atlantic croaker               | A |                     | ○ |   |               | ○ | ● |                      | ○ |   |             | ○ |   |             | ● | ● |           | ● | ● | √               | ● | ● |
| <i>Micropogonias undulatus</i> | S |                     |   |   |               |   |   |                      |   |   |             |   |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                                | J | ○                   | ● |   | ●             | ● | ● | ●                    | ● |   | ●           | ● |   | ○           | ● | ● | ○         | ● | ● | ●               | ● | ● |
|                                | L |                     |   |   |               | ○ | ● |                      | ○ |   |             | ○ |   |             | ● | ● |           | ● | ● |                 | ○ | ● |
|                                | E |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
| Black drum                     | A |                     | √ |   |               | ○ | ○ |                      | ○ |   |             | ○ |   |             | √ | √ |           | √ | √ |                 | √ | √ |
| <i>Pogonias cromis</i>         | S |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                | J |                     | √ |   |               | ○ | ○ |                      | ○ |   |             | ○ |   |             | √ | √ |           | √ | √ |                 | √ | √ |
|                                | L |                     |   |   |               |   |   |                      |   |   |             |   |   |             | √ | √ |           | √ | √ |                 |   | √ |
|                                | E |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
| Red drum                       | A |                     |   |   |               | ○ | ○ |                      |   |   |             | √ |   |             | ○ | ○ |           | √ | √ |                 | √ | ○ |
| <i>Sciaenops ocellatus</i>     | S |                     |   |   |               |   | √ |                      |   |   |             |   |   |             | ○ | ○ |           | √ | √ |                 | √ | ○ |
|                                | J | √                   | √ |   |               | ○ | ○ |                      | ○ |   |             | ○ |   | √           | ○ | ● | √         | √ | √ |                 | ○ | ○ |
|                                | L |                     |   |   |               | ○ | ○ |                      | ○ |   |             | ○ |   |             | ○ | ○ |           | √ | √ |                 | ○ | ○ |
|                                | E |                     |   |   |               |   | √ |                      |   |   |             |   |   |             | ○ | ○ |           | √ | √ |                 | ○ | ○ |
| Striped mullet                 | A | ○                   | ● |   | ○             | ● | ● | ○                    | ● |   | ○           | ● |   | ○           | ○ | ● | ○         | ○ | ○ |                 | ● | ● |
| <i>Mugil cephalus</i>          | S |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                | J | ○                   | ● |   | ○             | ● | ● | ○                    | ● |   | ○           | ● |   | ○           | ● | ● | ○         | ● | ● | ○               | ● | ● |
|                                | L |                     |   |   | ○             | ● | ● |                      |   |   | √           | ● |   |             | ● | ● |           | ● | ● |                 | ● | ● |
|                                | E |                     |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |
|                                |   | T                   | M | * | T             | M | S | T                    | M | * | T           | M | * | T           | M | S | T         | M | S | T               | M | S |
|                                |   | Albemarle Sound     |   |   | Pamlico Sound |   |   | Pamlico/Pungo Rivers |   |   | Neuse River |   |   | Bogue Sound |   |   | New River |   |   | Cape Fear River |   |   |
|                                |   | Southeast Estuaries |   |   |               |   |   |                      |   |   |             |   |   |             |   |   |           |   |   |                 |   |   |

## Relative Abundance

- Highly Abundant
- Abundant
- Common
- √ Rare
- Blank Not Present

## Salinity Zone

- T - Tidal Fresh
- M - Mixing
- S - Seawater
- \* - Salinity zone not present.

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs
- M - Mating

Table 2, continued. Spatial distribution and relative abundance

|                                |   | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|--------------------------------|---|---------------------|---|---|---------------------|---|---|-------------------|---|---|------------------|---|---|-------------|---|---|----------------|---|---|---------------|---|---|
|                                |   | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |
| Species/Life Stage             |   | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |
| Spot                           | A |                     | ● | ● |                     | ● |   |                   | ● | ● |                  | ● | ● |             | ● | ● |                | ○ | ○ |               | ● | ● |
| <i>Leiostomus xanthurus</i>    | S |                     |   |   |                     |   |   |                   | ● | ● |                  | ● | ● |             | ● | ● |                |   |   |               | ● | ● |
|                                | J | √                   | ● | ● | √                   | ● |   | ○                 | ● | ● |                  | ● | ● |             | ● | ● | ○              | ● | ● | ●             | ● | ● |
|                                | L |                     | ● | ● |                     | ● |   |                   | ● | ● |                  | ● | ● |             | ● | ● |                | ● | ● |               | ● | ● |
|                                | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| Southern kingfish              | A |                     | ○ | ○ |                     | ● |   |                   | ● | ● |                  | ● | ● |             | ● | ● |                | ● | ● |               | ● | ● |
| <i>Menticirrhus americanus</i> | S |                     |   |   |                     |   |   |                   | ● | ● |                  | ● | ● |             | ● | ● |                | ● | ● |               | ● | ● |
|                                | J |                     | ● | ● |                     | ● |   |                   | ● | ● |                  | ● | ● |             | ● | ● |                | ● | ● |               | ● | ● |
|                                | L |                     | ● | ● |                     | ● |   |                   | ● | ● |                  | ● | ● |             | ● | ● |                | ○ | ○ |               | ○ | ○ |
|                                | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   | √              | √ |   | √             | √ |   |
| Atlantic croaker               | A |                     | ● | ○ |                     | ● |   |                   | ○ | ○ |                  | ● | ● |             | ● | ● |                | ○ | ○ |               | ● | ● |
| <i>Micropogonias undulatus</i> | S |                     |   |   |                     |   |   |                   | ○ | ○ |                  |   |   |             | ● | ● |                |   |   |               |   |   |
|                                | J | √                   | ● | ○ | √                   | ● |   | ○                 | ● | ● |                  | ● | ● |             | ● | ● | ○              | ● | ● | ○             | ● | ● |
|                                | L |                     | ● | ● |                     | ● |   |                   | ● | ● |                  | ● | ● |             | ● | ● |                | ● | ● |               | ● | ● |
|                                | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
| Black drum                     | A |                     | ○ | √ |                     | √ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
| <i>Pogonias cromis</i>         | S |                     |   |   |                     |   |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                | J |                     | ○ | ○ |                     | √ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ | √              | ○ | ○ | √             | ○ | ○ |
|                                | L |                     | √ | √ |                     | √ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                | E |                     |   |   |                     |   |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | √ | √ |               | √ | √ |
| Red drum                       | A | √                   | ○ | ○ | √                   | √ |   | √                 | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
| <i>Sciaenops ocellatus</i>     | S |                     |   |   |                     |   |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                | J | √                   | ● | ● | √                   | √ |   | √                 | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ● | ● |
|                                | L |                     | √ | ○ |                     | √ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |
|                                | E |                     |   | ○ |                     |   |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | √ | √ |               | √ | √ |
| Striped mullet                 | A | ○                   | ○ | ● | ○                   | ○ |   | √                 | ● | ● | ○                | ○ | ○ | ○           | ● | ● | ○              | ● | ● | ○             | ● | ● |
| <i>Mugil cephalus</i>          | S |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                | J | ○                   | ● | ● | ○                   | ● |   | ○                 | ● | ● | ○                | ● | ● | ○           | ● | ● | ●              | ● | ● | ●             | ● | ● |
|                                | L |                     |   |   | ○                   | ● |   |                   | ● | ● |                  | ● | ● |             | ● | ● |                | ○ | ○ |               | ○ | ○ |
|                                | E |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |
|                                |   | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |
|                                |   | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |
|                                |   | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |

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- A - Adults
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- E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                                                             |        | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|-------------------------------------------------------------|--------|--------------------------------|---|---|-------------------|---|---|-----------------------------------|---|---|--------------------|---|---|-----------------|---|---|-----------------|---|---|
|                                                             |        | St. Cathe./<br>Sapelo<br>Sound |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
| Species/Life Stage                                          |        | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
| Spot<br><br><i>Leiostomus<br/>xanthurus</i>                 | A      |                                | ● | ● |                   | ● | ● |                                   | ● | ● | ○                  | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                                             | S      |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                             | J      | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ●                  | ● | ● |                 | ● | ● |                 | ○ | ○ |
|                                                             | L<br>E |                                | ● | ● |                   | ● | ● |                                   | ● | ● |                    | ○ | ○ |                 |   |   |                 | ○ | ○ |
| Southern kingfish<br><br><i>Menticirrhus<br/>americanus</i> | A      |                                | ● | ● |                   | ● | ● |                                   | ● | ● |                    | ○ | ○ |                 | ○ | ○ |                 | ✓ | ✓ |
|                                                             | S      |                                | ✓ | ✓ |                   | ✓ | ✓ |                                   | ✓ | ✓ |                    |   |   |                 |   |   |                 |   |   |
|                                                             | J      |                                | ● | ● |                   | ● | ● |                                   | ● | ● |                    | ○ | ○ |                 | ○ | ○ |                 | ✓ | ✓ |
|                                                             | L<br>E |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 | ○ | ○ |                 | ✓ | ✓ |
| Atlantic croaker<br><br><i>Micropogonias<br/>undulatus</i>  | A      |                                | ● | ● |                   | ● | ● |                                   | ● | ● | ●                  | ● | ● |                 | ○ | ○ |                 | ✓ | ✓ |
|                                                             | S      |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                             | J      | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ●                  | ● | ● |                 | ○ | ○ |                 | ✓ | ✓ |
|                                                             | L<br>E |                                | ● | ● |                   | ● | ● |                                   | ● | ● |                    | ● | ● |                 |   |   |                 | ✓ | ✓ |
| Black drum<br><br><i>Pogonias<br/>cromis</i>                | A      |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ● |                    | ○ | ○ |                 | ● | ● |                 | ✓ | ✓ |
|                                                             | S      |                                | ✓ | ✓ |                   | ✓ | ✓ |                                   | ✓ | ○ |                    |   | ○ |                 | ● | ● |                 | ✓ | ✓ |
|                                                             | J      | ✓                              | ○ | ○ | ✓                 | ○ | ○ | ✓                                 | ○ | ○ | ○                  | ● | ● |                 | ● | ● |                 | ✓ | ✓ |
|                                                             | L<br>E |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ● | ● |                 | ● | ● |                 | ✓ | ✓ |
| Red drum<br><br><i>Sciaenops<br/>ocellatus</i>              | A      |                                | ○ | ● |                   | ○ | ● |                                   | ○ | ○ | ○                  | ○ | ○ |                 | ● | ● |                 | ✓ | ✓ |
|                                                             | S      |                                | ✓ | ✓ |                   | ✓ | ✓ |                                   | ✓ | ✓ |                    |   | ○ |                 |   | ○ |                 | ✓ | ✓ |
|                                                             | J      |                                | ● | ● |                   | ○ | ● |                                   | ○ | ● | ●                  | ● | ● |                 | ● | ● |                 | ✓ | ✓ |
|                                                             | L<br>E |                                | ○ | ○ |                   | ✓ | ○ |                                   | ○ | ○ |                    | ● | ● |                 | ○ | ○ |                 | ✓ | ✓ |
| Striped mullet<br><br><i>Mugil<br/>cephalus</i>             | A      | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ●                  | ● | ● |                 | ● | ● |                 | ○ | ○ |
|                                                             | S      |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|                                                             | J      | ●                              | ● | ● | ●                 | ● | ● | ●                                 | ● | ● | ●                  | ● | ● |                 | ● | ● |                 | ○ | ○ |
|                                                             | L<br>E |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ | ○                  | ● | ● |                 | ● | ● |                 | ○ | ○ |
|                                                             |        | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
|                                                             |        | St. Cath./<br>Sapelo<br>Sound  |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
|                                                             |        | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |

## Relative Abundance

- Highly Abundant
- Abundant
- Common
- ✓ Rare
- Blank Not Present

## Salinity Zone

- T - Tidal Fresh
- M - Mixing
- S - Seawater
- \* - Salinity zone not present.

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                                                      |  | Southeast Estuaries   |                     |   |               |               |    |                      |                      |   |             |             |   |             |             |   |           |           |   |                 |                 |   |   |
|------------------------------------------------------|--|-----------------------|---------------------|---|---------------|---------------|----|----------------------|----------------------|---|-------------|-------------|---|-------------|-------------|---|-----------|-----------|---|-----------------|-----------------|---|---|
|                                                      |  | Albemarle Sound       |                     |   | Pamlico Sound |               |    | Pamlico/Pungo Rivers |                      |   | Neuse River |             |   | Bogue Sound |             |   | New River |           |   | Cape Fear River |                 |   |   |
| Species/Life Stage                                   |  | T                     | M                   | * | T             | M             | S  | T                    | M                    | * | T           | M           | * | T           | M           | S | T         | M         | S | T               | M               | S |   |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   |  | A<br>S<br>J<br>L<br>E |                     | ○ |               |               | ○  | ○                    |                      | √ |             |             | √ |             |             | ○ | ●         |           | ○ | ●               |                 | √ | ○ |
|                                                      |  |                       |                     | ○ |               |               | ○  | ○                    |                      | ○ |             |             | ○ |             |             | ○ | ○         |           | ○ | ○               |                 | √ | ○ |
|                                                      |  |                       |                     |   |               |               | na | na                   |                      |   |             |             | ○ |             |             |   | ○         |           | ○ |                 |                 |   |   |
| Gulf flounder<br><i>Paralichthys albigutta</i>       |  | A<br>S<br>J<br>L<br>E |                     |   |               |               | √  | ○                    |                      |   |             |             |   |             |             | ○ | ○         |           |   | ○               |                 | √ | √ |
|                                                      |  |                       |                     |   |               |               | ○  | ○                    |                      |   |             |             |   |             |             | ○ | ○         |           | ○ | ○               |                 | √ | √ |
|                                                      |  |                       |                     |   |               |               |    | ○                    |                      |   |             |             |   |             |             |   | ○         |           | √ | ○               |                 | √ | √ |
| Summer flounder<br><i>Paralichthys dentatus</i>      |  | A<br>S<br>J<br>L<br>E |                     | ○ |               |               | ○  | ●                    |                      | ○ |             |             | ○ |             |             | ○ | ●         |           | ○ | ○               |                 | ○ | ○ |
|                                                      |  |                       | √                   | ○ |               |               | ●  | ●                    |                      | √ | ○           |             | ○ |             |             | ○ | ○         |           | ○ | ○               |                 | ○ | ○ |
|                                                      |  |                       |                     | ○ |               |               | ○  | ●                    |                      |   |             |             | ○ |             |             | √ | ○         |           | √ | ○               |                 | ○ | ○ |
| Southern flounder<br><i>Paralichthys lethostigma</i> |  | A<br>S<br>J<br>L<br>E | ○                   | ● |               | ○             | ●  | ●                    |                      | ○ | ●           |             | ○ | ●           |             | √ | ●         | ●         |   | ●               | ○               |   | ○ |
|                                                      |  |                       | ●                   | ● |               | ●             | ●  | ○                    |                      | ● | ●           |             | ● | ●           |             | ○ | ○         | ○         | ○ | ○               | ○               | ● | ● |
|                                                      |  |                       |                     | √ |               |               | ●  | ●                    |                      |   |             |             | ○ |             |             | ○ | ○         | ○         | ○ | ○               | ○               | ○ | ○ |
|                                                      |  |                       | T                   | M | *             | T             | M  | S                    | T                    | M | *           | T           | M | *           | T           | M | S         | T         | M | S               | T               | M | S |
|                                                      |  |                       | Albemarle Sound     |   |               | Pamlico Sound |    |                      | Pamlico/Pungo Rivers |   |             | Neuse River |   |             | Bogue Sound |   |           | New River |   |                 | Cape Fear River |   |   |
|                                                      |  |                       | Southeast Estuaries |   |               |               |    |                      |                      |   |             |             |   |             |             |   |           |           |   |                 |                 |   |   |

## Relative Abundance

- Highly Abundant  
 ● Abundant  
 ○ Common  
 √ Rare  
 Blank Not Present  
 na No data available

## Salinity Zone

- T - Tidal Fresh  
 M - Mixing  
 S - Seawater  
 \* - Salinity zone not present.

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                                                      |     | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |  |  |  |
|------------------------------------------------------|-----|---------------------|---|---|---------------------|---|---|-------------------|---|---|------------------|---|---|-------------|---|---|----------------|---|---|---------------|---|---|--|--|--|
|                                                      |     | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |  |  |  |
| Species/Life Stage                                   |     | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |  |  |  |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | A   |                     |   | ○ |                     |   |   |                   |   | ○ |                  | ○ | ○ |             | ○ | ○ |                |   |   |               | ○ | ○ |  |  |  |
|                                                      | S   |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |  |  |  |
|                                                      | J   |                     | √ | ○ |                     | √ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |  |  |  |
|                                                      | L E |                     |   | √ |                     |   |   |                   |   | √ |                  |   | √ |             |   | √ |                |   |   |               |   |   |  |  |  |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | A   |                     | √ | √ |                     | √ |   |                   | ○ | ○ |                  |   |   |             | √ | √ |                | √ | √ |               | √ | √ |  |  |  |
|                                                      | S   |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |  |  |  |
|                                                      | J   |                     | √ | √ |                     | √ |   |                   | ○ | ○ |                  |   |   |             | √ | √ |                | √ | √ |               | √ | √ |  |  |  |
|                                                      | L E |                     | √ | √ |                     | √ |   |                   | ○ | ○ |                  |   |   |             | √ | √ |                | √ | √ |               | √ | √ |  |  |  |
| Summer flounder<br><i>Paralichthys dentatus</i>      | A   |                     | √ | ○ |                     | ○ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | √ | √ |               | √ | √ |  |  |  |
|                                                      | S   |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |  |  |  |
|                                                      | J   |                     | ○ | ● |                     | ○ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ● | ● |               | ● | ● |  |  |  |
|                                                      | L E |                     | ○ | ○ |                     | ○ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ |                | ○ | ○ |               | ○ | ○ |  |  |  |
| Southern flounder<br><i>Paralichthys lethostigma</i> | A   | ○                   | ○ | ● | √                   | ○ |   | ○                 | ○ | ○ | ○                | ○ | ○ | ●           | ● | ● | ○              | ○ | ● | ○             | ○ | ● |  |  |  |
|                                                      | S   |                     |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |  |  |  |
|                                                      | J   | ○                   | ● | ● | √                   | ● |   | ○                 | ○ | ○ | ○                | ○ | ○ | ●           | ● | ● | ○              | ● | ● | ○             | ● | ● |  |  |  |
|                                                      | L E |                     | ● | ● |                     | ○ |   |                   | ○ | ○ |                  | ○ | ○ |             | ○ | ○ | √              | ○ | ○ | √             | ○ | ○ |  |  |  |
|                                                      |     | T                   | M | S | T                   | M | * | T                 | M | S | T                | M | S | T           | M | S | T              | M | S | T             | M | S |  |  |  |
|                                                      |     | Winyah Bay          |   |   | N & S Santee Rivers |   |   | Charleston Harbor |   |   | St. Helena Sound |   |   | Broad River |   |   | Savannah River |   |   | Ossabaw Sound |   |   |  |  |  |
|                                                      |     | Southeast Estuaries |   |   |                     |   |   |                   |   |   |                  |   |   |             |   |   |                |   |   |               |   |   |  |  |  |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Salinity Zone

T - Tidal Fresh  
M - Mixing  
S - Seawater  
\* - Salinity zone not present.

## Life Stage

A - Adults  
S - Spawning adults  
J - Juveniles  
L - Larvae  
E - Eggs

Table 2, continued. Spatial distribution and relative abundance

|                                 |   | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
|---------------------------------|---|--------------------------------|---|---|-------------------|---|---|-----------------------------------|---|---|--------------------|---|---|-----------------|---|---|-----------------|---|---|
|                                 |   | St. Cathe./<br>Sapelo<br>Sound |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
| Species/Life Stage              |   | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
| Spanish mackerel                | A |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    |   | ○ |                 |   | √ |                 | ○ | ○ |
|                                 | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| <i>Scomberomorus maculatus</i>  | J |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    |   | ○ |                 | √ | √ |                 | ○ | ○ |
|                                 | L |                                |   |   |                   |   |   |                                   |   |   |                    |   | ○ |                 |   |   |                 |   | ○ |
|                                 | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| Gulf flounder                   | A |                                | √ | √ |                   | √ | √ |                                   | √ | √ |                    | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                 | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| <i>Paralichthys albigutta</i>   | J |                                | √ | √ |                   | √ | √ |                                   | √ | √ |                    | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                 | L |                                | √ | √ |                   | √ | √ |                                   | √ | √ |                    | ○ | ○ |                 | ● | ● |                 | ○ | ○ |
|                                 | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| Summer flounder                 | A |                                | √ | √ |                   | √ | √ |                                   | √ | √ | ○                  | ○ | ○ |                 | ○ | ○ |                 |   |   |
|                                 | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| <i>Paralichthys dentatus</i>    | J |                                | ● | ● |                   | ● | ● |                                   | ● | ● | ○                  | ○ | ○ |                 | √ | √ |                 |   |   |
|                                 | L |                                | ○ | ○ |                   | ○ | ○ |                                   | ○ | ○ |                    | ○ | ○ |                 | √ | √ |                 |   |   |
|                                 | E |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| Southern flounder               | A | ○                              | ○ | ● | ○                 | ○ | ● | ○                                 | ○ | ● | ●                  | ● | ● |                 | ● | ● |                 | √ | √ |
|                                 | S |                                |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |
| <i>Paralichthys lethostigma</i> | J | ○                              | ● | ● | ○                 | ● | ● | ○                                 | ● | ● | ●                  | ● | ● |                 | ○ | ○ |                 | √ | √ |
|                                 | L | √                              | ○ | ○ | √                 | ○ | ○ | √                                 | ○ | ○ | ○                  | ● | ● |                 | ○ | ○ |                 | √ | √ |
|                                 | E |                                |   | ○ |                   |   | ○ |                                   |   | ○ |                    | ○ | ○ |                 | ○ | ○ |                 |   |   |
|                                 |   | T                              | M | S | T                 | M | S | T                                 | M | S | T                  | M | S | *               | M | S | *               | M | S |
|                                 |   | St. Cathe./<br>Sapelo<br>Sound |   |   | Altamaha<br>River |   |   | St. Andrew/<br>St. Simon<br>Sound |   |   | St. Johns<br>River |   |   | Indian<br>River |   |   | Biscayne<br>Bay |   |   |
|                                 |   | Southeast Estuaries            |   |   |                   |   |   |                                   |   |   |                    |   |   |                 |   |   |                 |   |   |

## Relative Abundance

● Highly Abundant  
 ● Abundant  
 ○ Common  
 √ Rare  
 Blank Not Present

## Salinity Zone

T - Tidal Fresh  
 M - Mixing  
 S - Seawater  
 \* - Salinity zone not present.

## Life Stage

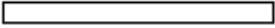
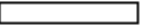
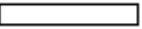
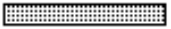
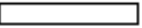
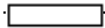
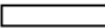
A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

**Table 3. Temporal distribution**

Index to Table 3. Page location of temporal distribution table for each species and estuary.

| Common and Scientific Name                            | Estuary         |               |                      |             |             |           |                 |            |
|-------------------------------------------------------|-----------------|---------------|----------------------|-------------|-------------|-----------|-----------------|------------|
|                                                       | Albemarle Sound | Pamlico Sound | Pamlico/Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River | Winyah Bay |
| Mussel ( <i>Mytilus edulis</i> )                      |                 |               |                      |             |             |           |                 |            |
| Bay scallop ( <i>Argopecten irradians</i> )           |                 |               |                      |             |             |           |                 |            |
| American oyster ( <i>Crassostrea virginica</i> )      |                 |               |                      |             |             |           |                 |            |
| Common rangia ( <i>Rangia cuneata</i> )               | p. 42           | p. 43         | p. 44                | p. 45       | p. 46       | p. 47     | p. 48           |            |
| Hard clam ( <i>Mercenaria</i> species)                |                 |               |                      |             |             |           |                 |            |
| Brown shrimp ( <i>Penaeus aztecus</i> )               |                 |               |                      |             |             |           |                 |            |
| Pink shrimp ( <i>Penaeus duorarum</i> )               |                 |               |                      |             |             |           |                 |            |
| White shrimp ( <i>Penaeus setiferus</i> )             |                 |               |                      |             |             |           |                 |            |
| Grass shrimp ( <i>Palaemonetes pugio</i> )            |                 |               |                      |             |             |           |                 |            |
| Blue crab ( <i>Callinectes sapidus</i> )              | p. 49           | p. 50         | p. 51                | p. 52       | p. 53       | p. 54     | p. 55           |            |
| Atlantic sturgeon ( <i>Acipenser oxyrinchus</i> )     |                 |               |                      |             |             |           |                 |            |
| Ladyfish ( <i>Elops saurus</i> )                      |                 |               |                      |             |             |           |                 |            |
| American eel ( <i>Anguilla rostrata</i> )             |                 |               |                      |             |             |           |                 |            |
| Blueback herring ( <i>Alosa aestivalis</i> )          |                 |               |                      |             |             |           |                 |            |
| Alewife ( <i>Alosa pseudoharengus</i> )               |                 |               |                      |             |             |           |                 |            |
| American shad ( <i>Alosa sapidissima</i> )            | p. 56           | p. 57         | p. 58                | p. 59       | p. 60       | p. 61     | p. 62           |            |
| Atlantic menhaden ( <i>Brevoortia tyrannus</i> )      |                 |               |                      |             |             |           |                 |            |
| Bay anchovy ( <i>Anchoa mitchilli</i> )               |                 |               |                      |             |             |           |                 |            |
| Sheepshead minnow ( <i>Cyprinodon variegatus</i> )    |                 |               |                      |             |             |           |                 |            |
| Mummichog ( <i>Fundulus heteroclitus</i> )            |                 |               |                      |             |             |           |                 |            |
| Atlantic silversides ( <i>Menidia</i> species)        |                 |               |                      |             |             |           |                 |            |
| White perch ( <i>Morone americana</i> )               | p. 63           | p. 64         | p. 65                | p. 66       | p. 67       | p. 68     | p. 69           |            |
| Striped bass ( <i>Morone saxatilis</i> )              |                 |               |                      |             |             |           |                 |            |
| Bluefish ( <i>Pomatomus saltatrix</i> )               |                 |               |                      |             |             |           |                 |            |
| Cobia ( <i>Rachycentron canadum</i> )                 |                 |               |                      |             |             |           |                 |            |
| Gray snapper ( <i>Lutjanus griseus</i> )              |                 |               |                      |             |             |           |                 |            |
| Sheepshead ( <i>Archosargus probatocephalus</i> )     | p. 70           | p. 71         | p. 72                | p. 73       | p. 74       | p. 75     | p. 76           |            |
| Pinfish ( <i>Lagodon rhomboides</i> )                 |                 |               |                      |             |             |           |                 |            |
| Spotted seatrout ( <i>Cynoscion nebulosus</i> )       |                 |               |                      |             |             |           |                 |            |
| Weakfish ( <i>Cynoscion regalis</i> )                 |                 |               |                      |             |             |           |                 |            |
| Spot ( <i>Leiostomus xanthurus</i> )                  |                 |               |                      |             |             |           |                 |            |
| Southern kingfish ( <i>Menticirrhus americanus</i> )  |                 |               |                      |             |             |           |                 |            |
| Atlantic croaker ( <i>Micropogonias undulatus</i> )   | p. 77           | p. 78         | p. 79                | p. 80       | p. 81       | p. 82     | p. 83           |            |
| Black drum ( <i>Pogonias cromis</i> )                 |                 |               |                      |             |             |           |                 |            |
| Red drum ( <i>Sciaenops ocellatus</i> )               |                 |               |                      |             |             |           |                 |            |
| Striped mullet ( <i>Mugil cephalus</i> )              |                 |               |                      |             |             |           |                 |            |
| Spanish mackerel ( <i>Scomberomorus maculatus</i> )   |                 |               |                      |             |             |           |                 |            |
| Gulf flounder ( <i>Paralichthys albigutta</i> )       | p. 84           | p. 85         | p. 86                | p. 87       | p. 88       | p. 89     | p. 90           |            |
| Summer flounder ( <i>Paralichthys dentatus</i> )      |                 |               |                      |             |             |           |                 |            |
| Southern flounder ( <i>Paralichthys lethostigma</i> ) |                 |               |                      |             |             |           |                 |            |

Table 3. Temporal distribution

|                      |   | Southeast Estuaries                                                                                                                                                     |                                                                                                                                                                           |                                                                                                                                                                             |
|----------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Estuary              |   | Albemarle Sound                                                                                                                                                         | Pamlico Sound                                                                                                                                                             | Pamlico/Pungo Rivers                                                                                                                                                        |
| Month                |   | J F M A M J J A S O N D                                                                                                                                                 |                                                                                                                                                                           |                                                                                                                                                                             |
| Species / Life Stage |   |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| Mussel               | A |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
|                      | S |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| <i>Mytilis</i>       | J |                                                                                                                                                                         | .....                                                                                                                                                                     |                                                                                                                                                                             |
| <i>edulis</i>        | L |                                                                                                                                                                         | .....                                                                                                                                                                     | ...                                                                                                                                                                         |
|                      | E |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| Bay scallop          | A |                                                                                                                                                                         |                                                                                         |                                                                                                                                                                             |
|                      | S |                                                                                                                                                                         |                                                                                         |                                                                                                                                                                             |
| <i>Argopecten</i>    | J |                                                                                                                                                                         |                                                                                         |                                                                                                                                                                             |
| <i>irradians</i>     | L |                                                                                                                                                                         |                                                                                         |                                                                                                                                                                             |
|                      | E |                                                                                                                                                                         |                                                                                         |                                                                                                                                                                             |
| American oyster      | A |                                                                                        |                                                                                         |                                                                                          |
|                      | S |                                                                                        |                                                                                         |                                                                                          |
| <i>Crassostrea</i>   | J |                                                                                        |                                                                                         |                                                                                          |
| <i>virginica</i>     | L |                                                                                        |                                                                                         |                                                                                          |
|                      | E |                                                                                        |                                                                                         |                                                                                          |
| Common rangia        | A |                                                                                        |                                                                                         |                                                                                          |
|                      | S |     |     |     |
| <i>Rangia</i>        | J |                                                                                      |                                                                                       |                                                                                        |
| <i>cuneata</i>       | L |   |   |   |
|                      | E |   |   |   |
| Hard clam            | A |                                                                                                                                                                         |                                                                                       |                                                                                                                                                                             |
|                      | S |                                                                                                                                                                         |                                                                                       |                                                                                                                                                                             |
| <i>Mercenaria</i>    | J |                                                                                                                                                                         |                                                                                       |                                                                                                                                                                             |
| species              | L |                                                                                                                                                                         |                                                                                       |                                                                                                                                                                             |
|                      | E |                                                                                                                                                                         |                                                                                       |                                                                                                                                                                             |
| Brown shrimp         | A |                                                                                      |                                                                                       |                                                                                        |
|                      | S |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| <i>Penaeus</i>       | J | .....                                                                                |                                                                                       | .....                                                                                  |
| <i>aztecus</i>       | L |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
|                      | E |                                                                                                                                                                         |                                                                                        |                                                                                                                                                                             |
|                      |   | J F M A M J J A S O N D                                                                                                                                                 |                                                                                                                                                                           |                                                                                                                                                                             |
|                      |   | Albemarle Sound                                                                                                                                                         | Pamlico Sound                                                                                                                                                             | Pamlico/Pungo Rivers                                                                                                                                                        |
|                      |   | Southeast Estuaries                                                                                                                                                     |                                                                                                                                                                           |                                                                                                                                                                             |

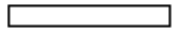
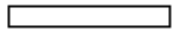
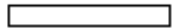
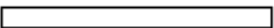
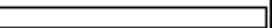
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                      |   | Southeast Estuaries                                                                                                                                                     |                                                                                                                                                                            |                                                                                                                                                                             |
|----------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Estuary              |   | Neuse River                                                                                                                                                             | Bogue Sound                                                                                                                                                                | New River                                                                                                                                                                   |
| Month                |   | J F M A M J J A S O N D                                                                                                                                                 |                                                                                                                                                                            |                                                                                                                                                                             |
| Species / Life Stage |   |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |
| Mussel               | A |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |
|                      | S |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |
| <i>Mytilus</i>       | J |                                                                                                                                                                         | .....                                                                                                                                                                      | .....                                                                                                                                                                       |
| <i>edulis</i>        | L |                                                                                                                                                                         | .....                                                                                                                                                                      | .....                                                                                                                                                                       |
|                      | E |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |
| Bay scallop          | A |                                                                                                                                                                         |                                                                                          |                                                                                          |
|                      | S |                                                                                                                                                                         |       |                                                                                          |
| <i>Argopecten</i>    | J |                                                                                                                                                                         |                                                                                          |                                                                                          |
| <i>irradians</i>     | L |                                                                                                                                                                         |       |                                                                                          |
|                      | E |                                                                                                                                                                         |       |                                                                                          |
| American oyster      | A |                                                                                        |                                                                                          |                                                                                          |
|                      | S |                                                                                        |                                                                                          |                                                                                          |
| <i>Crassostrea</i>   | J |                                                                                        |                                                                                          |                                                                                          |
| <i>virginica</i>     | L |                                                                                        |                                                                                          |                                                                                          |
|                      | E |                                                                                        |                                                                                          |                                                                                          |
| Common rangia        | A |                                                                                        |                                                                                          |                                                                                          |
|                      | S |     |       |     |
| <i>Rangia</i>        | J |                                                                                      |                                                                                        |                                                                                        |
| <i>cuneata</i>       | L |   |     |   |
|                      | E |   |     |   |
| Hard clam            | A |                                                                                                                                                                         |                                                                                        |                                                                                        |
|                      | S |                                                                                                                                                                         |   |                                                                                        |
| <i>Mercenaria</i>    | J |                                                                                                                                                                         |                                                                                        |                                                                                        |
| species              | L |                                                                                                                                                                         |   |                                                                                        |
|                      | E |                                                                                                                                                                         |   |                                                                                        |
| Brown shrimp         | A |                                                                                      |                                                                                                                                                                            |                                                                                                                                                                             |
|                      | S |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |
| <i>Penaeus</i>       | J | .....                                                                                |                                                                                        |                                                                                        |
| <i>aztecus</i>       | L |                                                                                      |    |   |
|                      | E |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |
|                      |   | J F M A M J J A S O N D                                                                                                                                                 |                                                                                                                                                                            |                                                                                                                                                                             |
|                      |   | Neuse River                                                                                                                                                             | Bogue Sound                                                                                                                                                                | New River                                                                                                                                                                   |
|                      |   | Southeast Estuaries                                                                                                                                                     |                                                                                                                                                                            |                                                                                                                                                                             |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                      |   | Southeast Estuaries     |             |                  |
|----------------------|---|-------------------------|-------------|------------------|
| Estuary              |   | Cape Fear River         | Winyah Bay  | N&S Santee River |
| Month                |   | J F M A M J J A S O N D |             |                  |
| Species / Life Stage |   |                         |             |                  |
| Mussel               | A |                         |             |                  |
|                      | S |                         |             |                  |
| <i>Mytilus</i>       | J | .....                   | .....       | .....            |
| <i>edulis</i>        | L | .....                   | .....       | .....            |
|                      | E |                         |             |                  |
| Bay scallop          | A | .....                   |             |                  |
|                      | S | .....                   |             |                  |
| <i>Argopecten</i>    | J | .....                   |             |                  |
| <i>irradians</i>     | L | .....                   |             |                  |
|                      | E | .....                   |             |                  |
| American oyster      | A | ██████████              | ██████████  | ▬                |
|                      | S | ███▬                    | ███▬███     | ▬                |
| <i>Crassostrea</i>   | J | ██████████              | ██████████  | ▬                |
| <i>virginica</i>     | L | ███▬                    | ███▬███     | ▬                |
|                      | E | ███▬                    | ███▬███     | ▬                |
| Common rangia        | A | ▬                       | ▬           | ▬                |
|                      | S | ▬ ▬                     | ▬ ▬         | ▬ ▬              |
| <i>Rangia</i>        | J | ▬                       | ▬           | ▬                |
| <i>cuneata</i>       | L | ▬ ▬                     | ▬ ▬         | ▬ ▬              |
|                      | E | ▬ ▬                     | ▬ ▬         | ▬ ▬              |
| Hard clam            | A | ██████████              | ▨▨▨▨▨▨▨▨    | ▬                |
|                      | S | ██████████              | ▨▨▨▨▨▨      | ▬                |
| <i>Mercenaria</i>    | J | ██████████              | ▨▨▨▨▨▨▨▨    | ▬                |
| species              | L | ██████████              | ▨▨▨▨▨▨▨▨    | ▬                |
|                      | E | ██████████              | ▨▨▨▨▨▨▨▨    | ▬                |
| Brown shrimp         | A |                         | ▨▨▨▨▨▨▨▨    | ▬                |
|                      | S |                         | .....       | .....            |
| <i>Penaeus</i>       | J | ▨▨▨▨▨▨                  | ▨▨▨▨▨▨▨▨    | ▨▨▨▨▨▨▨▨         |
| <i>aztecus</i>       | L | ▨▨▨▨▨▨                  | ▨▨▨▨▨▨..... | ▨▨▨▨▨▨.....      |
|                      | E |                         | .....       |                  |
|                      |   | J F M A M J J A S O N D |             |                  |
|                      |   | Cape Fear River         | Winyah Bay  | N&S Santee River |
|                      |   | Southeast Estuaries     |             |                  |

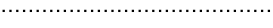
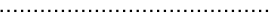
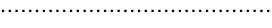
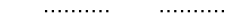
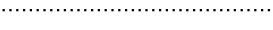
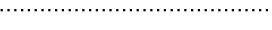
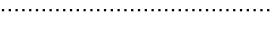
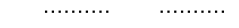
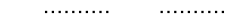
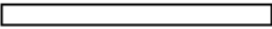
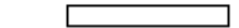
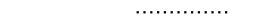
## Relative Abundance

|       |                 |
|-------|-----------------|
| ████  | Highly Abundant |
| ▨▨▨▨  | Abundant        |
| ▬     | Common          |
| ..... | Rare            |
| Blank | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                              |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                      |   | Charleston Harbor                                                                   | St. Helena Sound                                                                     | Broad River                                                                           |
| Month                        |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage         |   |                                                                                     |                                                                                      |                                                                                       |
| Mussel                       | A |                                                                                     |                                                                                      |                                                                                       |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Mytilus edulis</i>        | J |                                                                                     |                                                                                      |                                                                                       |
|                              | L |                                                                                     |                                                                                      |                                                                                       |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
| Bay scallop                  | A |                                                                                     |                                                                                      |                                                                                       |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Argopecten irradians</i>  | J |                                                                                     |                                                                                      |                                                                                       |
|                              | L |                                                                                     |                                                                                      |                                                                                       |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
| American oyster              | A |    |    |    |
|                              | S |    |    |    |
| <i>Crassostrea virginica</i> | J |    |    |    |
|                              | L |    |    |    |
|                              | E |    |    |    |
| Common rangia                | A |    |    |    |
|                              | S |   |   |   |
| <i>Rangia cuneata</i>        | J |  |  |  |
|                              | L |  |  |  |
|                              | E |  |  |  |
| Hard clam                    | A |  |  |  |
|                              | S |  |  |  |
| <i>Mercenaria</i> species    | J |  |  |  |
|                              | L |  |  |  |
|                              | E |  |  |  |
| Brown shrimp                 | A |  |  |  |
|                              | S |  |  |  |
| <i>Penaeus aztecus</i>       | J |  |  |  |
|                              | L |  |   |  |
|                              | E |  |   |  |
|                              |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                              |   | Charleston Harbor                                                                   | St. Helena Sound                                                                     | Broad River                                                                           |
|                              |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

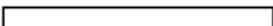
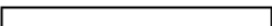
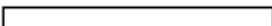
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                              |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                      |   | Savannah River                                                                      | Ossabaw Sound                                                                        | St. Cath./Sapelo Sound                                                                |
| Month                        |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage         |   |                                                                                     |                                                                                      |                                                                                       |
| Mussel                       | A |                                                                                     |                                                                                      |                                                                                       |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Mytilis edulis</i>        | J |                                                                                     |                                                                                      |                                                                                       |
|                              | L |                                                                                     |                                                                                      |                                                                                       |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
| Bay scallop                  | A |                                                                                     |                                                                                      |                                                                                       |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Argopecten irradians</i>  | J |                                                                                     |                                                                                      |                                                                                       |
|                              | L |                                                                                     |                                                                                      |                                                                                       |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
| American oyster              | A |    |    |    |
|                              | S |    |    |    |
| <i>Crassostrea virginica</i> | J |    |    |    |
|                              | L |    |    |    |
|                              | E |    |    |    |
| Common rangia                | A |    |    |    |
|                              | S |   |   |   |
| <i>Rangia cuneata</i>        | J |  |  |  |
|                              | L |  |  |  |
|                              | E |  |  |  |
| Hard clam                    | A |  |  |  |
|                              | S |  |  |  |
| <i>Mercenaria</i> species    | J |  |  |  |
|                              | L |  |  |  |
|                              | E |  |  |  |
| Brown shrimp                 | A |  |  |  |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Penaeus aztecus</i>       | J |  |  |  |
|                              | L |                                                                                     |                                                                                      |                                                                                       |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
|                              |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                              |   | Savannah River                                                                      | Ossabaw Sound                                                                        | St. Cath./Sapelo Sound                                                                |
|                              |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

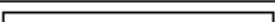
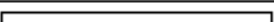
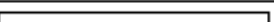
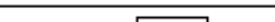
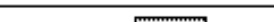
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                              |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                      |   | Altamaha River                                                                      | St. And./St. Sim. Sound                                                              | St. Johns River                                                                       |
| Month                        |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage         |   |                                                                                     |                                                                                      |                                                                                       |
| Mussel                       | A |                                                                                     |                                                                                      |                                                                                       |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Mytilis edulis</i>        | J |                                                                                     |                                                                                      |                                                                                       |
|                              | L |                                                                                     |                                                                                      |                                                                                       |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
| Bay scallop                  | A |                                                                                     |                                                                                      |                                                                                       |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Argopecten irradians</i>  | J |                                                                                     |                                                                                      |                                                                                       |
|                              | L |                                                                                     |                                                                                      |                                                                                       |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
| American oyster              | A |    |    |    |
|                              | S |    |    |    |
| <i>Crassostrea virginica</i> | J |    |    |    |
|                              | L |    |    |    |
|                              | E |    |    |    |
| Common rangia                | A |    |    |    |
|                              | S |   |   |   |
| <i>Rangia cuneata</i>        | J |  |  |  |
|                              | L |  |  |  |
|                              | E |  |  |  |
| Hard clam                    | A |  |  |  |
|                              | S |  |  |  |
| <i>Mercenaria</i> species    | J |  |  |  |
|                              | L |  |  |  |
|                              | E |  |  |  |
| Brown shrimp                 | A |  |  |                                                                                       |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Penaeus aztecus</i>       | J |  |  |  |
|                              | L |                                                                                     |                                                                                      |  |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
|                              |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                              |   | Altamaha River                                                                      | St. And./St. Sim. Sound                                                              | St. Johns River                                                                       |
|                              |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

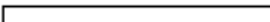
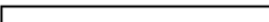
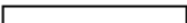
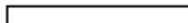
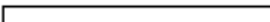
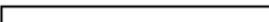
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                      |   | Southeast Estuaries                                                                                                                                                           |                                                                                      |
|----------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Estuary              |   | Indian River                                                                                                                                                                  | Biscayne Bay                                                                         |
| Month                |   | J F M A M J J A S O N D                                                                                                                                                       |                                                                                      |
| Species / Life Stage |   |                                                                                                                                                                               |                                                                                      |
| Mussel               | A |                                                                                                                                                                               |                                                                                      |
|                      | S |                                                                                                                                                                               |                                                                                      |
| <i>Mytilis</i>       | J |                                                                                                                                                                               |                                                                                      |
| <i>edulis</i>        | L |                                                                                                                                                                               |                                                                                      |
|                      | E |                                                                                                                                                                               |                                                                                      |
| Bay scallop          | A | .....                                                                                                                                                                         |    |
|                      | S | .....                                                                                                                                                                         |   |
| <i>Argopecten</i>    | J | .....                                                                                                                                                                         |    |
| <i>irradians</i>     | L | .....                                                                                                                                                                         |   |
|                      | E | .....                                                                                                                                                                         |   |
| American oyster      | A |                                                                                              |    |
|                      | S |                                                                                              |    |
| <i>Crassostrea</i>   | J |                                                                                              |    |
| <i>virginica</i>     | L |                                                                                              |    |
|                      | E |                                                                                              |    |
| Common rangia        | A | .....                                                                                                                                                                         |                                                                                      |
|                      | S | .....                                                                                                                                                                         |                                                                                      |
| <i>Rangia</i>        | J | .....                                                                                                                                                                         |                                                                                      |
| <i>cuneata</i>       | L | .....                                                                                                                                                                         |                                                                                      |
|                      | E | .....                                                                                                                                                                         |                                                                                      |
| Hard clam            | A |                                                                                            |  |
|                      | S |  .....  |  |
| <i>Mercenaria</i>    | J |                                                                                            |  |
| species              | L |  .....  |  |
|                      | E |  .....  |  |
| Brown shrimp         | A | .....                                                                                                                                                                         | .....                                                                                |
|                      | S |                                                                                                                                                                               | .....                                                                                |
| <i>Penaeus</i>       | J |                                                                                            | .....                                                                                |
| <i>aztecus</i>       | L |  .....  | .....                                                                                |
|                      | E |                                                                                                                                                                               |                                                                                      |
|                      |   | J F M A M J J A S O N D                                                                                                                                                       |                                                                                      |
|                      |   | Indian River                                                                                                                                                                  | Biscayne Bay                                                                         |
|                      |   | Southeast Estuaries                                                                                                                                                           |                                                                                      |

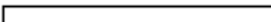
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                              |   | Southeast Estuaries                                                                 |                                                                                       |                                                                                       |
|------------------------------|---|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                      |   | Albemarle Sound                                                                     | Pamlico Sound                                                                         | Pamlico/Pungo Rivers                                                                  |
| Month                        |   | J F M A M J J A S O N D                                                             |                                                                                       |                                                                                       |
| Species / Life Stage         |   |                                                                                     |                                                                                       |                                                                                       |
| Pink shrimp                  | A |                                                                                     |      |    |
|                              | S |                                                                                     |     |                                                                                       |
| <i>Penaeus duorarum</i>      | J |    |     |    |
|                              | L |                                                                                     |                                                                                       |                                                                                       |
|                              | E |                                                                                     |                                                                                       |                                                                                       |
| White shrimp                 | A |    |     |    |
|                              | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Penaeus setiferus</i>     | J |    |     |    |
|                              | L |    |     |                                                                                       |
|                              | E |                                                                                     |                                                                                       |                                                                                       |
| Grass shrimp                 | A |    |     |    |
|                              | S |    |     |    |
| <i>Palaemonetes pugio</i>    | J |    |     |    |
|                              | L |    |     |    |
|                              | E |    |     |    |
| Blue crab                    | A |    |     |    |
|                              | M |  |   |  |
| <i>Callinectes sapidus</i>   | J |  |   |  |
|                              | L | .....                                                                               |   | .....                                                                                 |
|                              | S | .....                                                                               |   | .....                                                                                 |
| Atlantic sturgeon            | A |  |    |  |
|                              | S |  |    |  |
| <i>Acipenser oxyrhynchus</i> | J |  |   |  |
|                              | L |  |    |  |
|                              | E |  |    |  |
| Ladyfish                     | A |                                                                                     |   |                                                                                       |
|                              | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Elops saurus</i>          | J |  |   |  |
|                              | L | .....                                                                               |    |                                                                                       |
|                              | E |                                                                                     |  |                                                                                       |
|                              |   | J F M A M J J A S O N D                                                             |                                                                                       |                                                                                       |
|                              |   | Albemarle Sound                                                                     | Pamlico Sound                                                                         | Pamlico/Pungo Rivers                                                                  |
|                              |   | Southeast Estuaries                                                                 |                                                                                       |                                                                                       |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |
| M | Mating          |

Table 3, continued. Temporal distribution

|                             |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|-----------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                     |   | Neuse River                                                                         | Bogue Sound                                                                          | New River                                                                             |
| Month                       |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage        |   |                                                                                     |                                                                                      |                                                                                       |
| Pink shrimp                 | A |    |                                                                                      |                                                                                       |
|                             | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Penaeus duorarum</i>     | J |    |    |    |
|                             | L |                                                                                     |    |    |
|                             | E |                                                                                     |                                                                                      |                                                                                       |
| White shrimp                | A |                                                                                     |     |                                                                                       |
|                             | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Penaeus setiferus</i>    | J |    |    |    |
|                             | L |    |    |    |
|                             | E |                                                                                     |                                                                                      |                                                                                       |
| Grass shrimp                | A |    |    |    |
|                             | S |    |    |    |
| <i>Palaemonetes pugio</i>   | J |    |    |    |
|                             | L |    |    |    |
|                             | E |    |    |    |
| Blue crab                   | A |    |    |    |
|                             | M |   |   |   |
| <i>Callinectes sapidus</i>  | J |  |  |  |
|                             | L | .....                                                                               |  |  |
|                             | S | .....                                                                               |  |  |
| Atlantic sturgeon           | A |  |                                                                                      |                                                                                       |
|                             | S |  |                                                                                      |                                                                                       |
| <i>Acipenser oxyrinchus</i> | J |  |                                                                                      | .....                                                                                 |
|                             | L |  |                                                                                      |                                                                                       |
|                             | E |  |                                                                                      |                                                                                       |
| Ladyfish                    | A |                                                                                     |                                                                                      |                                                                                       |
|                             | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Elops saurus</i>         | J |  | .....                                                                                | .....                                                                                 |
|                             | L |                                                                                     | .....                                                                                | .....                                                                                 |
|                             | E |                                                                                     |                                                                                      |                                                                                       |
|                             |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                             |   | Neuse River                                                                         | Bogue Sound                                                                          | New River                                                                             |
|                             |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |
| M | Mating          |

Table 3, continued. Temporal distribution

|                                                   |   | Southeast Estuaries     |            |                   |
|---------------------------------------------------|---|-------------------------|------------|-------------------|
| Estuary                                           |   | Cape Fear River         | Winyah Bay | N&S Santee Rivers |
| Month                                             |   | J F M A M J J A S O N D |            |                   |
| Species / Life Stage                              |   |                         |            |                   |
| Pink shrimp<br><i>Penaeus duorarum</i>            | A |                         | .....      | .....             |
|                                                   | S |                         | .....      | .....             |
|                                                   | J | .....                   | .....      | .....             |
|                                                   | L | .....                   | .....      | .....             |
|                                                   | E |                         | .....      | .....             |
| White shrimp<br><i>Penaeus setiferus</i>          | A |                         | .....      | .....             |
|                                                   | S |                         | .....      | .....             |
|                                                   | J | .....                   | .....      | .....             |
|                                                   | L | .....                   | .....      | .....             |
|                                                   | E |                         | .....      | .....             |
| Grass shrimp<br><i>Palaemonetes pugio</i>         | A | .....                   | .....      | .....             |
|                                                   | S | .....                   | .....      | .....             |
|                                                   | J | .....                   | .....      | .....             |
|                                                   | L | .....                   | .....      | .....             |
|                                                   | E | .....                   | .....      | .....             |
| Blue crab<br><i>Callinectes sapidus</i>           | A | .....                   | .....      | .....             |
|                                                   | M | .....                   | .....      | .....             |
|                                                   | J | .....                   | .....      | .....             |
|                                                   | L | .....                   | .....      | .....             |
|                                                   | S | .....                   | .....      | .....             |
| Atlantic sturgeon<br><i>Acipenser oxyrhynchus</i> | A | .....                   | .....      | .....             |
|                                                   | S | .....                   | .....      | .....             |
|                                                   | J | .....                   | .....      | .....             |
|                                                   | L | .....                   | .....      | .....             |
|                                                   | E | .....                   | .....      | .....             |
| Ladyfish<br><i>Elops saurus</i>                   | A | .....                   | .....      | .....             |
|                                                   | S | .....                   | .....      | .....             |
|                                                   | J | .....                   | .....      | .....             |
|                                                   | L | .....                   | .....      | .....             |
|                                                   | E | .....                   | .....      | .....             |
|                                                   |   | J F M A M J J A S O N D |            |                   |
|                                                   |   | Cape Fear River         | Winyah Bay | N&S Santee Rivers |
|                                                   |   | Southeast Estuaries     |            |                   |

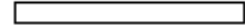
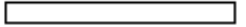
## Relative Abundance

|       |                 |
|-------|-----------------|
| ..... | Highly Abundant |
| ..... | Abundant        |
| ..... | Common          |
| ..... | Rare            |
| Blank | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |
| M | Mating          |

Table 3, continued. Temporal distribution

|                      |   | Southeast Estuaries                                                                                                                                                     |                                                                                                                                                                           |                                                                                                                                                                             |
|----------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Estuary              |   | Charleston Harbor                                                                                                                                                       | St. Helena Sound                                                                                                                                                          | Broad River                                                                                                                                                                 |
| Month                |   | J F M A M J J A S O N D                                                                                                                                                 |                                                                                                                                                                           |                                                                                                                                                                             |
| Species / Life Stage |   |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| Pink shrimp          | A | .....                                                                                                                                                                   | .....                                                                                                                                                                     |                                                                                          |
|                      | S |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| <i>Penaeus</i>       | J |                                                                                        | .....                                                                                                                                                                     |                                                                                          |
| <i>duorarum</i>      | L |                                                                                        | .....                                                                                                                                                                     |                                                                                          |
|                      | E |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| White shrimp         | A |       |                                                                                          |  .....                                                                                   |
|                      | S | .....                                                                                                                                                                   |                                                                                                                                                                           |                                                                                                                                                                             |
| <i>Penaeus</i>       | J |       |        |       |
| <i>setiferus</i>     | L |       |       |                                                                                          |
|                      | E | .....                                                                                                                                                                   |                                                                                                                                                                           |                                                                                                                                                                             |
| Grass shrimp         | A |                                                                                        |                                                                                         |                                                                                          |
|                      | S |                                                                                        |                                                                                         |                                                                                          |
| <i>Palaemonetes</i>  | J |                                                                                        |                                                                                         |                                                                                          |
| <i>pugio</i>         | L |       |                                                                                         |                                                                                          |
|                      | E |       |                                                                                         |                                                                                          |
| Blue crab            | A |       |       |       |
|                      | M |                                                                                       |                                                                                        |                                                                                         |
| <i>Callinectes</i>   | J |   |   |   |
| <i>sapidus</i>       | L |   |   |   |
|                      | E |                                                                                      |                                                                                       |                                                                                        |
| Atlantic sturgeon    | A | .....                                                                                                                                                                   |                                                                                       |                                                                                        |
|                      | S | .....                                                                                                                                                                   |                                                                                        |                                                                                        |
| <i>Acipenser</i>     | J | .....                                                                                                                                                                   |                                                                                       |                                                                                        |
| <i>oxyrhynchus</i>   | L | .....                                                                                                                                                                   |                                                                                        |                                                                                        |
|                      | E | .....                                                                                                                                                                   |                                                                                        |                                                                                        |
| Ladyfish             | A | .....                                                                                                                                                                   |                                                                                       |                                                                                        |
|                      | S |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| <i>Elops</i>         | J |                                                                                      |                                                                                       |                                                                                        |
| <i>saurus</i>        | L |   |   |   |
|                      | E |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
|                      |   | J F M A M J J A S O N D                                                                                                                                                 |                                                                                                                                                                           |                                                                                                                                                                             |
|                      |   | Charleston Harbor                                                                                                                                                       | St. Helena Sound                                                                                                                                                          | Broad River                                                                                                                                                                 |
|                      |   | Southeast Estuaries                                                                                                                                                     |                                                                                                                                                                           |                                                                                                                                                                             |

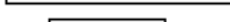
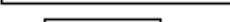
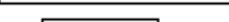
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |
| M | Mating          |

Table 3, continued. Temporal distribution

|                      |   | Southeast Estuaries                                                                     |                                                                                          |                                                                                           |
|----------------------|---|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Estuary              |   | Savannah River                                                                          | Ossabaw Sound                                                                            | St. Cath./Sapelo Sound                                                                    |
| Month                |   | J F M A M J J A S O N D                                                                 |                                                                                          |                                                                                           |
| Species / Life Stage |   |                                                                                         |                                                                                          |                                                                                           |
| Pink shrimp          | A | ...                                                                                     | ...                                                                                      | ...                                                                                       |
|                      | S |                                                                                         |                                                                                          |                                                                                           |
| <i>Penaeus</i>       | J |        |        |        |
| <i>duorarum</i>      | L | .....                                                                                   | .....                                                                                    | .....                                                                                     |
|                      | E |                                                                                         |                                                                                          |                                                                                           |
| White shrimp         | A |        |        |        |
|                      | S |                                                                                         |                                                                                          |                                                                                           |
| <i>Penaeus</i>       | J |        |        |        |
| <i>setiferus</i>     | L |        |        |        |
|                      | E |                                                                                         |                                                                                          |                                                                                           |
| Grass shrimp         | A |        |        |        |
|                      | S |        |        |        |
| <i>Palaemonetes</i>  | J |        |        |        |
| <i>pugio</i>         | L |        |        |        |
|                      | E |        |        |        |
| Blue crab            | A |        |        |        |
|                      | M |       |       |       |
| <i>Callinectes</i>   | J |      |      |      |
| <i>sapidus</i>       | L |      |      |      |
|                      | S | ...  | ...  | ...  |
| Atlantic sturgeon    | A |      |      |      |
|                      | S |      |       |      |
| <i>Acipenser</i>     | J |      |      |      |
| <i>oxyrhynchus</i>   | L |      |       |      |
|                      | E |      |       |      |
| Ladyfish             | A |      |      |      |
|                      | S |                                                                                         |                                                                                          |                                                                                           |
| <i>Elops</i>         | J |      |      |      |
| <i>saurus</i>        | L |      |      |      |
|                      | E |                                                                                         |                                                                                          |                                                                                           |
|                      |   | J F M A M J J A S O N D                                                                 |                                                                                          |                                                                                           |
|                      |   | Savannah River                                                                          | Ossabaw Sound                                                                            | St. Cath./Sapelo Sound                                                                    |
|                      |   | Southeast Estuaries                                                                     |                                                                                          |                                                                                           |

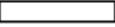
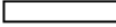
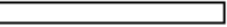
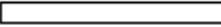
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |
| M | Mating          |

Table 3, continued. Temporal distribution

|                              |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                      |   | Altamaha River                                                                      | St. And./St. Sim. Sound                                                              | St. Johns River                                                                       |
| Month                        |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage         |   |                                                                                     |                                                                                      |                                                                                       |
| Pink shrimp                  | A |                                                                                     | .....                                                                                |                                                                                       |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Penaeus duorarum</i>      | J | .....                                                                               |    |    |
|                              | L |                                                                                     | .....                                                                                |    |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
| White shrimp                 | A |    |    |                                                                                       |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Penaeus setiferus</i>     | J |    |    |    |
|                              | L |    |    |    |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
| Grass shrimp                 | A |    |    |    |
|                              | S |    |    |    |
| <i>Palaemonetes pugio</i>    | J |    |    |    |
|                              | L |    |    |    |
|                              | E |    |    |    |
| Blue crab                    | A |    |    |    |
|                              | M |   |   |   |
| <i>Callinectes sapidus</i>   | J |  |  |  |
|                              | L |  |  |  |
|                              | S |  |  |  |
| Atlantic sturgeon            | A |  |  | .....                                                                                 |
|                              | S |  |   | .....                                                                                 |
| <i>Acipenser oxyrhynchus</i> | J |  |  | .....                                                                                 |
|                              | L |  |   | .....                                                                                 |
|                              | E |  |   | .....                                                                                 |
| Ladyfish                     | A |  |  |  |
|                              | S |                                                                                     |                                                                                      |                                                                                       |
| <i>Elops saurus</i>          | J |  |  |  |
|                              | L |  |  |  |
|                              | E |                                                                                     |                                                                                      |                                                                                       |
|                              |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                              |   | Altamaha River                                                                      | St. And./St. Sim. Sound                                                              | St. Johns River                                                                       |
|                              |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |
| M | Mating          |

Table 3, continued. Temporal distribution

|                                                  |   | Southeast Estuaries                                                                                                                                                     |                                                                                                                                                                      |
|--------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Estuary                                          |   | Indian River                                                                                                                                                            | Biscayne Bay                                                                                                                                                         |
| Month                                            |   | J F M A M J J A S O N D                                                                                                                                                 |                                                                                                                                                                      |
| Species / Life Stage                             |   |                                                                                                                                                                         |                                                                                                                                                                      |
| Pink shrimp<br><i>Penaeus duorarum</i>           | A |                                                                                        |                                                                                                                                                                      |
|                                                  | S |                                                                                                                                                                         |                                                                                                                                                                      |
|                                                  | J |                                                                                        |                                                                                    |
|                                                  | L |                                                                                        |   |
|                                                  | E |                                                                                                                                                                         |                                                                                                                                                                      |
| White shrimp<br><i>Penaeus setiferus</i>         | A |                                                                                        |                                                                                    |
|                                                  | S |                                                                                                                                                                         |                                                                                                                                                                      |
|                                                  | J |                                                                                        |                                                                                    |
|                                                  | L |                                                                                        |                                                                                    |
|                                                  | E |                                                                                                                                                                         |                                                                                                                                                                      |
| Grass shrimp<br><i>Palaemonetes pugio</i>        | A |                                                                                        |                                                                                    |
|                                                  | S |                                                                                        |                                                                                    |
|                                                  | J |                                                                                        |                                                                                    |
|                                                  | L |                                                                                        |                                                                                    |
|                                                  | E |                                                                                        |                                                                                    |
| Blue crab<br><i>Callinectes sapidus</i>          | A |                                                                                        |                                                                                    |
|                                                  | M |                                                                                       |                                                                                   |
|                                                  | J |                                                                                      |                                                                                  |
|                                                  | L |                                                                                      |                                                                                  |
|                                                  | S |                                                                                      |                                                                                  |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i> | A |                                                                                                                                                                         |                                                                                                                                                                      |
|                                                  | S |                                                                                                                                                                         |                                                                                                                                                                      |
|                                                  | J |                                                                                                                                                                         |                                                                                                                                                                      |
|                                                  | L |                                                                                                                                                                         |                                                                                                                                                                      |
|                                                  | E |                                                                                                                                                                         |                                                                                                                                                                      |
| Ladyfish<br><i>Elops saurus</i>                  | A |                                                                                      |                                                                                  |
|                                                  | S |                                                                                                                                                                         |                                                                                                                                                                      |
|                                                  | J |                                                                                      |                                                                                  |
|                                                  | L |   |                                                                                  |
|                                                  | E |                                                                                                                                                                         |                                                                                                                                                                      |
|                                                  |   | J F M A M J J A S O N D                                                                                                                                                 |                                                                                                                                                                      |
|                                                  |   | Indian River                                                                                                                                                            | Biscayne Bay                                                                                                                                                         |
|                                                  |   | Southeast Estuaries                                                                                                                                                     |                                                                                                                                                                      |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |
| M | Mating          |

Table 3, continued. Temporal distribution

|                                                 |   | Southeast Estuaries     |                      |                      |
|-------------------------------------------------|---|-------------------------|----------------------|----------------------|
| Estuary                                         |   | Albemarle Sound         | Pamlico Sound        | Pamlico/Pungo Rivers |
| Month                                           |   | J F M A M J J A S O N D |                      |                      |
| Species / Life Stage                            |   |                         |                      |                      |
| American eel**<br><i>Anguilla rostrata</i>      | A |                         |                      |                      |
|                                                 | S |                         |                      |                      |
|                                                 | J | ████████████████████    | ████████████████████ | ████████████████████ |
|                                                 | L | ... ██████████          | ... ██████████       | ... ██████████       |
|                                                 | E |                         |                      |                      |
| Blueback herring<br><i>Alosa aestivalis</i>     | A | ████████████████████    | ████████████████████ | ████████████████████ |
|                                                 | S | ████████                | ████████             | ████████             |
|                                                 | J | ████████████████████    | ████████████████████ | ..... ██████████ ..  |
|                                                 | L | ████████                | ████████             | ████████             |
|                                                 | E | ████████                | ████████             | ████████             |
| Alewife<br><i>Alosa pseudoharengus</i>          | A | ████████████████████    | ████████████████████ | ████████████████████ |
|                                                 | S | ████████                | ████████             | ████████             |
|                                                 | J | ████████████████████    | ████████████████████ | ████████████████████ |
|                                                 | L | ████████                | ████████             | ████████             |
|                                                 | E | ████████                | ████████             | ████████             |
| American shad<br><i>Alosa sapidissima</i>       | A | ████████                | ████████             | ████████             |
|                                                 | S | ████████                | ████████             | ████████             |
|                                                 | J | ████████████████████    | ████████████████████ | ████████████████████ |
|                                                 | L | ████████                | ████████             | ████████             |
|                                                 | E | ████████                | ████████             | ████████             |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i> | A |                         | ████████████████████ | ████████████████████ |
|                                                 | S |                         |                      |                      |
|                                                 | J | ████████████████████    | ████████████████████ | ████████████████████ |
|                                                 | L | ████████                | ████████             | ████████             |
|                                                 | E |                         |                      |                      |
| Bay anchovy<br><i>Anchoa mitchilli</i>          | A | ████████████████████    | ████████████████████ | ████████████████████ |
|                                                 | S | ████████                | ████████             | ████████             |
|                                                 | J | ████████████████████    | ████████████████████ | ████████████████████ |
|                                                 | L | ████████                | ████████             | ████████             |
|                                                 | E | ████████                | ████████             | ████████             |
|                                                 |   | J F M A M J J A S O N D |                      |                      |
|                                                 |   | Albemarle Sound         | Pamlico Sound        | Pamlico/Pungo Rivers |
|                                                 |   | Southeast Estuaries     |                      |                      |

## Relative Abundance

|          |                 |
|----------|-----------------|
| ████████ | Highly Abundant |
| ████████ | Abundant        |
| ████████ | Common          |
| .....    | Rare            |
| Blank    | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

\*\* See Life History Notes, p. 12.

|                                             |   | Southeast Estuaries     |             |           |
|---------------------------------------------|---|-------------------------|-------------|-----------|
| Estuary                                     |   | Neuse River             | Bogue Sound | New River |
| Month                                       |   | J F M A M J J A S O N D |             |           |
| Species / Life Stage                        |   |                         |             |           |
| American eel**<br><i>Anguilla rostrata</i>  | A |                         |             |           |
|                                             | S |                         |             |           |
|                                             | J |                         |             |           |
|                                             | L |                         |             |           |
|                                             | E |                         |             |           |
| Blueback herring<br><i>Alosa aestivalis</i> | A |                         |             |           |
|                                             | S |                         |             |           |
|                                             | J |                         |             |           |
|                                             | L |                         |             |           |
|                                             | E |                         |             |           |
| Alewife<br><i>Alosa pseudoharengus</i>      | A |                         |             |           |
|                                             | S |                         |             |           |
|                                             | J |                         |             |           |
|                                             | L |                         |             |           |
|                                             | E |                         |             |           |
| American shad<br><i>Alosa sapidissima</i>   | A |                         |             | </        |

Life Stage

A - Adults  
S - Spawning adults  
J - Juveniles  
L - Larvae  
E - Eggs

Table 3, continued. Temporal distribution

|                                                 |   | Southeast Estuaries     |            |                   |
|-------------------------------------------------|---|-------------------------|------------|-------------------|
| Estuary                                         |   | Cape Fear River         | Winyah Bay | N&S Santee Rivers |
| Month                                           |   | J F M A M J J A S O N D |            |                   |
| Species / Life Stage                            |   |                         |            |                   |
| American eel**<br><i>Anguilla rostrata</i>      | A |                         |            |                   |
|                                                 | S |                         |            |                   |
|                                                 | J |                         |            |                   |
|                                                 | L |                         |            |                   |
|                                                 | E |                         |            |                   |
| Blueback herring<br><i>Alosa aestivalis</i>     | A |                         |            |                   |
|                                                 | S |                         |            |                   |
|                                                 | J |                         |            |                   |
|                                                 | L |                         |            |                   |
|                                                 | E |                         |            |                   |
| Alewife<br><i>Alosa pseudoharengus</i>          | A |                         |            |                   |
|                                                 | S |                         |            |                   |
|                                                 | J |                         |            |                   |
|                                                 | L |                         |            |                   |
|                                                 | E |                         |            |                   |
| American shad<br><i>Alosa sapidissima</i>       | A |                         |            |                   |
|                                                 | S |                         |            |                   |
|                                                 | J |                         |            |                   |
|                                                 | L |                         |            |                   |
|                                                 | E |                         |            |                   |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i> | A |                         |            |                   |
|                                                 | S |                         |            |                   |
|                                                 | J |                         |            |                   |
|                                                 | L |                         |            |                   |
|                                                 | E |                         |            |                   |
| Bay anchovy<br><i>Anchoa mitchilli</i>          | A |                         |            |                   |
|                                                 | S |                         |            |                   |
|                                                 | J |                         |            |                   |
|                                                 | L |                         |            |                   |
|                                                 | E |                         |            |                   |
|                                                 |   | J F M A M J J A S O N D |            |                   |
|                                                 |   | Cape Fear River         | Winyah Bay | N&S Santee Rivers |
|                                                 |   | Southeast Estuaries     |            |                   |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

\*\* See *Life History Notes*, p. 12.

Table 3, continued. Temporal distribution

|                                                 |   | Southeast Estuaries |   |   |   |   |                  |   |   |       |   |             |       |   |  |
|-------------------------------------------------|---|---------------------|---|---|---|---|------------------|---|---|-------|---|-------------|-------|---|--|
| Estuary                                         |   | Charleston Harbor   |   |   |   |   | St. Helena Sound |   |   |       |   | Broad River |       |   |  |
| Month                                           |   | J                   | F | M | A | M | J                | J | A | S     | O | N           | D     |   |  |
| Species / Life Stage                            |   |                     |   |   |   |   |                  |   |   |       |   |             |       |   |  |
| American eel**<br><i>Anguilla rostrata</i>      | A | □                   |   |   |   |   | □                |   |   |       |   | □           |       |   |  |
|                                                 | S |                     |   |   |   |   |                  |   |   |       |   |             |       |   |  |
|                                                 | J | □                   |   |   |   |   | □                |   |   |       |   | □           |       |   |  |
|                                                 | L | □                   |   |   |   |   | □                |   |   |       |   |             | □     |   |  |
|                                                 | E |                     |   |   |   |   |                  |   |   |       |   |             |       |   |  |
| Blueback herring<br><i>Alosa aestivalis</i>     | A | □                   |   |   |   |   | □                |   |   |       |   | □           |       |   |  |
|                                                 | S | □                   |   |   |   |   | □                |   |   |       |   | □           |       |   |  |
|                                                 | J | □                   |   |   |   |   | □                |   |   | □     |   |             |       |   |  |
|                                                 | L | □                   |   |   |   |   | □                |   |   |       |   |             | □     |   |  |
|                                                 | E | □                   |   |   |   |   | □                |   |   |       |   |             | □     |   |  |
| Alewife<br><i>Alosa pseudoharengus</i>          | A |                     |   |   |   |   |                  |   |   |       |   |             |       |   |  |
|                                                 | S |                     |   |   |   |   |                  |   |   |       |   |             |       |   |  |
|                                                 | J |                     |   |   |   |   |                  |   |   |       |   |             |       |   |  |
|                                                 | L |                     |   |   |   |   |                  |   |   |       |   |             |       |   |  |
|                                                 | E |                     |   |   |   |   |                  |   |   |       |   |             |       |   |  |
| American shad<br><i>Alosa sapidissima</i>       | A | □                   |   |   |   |   | □                |   |   |       |   | .....       |       |   |  |
|                                                 | S | □                   |   |   |   |   | □                |   |   |       |   | .....       |       |   |  |
|                                                 | J | □                   |   |   |   |   | □                |   |   | ..... |   |             |       |   |  |
|                                                 | L | □                   |   |   |   |   | □                |   |   |       |   |             | ..... |   |  |
|                                                 | E | □                   |   |   |   |   | □                |   |   |       |   |             | ..... |   |  |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i> | A | □                   |   |   |   |   | □                |   |   |       |   |             | □     |   |  |
|                                                 | S |                     |   |   |   |   |                  |   |   |       |   |             |       |   |  |
|                                                 | J | ▨                   |   |   |   |   | ▨                |   |   | ▨     |   |             |       |   |  |
|                                                 | L | ▨                   |   | ▨ |   |   |                  |   | ▨ |       |   |             |       | ▨ |  |
|                                                 | E |                     |   |   |   |   |                  |   |   |       |   |             |       |   |  |
| Bay anchovy<br><i>Anchoa mitchilli</i>          | A | ▨                   |   |   |   |   | ▨                |   |   | ▨     |   |             |       |   |  |
|                                                 | S | ▨                   |   | ▨ |   |   |                  |   | ▨ |       | ▨ |             |       |   |  |
|                                                 | J | ▨                   |   |   |   |   | ▨                |   |   | ▨     |   |             |       |   |  |
|                                                 | L | ▨                   |   | ▨ |   |   |                  |   | ▨ |       | ▨ |             |       |   |  |
|                                                 | E | ▨                   |   | ▨ |   |   |                  |   | ▨ |       | ▨ |             |       |   |  |
|                                                 |   | J                   | F | M | A | M | J                | J | A | S     | O | N           | D     |   |  |
|                                                 |   | Charleston Harbor   |   |   |   |   | St. Helena Sound |   |   |       |   | Broad River |       |   |  |
|                                                 |   | Southeast Estuaries |   |   |   |   |                  |   |   |       |   |             |       |   |  |

## Relative Abundance

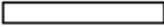
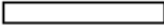
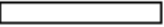
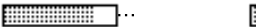
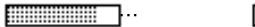
|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

\*\* See *Life History Notes*, p. 12.

Table 3, continued. Temporal distribution

|                                                 |   | Southeast Estuaries                                                                 |                                                                                       |                                                                                       |
|-------------------------------------------------|---|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                         |   | Savannah River                                                                      | Ossabaw Sound                                                                         | St. Cath./Sapelo Sound                                                                |
| Month                                           |   | J F M A M J J A S O N D                                                             |                                                                                       |                                                                                       |
| Species / Life Stage                            |   |                                                                                     |                                                                                       |                                                                                       |
| American eel**<br><i>Anguilla rostrata</i>      | A |    |      |    |
|                                                 | S |                                                                                     |                                                                                       |                                                                                       |
|                                                 | J |    |     |    |
|                                                 | L |    |      |    |
|                                                 | E |                                                                                     |                                                                                       |                                                                                       |
| Blueback herring<br><i>Alosa aestivalis</i>     | A |    |      |    |
|                                                 | S |    |      |    |
|                                                 | J |    |     |    |
|                                                 | L |    |      |    |
|                                                 | E |    |      |    |
| Alewife<br><i>Alosa pseudoharengus</i>          | A |                                                                                     |                                                                                       |                                                                                       |
|                                                 | S |                                                                                     |                                                                                       |                                                                                       |
|                                                 | J |                                                                                     |                                                                                       |                                                                                       |
|                                                 | L |                                                                                     |                                                                                       |                                                                                       |
|                                                 | E |                                                                                     |                                                                                       |                                                                                       |
| American shad<br><i>Alosa sapidissima</i>       | A |    |     |    |
|                                                 | S |   |     |   |
|                                                 | J |  |   |  |
|                                                 | L |  |    |  |
|                                                 | E |  |    |  |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i> | A |  |   |  |
|                                                 | S |                                                                                     |                                                                                       |                                                                                       |
|                                                 | J |  |   |  |
|                                                 | L |  |   |  |
|                                                 | E |  |  |  |
| Bay anchovy<br><i>Anchoa mitchilli</i>          | A |  |   |  |
|                                                 | S |  |   |  |
|                                                 | J |  |   |  |
|                                                 | L |  |   |  |
|                                                 | E |  |   |  |
|                                                 |   | J F M A M J J A S O N D                                                             |                                                                                       |                                                                                       |
|                                                 |   | Savannah River                                                                      | Ossabaw Sound                                                                         | St. Cath./Sapelo Sound                                                                |
|                                                 |   | Southeast Estuaries                                                                 |                                                                                       |                                                                                       |

## Relative Abundance

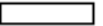
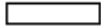
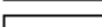
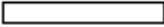
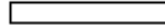
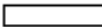
|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

\*\* See Life History Notes, p. 12.

Table 3, continued. Temporal distribution

|                                                 |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|-------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                         |   | Altamaha River                                                                      | St. And./St. Sim. Sound                                                              | St. Johns River                                                                       |
| Month                                           |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage                            |   |                                                                                     |                                                                                      |                                                                                       |
| American eel**<br><i>Anguilla rostrata</i>      | A |    |    |    |
|                                                 | S |                                                                                     |                                                                                      |                                                                                       |
|                                                 | J |    |    |    |
|                                                 | L |    |     |    |
|                                                 | E |                                                                                     |                                                                                      |                                                                                       |
| Blueback herring<br><i>Alosa aestivalis</i>     | A |    |     |    |
|                                                 | S |    |     |    |
|                                                 | J |    |    |    |
|                                                 | L |    |     |    |
|                                                 | E |    |     |    |
| Alewife<br><i>Alosa pseudoharengus</i>          | A |                                                                                     |                                                                                      |                                                                                       |
|                                                 | S |                                                                                     |                                                                                      |                                                                                       |
|                                                 | J |                                                                                     |                                                                                      |                                                                                       |
|                                                 | L |                                                                                     |                                                                                      |                                                                                       |
|                                                 | E |                                                                                     |                                                                                      |                                                                                       |
| American shad<br><i>Alosa sapidissima</i>       | A |    |    |    |
|                                                 | S |   |    |   |
|                                                 | J |  |   |  |
|                                                 | L |  |   |  |
|                                                 | E |  |   |  |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i> | A |  |  |  |
|                                                 | S |                                                                                     |                                                                                      |                                                                                       |
|                                                 | J |  |  |  |
|                                                 | L |  |   |  |
|                                                 | E |  |   |  |
| Bay anchovy<br><i>Anchoa mitchilli</i>          | A |  |  |  |
|                                                 | S |  |  |  |
|                                                 | J |  |  |  |
|                                                 | L |  |  |  |
|                                                 | E |  |  |  |
|                                                 |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                                                 |   | Altamaha River                                                                      | St. And./St. Sim. Sound                                                              | St. Johns River                                                                       |
|                                                 |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

\*\* See *Life History Notes*, p. 12.

Table 3, continued. Temporal distribution

|                                                 |   | Southeast Estuaries     |  |  |  |  |  |              |  |  |  |  |  |
|-------------------------------------------------|---|-------------------------|--|--|--|--|--|--------------|--|--|--|--|--|
| Estuary                                         |   | Indian River            |  |  |  |  |  | Biscayne Bay |  |  |  |  |  |
| Month                                           |   | J F M A M J J A S O N D |  |  |  |  |  |              |  |  |  |  |  |
| Species / Life Stage                            |   |                         |  |  |  |  |  |              |  |  |  |  |  |
| American eel**<br><i>Anguilla rostrata</i>      | A |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | S |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | J |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | L |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | E |                         |  |  |  |  |  |              |  |  |  |  |  |
| Blueback herring<br><i>Alosa aestivalis</i>     | A |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | S |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | J |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | L |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | E |                         |  |  |  |  |  |              |  |  |  |  |  |
| Alewife<br><i>Alosa pseudoharengus</i>          | A |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | S |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | J |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | L |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | E |                         |  |  |  |  |  |              |  |  |  |  |  |
| American shad<br><i>Alosa sapidissima</i>       | A |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | S |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | J |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | L |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | E |                         |  |  |  |  |  |              |  |  |  |  |  |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i> | A |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | S |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | J |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | L |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | E |                         |  |  |  |  |  |              |  |  |  |  |  |
| Bay anchovy<br><i>Anchoa mitchilli</i>          | A |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | S |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | J |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | L |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 | E |                         |  |  |  |  |  |              |  |  |  |  |  |
|                                                 |   | J F M A M J J A S O N D |  |  |  |  |  |              |  |  |  |  |  |
|                                                 |   | Indian River            |  |  |  |  |  | Biscayne Bay |  |  |  |  |  |
|                                                 |   | Southeast Estuaries     |  |  |  |  |  |              |  |  |  |  |  |

Relative Abundance

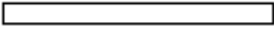
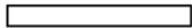
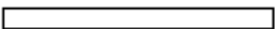
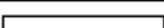
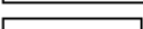
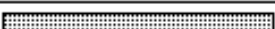
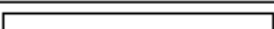
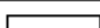
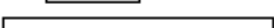
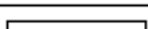
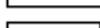
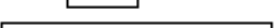
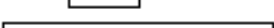
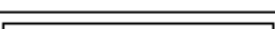
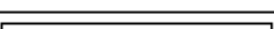
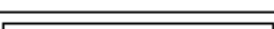
|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

\*\* See *Life History Notes*, p. 12.

Table 3, continued. Temporal distribution

|                                                   |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|---------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                           |   | Albemarle Sound                                                                     | Pamlico Sound                                                                        | Pamlico/Pungo Rivers                                                                  |
| Month                                             |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage                              |   |                                                                                     |                                                                                      |                                                                                       |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A | .....                                                                               |    |    |
|                                                   | S | .....                                                                               |    |    |
|                                                   | J | .....                                                                               |    |    |
|                                                   | L | .....                                                                               |    |    |
|                                                   | E | .....                                                                               |    |    |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A |    |    |    |
|                                                   | S |    |    |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |    |    |
| Atlantic silversides<br><i>Menidia</i> species    | A |    |    |    |
|                                                   | S |    |     |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |     |    |
| White perch<br><i>Morone americana</i>            | A |    |    |    |
|                                                   | S |   |    |   |
|                                                   | J |  |  |  |
|                                                   | L |  |   |  |
|                                                   | E |  |   |  |
| Striped bass<br><i>Morone saxatilis</i>           | A |  |  |  |
|                                                   | S |  |   |  |
|                                                   | J |  |  |  |
|                                                   | L |  |   |  |
|                                                   | E |  |   |  |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A |  |  |  |
|                                                   | S |                                                                                     |                                                                                      |                                                                                       |
|                                                   | J |  |  |  |
|                                                   | L |                                                                                     |                                                                                      |                                                                                       |
|                                                   | E |                                                                                     |                                                                                      |                                                                                       |
|                                                   |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                                                   |   | Albemarle Sound                                                                     | Pamlico Sound                                                                        | Pamlico/Pungo Rivers                                                                  |
|                                                   |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                   |   | Southeast Estuaries     |             |           |
|---------------------------------------------------|---|-------------------------|-------------|-----------|
| Estuary                                           |   | Neuse River             | Bogue Sound | New River |
| Month                                             |   | J F M A M J J A S O N D |             |           |
| Species / Life Stage                              |   |                         |             |           |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A |                         |             |           |
|                                                   | S |                         |             |           |
|                                                   | J |                         |             |           |
|                                                   | L |                         |             |           |
|                                                   | E |                         |             |           |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A |                         |             |           |
|                                                   | S |                         |             |           |
|                                                   | J |                         |             |           |
|                                                   | L |                         |             |           |
|                                                   | E |                         |             |           |
| Atlantic silversides<br><i>Menidia</i> species    | A |                         |             |           |
|                                                   | S |                         |             |           |
|                                                   | J |                         |             |           |
|                                                   | L |                         |             |           |
|                                                   | E |                         |             |           |
| White perch<br><i>Morone americana</i>            | A |                         | .....       |           |
|                                                   | S |                         | .....       |           |
|                                                   | J |                         | .....       |           |
|                                                   | L |                         | .....       |           |
|                                                   | E |                         | .....       |           |
| Striped bass<br><i>Morone saxatilis</i>           | A |                         | .....       | .....     |
|                                                   | S |                         | .....       | .....     |
|                                                   | J |                         | .....       | .....     |
|                                                   | L |                         | .....       | .....     |
|                                                   | E |                         | .....       | .....     |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A | .....                   |             | .....     |
|                                                   | S |                         |             |           |
|                                                   | J |                         |             |           |
|                                                   | L |                         |             |           |
|                                                   | E |                         |             |           |
|                                                   |   | J F M A M J J A S O N D |             |           |
|                                                   |   | Neuse River             | Bogue Sound | New River |
|                                                   |   | Southeast Estuaries     |             |           |

## Relative Abundance

|       |                 |
|-------|-----------------|
|       | Highly Abundant |
|       | Abundant        |
|       | Common          |
| ..... | Rare            |
| Blank | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                   |   | Southeast Estuaries     |            |                   |
|---------------------------------------------------|---|-------------------------|------------|-------------------|
| Estuary                                           |   | Cape Fear River         | Winyah Bay | N/S Santee Rivers |
| Month                                             |   | J F M A M J J A S O N D |            |                   |
| Species / Life Stage                              |   |                         |            |                   |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A |                         |            |                   |
|                                                   | S |                         |            |                   |
|                                                   | J |                         |            |                   |
|                                                   | L |                         |            |                   |
|                                                   | E |                         |            |                   |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A |                         |            |                   |
|                                                   | S |                         |            |                   |
|                                                   | J |                         |            |                   |
|                                                   | L |                         |            |                   |
|                                                   | E |                         |            |                   |
| Atlantic silversides<br><i>Menidia</i> species    | A |                         |            |                   |
|                                                   | S |                         |            |                   |
|                                                   | J |                         |            |                   |
|                                                   | L |                         |            |                   |
|                                                   | E |                         |            |                   |
| White perch<br><i>Morone americana</i>            | A |                         |            |                   |
|                                                   | S |                         |            |                   |
|                                                   | J |                         |            |                   |
|                                                   | L |                         |            |                   |
|                                                   | E |                         |            |                   |
| Striped bass<br><i>Morone saxatilis</i>           | A |                         |            |                   |
|                                                   | S |                         |            |                   |
|                                                   | J |                         |            |                   |
|                                                   | L |                         |            |                   |
|                                                   | E |                         |            |                   |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A |                         |            |                   |
|                                                   | S |                         |            |                   |
|                                                   | J |                         |            |                   |
|                                                   | L |                         |            |                   |
|                                                   | E |                         |            |                   |
|                                                   |   | J F M A M J J A S O N D |            |                   |
|                                                   |   | Cape Fear River         | Winyah Bay | N/S Santee Rivers |
|                                                   |   | Southeast Estuaries     |            |                   |

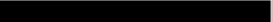
## Relative Abundance

|       |                 |
|-------|-----------------|
|       | Highly Abundant |
|       | Abundant        |
|       | Common          |
|       | Rare            |
| Blank | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                   |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|---------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                           |   | Charleston Harbor                                                                   | St. Helena Sound                                                                     | Broad River                                                                           |
| Month                                             |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage                              |   |                                                                                     |                                                                                      |                                                                                       |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A |    |    |    |
|                                                   | S |    |    |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |    |    |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A |    |    |    |
|                                                   | S |    |    |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |    |    |
| Atlantic silversides<br><i>Menidia species</i>    | A |    |    |    |
|                                                   | S |    |     |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |     |    |
| White perch<br><i>Morone americana</i>            | A |    |                                                                                      |                                                                                       |
|                                                   | S |   |                                                                                      |                                                                                       |
|                                                   | J |  |                                                                                      |                                                                                       |
|                                                   | L |  |                                                                                      |                                                                                       |
|                                                   | E |  |                                                                                      |                                                                                       |
| Striped bass<br><i>Morone saxatilis</i>           | A |  |  |  |
|                                                   | S |  |   |  |
|                                                   | J |  |  |  |
|                                                   | L |  |   |  |
|                                                   | E |  |   |  |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A |                                                                                     |   |  |
|                                                   | S |                                                                                     |                                                                                      |                                                                                       |
|                                                   | J |  |  |  |
|                                                   | L |                                                                                     |                                                                                      |                                                                                       |
|                                                   | E |                                                                                     |                                                                                      |                                                                                       |
|                                                   |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                                                   |   | Charleston Harbor                                                                   | St. Helena Sound                                                                     | Broad River                                                                           |
|                                                   |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

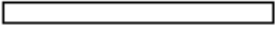
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                   |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|---------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                           |   | Savannah River                                                                      | Ossabaw Sound                                                                        | St. Cath./Sapelo Sound                                                                |
| Month                                             |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage                              |   |                                                                                     |                                                                                      |                                                                                       |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A |    |    |    |
|                                                   | S |    |    |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |    |    |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A |    |    |    |
|                                                   | S |    |    |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |    |    |
| Atlantic silversides<br><i>Menidia species</i>    | A |    |    |    |
|                                                   | S |    |    |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |    |    |
| White perch<br><i>Morone americana</i>            | A |                                                                                     |                                                                                      |                                                                                       |
|                                                   | S |                                                                                     |                                                                                      |                                                                                       |
|                                                   | J |                                                                                     |                                                                                      |                                                                                       |
|                                                   | L |                                                                                     |                                                                                      |                                                                                       |
|                                                   | E |                                                                                     |                                                                                      |                                                                                       |
| Striped bass<br><i>Morone saxatilis</i>           | A |  |  | .....                                                                                 |
|                                                   | S |  |   | .....                                                                                 |
|                                                   | J |  |  | .....                                                                                 |
|                                                   | L |  |   | .....                                                                                 |
|                                                   | E |  |   | .....                                                                                 |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A |                                                                                     |                                                                                      |                                                                                       |
|                                                   | S |                                                                                     |                                                                                      |                                                                                       |
|                                                   | J |  |  |  |
|                                                   | L |                                                                                     |                                                                                      |                                                                                       |
|                                                   | E |                                                                                     |                                                                                      |                                                                                       |
|                                                   |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                                                   |   | Savannah River                                                                      | Ossabaw Sound                                                                        | St. Cath./Sapelo Sound                                                                |
|                                                   |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

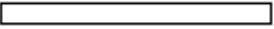
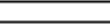
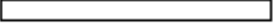
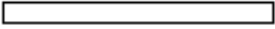
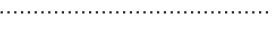
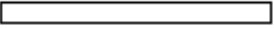
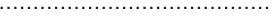
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                   |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|---------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                           |   | Altamaha River                                                                      | St. And./St. Sim. Sound                                                              | St. Johns River                                                                       |
| Month                                             |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage                              |   |                                                                                     |                                                                                      |                                                                                       |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A |    |    |    |
|                                                   | S |    |    |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |    |    |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A |    |    |    |
|                                                   | S |    |    |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |    |    |
| Atlantic silversides<br><i>Menidia</i> species    | A |    |    |    |
|                                                   | S |    |    |    |
|                                                   | J |    |    |    |
|                                                   | L |    |    |    |
|                                                   | E |    |    |    |
| White perch<br><i>Morone americana</i>            | A |                                                                                     |                                                                                      |                                                                                       |
|                                                   | S |                                                                                     |                                                                                      |                                                                                       |
|                                                   | J |                                                                                     |                                                                                      |                                                                                       |
|                                                   | L |                                                                                     |                                                                                      |                                                                                       |
|                                                   | E |                                                                                     |                                                                                      |                                                                                       |
| Striped bass<br><i>Morone saxatilis</i>           | A |  |  |  |
|                                                   | S |  |   |  |
|                                                   | J |  |  |  |
|                                                   | L |  |   |  |
|                                                   | E |  |   |  |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A |                                                                                     |                                                                                      |  |
|                                                   | S |                                                                                     |                                                                                      |  |
|                                                   | J |  |  |  |
|                                                   | L |                                                                                     |                                                                                      |                                                                                       |
|                                                   | E |                                                                                     |                                                                                      |                                                                                       |
|                                                   |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                                                   |   | Altamaha River                                                                      | St. And./St. Sim. Sound                                                              | St. Johns River                                                                       |
|                                                   |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

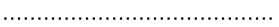
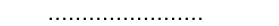
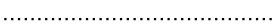
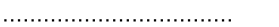
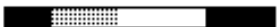
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                   |   | Southeast Estuaries                                                                 |                                                                                      |
|---------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Estuary                                           |   | Indian River                                                                        | Biscayne Bay                                                                         |
| Month                                             |   | J F M A M J J A S O N D                                                             |                                                                                      |
| Species / Life Stage                              |   |                                                                                     |                                                                                      |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A |    |    |
|                                                   | S |    |    |
|                                                   | J |    |    |
|                                                   | L |    |    |
|                                                   | E |    |    |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A |    |                                                                                      |
|                                                   | S |    |                                                                                      |
|                                                   | J |    |                                                                                      |
|                                                   | L |    |                                                                                      |
|                                                   | E |    |                                                                                      |
| Atlantic silversides<br><i>Menidia</i> species    | A |    |    |
|                                                   | S |    |    |
|                                                   | J |    |    |
|                                                   | L |    |    |
|                                                   | E |    |    |
| White perch<br><i>Morone americana</i>            | A |                                                                                     |                                                                                      |
|                                                   | S |                                                                                     |                                                                                      |
|                                                   | J |                                                                                     |                                                                                      |
|                                                   | L |                                                                                     |                                                                                      |
|                                                   | E |                                                                                     |                                                                                      |
| Striped bass<br><i>Morone saxatilis</i>           | A |                                                                                     |                                                                                      |
|                                                   | S |                                                                                     |                                                                                      |
|                                                   | J |                                                                                     |                                                                                      |
|                                                   | L |                                                                                     |                                                                                      |
|                                                   | E |                                                                                     |                                                                                      |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A |  |                                                                                      |
|                                                   | S |                                                                                     |                                                                                      |
|                                                   | J |  |  |
|                                                   | L |                                                                                     |                                                                                      |
|                                                   | E |                                                                                     |                                                                                      |
|                                                   |   | J F M A M J J A S O N D                                                             |                                                                                      |
|                                                   |   | Indian River                                                                        | Biscayne Bay                                                                         |
|                                                   |   | Southeast Estuaries                                                                 |                                                                                      |

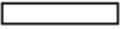
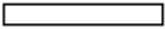
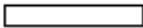
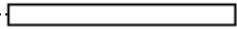
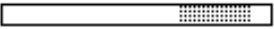
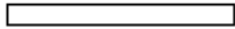
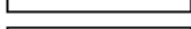
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                  |   | Southeast Estuaries                                                                       |                                                                                            |                                                                                             |
|--------------------------------------------------|---|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Estuary                                          |   | Albemarle Sound                                                                           | Pamlico Sound                                                                              | Pamlico/Pungo Rivers                                                                        |
| Month                                            |   | J F M A M J J A S O N D                                                                   |                                                                                            |                                                                                             |
| Species / Life Stage                             |   |                                                                                           |                                                                                            |                                                                                             |
| Cobia<br><i>Rachycentron canadum</i>             | A |                                                                                           |          |                                                                                             |
|                                                  | S |                                                                                           | na                                                                                         |                                                                                             |
|                                                  | J |                                                                                           |          |                                                                                             |
|                                                  | L |                                                                                           | na                                                                                         |                                                                                             |
|                                                  | E |                                                                                           | na                                                                                         |                                                                                             |
| Gray snapper<br><i>Lutjanus griseus</i>          | A |                                                                                           |                                                                                            |                                                                                             |
|                                                  | S |                                                                                           |                                                                                            |                                                                                             |
|                                                  | J | .....                                                                                     |          | .....                                                                                       |
|                                                  | L |                                                                                           |                                                                                            |                                                                                             |
|                                                  | E |                                                                                           |                                                                                            |                                                                                             |
| Sheepshead<br><i>Archosargus probatocephalus</i> | A | .....                                                                                     |          | .....                                                                                       |
|                                                  | S |                                                                                           |                                                                                            |                                                                                             |
|                                                  | J | .....                                                                                     |          | .....                                                                                       |
|                                                  | L |                                                                                           |          |                                                                                             |
|                                                  | E |                                                                                           |           |                                                                                             |
| Pinfish<br><i>Lagodon rhomboides</i>             | A |          |          |          |
|                                                  | S |                                                                                           |                                                                                            |                                                                                             |
|                                                  | J |        |        |        |
|                                                  | L |                                                                                           |         |        |
|                                                  | E |                                                                                           |       |        |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>   | A | .....  |        |        |
|                                                  | S |                                                                                           |        |                                                                                             |
|                                                  | J |        |        |        |
|                                                  | L |                                                                                           |        |                                                                                             |
|                                                  | E |                                                                                           |        |                                                                                             |
| Weakfish<br><i>Cynoscion regalis</i>             | A |        | .....  |        |
|                                                  | S |                                                                                           |        |        |
|                                                  | J | .....  | .....  | .....  |
|                                                  | L | na                                                                                        |        |        |
|                                                  | E | na                                                                                        |        |        |
|                                                  |   | J F M A M J J A S O N D                                                                   |                                                                                            |                                                                                             |
|                                                  |   | Albemarle Sound                                                                           | Pamlico Sound                                                                              | Pamlico/Pungo Rivers                                                                        |
|                                                  |   | Southeast Estuaries                                                                       |                                                                                            |                                                                                             |

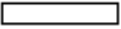
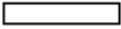
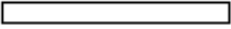
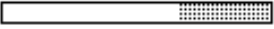
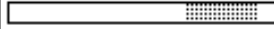
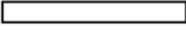
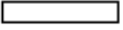
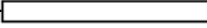
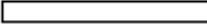
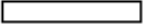
## Relative Abundance

|                                                                                     |                   |
|-------------------------------------------------------------------------------------|-------------------|
|  | Highly Abundant   |
|  | Abundant          |
|  | Common            |
| .....                                                                               | Rare              |
| Blank                                                                               | Not Present       |
| na                                                                                  | No Data Available |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                  |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|--------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                          |   | Neuse River                                                                         | Bogue Sound                                                                          | New River                                                                             |
| Month                                            |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage                             |   |                                                                                     |                                                                                      |                                                                                       |
| Cobia<br><i>Rachycentron canadum</i>             | A |                                                                                     |    |    |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J |                                                                                     |    |    |
|                                                  | L |                                                                                     |    |    |
|                                                  | E |                                                                                     |                                                                                      |                                                                                       |
| Gray snapper<br><i>Lutjanus griseus</i>          | A |                                                                                     |                                                                                      |                                                                                       |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J | .....                                                                               | .....                                                                                | .....                                                                                 |
|                                                  | L |                                                                                     |                                                                                      |                                                                                       |
|                                                  | E |                                                                                     |                                                                                      |                                                                                       |
| Sheepshead<br><i>Archosargus probatocephalus</i> | A | .....                                                                               |    |    |
|                                                  | S |                                                                                     |     |                                                                                       |
|                                                  | J |    |    |    |
|                                                  | L |                                                                                     |     |    |
|                                                  | E |                                                                                     |     |    |
| Pinfish<br><i>Lagodon rhomboides</i>             | A |    |    |    |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J |  |  |  |
|                                                  | L |  |   |  |
|                                                  | E |                                                                                     |                                                                                      |                                                                                       |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>   | A |  |  |  |
|                                                  | S |                                                                                     | .....                                                                                | .....                                                                                 |
|                                                  | J |  |  |  |
|                                                  | L |                                                                                     | .....                                                                                | .....                                                                                 |
|                                                  | E |                                                                                     | .....                                                                                | .....                                                                                 |
| Weakfish<br><i>Cynoscion regalis</i>             | A |  |  |  |
|                                                  | S |  |  | .....                                                                                 |
|                                                  | J |  |  |  |
|                                                  | L |  |  | .....                                                                                 |
|                                                  | E |  |  | .....                                                                                 |
|                                                  |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                                                  |   | Neuse River                                                                         | Bogue Sound                                                                          | New River                                                                             |
|                                                  |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

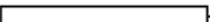
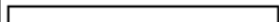
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                    |        | Southeast Estuaries                                                                                                                                                           |                                                                                                                                                                                 |                                                                                                                                                                                   |
|------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Estuary                            |        | Cape Fear River                                                                                                                                                               | Winyah Bay                                                                                                                                                                      | N&S Santee Rivers                                                                                                                                                                 |
| Month                              |        | J F M A M J J A S O N D                                                                                                                                                       |                                                                                                                                                                                 |                                                                                                                                                                                   |
| Species / Life Stage               |        |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
| Cobia                              | A      |                                                                                              | .....                                                                                                                                                                           |                                                                                                |
|                                    | S      |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
|                                    | J      |                                                                                              | .....                                                                                                                                                                           |                                                                                                |
|                                    | L<br>E |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
| <i>Rachycentron canadum</i>        |        |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
| Gray snapper                       | A      |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
|                                    | S      |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
|                                    | J      | .....                                                                                                                                                                         | .....                                                                                                                                                                           | .....                                                                                          |
|                                    | L<br>E |                                                                                                                                                                               | .....                                                                                                                                                                           | .....                                                                                                                                                                             |
| <i>Lutjanus griseus</i>            |        |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
| Sheepshead                         | A      |                                                                                              |                                                                                               |                                                                                                |
|                                    | S      |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
|                                    | J      |                                                                                              |                                                                                               |                                                                                                |
|                                    | L<br>E |                                                                                              | .....                                                                                                                                                                           |                                                                                                |
| <i>Archosargus probatocephalus</i> |        |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
| Pinfish                            | A      |                                                                                              |                                                                                               |                                                                                                |
|                                    | S      |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
|                                    | J      |                                                                                            |                                                                                             |                                                                                              |
|                                    | L<br>E |  .....  |  .....  |  .....  |
| <i>Lagodon rhomboides</i>          |        |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
| Spotted seatrout                   | A      |                                                                                            |                                                                                             |  .....                                                                                       |
|                                    | S      |                                                                                            |                                                                                             |                                                                                                                                                                                   |
|                                    | J      |                                                                                            |                                                                                             |  .....                                                                                       |
|                                    | L<br>E |  .....  |  .....  | .....                                                                                                                                                                             |
| <i>Cynoscion nebulosus</i>         |        |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
| Weakfish                           | A      | .....                                                                                      |                                                                                             | .....                                                                                        |
|                                    | S      |                                                                                            |                                                                                                                                                                                 |                                                                                                                                                                                   |
|                                    | J      |                                                                                            |                                                                                             | .....                                                                                        |
|                                    | L<br>E |  .....  | .....                                                                                       |  .....  |
| <i>Cynoscion regalis</i>           |        |                                                                                                                                                                               |                                                                                                                                                                                 |                                                                                                                                                                                   |
|                                    |        | J F M A M J J A S O N D                                                                                                                                                       |                                                                                                                                                                                 |                                                                                                                                                                                   |
|                                    |        | Cape Fear River                                                                                                                                                               | Winyah Bay                                                                                                                                                                      | N&S Santee Rivers                                                                                                                                                                 |
|                                    |        | Southeast Estuaries                                                                                                                                                           |                                                                                                                                                                                 |                                                                                                                                                                                   |

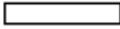
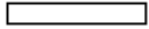
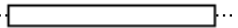
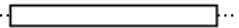
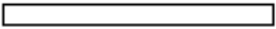
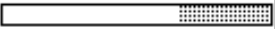
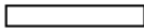
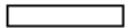
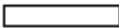
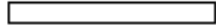
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                  |   | Southeast Estuaries                                                                           |                                                                                                  |                                                                                                   |
|--------------------------------------------------|---|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Estuary                                          |   | Charleston Harbor                                                                             | St. Helena Sound                                                                                 | Broad River                                                                                       |
| Month                                            |   | J F M A M J J A S O N D                                                                       |                                                                                                  |                                                                                                   |
| Species / Life Stage                             |   |                                                                                               |                                                                                                  |                                                                                                   |
| Cobia<br><i>Rachycentron canadum</i>             | A |              |                |                |
|                                                  | S |                                                                                               |                                                                                                  |                                                                                                   |
|                                                  | J |              |                |                |
|                                                  | L |                                                                                               |                                                                                                  |                                                                                                   |
|                                                  | E |                                                                                               |                                                                                                  |                                                                                                   |
| Gray snapper<br><i>Lutjanus griseus</i>          | A |                                                                                               |                                                                                                  |                                                                                                   |
|                                                  | S |                                                                                               |                                                                                                  |                                                                                                   |
|                                                  | J |              | .....                                                                                            | .....                                                                                             |
|                                                  | L |              |                                                                                                  |                                                                                                   |
|                                                  | E |                                                                                               |                                                                                                  |                                                                                                   |
| Sheepshead<br><i>Archosargus probatocephalus</i> | A |              |                |                |
|                                                  | S |                                                                                               |                                                                                                  |                                                                                                   |
|                                                  | J |              |                |                |
|                                                  | L |              |                 |                |
|                                                  | E |                                                                                               |                                                                                                  |                                                                                                   |
| Pinfish<br><i>Lagodon rhomboides</i>             | A | .....  ..... |                | .....  .....   |
|                                                  | S |                                                                                               |                                                                                                  |                                                                                                   |
|                                                  | J |            |              |              |
|                                                  | L |            |               |              |
|                                                  | E |            |             |              |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>   | A |            |              |              |
|                                                  | S |            |              |              |
|                                                  | J |            |              |              |
|                                                  | L |            |              |              |
|                                                  | E |            |              |              |
| Weakfish<br><i>Cynoscion regalis</i>             | A |            |              |              |
|                                                  | S |                                                                                               |               |              |
|                                                  | J |            | .....  ..... | .....  ..... |
|                                                  | L |            |              |              |
|                                                  | E |            |               |              |
|                                                  |   | J F M A M J J A S O N D                                                                       |                                                                                                  |                                                                                                   |
|                                                  |   | Charleston Harbor                                                                             | St. Helena Sound                                                                                 | Broad River                                                                                       |
|                                                  |   | Southeast Estuaries                                                                           |                                                                                                  |                                                                                                   |

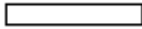
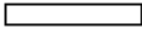
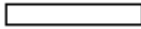
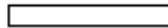
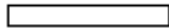
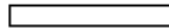
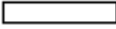
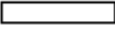
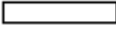
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                  |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|--------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                          |   | Savannah River                                                                      | Ossabaw Sound                                                                        | St. Cath./Sapelo Sound                                                                |
| Month                                            |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage                             |   |                                                                                     |                                                                                      |                                                                                       |
| Cobia<br><i>Rachycentron canadum</i>             | A | .....                                                                               | .....                                                                                | .....                                                                                 |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J |    |    |    |
|                                                  | L |                                                                                     |                                                                                      |                                                                                       |
|                                                  | E |                                                                                     |                                                                                      |                                                                                       |
| Gray snapper<br><i>Lutjanus griseus</i>          | A |                                                                                     |                                                                                      |                                                                                       |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J | .....                                                                               | .....                                                                                | .....                                                                                 |
|                                                  | L |                                                                                     |                                                                                      |                                                                                       |
|                                                  | E |                                                                                     |                                                                                      |                                                                                       |
| Sheepshead<br><i>Archosargus probatocephalus</i> | A |    |    |    |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J |    |    |    |
|                                                  | L |    |    |    |
|                                                  | E |                                                                                     |                                                                                      |                                                                                       |
| Pinfish<br><i>Lagodon rhomboides</i>             | A |    |    |    |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J |  |  |  |
|                                                  | L |  |   |  |
|                                                  | E |                                                                                     |                                                                                      |                                                                                       |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>   | A |  |  |  |
|                                                  | S |  |  |  |
|                                                  | J |  |  |  |
|                                                  | L |  |  |  |
|                                                  | E |  |  |  |
| Weakfish<br><i>Cynoscion regalis</i>             | A | .....                                                                               | .....                                                                                | .....                                                                                 |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J |  |  |  |
|                                                  | L |  |  |  |
|                                                  | E | .....                                                                               | .....                                                                                | .....                                                                                 |
|                                                  |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                                                  |   | Savannah River                                                                      | Ossabaw Sound                                                                        | St. Cath./Sapelo Sound                                                                |
|                                                  |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

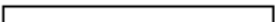
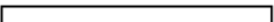
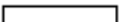
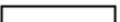
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                  |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|--------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                          |   | Altamaha River                                                                      | St. And./St. Sim. Sound                                                              | St. Johns River                                                                       |
| Month                                            |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage                             |   |                                                                                     |                                                                                      |                                                                                       |
| Cobia<br><i>Rachycentron canadum</i>             | A | .....                                                                               | .....                                                                                |    |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J |    |    |    |
|                                                  | L |                                                                                     |                                                                                      |                                                                                       |
|                                                  | E |                                                                                     |                                                                                      |                                                                                       |
| Gray snapper<br><i>Lutjanus griseus</i>          | A |                                                                                     |                                                                                      |    |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J | .....                                                                               | .....                                                                                |    |
|                                                  | L |                                                                                     |                                                                                      |    |
|                                                  | E |                                                                                     |                                                                                      |                                                                                       |
| Sheepshead<br><i>Archosargus probatocephalus</i> | A |    |    |    |
|                                                  | S |                                                                                     |                                                                                      |    |
|                                                  | J |    |    |    |
|                                                  | L |    |    |    |
|                                                  | E |                                                                                     |                                                                                      |    |
| Pinfish<br><i>Lagodon rhomboides</i>             | A |    |    |    |
|                                                  | S |                                                                                     |                                                                                      |                                                                                       |
|                                                  | J |  |  |  |
|                                                  | L |  |   |  |
|                                                  | E |                                                                                     |                                                                                      |  |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>   | A |  |  |  |
|                                                  | S |  |  |  |
|                                                  | J |  |  |  |
|                                                  | L |  |  |  |
|                                                  | E |  |  |  |
| Weakfish<br><i>Cynoscion regalis</i>             | A | .....                                                                               | .....                                                                                |  |
|                                                  | S | .....                                                                               |   |  |
|                                                  | J |  |  |  |
|                                                  | L |  |  |  |
|                                                  | E | .....                                                                               |   |  |
|                                                  |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                                                  |   | Altamaha River                                                                      | St. And./St. Sim. Sound                                                              | St. Johns River                                                                       |
|                                                  |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

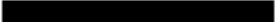
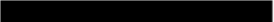
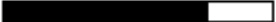
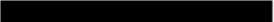
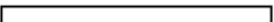
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                    |   | Southeast Estuaries                                                                 |                                                                                      |
|------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Estuary                            |   | Indian River                                                                        | Biscayne Bay                                                                         |
| Month                              |   | J F M A M J J A S O N D                                                             |                                                                                      |
| Species / Life Stage               |   |                                                                                     |                                                                                      |
| Cobia                              | A |                                                                                     |                                                                                      |
|                                    | S |                                                                                     |                                                                                      |
| <i>Rachycentron canadum</i>        | J |                                                                                     |                                                                                      |
|                                    | L |                                                                                     |                                                                                      |
|                                    | E |                                                                                     |                                                                                      |
| Gray snapper                       | A |    |    |
|                                    | S |                                                                                     |                                                                                      |
| <i>Lutjanus griseus</i>            | J |    |    |
|                                    | L |                                                                                     |    |
|                                    | E |                                                                                     |                                                                                      |
| Sheepshead                         | A |    | .....                                                                                |
|                                    | S |                                                                                     | .....                                                                                |
| <i>Archosargus probatocephalus</i> | J |    | .....                                                                                |
|                                    | L |                                                                                     | .....                                                                                |
|                                    | E |                                                                                     | .....                                                                                |
| Pinfish                            | A |    |    |
|                                    | S |   |                                                                                      |
| <i>Lagodon rhomboides</i>          | J |  |  |
|                                    | L |  |  |
|                                    | E |  |                                                                                      |
| Spotted seatrout                   | A |  |  |
|                                    | S |  |  |
| <i>Cynoscion nebulosus</i>         | J |  |  |
|                                    | L |  |  |
|                                    | E |  |  |
| Weakfish                           | A |  | .....                                                                                |
|                                    | S |                                                                                     | .....                                                                                |
| <i>Cynoscion regalis</i>           | J |                                                                                     | .....                                                                                |
|                                    | L |                                                                                     | .....                                                                                |
|                                    | E |                                                                                     | .....                                                                                |
|                                    |   | J F M A M J J A S O N D                                                             |                                                                                      |
|                                    |   | Indian River                                                                        | Biscayne Bay                                                                         |
|                                    |   | Southeast Estuaries                                                                 |                                                                                      |

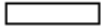
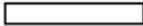
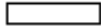
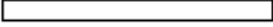
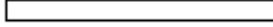
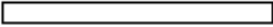
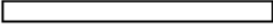
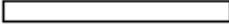
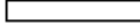
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                |   | Southeast Estuaries                                                                 |                                                                                       |                                                                                       |
|--------------------------------|---|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                        |   | Albemarle Sound                                                                     | Pamlico Sound                                                                         | Pamlico/Pungo Rivers                                                                  |
| Month                          |   | J F M A M J J A S O N D                                                             |                                                                                       |                                                                                       |
| Species / Life Stage           |   |                                                                                     |                                                                                       |                                                                                       |
| Spot                           | A |    |     |    |
|                                | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Leiostomus xanthurus</i>    | J |    |     |    |
|                                | L | .....                                                                               |      | .....                                                                                 |
|                                | E |                                                                                     |                                                                                       |                                                                                       |
| Southern kingfish              | A |    |     |    |
|                                | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Menticirrhus americanus</i> | J |    |     |    |
|                                | L |                                                                                     |     |                                                                                       |
|                                | E |                                                                                     |                                                                                       |                                                                                       |
| Atlantic croaker               | A |    |     |    |
|                                | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Micropogonias undulatus</i> | J |    |     |    |
|                                | L |                                                                                     |      |    |
|                                | E |                                                                                     |    |    |
| Black drum                     | A | .....                                                                               |     |    |
|                                | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Pogonias cromis</i>         | J | .....                                                                               |   |  |
|                                | L |                                                                                     |                                                                                       |                                                                                       |
|                                | E |                                                                                     |                                                                                       |                                                                                       |
| Red drum                       | A |                                                                                     |   |                                                                                       |
|                                | S |                                                                                     | .....                                                                                 |                                                                                       |
| <i>Sciaenops ocellatus</i>     | J | .....                                                                               |   |  |
|                                | L |                                                                                     |   |  |
|                                | E |                                                                                     | .....                                                                                 |                                                                                       |
| Striped mullet                 | A |  |   |  |
|                                | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Mugil cephalus</i>          | J |  |   |  |
|                                | L |                                                                                     |    |                                                                                       |
|                                | E |                                                                                     |  |                                                                                       |
|                                |   | J F M A M J J A S O N D                                                             |                                                                                       |                                                                                       |
|                                |   | Albemarle Sound                                                                     | Pamlico Sound                                                                         | Pamlico/Pungo Rivers                                                                  |
|                                |   | Southeast Estuaries                                                                 |                                                                                       |                                                                                       |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                     |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|-----------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                             |   | Neuse River                                                                         | Bogue Sound                                                                          | New River                                                                             |
| Month                                               |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage                                |   |                                                                                     |                                                                                      |                                                                                       |
| Spot<br><i>Leiostomus xanthurus</i>                 | A |    |    |    |
|                                                     | S |                                                                                     |                                                                                      |                                                                                       |
|                                                     | J |    |    |    |
|                                                     | L | .....                                                                               |     |    |
|                                                     | E |                                                                                     |                                                                                      |                                                                                       |
| Southern kingfish<br><i>Menticirrhus americanus</i> | A |    |    |    |
|                                                     | S |                                                                                     |                                                                                      |                                                                                       |
|                                                     | J |    |    |    |
|                                                     | L |    |    |    |
|                                                     | E |                                                                                     |                                                                                      |                                                                                       |
| Atlantic croaker<br><i>Micropogonias undulatus</i>  | A |    |    |    |
|                                                     | S |                                                                                     |                                                                                      |                                                                                       |
|                                                     | J |    |    |    |
|                                                     | L |    |     |    |
|                                                     | E |                                                                                     |                                                                                      |                                                                                       |
| Black drum<br><i>Pogonias cromis</i>                | A |    | .....                                                                                | .....                                                                                 |
|                                                     | S |                                                                                     |                                                                                      |                                                                                       |
|                                                     | J |  | .....                                                                                | .....                                                                                 |
|                                                     | L |                                                                                     | .....                                                                                | .....                                                                                 |
|                                                     | E |                                                                                     |                                                                                      |                                                                                       |
| Red drum<br><i>Sciaenops ocellatus</i>              | A | .....                                                                               |  | .....                                                                                 |
|                                                     | S |                                                                                     |  | .....                                                                                 |
|                                                     | J |  |  | .....                                                                                 |
|                                                     | L |  |  | .....                                                                                 |
|                                                     | E |                                                                                     |  | .....                                                                                 |
| Striped mullet<br><i>Mugil cephalus</i>             | A |  |  |  |
|                                                     | S |                                                                                     |                                                                                      |                                                                                       |
|                                                     | J |  |  |  |
|                                                     | L |  |   |  |
|                                                     | E |                                                                                     |                                                                                      |                                                                                       |
|                                                     |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                                                     |   | Neuse River                                                                         | Bogue Sound                                                                          | New River                                                                             |
|                                                     |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

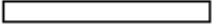
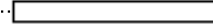
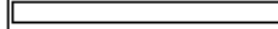
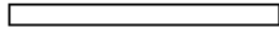
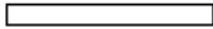
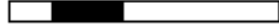
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                     |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |
|-----------------------------------------------------|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                                             |   | Cape Fear River                                                                     | Winyah Bay                                                                           | N/S Santee Rivers                                                                     |
| Month                                               |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
| Species / Life Stage                                |   |                                                                                     |                                                                                      |                                                                                       |
| Spot<br><i>Leiostomus xanthurus</i>                 | A |    |    |    |
|                                                     | S |                                                                                     |                                                                                      |                                                                                       |
|                                                     | J |    |    |    |
|                                                     | L |    |     |    |
|                                                     | E |    |   |    |
| Southern kingfish<br><i>Menticirhhus americanus</i> | A |    |    |    |
|                                                     | S |                                                                                     |                                                                                      |                                                                                       |
|                                                     | J |    |    |    |
|                                                     | L |    |    |    |
|                                                     | E |                                                                                     |                                                                                      |                                                                                       |
| Atlantic croaker<br><i>Micropogonias undulatus</i>  | A |    |    |    |
|                                                     | S |                                                                                     |                                                                                      |                                                                                       |
|                                                     | J |    |    |    |
|                                                     | L |    |     |    |
|                                                     | E |    |   |    |
| Black drum<br><i>Pogonias cromis</i>                | A |                                                                                     |    |                                                                                       |
|                                                     | S |                                                                                     |                                                                                      |                                                                                       |
|                                                     | J |                                                                                     |  |                                                                                       |
|                                                     | L |                                                                                     |                                                                                      |                                                                                       |
|                                                     | E |                                                                                     |                                                                                      |                                                                                       |
| Red drum<br><i>Sciaenops ocellatus</i>              | A |  |  |                                                                                       |
|                                                     | S |  |  |                                                                                       |
|                                                     | J |  |  |                                                                                       |
|                                                     | L |  |  |                                                                                       |
|                                                     | E |  |  |                                                                                       |
| Striped mullet<br><i>Mugil cephalus</i>             | A |  |  |  |
|                                                     | S |                                                                                     |                                                                                      |                                                                                       |
|                                                     | J |  |  |  |
|                                                     | L |  |                                                                                      |  |
|                                                     | E |  |                                                                                      |  |
|                                                     |   | J F M A M J J A S O N D                                                             |                                                                                      |                                                                                       |
|                                                     |   | Cape Fear River                                                                     | Winyah Bay                                                                           | N/S Santee Rivers                                                                     |
|                                                     |   | Southeast Estuaries                                                                 |                                                                                      |                                                                                       |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                     |   | Southeast Estuaries     |                  |             |
|-----------------------------------------------------|---|-------------------------|------------------|-------------|
| Estuary                                             |   | Charleston Harbor       | St. Helena Sound | Broad River |
| Month                                               |   | J F M A M J J A S O N D |                  |             |
| Species / Life Stage                                |   |                         |                  |             |
| Spot<br><i>Leiostomus xanthurus</i>                 | A | .....                   | .....            | .....       |
|                                                     | S | .....                   | .....            | .....       |
|                                                     | J | .....                   | .....            | .....       |
|                                                     | L | .....                   | .....            | .....       |
|                                                     | E | .....                   | .....            | .....       |
| Southern kingfish<br><i>Menticirhhus americanus</i> | A | .....                   | .....            | .....       |
|                                                     | S | .....                   | .....            | .....       |
|                                                     | J | .....                   | .....            | .....       |
|                                                     | L | .....                   | .....            | .....       |
|                                                     | E | .....                   | .....            | .....       |
| Atlantic croaker<br><i>Micropogonias undulatus</i>  | A | .....                   | .....            | .....       |
|                                                     | S | .....                   | .....            | .....       |
|                                                     | J | .....                   | .....            | .....       |
|                                                     | L | .....                   | .....            | .....       |
|                                                     | E | .....                   | .....            | .....       |
| Black drum<br><i>Pogonias cromis</i>                | A | .....                   | .....            | .....       |
|                                                     | S | .....                   | .....            | .....       |
|                                                     | J | .....                   | .....            | .....       |
|                                                     | L | .....                   | .....            | .....       |
|                                                     | E | .....                   | .....            | .....       |
| Red drum<br><i>Sciaenops ocellatus</i>              | A | .....                   | .....            | .....       |
|                                                     | S | .....                   | .....            | .....       |
|                                                     | J | .....                   | .....            | .....       |
|                                                     | L | .....                   | .....            | .....       |
|                                                     | E | .....                   | .....            | .....       |
| Striped mullet<br><i>Mugil cephalus</i>             | A | .....                   | .....            | .....       |
|                                                     | S | .....                   | .....            | .....       |
|                                                     | J | .....                   | .....            | .....       |
|                                                     | L | .....                   | .....            | .....       |
|                                                     | E | .....                   | .....            | .....       |
|                                                     |   | J F M A M J J A S O N D |                  |             |
|                                                     |   | Charleston Harbor       | St. Helena Sound | Broad River |
|                                                     |   | Southeast Estuaries     |                  |             |

## Relative Abundance

|       |                 |
|-------|-----------------|
| ■     | Highly Abundant |
| ▨     | Abundant        |
| □     | Common          |
| ..... | Rare            |
| Blank | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                     |   | Southeast Estuaries     |               |                        |
|-----------------------------------------------------|---|-------------------------|---------------|------------------------|
| Estuary                                             |   | Savannah River          | Ossabaw Sound | St. Cath./Sapelo Sound |
| Month                                               |   | J F M A M J J A S O N D |               |                        |
| Species / Life Stage                                |   |                         |               |                        |
| Spot<br><i>Leiostomus xanthurus</i>                 | A |                         |               |                        |
|                                                     | S |                         |               |                        |
|                                                     | J |                         |               |                        |
|                                                     | L |                         |               |                        |
|                                                     | E |                         |               |                        |
| Southern kingfish<br><i>Menticirhhus americanus</i> | A |                         |               |                        |
|                                                     | S |                         |               |                        |
|                                                     | J |                         |               |                        |
|                                                     | L |                         |               |                        |
|                                                     | E |                         |               |                        |
| Atlantic croaker<br><i>Micropogonias undulatus</i>  | A |                         |               |                        |
|                                                     | S |                         |               |                        |
|                                                     | J |                         |               |                        |
|                                                     | L |                         |               |                        |
|                                                     | E |                         |               |                        |
| Black drum<br><i>Pogonias cromis</i>                | A |                         |               |                        |
|                                                     | S |                         |               |                        |
|                                                     | J |                         |               |                        |
|                                                     | L |                         |               |                        |
|                                                     | E |                         |               |                        |
| Red drum<br><i>Sciaenops ocellatus</i>              | A |                         |               |                        |
|                                                     | S |                         |               |                        |
|                                                     | J |                         |               |                        |
|                                                     | L |                         |               |                        |
|                                                     | E |                         |               |                        |
| Striped mullet<br><i>Mugil cephalus</i>             | A |                         |               |                        |
|                                                     | S |                         |               |                        |
|                                                     | J |                         |               |                        |
|                                                     | L |                         |               |                        |
|                                                     | E |                         |               |                        |
|                                                     |   | J F M A M J J A S O N D |               |                        |
|                                                     |   | Savannah River          | Ossabaw Sound | St. Cath./Sapelo Sound |
|                                                     |   | Southeast Estuaries     |               |                        |

## Relative Abundance

|       |                 |
|-------|-----------------|
|       | Highly Abundant |
|       | Abundant        |
|       | Common          |
|       | Rare            |
| Blank | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                     |   | Southeast Estuaries                     |                                         |                                         |
|-----------------------------------------------------|---|-----------------------------------------|-----------------------------------------|-----------------------------------------|
| Estuary                                             |   | Altamaha River                          | St. And./St. Sim. Sound                 | St. Johns River                         |
| Month                                               |   | J F M A M J J A S O N D                 |                                         |                                         |
| Species / Life Stage                                |   |                                         |                                         |                                         |
| Spot<br><i>Leiostomus xanthurus</i>                 | A | ..... [ ]                               | ..... [ ]                               | [ ]                                     |
|                                                     | S |                                         |                                         |                                         |
|                                                     | J | [ ] [ ] [ ] [ ] [ ]                     | [ ] [ ] [ ] [ ] [ ]                     | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | L | [ ] [ ] [ ] [ ] [ ]                     | [ ] [ ] [ ] [ ] [ ]                     | [ ] [ ] [ ] [ ] [ ]                     |
|                                                     | E |                                         |                                         |                                         |
| Southern kingfish<br><i>Menticirhhus americanus</i> | A | [ ] [ ] [ ] [ ] [ ]                     | [ ] [ ] [ ] [ ] [ ]                     | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | S | .....                                   | .....                                   |                                         |
|                                                     | J | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | L | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | E | .....                                   | .....                                   |                                         |
| Atlantic croaker<br><i>Micropogonias undulatus</i>  | A | [ ] [ ] [ ] [ ] [ ]                     | [ ] [ ] [ ] [ ] [ ]                     | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | S |                                         |                                         |                                         |
|                                                     | J | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | L | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | E |                                         |                                         |                                         |
| Black drum<br><i>Pogonias cromis</i>                | A | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | S | .....                                   | .....                                   | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | J | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | L | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | E | .....                                   | .....                                   | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
| Red drum<br><i>Sciaenops ocellatus</i>              | A | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | S | .....                                   | .....                                   | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | J | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | L | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | E | .....                                   | .....                                   | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
| Striped mullet<br><i>Mugil cephalus</i>             | A | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | S |                                         |                                         |                                         |
|                                                     | J | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | L | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] | [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] |
|                                                     | E |                                         |                                         |                                         |
|                                                     |   | J F M A M J J A S O N D                 |                                         |                                         |
|                                                     |   | Altamaha River                          | St. And./St. Sim. Sound                 | St. Johns River                         |
|                                                     |   | Southeast Estuaries                     |                                         |                                         |

## Relative Abundance

|                   |                 |
|-------------------|-----------------|
| [Solid Black Box] | Highly Abundant |
| [Dotted Box]      | Abundant        |
| [White Box]       | Common          |
| [Dotted Line]     | Rare            |
| [Blank]           | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                     |   | Southeast Estuaries               |   |   |   |   |   |                                   |   |   |   |   |   |                                   |                                   |
|-----------------------------------------------------|---|-----------------------------------|---|---|---|---|---|-----------------------------------|---|---|---|---|---|-----------------------------------|-----------------------------------|
| Estuary                                             |   | Indian River                      |   |   |   |   |   | Biscayne Bay                      |   |   |   |   |   |                                   |                                   |
| Month                                               |   | J                                 | F | M | A | M | J | J                                 | A | S | O | N | D |                                   |                                   |
| Species / Life Stage                                |   |                                   |   |   |   |   |   |                                   |   |   |   |   |   |                                   |                                   |
| Spot<br><i>Leiostomus xanthurus</i>                 | A | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | S |                                   |   |   |   |   |   |                                   |   |   |   |   |   |                                   |                                   |
|                                                     | J | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | L |                                   |   |   |   |   |   |                                   |   |   |   |   |   | <div><div></div><div></div></div> | <div><div></div><div></div></div> |
|                                                     | E |                                   |   |   |   |   |   |                                   |   |   |   |   |   |                                   |                                   |
| Southern kingfish<br><i>Menticirhhus americanus</i> | A | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | S |                                   |   |   |   |   |   |                                   |   |   |   |   |   |                                   |                                   |
|                                                     | J | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | L | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | E |                                   |   |   |   |   |   |                                   |   |   |   |   |   |                                   |                                   |
| Atlantic croaker<br><i>Micropogonias undulatus</i>  | A | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | S |                                   |   |   |   |   |   |                                   |   |   |   |   |   |                                   |                                   |
|                                                     | J | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | L |                                   |   |   |   |   |   |                                   |   |   |   |   |   | <div><div></div><div></div></div> | <div><div></div><div></div></div> |
|                                                     | E |                                   |   |   |   |   |   |                                   |   |   |   |   |   |                                   |                                   |
| Black drum<br><i>Pogonias cromis</i>                | A | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | S | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | J | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | L | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | E | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
| Red drum<br><i>Sciaenops ocellatus</i>              | A | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | S | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | J | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | L | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | E | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
| Striped mullet<br><i>Mugil cephalus</i>             | A | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | S |                                   |   |   |   |   |   |                                   |   |   |   |   |   |                                   |                                   |
|                                                     | J | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | L | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     | E | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |   |   |   |   |   | <div><div></div><div></div></div> |                                   |
|                                                     |   | J                                 | F | M | A | M | J | J                                 | A | S | O | N | D |                                   |                                   |
|                                                     |   | Indian River                      |   |   |   |   |   | Biscayne Bay                      |   |   |   |   |   |                                   |                                   |
|                                                     |   | Southeast Estuaries               |   |   |   |   |   |                                   |   |   |   |   |   |                                   |                                   |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                 |   | Southeast Estuaries     |               |                      |
|---------------------------------|---|-------------------------|---------------|----------------------|
| Estuary                         |   | Albemarle Sound         | Pamlico Sound | Pamlico/Pungo Rivers |
| Month                           |   | J F M A M J J A S O N D |               |                      |
| Species / Life Stage            |   |                         |               |                      |
| Spanish mackerel                | A | .....                   |               | .....                |
|                                 | S |                         |               |                      |
| <i>Scomberomorus maculatus</i>  | J |                         |               |                      |
|                                 | L |                         | na            |                      |
|                                 | E |                         |               |                      |
| Gulf flounder                   | A |                         |               |                      |
|                                 | S |                         |               |                      |
| <i>Paralichthys albigutta</i>   | J |                         |               |                      |
|                                 | L |                         |               |                      |
|                                 | E |                         |               |                      |
| Summer flounder                 | A |                         |               |                      |
|                                 | S |                         |               |                      |
| <i>Paralichthys dentatus</i>    | J |                         |               |                      |
|                                 | L |                         |               |                      |
|                                 | E |                         |               |                      |
| Southern flounder               | A |                         |               |                      |
|                                 | S |                         |               |                      |
| <i>Paralichthys lethostigma</i> | J |                         |               |                      |
|                                 | L |                         |               |                      |
|                                 | E |                         |               |                      |
|                                 |   | J F M A M J J A S O N D |               |                      |
|                                 |   | Albemarle Sound         | Pamlico Sound | Pamlico/Pungo Rivers |
|                                 |   | Southeast Estuaries     |               |                      |

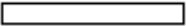
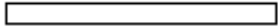
## Relative Abundance

|                                                                                     |                   |
|-------------------------------------------------------------------------------------|-------------------|
|  | Highly Abundant   |
|  | Abundant          |
|  | Common            |
| .....                                                                               | Rare              |
| Blank                                                                               | Not Present       |
| na                                                                                  | No Data Available |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                 |   | Southeast Estuaries                                                                                                                                                     |                                                                                                                                                                           |                                                                                                                                                                             |
|---------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Estuary                         |   | Neuse River                                                                                                                                                             | Bogue Sound                                                                                                                                                               | New River                                                                                                                                                                   |
| Month                           |   | J F M A M J J A S O N D                                                                                                                                                 |                                                                                                                                                                           |                                                                                                                                                                             |
| Species / Life Stage            |   |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| Spanish mackerel                | A | .....                                                                                                                                                                   |                                                                                         |                                                                                          |
|                                 | S |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| <i>Scomberomorus maculatus</i>  | J |                                                                                        |                                                                                         |                                                                                          |
|                                 | L |                                                                                                                                                                         |                                                                                         |                                                                                          |
|                                 | E |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| Gulf flounder                   | A |                                                                                                                                                                         |                                                                                         |                                                                                          |
|                                 | S |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| <i>Paralichthys albigutta</i>   | J |                                                                                                                                                                         |                                                                                         |                                                                                          |
|                                 | L |                                                                                                                                                                         |       |       |
|                                 | E |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| Summer flounder                 | A |                                                                                        |                                                                                         |                                                                                          |
|                                 | S |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| <i>Paralichthys dentatus</i>    | J |                                                                                        |                                                                                         |                                                                                          |
|                                 | L |       |                                                                                          |  .....                                                                                   |
|                                 | E |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| Southern flounder               | A |  .....                                                                                 |                                                                                         |                                                                                          |
|                                 | S |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
| <i>Paralichthys lethostigma</i> | J |                                                                                      |                                                                                       |                                                                                        |
|                                 | L |   |   |   |
|                                 | E |                                                                                                                                                                         |                                                                                                                                                                           |                                                                                                                                                                             |
|                                 |   | J F M A M J J A S O N D                                                                                                                                                 |                                                                                                                                                                           |                                                                                                                                                                             |
|                                 |   | Neuse River                                                                                                                                                             | Bogue Sound                                                                                                                                                               | New River                                                                                                                                                                   |
|                                 |   | Southeast Estuaries                                                                                                                                                     |                                                                                                                                                                           |                                                                                                                                                                             |

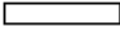
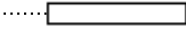
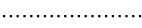
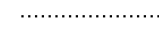
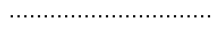
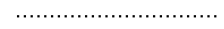
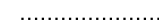
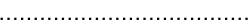
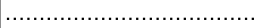
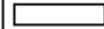
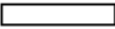
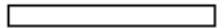
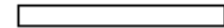
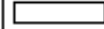
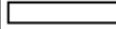
## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                 |   | Southeast Estuaries                                                                 |                                                                                       |                                                                                       |
|---------------------------------|---|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Estuary                         |   |                                                                                     |                                                                                       |                                                                                       |
| Month                           |   | J F M A M J J A S O N D                                                             |                                                                                       |                                                                                       |
| Species / Life Stage            |   | Cape Fear River                                                                     | Winyah Bay                                                                            | N/S Santee Rivers                                                                     |
| Spanish mackerel                | A |    |     |                                                                                       |
|                                 | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Scomberomorus maculatus</i>  | J |    |     |    |
|                                 | L |                                                                                     |     |                                                                                       |
|                                 | E |                                                                                     |                                                                                       |                                                                                       |
| Gulf flounder                   | A |    |     |    |
|                                 | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Paralichthys albigutta</i>   | J |    |     |    |
|                                 | L |    |      |    |
|                                 | E |                                                                                     |                                                                                       |                                                                                       |
| Summer flounder                 | A |    |     |    |
|                                 | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Paralichthys dentatus</i>    | J |    |     |    |
|                                 | L |    |      |    |
|                                 | E |    |    |                                                                                       |
| Southern flounder               | A |    |     |    |
|                                 | S |                                                                                     |                                                                                       |                                                                                       |
| <i>Paralichthys lethostigma</i> | J |  |   |  |
|                                 | L |  |    |  |
|                                 | E |  |  |  |
|                                 |   | J F M A M J J A S O N D                                                             |                                                                                       |                                                                                       |
|                                 |   | Cape Fear River                                                                     | Winyah Bay                                                                            | N/S Santee Rivers                                                                     |
|                                 |   | Southeast Estuaries                                                                 |                                                                                       |                                                                                       |

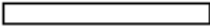
Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                 |   | Southeast Estuaries                                                                     |                                                                                      |                                                                                                 |
|---------------------------------|---|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Estuary                         |   |                                                                                         |                                                                                      |                                                                                                 |
| Month                           |   | J F M A M J J A S O N D                                                                 |                                                                                      |                                                                                                 |
| Species / Life Stage            |   | Charleston Harbor                                                                       | St. Helena Sound                                                                     | Broad River                                                                                     |
| Spanish mackerel                | A | .....  |    |              |
| <i>Scomberomorus maculatus</i>  | S |                                                                                         |                                                                                      |                                                                                                 |
|                                 | J |        |    |              |
|                                 | L | .....                                                                                   | .....                                                                                | .....                                                                                           |
|                                 | E |                                                                                         |                                                                                      |                                                                                                 |
| Gulf flounder                   | A |        |                                                                                      | .....                                                                                           |
| <i>Paralichthys albigitta</i>   | S |                                                                                         |                                                                                      |                                                                                                 |
|                                 | J |        |                                                                                      | .....                                                                                           |
|                                 | L |        |                                                                                      | .....                                                                                           |
|                                 | E |                                                                                         |                                                                                      |                                                                                                 |
| Summer flounder                 | A |        |    |              |
| <i>Paralichthys dentatus</i>    | S |                                                                                         |                                                                                      |                                                                                                 |
|                                 | J |        |    |              |
|                                 | L |        |     |              |
|                                 | E |                                                                                         |                                                                                      |                                                                                                 |
| Southern flounder               | A |        |    | .....  ..... |
| <i>Paralichthys lethostigma</i> | S |                                                                                         |                                                                                      |                                                                                                 |
|                                 | J |      |  |            |
|                                 | L |      |   |            |
|                                 | E |                                                                                         |                                                                                      |                                                                                                 |
|                                 |   | J F M A M J J A S O N D                                                                 |                                                                                      |                                                                                                 |
|                                 |   | Charleston Harbor                                                                       | St. Helena Sound                                                                     | Broad River                                                                                     |
|                                 |   | Southeast Estuaries                                                                     |                                                                                      |                                                                                                 |

Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                 |   | Southeast Estuaries                                                                     |                                                                                          |                                                                                           |
|---------------------------------|---|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Estuary                         |   |                                                                                         |                                                                                          |                                                                                           |
| Month                           |   | J F M A M J J A S O N D                                                                 |                                                                                          |                                                                                           |
| Species / Life Stage            |   | Savannah River                                                                          | Ossabaw Sound                                                                            | St. Cath./Sapelo Sound                                                                    |
| Spanish mackerel                | A |                                                                                         |        |        |
|                                 | S |                                                                                         |                                                                                          |                                                                                           |
| <i>Scomberomorus maculatus</i>  | J |        |        |        |
|                                 | L |                                                                                         |                                                                                          |                                                                                           |
|                                 | E |                                                                                         |                                                                                          |                                                                                           |
| Gulf flounder                   | A | .....                                                                                   |                                                                                          |                                                                                           |
|                                 | S |                                                                                         |                                                                                          |                                                                                           |
| <i>Paralichthys albigutta</i>   | J | .....                                                                                   |                                                                                          |                                                                                           |
|                                 | L | .....                                                                                   | .....                                                                                    | .....                                                                                     |
|                                 | E |                                                                                         |                                                                                          |                                                                                           |
| Summer flounder                 | A | .....                                                                                   |                                                                                          |                                                                                           |
|                                 | S |                                                                                         |                                                                                          |                                                                                           |
| <i>Paralichthys dentatus</i>    | J |        |        |        |
|                                 | L |        |         |        |
|                                 | E |                                                                                         |                                                                                          |                                                                                           |
| Southern flounder               | A | .....  | .....  | .....  |
|                                 | S |                                                                                         |                                                                                          |                                                                                           |
| <i>Paralichthys lethostigma</i> | J |      |      |      |
|                                 | L |      |       |      |
|                                 | E |                                                                                         |                                                                                          |                                                                                           |
|                                 |   | J F M A M J J A S O N D                                                                 |                                                                                          |                                                                                           |
|                                 |   | Savannah River                                                                          | Ossabaw Sound                                                                            | St. Cath./Sapelo Sound                                                                    |
|                                 |   | Southeast Estuaries                                                                     |                                                                                          |                                                                                           |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
| .....                                                                               | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                 |   | Southeast Estuaries     |                         |                 |
|---------------------------------|---|-------------------------|-------------------------|-----------------|
| Estuary                         |   |                         |                         |                 |
| Month                           |   | J F M A M J J A S O N D |                         |                 |
| Species / Life Stage            |   | Altamaha River          | St. And./St. Sim. Sound | St. Johns River |
| Spanish mackerel                | A |                         |                         |                 |
|                                 | S |                         |                         |                 |
| <i>Scomberomorus maculatus</i>  | J |                         |                         |                 |
|                                 | L |                         |                         |                 |
|                                 | E |                         |                         |                 |
| Gulf flounder                   | A |                         |                         |                 |
|                                 | S |                         |                         |                 |
| <i>Paralichthys albigutta</i>   | J |                         |                         |                 |
|                                 | L |                         |                         |                 |
|                                 | E |                         |                         |                 |
| Summer flounder                 | A |                         |                         |                 |
|                                 | S |                         |                         |                 |
| <i>Paralichthys dentatus</i>    | J |                         |                         |                 |
|                                 | L |                         |                         |                 |
|                                 | E |                         |                         |                 |
| Southern flounder               | A |                         |                         |                 |
|                                 | S |                         |                         |                 |
| <i>Paralichthys lethostigma</i> | J |                         |                         |                 |
|                                 | L |                         |                         |                 |
|                                 | E |                         |                         |                 |
|                                 |   | J F M A M J J A S O N D |                         |                 |
|                                 |   | Altamaha River          | St. And./St. Sim. Sound | St. Johns River |
|                                 |   | Southeast Estuaries     |                         |                 |

## Relative Abundance

|                                                                                     |                 |
|-------------------------------------------------------------------------------------|-----------------|
|  | Highly Abundant |
|  | Abundant        |
|  | Common          |
|  | Rare            |
| Blank                                                                               | Not Present     |

## Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

Table 3, continued. Temporal distribution

|                                                      |   | Southeast Estuaries     |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
|------------------------------------------------------|---|-------------------------|--|-------|--|--|--|--------------|--|-------------|--|-------|--|-------------|-------------|--|--|--|--|
| Estuary                                              |   | Indian River            |  |       |  |  |  | Biscayne Bay |  |             |  |       |  |             |             |  |  |  |  |
| Month                                                |   | J F M A M J J A S O N D |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
| Species / Life Stage                                 |   |                         |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | A | .....                   |  |       |  |  |  | .....        |  |             |  |       |  | <div></div> | <div></div> |  |  |  |  |
|                                                      | S |                         |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
|                                                      | J | .....                   |  |       |  |  |  |              |  |             |  |       |  | <div></div> |             |  |  |  |  |
|                                                      | L |                         |  |       |  |  |  |              |  |             |  |       |  | <div></div> |             |  |  |  |  |
|                                                      | E |                         |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | A | <div></div>             |  |       |  |  |  | <div></div>  |  |             |  |       |  | <div></div> |             |  |  |  |  |
|                                                      | S |                         |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
|                                                      | J | <div></div>             |  |       |  |  |  | <div></div>  |  |             |  |       |  | <div></div> |             |  |  |  |  |
|                                                      | L | <div></div>             |  |       |  |  |  | <div></div>  |  |             |  |       |  | <div></div> |             |  |  |  |  |
|                                                      | E | <div></div>             |  |       |  |  |  | <div></div>  |  |             |  |       |  | <div></div> |             |  |  |  |  |
| Summer flounder<br><i>Paralichthys dentatus</i>      | A | <div></div>             |  | ..... |  |  |  |              |  | <div></div> |  |       |  |             |             |  |  |  |  |
|                                                      | S |                         |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
|                                                      | J | .....                   |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
|                                                      | L | .....                   |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
|                                                      | E |                         |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
| Southern flounder<br><i>Paralichthys lethostigma</i> | A | <div></div>             |  |       |  |  |  | <div></div>  |  |             |  |       |  | .....       |             |  |  |  |  |
|                                                      | S |                         |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
|                                                      | J | <div></div>             |  |       |  |  |  |              |  |             |  |       |  | .....       |             |  |  |  |  |
|                                                      | L | <div></div>             |  |       |  |  |  |              |  | <div></div> |  | ..... |  |             |             |  |  |  |  |
|                                                      | E | <div></div>             |  |       |  |  |  |              |  | <div></div> |  |       |  |             |             |  |  |  |  |
|                                                      |   | J F M A M J J A S O N D |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |
|                                                      |   | Indian River            |  |       |  |  |  | Biscayne Bay |  |             |  |       |  |             |             |  |  |  |  |
|                                                      |   | Southeast Estuaries     |  |       |  |  |  |              |  |             |  |       |  |             |             |  |  |  |  |

Relative Abundance

|       |                 |
|-------|-----------------|
| ■     | Highly Abundant |
| ■     | Abundant        |
| ■     | Common          |
| ..... | Rare            |
| Blank | Not Present     |

Life Stage

|   |                 |
|---|-----------------|
| A | Adults          |
| S | Spawning adults |
| J | Juveniles       |
| L | Larvae          |
| E | Eggs            |

**Table 4. Data reliability**

Index to Table 4. Page location of data reliability table for each species and estuary.

| Common and Scientific Name                            | Estuary         |               |                      |             |             |           |                 |            |     |              |                   |                  |
|-------------------------------------------------------|-----------------|---------------|----------------------|-------------|-------------|-----------|-----------------|------------|-----|--------------|-------------------|------------------|
|                                                       | Albemarle Sound | Pamlico Sound | Pamlico/Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River | Winyah Bay | N/S | Santee River | Charleston Harbor | St. Helena Sound |
| Mussel ( <i>Mytilus edulis</i> )                      |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Bay scallop ( <i>Argopecten irradians</i> )           |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| American oyster ( <i>Crassostrea virginica</i> )      |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Common rangia ( <i>Rangia cuneata</i> )               |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Hard clam ( <i>Mercenaria</i> species)                |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Brown shrimp ( <i>Penaeus aztecus</i> )               |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Pink shrimp ( <i>Penaeus duorarum</i> )               |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| White shrimp ( <i>Penaeus setiferus</i> )             |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Grass shrimp ( <i>Palaemonetes pugio</i> )            |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Blue crab ( <i>Callinectes sapidus</i> )              |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Atlantic sturgeon ( <i>Acipenser oxyrhynchus</i> )    |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Ladyfish ( <i>Elops saurus</i> )                      |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| American eel ( <i>Anguilla rostrata</i> )             |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Blueback herring ( <i>Alosa aestivalis</i> )          |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Alewife ( <i>Alosa pseudoharengus</i> )               |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| American shad ( <i>Alosa sapidissima</i> )            |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Atlantic menhaden ( <i>Brevoortia tyrannus</i> )      |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Bay anchovy ( <i>Anchoa mitchilli</i> )               |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Sheepshead minnow ( <i>Cyprinodon variegatus</i> )    |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Mummichog ( <i>Fundulus heteroclitus</i> )            |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Atlantic silversides ( <i>Menidia</i> species)        |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| White perch ( <i>Morone americana</i> )               |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Striped bass ( <i>Morone saxatilis</i> )              |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Bluefish ( <i>Pomatomus saltatrix</i> )               |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Cobia ( <i>Rachycentron canadum</i> )                 |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Gray snapper ( <i>Lutjanus griseus</i> )              |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Sheepshead ( <i>Archosargus probatocephalus</i> )     |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Pinfish ( <i>Lagodon rhomboides</i> )                 |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Spotted seatrout ( <i>Cynoscion nebulosus</i> )       |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Weakfish ( <i>Cynoscion regalis</i> )                 |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Spot ( <i>Leiostomus xanthurus</i> )                  |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Southern kingfish ( <i>Menticirrhus americanus</i> )  |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Atlantic croaker ( <i>Micropogonias undulatus</i> )   |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Black drum ( <i>Pogonias cromis</i> )                 |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Red drum ( <i>Sciaenops ocellatus</i> )               |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Striped mullet ( <i>Mugil cephalus</i> )              |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Spanish mackerel ( <i>Scomberomorus maculatus</i> )   |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Gulf flounder ( <i>Paralichthys albigutta</i> )       |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Summer flounder ( <i>Paralichthys dentatus</i> )      |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |
| Southern flounder ( <i>Paralichthys lethostigma</i> ) |                 |               |                      |             |             |           |                 |            |     |              |                   |                  |

Table 4. Data reliability

| Species/Life Stage                              |   | Southeast Estuaries |               |                      |             |             |           |                 |
|-------------------------------------------------|---|---------------------|---------------|----------------------|-------------|-------------|-----------|-----------------|
|                                                 |   | Albemarle Sound     | Pamlico Sound | Pamlico/Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River |
| Mussel<br><i>Mytilus edulis</i>                 | A | ■                   | □             | ■                    | ■           | □           | □         | □               |
|                                                 | S | ■                   | ■             | ■                    | ■           | □           | ■         | ■               |
|                                                 | J | ■                   | □             | ■                    | ■           | □           | □         | □               |
|                                                 | L | ■                   | □             | ■                    | ■           | □           | □         | □               |
|                                                 | E | ■                   | ■             | ■                    | ■           | □           | ■         | ■               |
| Bay scallop<br><i>Argopecten irradians</i>      | A | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
|                                                 | S | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
|                                                 | J | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
|                                                 | L | ■                   | □             | ■                    | ■           | ■           | ■         | ■               |
|                                                 | E | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
| American oyster<br><i>Crassostrea virginica</i> | A | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
|                                                 | S | ■                   | ■             | ■                    | □           | ■           | ■         | ■               |
|                                                 | J | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
|                                                 | L | ■                   | ■             | ■                    | □           | ■           | ■         | ■               |
|                                                 | E | ■                   | ■             | ■                    | □           | ■           | ■         | ■               |
| Common rangia<br><i>Rangia cuneata</i>          | A | ■                   | ■             | ■                    | ■           | □           | □         | □               |
|                                                 | S | ■                   | □             | □                    | □           | □           | □         | □               |
|                                                 | J | ■                   | ■             | ■                    | ■           | □           | □         | □               |
|                                                 | L | ■                   | □             | □                    | □           | □           | □         | □               |
|                                                 | E | ■                   | □             | □                    | □           | □           | □         | □               |
| Hard clam<br><i>Mercenaria species</i>          | A | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
|                                                 | S | ■                   | ■             | ■                    | ■           | ■           | □         | ■               |
|                                                 | J | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
|                                                 | L | ■                   | ■             | ■                    | ■           | ■           | □         | ■               |
|                                                 | E | ■                   | ■             | ■                    | ■           | ■           | □         | ■               |
| Brown shrimp<br><i>Penaeus aztecus</i>          | A | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
|                                                 | S | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
|                                                 | J | ■                   | ■             | ■                    | □           | ■           | ■         | ■               |
|                                                 | L | ■                   | ■             | ■                    | □           | ■           | ■         | ■               |
|                                                 | E | ■                   | ■             | ■                    | ■           | ■           | ■         | ■               |
|                                                 |   | Albemarle Sound     | Pamlico Sound | Pamlico/Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River |
| Southeast Estuaries                             |   |                     |               |                      |             |             |           |                 |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage                              |   | Southeast Estuaries |                     |                   |                  |             |                |               |
|-------------------------------------------------|---|---------------------|---------------------|-------------------|------------------|-------------|----------------|---------------|
|                                                 |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Mussel<br><i>Mytilus edulis</i>                 | A | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | J | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | L | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| Bay scallop<br><i>Argopecten irradians</i>      | A | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | J | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | L | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| American oyster<br><i>Crassostrea virginica</i> | A | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                 | S | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                 | J | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                 | L | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                 | E | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
| Common rangia<br><i>Rangia cuneata</i>          | A | □                   | □                   | ■                 | □                | □           | □              | □             |
|                                                 | S | □                   | □                   | □                 | □                | □           | □              | □             |
|                                                 | J | □                   | □                   | ■                 | □                | □           | □              | □             |
|                                                 | L | □                   | □                   | □                 | □                | □           | □              | □             |
|                                                 | E | □                   | □                   | □                 | □                | □           | □              | □             |
| Hard clam<br><i>Mercenaria species</i>          | A | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | J | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | L | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| Brown shrimp<br><i>Penaeus aztecus</i>          | A | ■                   | ■                   | ■                 | □                | ■           | ■              | ■             |
|                                                 | S | □                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | J | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 | L | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                 | E | □                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                 |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Southeast Estuaries                             |   |                     |                     |                   |                  |             |                |               |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage |   | Southeast Estuaries            |                   |                                   |                    |                 |                 |
|--------------------|---|--------------------------------|-------------------|-----------------------------------|--------------------|-----------------|-----------------|
|                    |   | St. Cathe./<br>Sapelo<br>Sound | Altamaha<br>River | St. Andrew/<br>St. Simon<br>Sound | St. Johns<br>River | Indian<br>River | Biscayne<br>Bay |
| Mussel             | A | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
|                    | S | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
| <i>Mytilus</i>     | J | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
| <i>edulis</i>      | L | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
|                    | E | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
| Bay scallop        | A | ■                              | ■                 | ■                                 | □                  | □               | □               |
|                    | S | ■                              | ■                 | ■                                 | □                  | □               | □               |
| <i>Argopecten</i>  | J | ■                              | ■                 | ■                                 | □                  | □               | □               |
| <i>irradians</i>   | L | ■                              | ■                 | ■                                 | □                  | □               | □               |
|                    | E | ■                              | ■                 | ■                                 | □                  | □               | □               |
| American oyster    | A | ▣                              | ▣                 | ▣                                 | ▣                  | ▣               | ▣               |
|                    | S | □                              | □                 | ▣                                 | ▣                  | □               | □               |
| <i>Crassostrea</i> | J | ▣                              | ▣                 | ▣                                 | ▣                  | ▣               | ▣               |
| <i>virginica</i>   | L | □                              | □                 | □                                 | ▣                  | □               | □               |
|                    | E | □                              | □                 | □                                 | ▣                  | □               | □               |
| Common rangia      | A | □                              | □                 | □                                 | ■                  | ■               | □               |
|                    | S | □                              | □                 | □                                 | ■                  | □               | □               |
| <i>Rangia</i>      | J | □                              | □                 | □                                 | ■                  | ■               | □               |
| <i>cuneata</i>     | L | □                              | □                 | □                                 | ■                  | □               | □               |
|                    | E | □                              | □                 | □                                 | ■                  | □               | □               |
| Hard clam          | A | ▣                              | ▣                 | ▣                                 | □                  | ▣               | □               |
|                    | S | ▣                              | ▣                 | ▣                                 | □                  | ▣               | □               |
| <i>Mercenaria</i>  | J | ▣                              | ▣                 | ▣                                 | □                  | ▣               | □               |
| <i>species</i>     | L | ▣                              | ▣                 | ▣                                 | □                  | □               | □               |
|                    | E | ▣                              | ▣                 | ▣                                 | □                  | ▣               | □               |
| Brown shrimp       | A | ▣                              | □                 | ▣                                 | ■                  | □               | □               |
|                    | S | ▣                              | ■                 | ■                                 | ■                  | ■               | ■               |
| <i>Penaeus</i>     | J | ▣                              | □                 | ▣                                 | ■                  | ▣               | ▣               |
| <i>aztecus</i>     | L | □                              | □                 | □                                 | ■                  | □               | □               |
|                    | E | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
|                    |   | St. Cathe./<br>Sapelo<br>Sound | Altamaha<br>River | St. Andrew/<br>St. Simon<br>Sound | St. Johns<br>River | Indian<br>River | Biscayne<br>Bay |
|                    |   | Southeast Estuaries            |                   |                                   |                    |                 |                 |

## Reliability

- Highly Certain  
 ▣ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage                               |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |                                     |
|--------------------------------------------------|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                                                  |   | Albemarle Sound                     | Pamlico Sound                       | Pamlico & Pungo Rivers              | Neuse River                         | Bogue Sound                         | New River                           | Cape Fear River                     |
| Pink shrimp<br><i>Penaeus duorarum</i>           | A | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                  | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| White shrimp<br><i>Penaeus setiferus</i>         | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | J | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Grass shrimp<br><i>Palaemonetes pugio</i>        | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | S | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | J | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                  | E | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Blue crab<br><i>Callinectes sapidus</i>          | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | M | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                  | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                  | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i> | A | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | J | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                  | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Ladyfish<br><i>Elops saurus</i>                  | A | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                  | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  | J | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                  | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                  | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                  |   | Albemarle Sound                     | Pamlico Sound                       | Pamlico & Pungo Rivers              | Neuse River                         | Bogue Sound                         | New River                           | Cape Fear River                     |
| Southeast Estuaries                              |   |                                     |                                     |                                     |                                     |                                     |                                     |                                     |

## Reliability

- ☒ Highly Certain  
☒ Moderately Certain  
☐ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs  
 M - Mating

Table 4, continued. Data reliability

|                                                  |   | Southeast Estuaries |                     |                   |                  |             |                |               |
|--------------------------------------------------|---|---------------------|---------------------|-------------------|------------------|-------------|----------------|---------------|
|                                                  |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Species/Life Stage                               |   |                     |                     |                   |                  |             |                |               |
| Pink shrimp<br><i>Penaeus duorarum</i>           | A | ■                   | ■                   | ■                 | ■                | ■           | ■              | □             |
|                                                  | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                  | J | ■                   | ■                   | ■                 | ■                | ■           | ■              | □             |
|                                                  | L | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                  | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| White shrimp<br><i>Penaeus setiferus</i>         | A | ■                   | ■                   | ■                 | ■                | ■           | □              | ■             |
|                                                  | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                  | J | ■                   | ■                   | ■                 | ■                | ■           | □              | ■             |
|                                                  | L | ■                   | □                   | ■                 | ■                | ■           | □              | ■             |
|                                                  | E | ■                   | ■                   | □                 | ■                | ■           | ■              | ■             |
| Grass shrimp<br><i>Palaemonetes pugio</i>        | A | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                  | S | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                  | J | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                  | L | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                  | E | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
| Blue crab<br><i>Callinectes sapidus</i>          | A | ■                   | □                   | ■                 | ■                | ■           | □              | □             |
|                                                  | M | □                   | □                   | ■                 | □                | □           | □              | □             |
|                                                  | J | ■                   | □                   | □                 | □                | □           | □              | □             |
|                                                  | L | ■                   | □                   | ■                 | □                | ■           | □              | □             |
|                                                  | E | ■                   | □                   | ■                 | □                | ■           | □              | □             |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i> | A | □                   | □                   | □                 | □                | □           | □              | □             |
|                                                  | S | ■                   | □                   | □                 | ■                | □           | □              | □             |
|                                                  | J | ■                   | □                   | □                 | □                | □           | □              | □             |
|                                                  | L | ■                   | □                   | □                 | □                | □           | □              | □             |
|                                                  | E | ■                   | □                   | □                 | □                | □           | □              | □             |
| Ladyfish<br><i>Elops saurus</i>                  | A | ■                   | ■                   | □                 | □                | ■           | □              | □             |
|                                                  | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                  | J | ■                   | □                   | □                 | ■                | ■           | □              | □             |
|                                                  | L | ■                   | □                   | □                 | ■                | ■           | □              | □             |
|                                                  | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                  |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
|                                                  |   | Southeast Estuaries |                     |                   |                  |             |                |               |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs  
 M - Mating

Table 4, continued. Data reliability

| Species/Life Stage                                   |   | Southeast Estuaries            |                   |                                   |                    |                 |                 |
|------------------------------------------------------|---|--------------------------------|-------------------|-----------------------------------|--------------------|-----------------|-----------------|
|                                                      |   | St. Cathe./<br>Sapelo<br>Sound | Altamaha<br>River | St. Andrew/<br>St. Simon<br>Sound | St. Johns<br>River | Indian<br>River | Biscayne<br>Bay |
| Pink shrimp<br><i>Penaeus<br/>duorarum</i>           | A | ■                              | ■                 | □                                 | ■                  | ■               | ■               |
|                                                      | S | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
|                                                      | J | ■                              | ■                 | □                                 | ■                  | ■               | ■               |
|                                                      | L | □                              | □                 | □                                 | ■                  | ■               | □               |
|                                                      | E | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
| White shrimp<br><i>Penaeus<br/>setiferus</i>         | A | ■                              | □                 | ■                                 | ■                  | □               | □               |
|                                                      | S | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
|                                                      | J | ■                              | □                 | ■                                 | ■                  | ■               | ■               |
|                                                      | L | ■                              | □                 | □                                 | ■                  | □               | □               |
|                                                      | E | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
| Grass shrimp<br><i>Palaemonetes<br/>pugio</i>        | A | ■                              | □                 | □                                 | ■                  | ■               | □               |
|                                                      | S | □                              | □                 | □                                 | ■                  | ■               | □               |
|                                                      | J | ■                              | □                 | □                                 | ■                  | ■               | □               |
|                                                      | L | □                              | □                 | □                                 | ■                  | ■               | □               |
|                                                      | E | □                              | □                 | □                                 | ■                  | ■               | □               |
| Blue crab<br><i>Callinectes<br/>sapidus</i>          | A | ■                              | □                 | □                                 | ■                  | ■               | ■               |
|                                                      | M | □                              | □                 | □                                 | ■                  | □               | □               |
|                                                      | J | □                              | □                 | □                                 | ■                  | ■               | ■               |
|                                                      | L | □                              | □                 | □                                 | ■                  | □               | □               |
|                                                      | E | □                              | □                 | □                                 | ■                  | □               | □               |
| Atlantic sturgeon<br><i>Acipenser<br/>oxyrinchus</i> | A | □                              | □                 | □                                 | □                  | ■               | ■               |
|                                                      | S | □                              | □                 | □                                 | □                  | ■               | ■               |
|                                                      | J | □                              | □                 | □                                 | □                  | ■               | ■               |
|                                                      | L | □                              | □                 | □                                 | □                  | ■               | ■               |
|                                                      | E | □                              | □                 | □                                 | □                  | ■               | ■               |
| Ladyfish<br><i>Elops<br/>saurus</i>                  | A | □                              | □                 | □                                 | ■                  | ■               | ■               |
|                                                      | S | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
|                                                      | J | □                              | □                 | □                                 | ■                  | ■               | ■               |
|                                                      | L | ■                              | □                 | ■                                 | ■                  | ■               | □               |
|                                                      | E | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
|                                                      |   | St. Cathe./<br>Sapelo<br>Sound | Altamaha<br>River | St. Andrew/<br>St. Simon<br>Sound | St. Johns<br>River | Indian<br>River | Biscayne<br>Bay |
|                                                      |   | Southeast Estuaries            |                   |                                   |                    |                 |                 |

## Reliability

- Highly Certain  
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 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs  
 M - Mating

Table 4, continued. Data reliability

| Species/Life Stage                              |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |                                     |
|-------------------------------------------------|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                                                 |   | Albemarle Sound                     | Pamlico Sound                       | Pamlico & Pungo Rivers              | Neuse River                         | Bogue Sound                         | New River                           | Cape Fear River                     |
| American eel**<br><i>Anguilla rostrata</i>      | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                 | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Blueback herring<br><i>Alosa aestivalis</i>     | A | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | S | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | J | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | L | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | E | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| Alewife<br><i>Alosa pseudoharengus</i>          | A | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | J | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| American shad<br><i>Alosa sapidissima</i>       | A | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | J | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | L | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i> | A | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                 | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Bay anchovy<br><i>Anchoa mitchilli</i>          | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                 |   | Albemarle Sound                     | Pamlico Sound                       | Pamlico & Pungo Rivers              | Neuse River                         | Bogue Sound                         | New River                           | Cape Fear River                     |
| Southeast Estuaries                             |   |                                     |                                     |                                     |                                     |                                     |                                     |                                     |

## Reliability

- ☒ Highly Certain  
☒ Moderately Certain  
☐ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

\*\* See Life History Notes, p. 12.

Table 4, continued. Data reliability

|                                                 |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |                                     |
|-------------------------------------------------|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                                                 |   | Winyah Bay                          | N & S Santee Rivers                 | Charleston Harbor                   | St. Helena Sound                    | Broad River                         | Savannah River                      | Ossabaw Sound                       |
| Species/Life Stage                              |   |                                     |                                     |                                     |                                     |                                     |                                     |                                     |
| American eel**<br><i>Anguilla rostrata</i>      | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                 | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                 | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                 | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Blueback herring<br><i>Alosa aestivalis</i>     | A | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | S | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | J | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | L | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | E | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| Alewife<br><i>Alosa pseudoharengus</i>          | A | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                 | S | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                 | J | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                 | L | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                 | E | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| American shad<br><i>Alosa sapidissima</i>       | A | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | S | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                 | J | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | L | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | E | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i> | A | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                 | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | L | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Bay anchovy<br><i>Anchoa mitchilli</i>          | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | S | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 | E | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                 |   | Winyah Bay                          | N & S Santee Rivers                 | Charleston Harbor                   | St. Helena Sound                    | Broad River                         | Savannah River                      | Ossabaw Sound                       |
|                                                 |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |                                     |

## Reliability

- ☒ Highly Certain  
☒ Moderately Certain  
☐ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

\*\* See *Life History Notes*, p. 12.

Table 4, continued. Data reliability

| Species/Life Stage                                  |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |
|-----------------------------------------------------|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                                                     |   | St. Cathe./<br>Sapelo<br>Sound      | Altamaha<br>River                   | St. Andrew/<br>St. Simon<br>Sound   | St. Johns<br>River                  | Indian<br>River                     | Biscayne<br>Bay                     |
| American eel**<br><i>Anguilla<br/>rostrata</i>      | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | J | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | L | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                     | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Blueback herring<br><i>Alosa<br/>aestivalis</i>     | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | S | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | E | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Alewife<br><i>Alosa<br/>pseudoharengus</i>          | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| American shad<br><i>Alosa<br/>sapidissima</i>       | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | S | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | E | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Atlantic menhaden<br><i>Brevoortia<br/>tyrannus</i> | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                     | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | J | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                     | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Bay anchovy<br><i>Anchoa<br/>mitchilli</i>          | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | S | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | L | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     | E | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                     |   | St. Cathe./<br>Sapelo<br>Sound      | Altamaha<br>River                   | St. Andrew/<br>St. Simon<br>Sound   | St. Johns<br>River                  | Indian<br>River                     | Biscayne<br>Bay                     |
|                                                     |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |

## Reliability

- ☒ Highly Certain  
☒ Moderately Certain  
☐ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

\*\* See *Life History Notes*, p. 12.

Table 4, continued. Data reliability

| Species/Life Stage                                |   | Southeast Estuaries |               |                        |             |             |           |                 |
|---------------------------------------------------|---|---------------------|---------------|------------------------|-------------|-------------|-----------|-----------------|
|                                                   |   | Albemarle Sound     | Pamlico Sound | Pamlico & Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A | ■                   | ■             | □                      | □           | □           | □         | □               |
|                                                   | S | □                   | □             | □                      | □           | □           | □         | ■               |
|                                                   | J | ■                   | ■             | □                      | □           | □           | □         | □               |
|                                                   | L | □                   | □             | □                      | □           | □           | □         | ■               |
|                                                   | E | □                   | □             | □                      | □           | □           | □         | ■               |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A | □                   | ■             | □                      | □           | □           | □         | ■               |
|                                                   | S | □                   | □             | □                      | □           | □           | □         | ■               |
|                                                   | J | □                   | ■             | □                      | □           | □           | □         | ■               |
|                                                   | L | □                   | □             | □                      | □           | □           | □         | ■               |
|                                                   | E | □                   | □             | □                      | □           | □           | □         | ■               |
| Atlantic silversides<br><i>Menidia</i> species    | A | ■                   | □             | □                      | ■           | □           | □         | ■               |
|                                                   | S | ■                   | □             | □                      | ■           | ■           | □         | ■               |
|                                                   | J | ■                   | □             | □                      | ■           | □           | □         | ■               |
|                                                   | L | ■                   | □             | □                      | ■           | ■           | □         | ■               |
|                                                   | E | ■                   | □             | □                      | ■           | ■           | □         | ■               |
| White perch<br><i>Morone americana</i>            | A | ■                   | □             | ■                      | ■           | □           | ■         | ■               |
|                                                   | S | ■                   | □             | □                      | □           | □           | ■         | ■               |
|                                                   | J | ■                   | □             | ■                      | ■           | □           | ■         | ■               |
|                                                   | L | ■                   | □             | □                      | □           | □           | ■         | ■               |
|                                                   | E | ■                   | □             | □                      | □           | □           | ■         | ■               |
| Striped bass<br><i>Morone saxatilis</i>           | A | ■                   | ■             | ■                      | ■           | □           | □         | □               |
|                                                   | S | ■                   | ■             | ■                      | ■           | □           | □         | □               |
|                                                   | J | ■                   | ■             | ■                      | ■           | □           | □         | ■               |
|                                                   | L | ■                   | □             | ■                      | ■           | □           | □         | □               |
|                                                   | E | ■                   | ■             | ■                      | ■           | □           | □         | □               |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A | ■                   | ■             | ■                      | ■           | ■           | □         | □               |
|                                                   | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                   | J | ■                   | ■             | □                      | ■           | ■           | □         | ■               |
|                                                   | L | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                   | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                   |   | Albemarle Sound     | Pamlico Sound | Pamlico & Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River |
| Southeast Estuaries                               |   |                     |               |                        |             |             |           |                 |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage                                |   | Southeast Estuaries |                     |                   |                  |             |                |               |
|---------------------------------------------------|---|---------------------|---------------------|-------------------|------------------|-------------|----------------|---------------|
|                                                   |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i> | A | ■                   | ■                   | □                 | □                | □           | □              | □             |
|                                                   | S | □                   | □                   | □                 | □                | □           | □              | □             |
|                                                   | J | ■                   | ■                   | □                 | □                | □           | □              | □             |
|                                                   | L | □                   | □                   | □                 | □                | □           | □              | □             |
|                                                   | E | □                   | □                   | □                 | □                | □           | □              | □             |
| Mummichog<br><i>Fundulus heteroclitus</i>         | A | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                   | S | □                   | □                   | ■                 | ■                | ■           | □              | □             |
|                                                   | J | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                   | L | □                   | □                   | ■                 | ■                | ■           | □              | □             |
|                                                   | E | □                   | □                   | ■                 | ■                | ■           | □              | □             |
| Atlantic silversides<br><i>Menidia species</i>    | A | ■                   | □                   | □                 | □                | ■           | □              | □             |
|                                                   | S | ■                   | □                   | ■                 | □                | □           | □              | □             |
|                                                   | J | ■                   | □                   | □                 | □                | ■           | □              | □             |
|                                                   | L | ■                   | □                   | ■                 | □                | □           | □              | □             |
|                                                   | E | ■                   | □                   | ■                 | □                | □           | □              | □             |
| White perch<br><i>Morone americana</i>            | A | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                   | S | □                   | □                   | ■                 | ■                | ■           | ■              | ■             |
|                                                   | J | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                   | L | □                   | □                   | ■                 | ■                | ■           | ■              | ■             |
|                                                   | E | □                   | □                   | ■                 | ■                | ■           | ■              | ■             |
| Striped bass<br><i>Morone saxatilis</i>           | A | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                   | S | ■                   | ■                   | ■                 | ■                | □           | □              | ■             |
|                                                   | J | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                   | L | ■                   | ■                   | ■                 | ■                | □           | □              | ■             |
|                                                   | E | ■                   | ■                   | ■                 | ■                | □           | □              | ■             |
| Bluefish<br><i>Pomatomus saltatrix</i>            | A | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                   | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                   | J | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                   | L | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                   | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                   |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Southeast Estuaries                               |   |                     |                     |                   |                  |             |                |               |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage                                       |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |
|----------------------------------------------------------|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                                                          |   | St. Cathe./<br>Sapelo<br>Sound      | Altamaha<br>River                   | St. Andrew/<br>St. Simon<br>Sound   | St. Johns<br>River                  | Indian<br>River                     | Biscayne<br>Bay                     |
| Sheepshead<br>minnow<br><i>Cyprinodon<br/>variegatus</i> | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | S | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | E | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Mummichog<br><i>Fundulus<br/>heteroclitus</i>            | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | S | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | E | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Atlantic silversides<br><i>Menidia<br/>species</i>       | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                          | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                          | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| White perch<br><i>Morone<br/>americana</i>               | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Striped bass<br><i>Morone<br/>saxatilis</i>              | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | S | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | E | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Bluefish<br><i>Pomatomus<br/>saltatrix</i>               | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                          | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          |   | St. Cathe./<br>Sapelo<br>Sound      | Altamaha<br>River                   | St. Andrew/<br>St. Simon<br>Sound   | St. Johns<br>River                  | Indian<br>River                     | Biscayne<br>Bay                     |
|                                                          |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |

## Reliability

- ☒ Highly Certain  
☒ Moderately Certain  
☐ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage                               |   | Southeast Estuaries |               |                        |             |             |           |                 |
|--------------------------------------------------|---|---------------------|---------------|------------------------|-------------|-------------|-----------|-----------------|
|                                                  |   | Albemarle Sound     | Pamlico Sound | Pamlico & Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River |
| Cobia<br><i>Rachycentron canadum</i>             | A | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                                  | S | ■                   | □             | ■                      | ■           | ■           | ■         | ■               |
|                                                  | J | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                                  | L | ■                   | ■             | ■                      | ■           | □           | □         | ■               |
|                                                  | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| Gray snapper<br><i>Lutjanus griseus</i>          | A | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                  | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                  | J | ■                   | ■             | ■                      | □           | ■           | □         | ■               |
|                                                  | L | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                  | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| Sheepshead<br><i>Archosargus probatocephalus</i> | A | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                                  | S | ■                   | ■             | ■                      | ■           | □           | ■         | □               |
|                                                  | J | ■                   | ■             | ■                      | □           | ■           | □         | ■               |
|                                                  | L | ■                   | □             | ■                      | □           | □           | □         | □               |
|                                                  | E | ■                   | ■             | ■                      | ■           | □           | ■         | □               |
| Pinfish<br><i>Lagodon rhomboides</i>             | A | ■                   | □             | □                      | □           | ■           | □         | ■               |
|                                                  | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                  | J | ■                   | □             | □                      | ■           | ■           | □         | ■               |
|                                                  | L | ■                   | ■             | □                      | ■           | □           | □         | ■               |
|                                                  | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>   | A | ■                   | □             | □                      | □           | ■           | □         | □               |
|                                                  | S | ■                   | ■             | ■                      | ■           | □           | □         | ■               |
|                                                  | J | ■                   | □             | □                      | □           | ■           | □         | □               |
|                                                  | L | ■                   | □             | ■                      | □           | □           | □         | ■               |
|                                                  | E | ■                   | ■             | ■                      | ■           | □           | □         | ■               |
| Weakfish<br><i>Cynoscion regalis</i>             | A | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                                  | S | ■                   | ■             | □                      | □           | □           | □         | ■               |
|                                                  | J | □                   | □             | □                      | □           | ■           | ■         | ■               |
|                                                  | L | ■                   | ■             | □                      | □           | □           | □         | ■               |
|                                                  | E | ■                   | ■             | □                      | □           | □           | □         | ■               |
|                                                  |   | Albemarle Sound     | Pamlico Sound | Pamlico & Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River |
| Southeast Estuaries                              |   |                     |               |                        |             |             |           |                 |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage                               |   | Southeast Estuaries |                     |                   |                  |             |                |               |
|--------------------------------------------------|---|---------------------|---------------------|-------------------|------------------|-------------|----------------|---------------|
|                                                  |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Cobia<br><i>Rachycentron canadum</i>             | A | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                  | S | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                  | J | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                  | L | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                  | E | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
| Gray snapper<br><i>Lutjanus griseus</i>          | A | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                  | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                  | J | ■                   | ■                   | □                 | ■                | ■           | □              | □             |
|                                                  | L | ■                   | ■                   | □                 | ■                | ■           | ■              | ■             |
|                                                  | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| Sheepshead<br><i>Archosargus probatocephalus</i> | A | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                  | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                  | J | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                  | L | □                   | ■                   | □                 | ■                | ■           | □              | □             |
|                                                  | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| Pinfish<br><i>Lagodon rhomboides</i>             | A | ■                   | ■                   | □                 | ■                | ■           | □              | □             |
|                                                  | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                  | J | ■                   | ■                   | □                 | ■                | ■           | ■              | ■             |
|                                                  | L | □                   | ■                   | □                 | □                | □           | □              | □             |
|                                                  | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>   | A | □                   | ■                   | □                 | ■                | ■           | ■              | ■             |
|                                                  | S | ■                   | ■                   | □                 | □                | ■           | □              | □             |
|                                                  | J | □                   | ■                   | □                 | ■                | ■           | □              | □             |
|                                                  | L | □                   | ■                   | □                 | □                | □           | □              | □             |
|                                                  | E | ■                   | ■                   | □                 | □                | ■           | □              | □             |
| Weakfish<br><i>Cynoscion regalis</i>             | A | □                   | □                   | ■                 | □                | ■           | ■              | ■             |
|                                                  | S | ■                   | ■                   | ■                 | □                | ■           | □              | □             |
|                                                  | J | ■                   | ■                   | ■                 | □                | ■           | □              | □             |
|                                                  | L | ■                   | ■                   | □                 | □                | ■           | □              | □             |
|                                                  | E | ■                   | ■                   | ■                 | □                | ■           | □              | □             |
|                                                  |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Southeast Estuaries                              |   |                     |                     |                   |                  |             |                |               |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage                                   |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |
|------------------------------------------------------|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                                                      |   | St. Cathe./<br>Sapelo<br>Sound      | Altamaha<br>River                   | St. Andrew/<br>St. Simon<br>Sound   | St. Johns<br>River                  | Indian<br>River                     | Biscayne<br>Bay                     |
| Cobia<br><i>Rachycentron<br/>canadum</i>             | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | S | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | E | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Gray snapper<br><i>Lutjanus<br/>griseus</i>          | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | L | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Sheepshead<br><i>Archosargus<br/>probatocephalus</i> | A | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                      | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                      | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Pinfish<br><i>Lagodon<br/>rhomboides</i>             | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                      | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                      | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Spotted seatrout<br><i>Cynoscion<br/>nebulosus</i>   | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                      | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                      | E | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Weakfish<br><i>Cynoscion<br/>regalis</i>             | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | S | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                      | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                      | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                      | E | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                      |   | St. Cathe./<br>Sapelo<br>Sound      | Altamaha<br>River                   | St. Andrew/<br>St. Simon<br>Sound   | St. Johns<br>River                  | Indian<br>River                     | Biscayne<br>Bay                     |
|                                                      |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |

## Reliability

- ☒ Highly Certain  
☒ Moderately Certain  
☐ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage                                  |   | Southeast Estuaries |               |                        |             |             |           |                 |
|-----------------------------------------------------|---|---------------------|---------------|------------------------|-------------|-------------|-----------|-----------------|
|                                                     |   | Albemarle Sound     | Pamlico Sound | Pamlico & Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River |
| Spot<br><i>Leiostomus xanthurus</i>                 | A | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                     | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                     | J | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                                     | L | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                                     | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| Southern kingfish<br><i>Menticirrhus americanus</i> | A | □                   | □             | □                      | ■           | □           | □         | ■               |
|                                                     | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                     | J | □                   | ■             | □                      | ■           | □           | □         | ■               |
|                                                     | L | □                   | □             | ■                      | ■           | □           | □         | □               |
|                                                     | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| Atlantic croaker<br><i>Micropogonias undulatus</i>  | A | ■                   | □             | □                      | □           | ■           | □         | ■               |
|                                                     | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                     | J | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                                     | L | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                                     | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| Black drum<br><i>Pogonias cromis</i>                | A | ■                   | ■             | □                      | □           | □           | □         | ■               |
|                                                     | S | ■                   | □             | ■                      | ■           | ■           | ■         | ■               |
|                                                     | J | □                   | ■             | □                      | □           | □           | □         | ■               |
|                                                     | L | ■                   | □             | ■                      | □           | □           | □         | ■               |
|                                                     | E | ■                   | □             | ■                      | ■           | ■           | ■         | ■               |
| Red drum<br><i>Sciaenops ocellatus</i>              | A | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                                     | S | ■                   | □             | ■                      | ■           | □           | □         | ■               |
|                                                     | J | □                   | ■             | ■                      | ■           | □           | □         | □               |
|                                                     | L | ■                   | □             | ■                      | ■           | □           | □         | ■               |
|                                                     | E | ■                   | □             | ■                      | ■           | □           | □         | ■               |
| Striped mullet<br><i>Mugil cephalus</i>             | A | ■                   | ■             | ■                      | ■           | ■           | □         | □               |
|                                                     | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                     | J | ■                   | ■             | ■                      | ■           | ■           | □         | □               |
|                                                     | L | ■                   | □             | ■                      | □           | □           | □         | ■               |
|                                                     | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                                     |   | Albemarle Sound     | Pamlico Sound | Pamlico & Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River |
| Southeast Estuaries                                 |   |                     |               |                        |             |             |           |                 |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage                                  |   | Southeast Estuaries |                     |                   |                  |             |                |               |
|-----------------------------------------------------|---|---------------------|---------------------|-------------------|------------------|-------------|----------------|---------------|
|                                                     |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Spot<br><i>Leiostomus xanthurus</i>                 | A | ■                   | □                   | ■                 | □                | ■           | ■              | ■             |
|                                                     | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                     | J | ■                   | □                   | □                 | □                | ■           | □              | □             |
|                                                     | L | ■                   | ■                   | □                 | ■                | ■           | □              | ■             |
|                                                     | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| Southern kingfish<br><i>Menticirrhus americanus</i> | A | □                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                     | S | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                     | J | □                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                     | L | □                   | ■                   | □                 | ■                | □           | □              | □             |
|                                                     | E | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
| Atlantic croaker<br><i>Micropogonias undulatus</i>  | A | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                     | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                     | J | ■                   | □                   | □                 | ■                | ■           | □              | ■             |
|                                                     | L | ■                   | ■                   | □                 | ■                | ■           | □              | □             |
|                                                     | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| Black drum<br><i>Pogonias cromis</i>                | A | □                   | □                   | □                 | ■                | ■           | □              | □             |
|                                                     | S | □                   | □                   | □                 | ■                | ■           | □              | □             |
|                                                     | J | □                   | □                   | □                 | ■                | ■           | □              | □             |
|                                                     | L | □                   | ■                   | □                 | ■                | ■           | □              | □             |
|                                                     | E | □                   | □                   | □                 | ■                | ■           | □              | □             |
| Red drum<br><i>Sciaenops ocellatus</i>              | A | ■                   | □                   | □                 | ■                | ■           | □              | □             |
|                                                     | S | ■                   | ■                   | □                 | ■                | ■           | □              | □             |
|                                                     | J | ■                   | □                   | □                 | ■                | ■           | □              | □             |
|                                                     | L | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
|                                                     | E | ■                   | □                   | □                 | ■                | ■           | □              | □             |
| Striped mullet<br><i>Mugil cephalus</i>             | A | ■                   | ■                   | □                 | □                | ■           | □              | □             |
|                                                     | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                     | J | □                   | ■                   | □                 | □                | ■           | □              | □             |
|                                                     | L | ■                   | ■                   | □                 | □                | □           | □              | □             |
|                                                     | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                                     |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Southeast Estuaries                                 |   |                     |                     |                   |                  |             |                |               |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage   |   | Southeast Estuaries            |                   |                                   |                    |                 |                 |
|----------------------|---|--------------------------------|-------------------|-----------------------------------|--------------------|-----------------|-----------------|
|                      |   | St. Cathe./<br>Sapelo<br>Sound | Altamaha<br>River | St. Andrew/<br>St. Simon<br>Sound | St. Johns<br>River | Indian<br>River | Biscayne<br>Bay |
| Spot                 | A | ■                              | ■                 | ■                                 | □                  | ■               | □               |
|                      | S | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
| <i>Leiostomus</i>    | J | □                              | □                 | □                                 | ■                  | ■               | □               |
| <i>xanthurus</i>     | L | ■                              | ■                 | ■                                 | □                  | ■               | □               |
|                      | E | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
| Southern kingfish    | A | ■                              | □                 | ■                                 | □                  | □               | ■               |
|                      | S | □                              | □                 | □                                 | ■                  | ■               | ■               |
| <i>Menticirrhus</i>  | J | ■                              | □                 | ■                                 | ■                  | ■               | ■               |
| <i>americanus</i>    | L | ■                              | □                 | □                                 | □                  | □               | □               |
|                      | E | □                              | □                 | □                                 | ■                  | ■               | ■               |
| Atlantic croaker     | A | ■                              | □                 | □                                 | □                  | ■               | ■               |
|                      | S | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
| <i>Micropogonias</i> | J | □                              | □                 | □                                 | ■                  | ■               | ■               |
| <i>undulatus</i>     | L | □                              | □                 | □                                 | □                  | ■               | □               |
|                      | E | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
| Black drum           | A | □                              | □                 | □                                 | □                  | ■               | □               |
|                      | S | □                              | □                 | □                                 | □                  | ■               | □               |
| <i>Pogonias</i>      | J | □                              | □                 | □                                 | ■                  | ■               | □               |
| <i>cromis</i>        | L | □                              | □                 | □                                 | □                  | ■               | □               |
|                      | E | □                              | □                 | □                                 | □                  | ■               | □               |
| Red drum             | A | □                              | □                 | □                                 | □                  | ■               | □               |
|                      | S | □                              | □                 | □                                 | □                  | □               | □               |
| <i>Sciaenops</i>     | J | □                              | □                 | □                                 | □                  | ■               | □               |
| <i>ocellatus</i>     | L | □                              | □                 | □                                 | □                  | □               | □               |
|                      | E | □                              | □                 | □                                 | □                  | □               | □               |
| Striped mullet       | A | □                              | □                 | □                                 | □                  | ■               | □               |
|                      | S | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
| <i>Mugil</i>         | J | □                              | □                 | □                                 | ■                  | ■               | ■               |
| <i>cephalus</i>      | L | □                              | □                 | □                                 | □                  | ■               | □               |
|                      | E | ■                              | ■                 | ■                                 | ■                  | ■               | ■               |
|                      |   | St. Cathe./<br>Sapelo<br>Sound | Altamaha<br>River | St. Andrew/<br>St. Simon<br>Sound | St. Johns<br>River | Indian<br>River | Biscayne<br>Bay |
|                      |   | Southeast Estuaries            |                   |                                   |                    |                 |                 |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage              |   | Southeast Estuaries |               |                        |             |             |           |                 |
|---------------------------------|---|---------------------|---------------|------------------------|-------------|-------------|-----------|-----------------|
|                                 |   | Albemarle Sound     | Pamlico Sound | Pamlico & Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River |
| Spanish mackerel                | A | □                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                 | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| <i>Scomberomorus maculatus</i>  | J | □                   | ■             | ■                      | □           | ■           | □         | ■               |
|                                 | L | ■                   | ■             | □                      | ■           | ■           | □         | ■               |
|                                 | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| Gulf flounder                   | A | ■                   | □             | ■                      | ■           | ■           | ■         | ■               |
|                                 | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| <i>Paralichthys albigutta</i>   | J | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                 | L | ■                   | ■             | ■                      | ■           | ■           | □         | □               |
|                                 | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| Summer flounder                 | A | ■                   | ■             | □                      | □           | ■           | □         | ■               |
|                                 | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| <i>Paralichthys dentatus</i>    | J | ■                   | ■             | □                      | ■           | ■           | □         | ■               |
|                                 | L | □                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                 | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| Southern flounder               | A | ■                   | ■             | □                      | ■           | ■           | □         | ■               |
|                                 | S | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
| <i>Paralichthys lethostigma</i> | J | ■                   | ■             | ■                      | ■           | ■           | □         | ■               |
|                                 | L | □                   | ■             | ■                      | □           | ■           | □         | ■               |
|                                 | E | ■                   | ■             | ■                      | ■           | ■           | ■         | ■               |
|                                 |   | Albemarle Sound     | Pamlico Sound | Pamlico & Pungo Rivers | Neuse River | Bogue Sound | New River | Cape Fear River |
| Southeast Estuaries             |   |                     |               |                        |             |             |           |                 |

## Reliability

- Highly Certain  
 ■ Moderately Certain  
 □ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage              |   | Southeast Estuaries |                     |                   |                  |             |                |               |
|---------------------------------|---|---------------------|---------------------|-------------------|------------------|-------------|----------------|---------------|
|                                 |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Spanish mackerel                | A | ■                   | ■                   | □                 | ■                | ■           | □              | □             |
|                                 | S | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
| <i>Scomberomorus maculatus</i>  | J | ■                   | □                   | □                 | ■                | ■           | □              | □             |
|                                 | L | ■                   | ■                   | □                 | □                | □           | □              | □             |
|                                 | E | ■                   | ■                   | ■                 | ■                | ■           | □              | □             |
| Gulf flounder                   | A | □                   | ■                   | □                 | ■                | □           | □              | □             |
|                                 | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| <i>Paralichthys albigutta</i>   | J | □                   | ■                   | □                 | ■                | □           | □              | □             |
|                                 | L | □                   | ■                   | □                 | ■                | □           | □              | □             |
|                                 | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| Summer flounder                 | A | ■                   | □                   | □                 | ■                | ■           | ■              | ■             |
|                                 | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| <i>Paralichthys dentatus</i>    | J | ■                   | □                   | ■                 | ■                | ■           | □              | □             |
|                                 | L | ■                   | ■                   | □                 | □                | □           | □              | □             |
|                                 | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| Southern flounder               | A | ■                   | ■                   | □                 | □                | ■           | □              | □             |
|                                 | S | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
| <i>Paralichthys lethostigma</i> | J | ■                   | ■                   | □                 | □                | ■           | □              | □             |
|                                 | L | ■                   | ■                   | □                 | □                | □           | □              | □             |
|                                 | E | ■                   | ■                   | ■                 | ■                | ■           | ■              | ■             |
|                                 |   | Winyah Bay          | N & S Santee Rivers | Charleston Harbor | St. Helena Sound | Broad River | Savannah River | Ossabaw Sound |
| Southeast Estuaries             |   |                     |                     |                   |                  |             |                |               |

## Reliability

- Highly Certain
- Moderately Certain
- Reasonable Inference

## Life Stage

- A - Adults
- S - Spawning adults
- J - Juveniles
- L - Larvae
- E - Eggs

Table 4, continued. Data reliability

| Species/Life Stage                                       |   | Southeast Estuaries                 |                                     |                                     |                                     |                                     |                                     |
|----------------------------------------------------------|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                                                          |   | St. Cathe./<br>Sapelo<br>Sound      | Altamaha<br>River                   | St. Andrew/<br>St. Simon<br>Sound   | St. Johns<br>River                  | Indian<br>River                     | Biscayne<br>Bay                     |
| Spanish mackerel<br><i>Scomberomorus<br/>maculatus</i>   | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                          | S | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | J | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
|                                                          | E | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Gulf flounder<br><i>Paralichthys<br/>albigutta</i>       | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                          | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Summer flounder<br><i>Paralichthys<br/>dentatus</i>      | A | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                          | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | J | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                          | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
|                                                          | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Southern flounder<br><i>Paralichthys<br/>lethostigma</i> | A | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | S | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | J | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          | L | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
|                                                          | E | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                                          |   | St. Cathe./<br>Sapelo<br>Sound      | Altamaha<br>River                   | St. Andrew/<br>St. Simon<br>Sound   | St. Johns<br>River                  | Indian<br>River                     | Biscayne<br>Bay                     |
| Southeast Estuaries                                      |   |                                     |                                     |                                     |                                     |                                     |                                     |

## Reliability

- ☒ Highly Certain  
☒ Moderately Certain  
☐ Reasonable Inference

## Life Stage

- A - Adults  
 S - Spawning adults  
 J - Juveniles  
 L - Larvae  
 E - Eggs

## Appendix 5. Occurrences\* of 40 species in 20 estuaries

\*Highest relative abundance of adults or juveniles in any salinity zone, in any month.

| Species              | Estuary         |               |                      |             |             |           |                 |            |                  |                  |                   |             |                |               |                        |                |                        |                 |              |              |
|----------------------|-----------------|---------------|----------------------|-------------|-------------|-----------|-----------------|------------|------------------|------------------|-------------------|-------------|----------------|---------------|------------------------|----------------|------------------------|-----------------|--------------|--------------|
|                      | Albemarle Sound | Pamlico Sound | Pamlico/Pungo Rivers | Neuse River | Bogue River | New River | Cape Fear River | Winyah Bay | N/S Santee River | Charleston River | St. Helena Harbor | Broad River | Savannah River | Ossabaw River | St. Cath. /Sapelo Snd. | Altamaha River | St. And./St. Sim. Snd. | St. Johns River | Indian River | Biscayne Bay |
| blue mussel          | √               |               |                      | √           | √           | √         | √               |            |                  |                  |                   |             |                |               |                        |                |                        |                 |              |              |
| bay scallop          | ⦿               |               |                      | ⦿           | ●           | √         |                 |            |                  |                  |                   |             |                |               |                        |                |                        | √               | ○            |              |
| American oyster      | ○               | ⦿             | ⦿                    | ○           | ●           | ●         | ●               | ●          | ○                | ⦿                | ●                 | ●           | ○              | ⦿             | ⦿                      | ○              | ⦿                      | ⦿               | ○            | ○            |
| common rangia        | ⦿               | ⦿             | ⦿                    | ⦿           | ○           | ○         | ○               | ○          | ○                | √                | √                 | √           | ○              | ○             | ○                      | ○              | ○                      | ○               | √            |              |
| hard clam            |                 | ⦿             |                      |             | ●           | ●         | ●               | ⦿          | ○                | ⦿                | ○                 | ⦿           | ○              | ○             | ○                      | ○              | ○                      | ○               | ○            | ○            |
| brown shrimp         | ○               | ⦿             | ⦿                    | ⦿           | ●           | ⦿         | ⦿               | ⦿          | ⦿                | ●                | ●                 | ⦿           | ○              | ⦿             | ⦿                      | ○              | ⦿                      | ⦿               | ○            | √            |
| pink shrimp          | ○               | ⦿             | ○                    | ⦿           | ⦿           | ⦿         | ⦿               | ○          | ⦿                | ○                | √                 | ○           | ○              | ○             | ○                      | √              | ○                      | ○               | ⦿            | ●            |
| white shrimp         | ⦿               | ⦿             | ○                    | ○           | ○           | ○         | ⦿               | ⦿          | ●                | ●                | ●                 | ●           | ●              | ●             | ⦿                      | ●              | ●                      | ○               | √            |              |
| grass shrimp         | ○               | ⦿             | ⦿                    | ⦿           | ●           | ●         | ●               | ●          | ⦿                | ●                | ⦿                 | ⦿           | ⦿              | ⦿             | ⦿                      | ⦿              | ⦿                      | ⦿               | ○            |              |
| blue crab            | ⦿               | ●             | ●                    | ●           | ●           | ●         | ●               | ⦿          | ⦿                | ⦿                | ●                 | ⦿           | ⦿              | ⦿             | ⦿                      | ⦿              | ⦿                      | ⦿               | ●            |              |
| Atlantic sturgeon    | ○               | ○             | ○                    | ○           |             | √         | ○               | ○          | √                | √                | ○                 | ○           | ○              | ○             | ○                      | ○              | ○                      | √               |              |              |
| ladyfish             | ○               | ○             | ○                    | ○           | √           | √         | ○               | ○          | √                | ○                | ○                 | ○           | ○              | ○             | ○                      | ○              | ○                      | ○               | ●            | ○            |
| American eel         | ⦿               | ●             | ⦿                    | ●           | ○           | ○         | ⦿               | ⦿          | ○                | ○                | ○                 | ⦿           | ⦿              | ⦿             | ⦿                      | ⦿              | ⦿                      | ⦿               | ○            |              |
| blueback herring     | ●               | ●             | ●                    | ●           | √           | √         | ⦿               | ○          | ○                | ○                | ○                 | ○           | ○              | ○             | ○                      | ○              | ○                      |                 |              |              |
| alewife              | ●               | ⦿             | ○                    | ⦿           | ○           | √         | √               | √          |                  |                  |                   |             |                |               |                        |                |                        |                 |              |              |
| American shad        | ⦿               | ○             | ○                    | ○           | √           | √         | ○               | ○          | ⦿                | ○                | ○                 | √           | ○              | ○             | √                      | ⦿              | ○                      | ○               |              |              |
| Atlantic menhaden    | ●               | ●             | ●                    | ●           | ●           | ●         | ●               | ●          | ⦿                | ⦿                | ●                 | ⦿           | ⦿              | ⦿             | ⦿                      | ⦿              | ⦿                      | ○               |              |              |
| bay anchovy          | ●               | ●             | ⦿                    | ●           | ●           | ●         | ●               | ●          | ●                | ●                | ●                 | ●           | ●              | ●             | ●                      | ●              | ●                      | ●               | ●            | ●            |
| sheepshead minnow    | √               | ⦿             | ○                    | ⦿           | ⦿           | ⦿         | ⦿               | ○          | ○                | ○                | ⦿                 | ○           | ⦿              | ⦿             | ⦿                      | ⦿              | ⦿                      | ○               | ○            |              |
| mummichog            | ○               | ●             | ⦿                    | ⦿           | ●           | ●         | ●               | ⦿          | ⦿                | ⦿                | ●                 | ⦿           | ●              | ●             | ●                      | ●              | ⦿                      | √               |              |              |
| Atlantic silversides | ⦿               | ⦿             | ○                    | ⦿           | ●           | ●         | ⦿               | ⦿          | ⦿                | ○                | ●                 | ●           | ⦿              | ⦿             | ⦿                      | ⦿              | ⦿                      | ●               | ⦿            |              |
| white perch          | ●               | ○             | ○                    | ○           | √           |           |                 | ⦿          | ○                | ○                |                   |             |                |               |                        |                |                        |                 |              |              |
| striped bass         | ⦿               | ○             | ○                    | ○           | √           | √         | √               | ○          | ○                | ○                | ○                 | ⦿           | ○              | ⦿             | √                      | ○              | √                      | ○               |              |              |
| bluefish             | ○               | ⦿             | ○                    | ○           | ⦿           | ○         | ⦿               | ⦿          | ○                | ○                | ○                 | ○           | ○              | ○             | ○                      | ○              | ○                      | ○               | ●            | √            |
| cobia                |                 | ○             |                      |             | ○           | ○         | ○               | √          | ○                | ○                | ○                 | ⦿           | ○              | ○             | ○                      | ○              | ○                      |                 |              |              |
| gray snapper         | √               | ○             | √                    | √           | √           | √         | √               | √          | ○                | ○                | √                 | √           | √              | √             | √                      | √              | √                      | ○               | ●            | ●            |
| sheepshead           | √               | ⦿             | √                    | ○           | ⦿           | ⦿         | ⦿               | ○          | ○                | ○                | ○                 | ○           | ○              | ○             | ○                      | ○              | ○                      | ⦿               | ●            | √            |
| pinfish              | ○               | ⦿             | ⦿                    | ⦿           | ●           | ●         | ●               | ●          | ○                | ○                | ⦿                 | ○           | ○              | ○             | ○                      | ○              | ○                      | ⦿               | ●            | ●            |
| spotted seatrout     | ⦿               | ⦿             | ○                    | ○           | ⦿           | ⦿         | ⦿               | ○          | ○                | ○                | ⦿                 | ⦿           | ●              | ●             | ●                      | ●              | ○                      | ●               | ○            |              |
| weakfish             | ○               | ⦿             | ⦿                    | ○           | ⦿           | ⦿         | ⦿               | ○          | ●                | ⦿                | ○                 | ⦿           | ⦿              | ⦿             | ⦿                      | ⦿              | ⦿                      | ○               | √            |              |
| spot                 | ●               | ●             | ●                    | ●           | ●           | ●         | ●               | ●          | ●                | ●                | ⦿                 | ⦿           | ●              | ●             | ●                      | ●              | ⦿                      | ●               | ○            |              |
| southern kingfish    | ○               | ○             | ○                    | ○           | ⦿           | ⦿         | ○               | ⦿          | ⦿                | ⦿                | ⦿                 | ●           | ●              | ●             | ●                      | ●              | ○                      | ○               | √            |              |
| Atlantic croaker     | ⦿               | ●             | ●                    | ●           | ●           | ●         | ●               | ●          | ●                | ●                | ●                 | ⦿           | ●              | ●             | ●                      | ●              | ⦿                      | ○               | √            |              |
| black drum           | √               | ○             | ○                    | ○           | √           | √         | √               | ○          | √                | ○                | ○                 | ○           | ○              | ○             | ○                      | ○              | ⦿                      | ⦿               | ●            | √            |
| red drum             | √               | ○             | ○                    | ○           | ⦿           | √         | ○               | ⦿          | √                | ○                | ○                 | ○           | ○              | ⦿             | ⦿                      | ●              | ⦿                      | ●               | √            |              |
| striped mullet       | ⦿               | ⦿             | ⦿                    | ⦿           | ●           | ●         | ●               | ●          | ⦿                | ⦿                | ⦿                 | ⦿           | ●              | ●             | ●                      | ●              | ●                      | ●               | ○            |              |
| spanish mackerel     | ○               | ○             | ○                    | ○           | ⦿           | ⦿         | ○               | ○          | √                | ○                | ○                 | ○           | ○              | ○             | ○                      | ○              | ○                      | √               | ○            |              |
| gulf flounder        |                 | ○             |                      | ○           | ○           | √         | √               | √          | ○                |                  | √                 | √           | √              | √             | √                      | √              | ○                      | ●               | ○            |              |
| summer flounder      | ○               | ⦿             | ○                    | ○           | ⦿           | ○         | ○               | ⦿          | ○                | ○                | ○                 | ○           | ⦿              | ⦿             | ⦿                      | ⦿              | ○                      | ○               |              |              |
| southern flounder    | ⦿               | ⦿             | ⦿                    | ⦿           | ⦿           | ⦿         | ⦿               | ⦿          | ○                | ○                | ⦿                 | ⦿           | ⦿              | ⦿             | ⦿                      | ⦿              | ⦿                      | ⦿               | √            |              |



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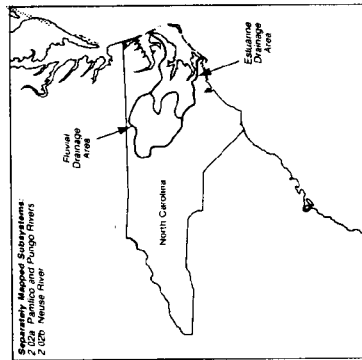
## *Appendices*

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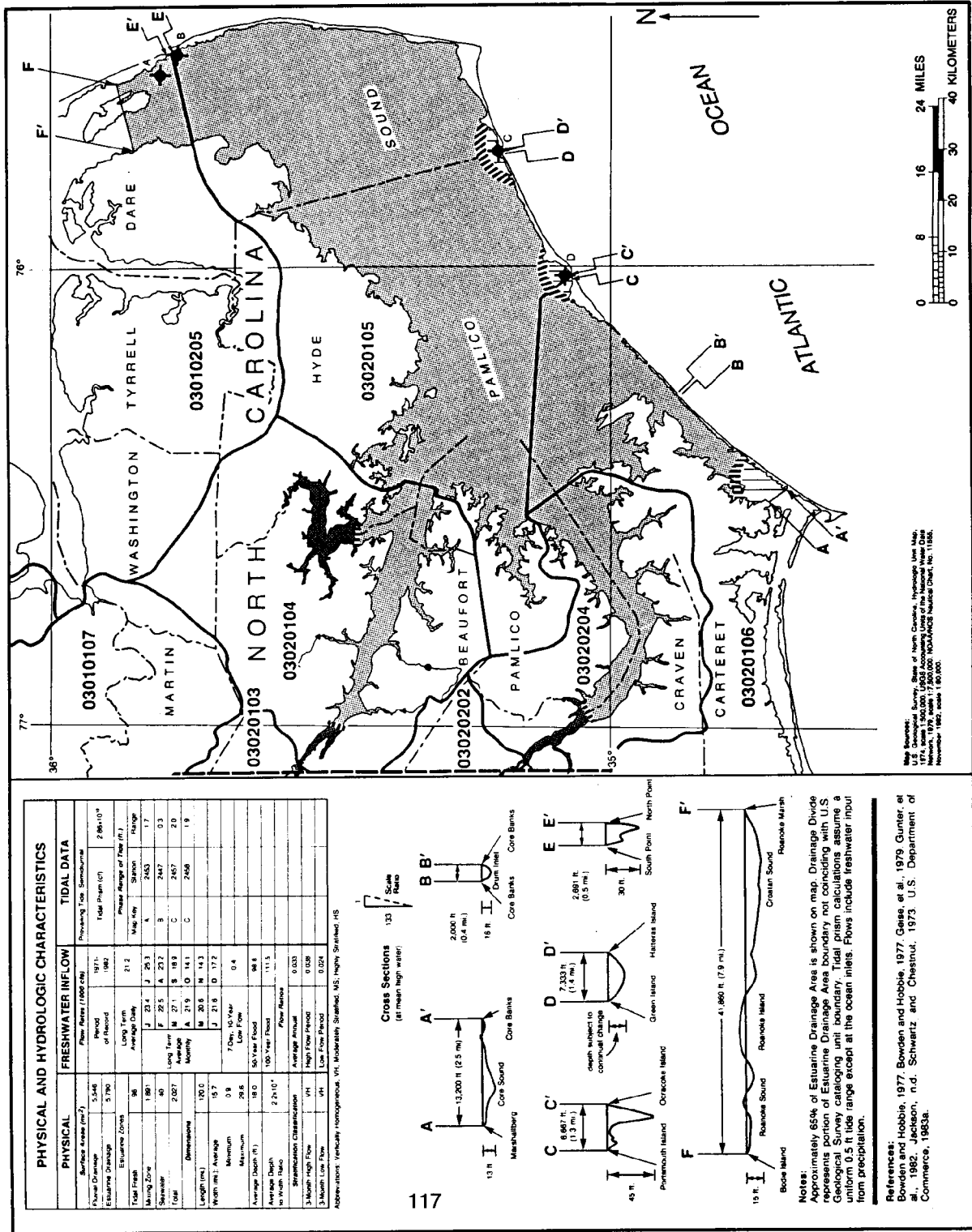
- Appendix 1. National Estuarine Inventory map of Pamlico Sound
- Appendix 2. Table of references and personal communications
- Appendix 3. Personal communications
- Appendix 4. References



**Pamlico Sound**  
**NC**



- |  |                                               |
|--|-----------------------------------------------|
|  | Tide Gage                                     |
|  | Flow Gage                                     |
|  | Head of Tide                                  |
|  | Estuarine Drainage Area (EDA)                 |
|  | Tidal Fresh Zone                              |
|  | Mixing Zone                                   |
|  | Seawater Zone                                 |
|  | Hydrologic Cataloging Unit Boundary           |
|  | County Boundary                               |
|  | Salinity Zone Boundary - Low Variability      |
|  | Salinity Zone Boundary - Moderate Variability |
|  | Salinity Zone Boundary - High Variability     |



## Appendix 2. Table of references and personal communications

| Common/Scientific Name                               | Albemarle Sound, NC                                                                                                   |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilus edulis</i>                      | 554<br>McKenna, Winslow                                                                                               |
| Bay scallop<br><i>Argopecten irradians</i>           | McKenna, Taylor, J. Ross, Chester, Winslow                                                                            |
| American oyster<br><i>Crassostrea virginica</i>      | 57, 86, 133, 134<br>McKenna, Marshall, J. Ross, Chester, Winslow                                                      |
| Common rangia<br><i>Rangia cuneata</i>               | 86, 289, 509, 588<br>McKenna, Winslow                                                                                 |
| Hard clam<br><i>Mercenaria species</i>               | 134, 138<br>McKenna, Winslow                                                                                          |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 86, 217, 586<br>McKenna, J. Ross, Chester, Winslow, Henry                                                             |
| Pink shrimp<br><i>Penaeus duorarum</i>               | McKenna, J. Ross, Chester, Winslow                                                                                    |
| White shrimp<br><i>Penaeus setiferus</i>             | 371<br>McKenna, J. Ross, Chester, Winslow                                                                             |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 86, 217, 319, 586<br>Winslow, McKenna, Henry                                                                          |
| Blue crab<br><i>Callinectes sapidus</i>              | 86, 133, 201, 203, 217, 245, 358, 579, 586<br>Manooch, Winslow, J. Ross                                               |
| Atlantic sturgeon<br><i>Acipenser oxyrhynchus</i>    | 86, 133, 203, 248, 427, 522<br>Manooch, J. Ross, Winslow, Henry                                                       |
| Ladyfish<br><i>Elops saurus</i>                      | 133, 586<br>Manooch, J. Ross, Winslow, Henry                                                                          |
| American eel<br><i>Anguilla rostrata</i>             | 86, 133, 201, 203, 217, 245, 260, 432, 521, 586<br>Manooch, J. Ross, Winslow, Henry                                   |
| Blueback herring<br><i>Alosa aestivalis</i>          | 86, 133, 203, 217, 248, 381, 585, 586<br>Winslow, Manooch, J. Ross, Henry                                             |
| Alewife<br><i>Alosa pseudoharengus</i>               | 86, 133, 203, 217, 248, 381, 585, 586<br>Manooch, Winslow, J. Ross, Henry                                             |
| American shad<br><i>Alosa sapidissima</i>            | 86, 133, 141, 203, 248, 256, 507, 585, 586<br>Manooch, Winslow, J. Ross, Henry                                        |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 86, 133, 203, 217, 432<br>Ahrenholz                                                                                   |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 86, 133, 203, 206, 217, 586<br>J. Ross, Chester, Winslow, Henry                                                       |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 133, 220<br>Henry, Winslow, J. Ross                                                                                   |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 133<br>J. Ross, Winslow, Henry                                                                                     |
| Atlantic silversides<br><i>Menidia species</i>       | 133, 147, 203, 408<br>J. Ross, Winslow                                                                                |
| White perch<br><i>Morone americana</i>               | 86, 133, 201, 203, 217, 245, 260, 432, 480, 586<br>Manooch, Winslow, J. Ross, Henry, Chester                          |
| Striped bass<br><i>Morone saxatilis</i>              | 73, 86, 202, 203, 217, 248, 245, 256, 316, 432, 584, 585, 586<br>Manooch, Chester, S. Ross, J. Ross, Winslow, Hawkins |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 133, 245, 586<br>Manooch, J. Ross, Winslow, Henry                                                                     |
| Cobia<br><i>Rachycentron canadum</i>                 | Manooch, J. Smith, J. Ross, Winslow                                                                                   |
| Gray snapper<br><i>Lutjanus griseus</i>              | 133, 203<br>Manooch, J. Ross, Chester, Winslow, Henry                                                                 |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 133, 245<br>J. Ross, Winslow, Henry                                                                                   |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 133, 203, 586<br>J. Ross, Chester, Winslow, Henry                                                                     |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 86, 247, 245, 339, 341<br>Manooch, J. Ross, Chester, Winslow, Henry                                                   |
| Weakfish<br><i>Cynoscion regalis</i>                 | 86, 133, 217, 247, 245, 338, 343, 346, 586<br>Winslow, Henry, Manooch, Chester, J. Ross                               |
| Spot<br><i>Leiostomus xanthurus</i>                  | 86, 133, 203, 217, 245, 345, 401, 586<br>Winslow, Chester, S. Ross                                                    |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 133, 247<br>J. Ross, Winslow                                                                                          |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 86, 133, 203, 217, 245, 344, 432, 586<br>S. Ross, Chester, Winslow, J. Ross                                           |
| Black drum<br><i>Pogonias cromis</i>                 | 133, 247, 376, 462<br>Manooch, J. Ross, Winslow                                                                       |
| Red drum<br><i>Sciaenops ocellatus</i>               | 133, 247, 340, 342, 462, 505<br>J. Ross, Winslow, Chester, S. Ross                                                    |
| Striped mullet<br><i>Mugil cephalus</i>              | 86, 133, 203, 245, 586<br>J. Ross, Chester, Winslow, Henry                                                            |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 133, 586<br>Manooch, J. Ross, Chester, Winslow, Henry                                                                 |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 402<br>Powell, Manooch, Winslow, Henry                                                                                |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 86, 203, 217, 400, 402<br>Powell, Manooch, J. Ross, Winslow, Chester                                                  |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 86, 201, 203, 217, 245, 400, 402<br>Powell, Manooch, J. Ross, Chester                                                 |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | Pamlico Sound, NC                                                                                                                                          |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilus edulis</i>                      | 554<br>McKenna                                                                                                                                             |
| Bay scallop<br><i>Argopecten irradians</i>           | 133, 134, 477<br>Taylor, McKenna, Freeman                                                                                                                  |
| American oyster<br><i>Crassostrea virginica</i>      | 57, 85, 133, 134, 245<br>McKenna, Taylor, Freeman, Marshall, Chester                                                                                       |
| Common rangia<br><i>Rangia cuneata</i>               | 85, 134, 289, 509, 566, 588<br>Freeman, McKenna, Taylor                                                                                                    |
| Hard clam<br><i>Mercenaria species</i>               | 85, 134, 138, 398<br>Freeman, McKenna, Taylor, Marshall                                                                                                    |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 85, 133, 134, 206, 242, 251, 319, 357, 408, 426, 477, 581<br>Freeman, McKenna, Taylor, J. Ross, Chester                                                    |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 85, 133, 134, 206, 319, 408, 426, 477<br>Freeman, McKenna, Taylor, J. Ross, Chester                                                                        |
| White shrimp<br><i>Penaeus setiferus</i>             | 85, 133, 134, 206, 371, 426<br>Freeman, McKenna, Taylor, J. Ross, Chester                                                                                  |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 85, 134, 206, 319<br>McKenna                                                                                                                               |
| Blue crab<br><i>Callinectes sapidus</i>              | 85, 118, 122, 123, 133, 134, 206, 251, 319, 356, 358, 408, 426, 477, 579<br>Freeman, Taylor, Winslow, S. Ross, Chester, Hawkins                            |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 85, 134, 245, 256, 356, 424, 426, 427, 522<br>Manooch                                                                                                      |
| Ladyfish<br><i>Elops saurus</i>                      | 133, 206, 271, 356, 408, 429, 505<br>Moye, Manooch, J. Ross, Hettler                                                                                       |
| American eel<br><i>Anguilla rostrata</i>             | 85, 133, 134, 201, 206, 245, 260, 271, 356, 408, 426, 429, 505, 521, 585, 586<br>Moye, J. Ross                                                             |
| Blueback herring<br><i>Alosa aestivalis</i>          | 85, 133, 134, 204, 205, 206, 245, 256, 271, 356, 381, 408, 426, 427, 429, 505, 585, 586<br>Moye, Manooch, J. Ross, Chester                                 |
| Alewife<br><i>Alosa pseudoharengus</i>               | 85, 133, 134, 204, 205, 206, 245, 251, 256, 271, 356, 381, 408, 426, 427, 429, 505, 585, 586<br>Moye, Manooch, J. Ross, Chester                            |
| American shad<br><i>Alosa sapidissima</i>            | 85, 133, 134, 141, 204, 205, 206, 248, 256, 271, 356, 426, 429, 505, 507, 533, 585, 586<br>Moye, J. Ross                                                   |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 85, 133, 134, 206, 217, 251, 271, 354, 356, 357, 396, 408, 424, 426, 429, 505<br>Ahrenholz                                                                 |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 85, 133, 134, 206, 271, 319, 356, 357, 408, 426, 429, 463, 505, 586<br>Moye, J. Ross, Chester                                                              |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 133, 220, 319, 408, 505<br>Marraro                                                                                                                         |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 133, 206, 271, 319, 357, 505<br>Moye, Marraro                                                                                                           |
| Atlantic silversides<br><i>Menidia species</i>       | 85, 133, 134, 147, 206, 319, 356, 426, 505<br>J. Ross                                                                                                      |
| White perch<br><i>Morone americana</i>               | 85, 133, 134, 206, 245, 251, 271, 356, 408, 426, 429, 480<br>Moye, J. Ross, Chester                                                                        |
| Striped bass<br><i>Morone saxatilis</i>              | 85, 134, 204, 205, 245, 256, 356, 357, 426, 429<br>Chester, S. Ross, Winslow, J. Ross, Manooch, Hawkins                                                    |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 85, 118, 133, 206, 245, 356, 408, 424, 426, 429, 505<br>Moye, Manooch, J. Ross, Chester                                                                    |
| Cobia<br><i>Rachycentron canadum</i>                 | 426<br>Manooch, J. Smith, J. Ross                                                                                                                          |
| Gray snapper<br><i>Lutjanus griseus</i>              | 85, 118, 133, 206, 356, 408, 426, 477, 505<br>Manooch, J. Ross                                                                                             |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 85, 118, 133, 206, 245, 356, 408, 424, 426<br>Moye, Manooch, J. Ross                                                                                       |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 85, 118, 133, 134, 206, 271, 319, 356, 408, 424, 426, 429, 505<br>Moye, J. Ross, Chester                                                                   |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 85, 118, 133, 134, 206, 247, 245, 251, 339, 341, 356, 408, 424, 426, 429, 505<br>Moye, Manooch, J. Ross                                                    |
| Weakfish<br><i>Cynoscion regalis</i>                 | 85, 133, 134, 206, 247, 245, 251, 338, 343, 346, 356, 424, 426, 505<br>Moye, Manooch, J. Ross, Chester                                                     |
| Spot<br><i>Leiostomus xanthurus</i>                  | 85, 99, 118, 133, 134, 206, 245, 251, 271, 319, 345, 356, 357, 366, 396, 401, 408, 424, 426, 429, 463, 477, 505, 549, 566<br>Winslow, Chester, Hawkins     |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 118, 133, 134, 206, 247, 245, 356, 408, 424, 426<br>Moye, J. Ross                                                                                          |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 85, 99, 118, 133, 134, 206, 217, 245, 251, 271, 319, 344, 355, 356, 357, 366, 408, 424, 425, 426, 429, 463, 505, 566<br>J. Ross, Chester, Winslow, Hawkins |
| Black drum<br><i>Pogonias cromis</i>                 | 85, 133, 206, 247, 356, 376, 424, 426, 462<br>Moye, Manooch, J. Ross                                                                                       |
| Red drum<br><i>Sciaenops ocellatus</i>               | 85, 133, 134, 206, 217, 247, 245, 340, 342, 356, 408, 424, 426, 462, 505<br>Manooch, Chester, S. Ross, J. Ross, Hawkins                                    |
| Striped mullet<br><i>Mugil cephalus</i>              | 85, 118, 133, 134, 206, 245, 271, 319, 356, 408, 426, 429, 505<br>Moye, J. Ross, Chester                                                                   |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 118, 133, 206, 245, 408, 426, 505<br>Moye, Manooch, J. Ross                                                                                                |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 402, 424, 426, 477<br>Moye, Powell, J. Ross, Chester                                                                                                       |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 85, 118, 119, 133, 134, 206, 245, 356, 357, 400, 402, 408, 424, 426, 477, 505<br>Moye, Powell, Manooch, J. Ross, Chester                                   |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 85, 117, 118, 119, 133, 134, 206, 245, 251, 271, 356, 357, 400, 402, 408, 424, 426, 429, 477, 494, 505<br>Moye, J. Ross, Chester, Manooch, Powell          |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | Pamlico and Pungo Rivers, NC                                                                   |
|------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilis edulis</i>                      | 554<br>McKenna                                                                                 |
| Bay scallop<br><i>Argopecten irradians</i>           | 85, 134<br>Chester, Taylor, McKenna                                                            |
| American oyster<br><i>Crassostrea virginica</i>      | 57, 85, 134<br>McKenna, Marshall, Chester                                                      |
| Common rangia<br><i>Rangia cuneata</i>               | 85, 134, 289, 395<br>McKenna, Marshall                                                         |
| Hard clam<br><i>Mercenaria species</i>               | 85, 134, 138<br>Chester, McKenna                                                               |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 85, 133, 134, 206, 393, 426<br>McKenna, Chester                                                |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 85, 133, 134, 206, 426, 581<br>McKenna, Chester                                                |
| White shrimp<br><i>Penaeus setiferus</i>             | 85, 133, 134, 206, 371<br>McKenna, Chester                                                     |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 85, 206<br>McKenna                                                                             |
| Blue crab<br><i>Callinectes sapidus</i>              | 85, 122, 123, 133, 206, 356, 358, 426, 579<br>Chester, Winslow, S. Ross, Hawkins               |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 85, 134, 245, 256, 356, 426, 427, 522<br>not reviewed                                          |
| Ladyfish<br><i>Elops saurus</i>                      | 133, 356<br>Moye, Manooch                                                                      |
| American eel<br><i>Anguilla rostrata</i>             | 85, 133, 134, 356, 426, 521<br>Moye                                                            |
| Blueback herring<br><i>Alosa aestivalis</i>          | 85, 133, 134, 204, 245, 256, 356, 426, 585<br>Manooch, Moye, Chester                           |
| Alewife<br><i>Alosa pseudoharengus</i>               | 85, 133, 134, 204, 256, 356, 426, 585<br>Manooch, Moye, Chester                                |
| American shad<br><i>Alosa sapidissima</i>            | 85, 133, 134, 141, 204, 256, 356, 426, 585<br>Manooch, Moye                                    |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 85, 134, 206, 356, 396, 424, 426, 429<br>Ahrenholz                                             |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 85, 356, 426, 505<br>Moye, Chester                                                             |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 133, 220<br>not reviewed                                                                       |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 133<br>Moye                                                                                 |
| Atlantic silversides<br><i>Menidia species</i>       | 85, 133, 134, 147, 356, 426<br>not reviewed                                                    |
| White perch<br><i>Morone americana</i>               | 85, 133, 134, 245, 356, 480<br>Moye, Chester                                                   |
| Striped bass<br><i>Morone saxatilis</i>              | 85, 204, 256, 356<br>Chester, S. Ross, Winslow, J. Ross, Hawkins                               |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 85, 133, 245, 356, 426<br>Manooch, Moye, Chester                                               |
| Cobia<br><i>Rachycentron canadum</i>                 | Moye, Smith, J.                                                                                |
| Gray snapper<br><i>Lutjanus griseus</i>              | 85, 133, 356, 408, 426<br>Manooch, Chester                                                     |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 85, 133, 356, 408, 424, 426<br>Manooch, Moye, Chester                                          |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 85, 133, 206, 356, 426<br>Moye, Chester                                                        |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 85, 133, 134, 206, 247, 245, 339, 341, 356, 426<br>Manooch, Moye                               |
| Weakfish<br><i>Cynoscion regalis</i>                 | 85, 133, 134, 206, 247, 245, 338, 343, 346, 356, 426, 494<br>Manooch, Moye, Chester            |
| Spot<br><i>Leiostomus xanthurus</i>                  | 85, 133, 134, 206, 345, 356, 357, 401, 424, 426<br>S. Ross, Chester, Winslow, J. Ross, Hawkins |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 133, 134, 206, 247, 356, 426<br>Moye                                                           |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 85, 133, 134, 344, 356, 357, 424, 425, 426, 494<br>S. Ross, Chester, Winslow, J. Ross, Hawkins |
| Black drum<br><i>Pogonias cromis</i>                 | 85, 133, 134, 206, 247, 356, 376, 426, 462<br>Manooch, Moye                                    |
| Red drum<br><i>Sciaenops ocellatus</i>               | 85, 133, 134, 206, 247, 340, 342, 356, 426, 462<br>Winslow, Chester, Ross, J. S. Ross, Hawkins |
| Striped mullet<br><i>Mugil cephalus</i>              | 85, 133, 134, 206, 356<br>Moye, Chester                                                        |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 133, 206, 426<br>Manooch, Moye                                                                 |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 402<br>Powell, Moye, Chester                                                                   |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 85, 117, 133, 134, 356, 400, 402, 426<br>Manooch, Powell, Moye, Chester                        |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 85, 119, 133, 134, 206, 356, 400, 402, 426, 494<br>Manooch, Powell, Moye, Chester              |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | Neuse River, NC                                                                            |
|------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilus edulis</i>                      | 554<br>McKenna                                                                             |
| Bay scallop<br><i>Argopecten irradians</i>           | 134<br>Chester, Taylor, McKenna                                                            |
| American oyster<br><i>Crassostrea virginica</i>      | 57, 134<br>McKenna, Marshall, Chester                                                      |
| Common rangia<br><i>Rangia cuneata</i>               | 289, 588<br>McKenna, Marshall                                                              |
| Hard clam<br><i>Mercenaria species</i>               | 134, 138<br>McKenna, Chester                                                               |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 134, 206, 217, 426<br>McKenna, Chester                                                     |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 206, 217<br>McKenna, Chester                                                               |
| White shrimp<br><i>Penaeus setiferus</i>             | 206, 217, 371<br>McKenna, Chester                                                          |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 217<br>McKenna                                                                             |
| Blue crab<br><i>Callinectes sapidus</i>              | 122, 123, 217, 358, 579<br>Chester, S. Ross, Winslow, Hawkins                              |
| Atlantic sturgeon<br><i>Acipenser oxyrhynchus</i>    | 205, 256, 427, 522<br>not reviewed                                                         |
| Ladyfish<br><i>Elops saurus</i>                      | 206, 271, 505<br>Manooch, Moyer                                                            |
| American eel<br><i>Anguilla rostrata</i>             | 134, 206, 217, 271, 505, 521<br>Moyer, Manooch                                             |
| Blueback herring<br><i>Alosa aestivalis</i>          | 134, 205, 206, 256, 271, 505, 585<br>Moyer, Manooch, Chester                               |
| Alewife<br><i>Alosa pseudoharengus</i>               | 134, 205, 206, 217, 256, 271, 505<br>Moyer, Manooch, Chester                               |
| American shad<br><i>Alosa sapidissima</i>            | 141, 205, 256, 271, 505<br>Moyer                                                           |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 206, 271, 505<br>Ahrenholz                                                                 |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 206, 217, 271, 580<br>Moyer, Chester                                                       |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 133, 220, 505<br>Moyer, Marraro                                                            |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 271, 505<br>Marraro                                                                     |
| Atlantic silversides<br><i>Menidia species</i>       | 147, 206, 505<br>not reviewed                                                              |
| White perch<br><i>Morone americana</i>               | 206, 217, 271, 480<br>Moyer, Chester                                                       |
| Striped bass<br><i>Morone saxatilis</i>              | 205, 256<br>Chester, S. Ross, Winslow, J. Ross, Manooch, Hawkins                           |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 206, 217, 505<br>Moyer, Manooch                                                            |
| Cobia<br><i>Rachycentron canadum</i>                 | Moyer, Manooch, Smith, J.                                                                  |
| Gray snapper<br><i>Lutjanus griseus</i>              | 206, 505<br>Manooch, Chester                                                               |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 424<br>Moyer, Manooch, Chester                                                             |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 206, 217, 271, 505<br>Moyer, Chester                                                       |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 134, 206, 247, 339, 341, 505<br>Moyer, Manooch                                             |
| Weakfish<br><i>Cynoscion regalis</i>                 | 206, 217, 247, 338, 343, 346, 505<br>Moyer, Manooch, Chester                               |
| Spot<br><i>Leiostomus xanthurus</i>                  | 206, 217, 271, 345, 401, 426, 463, 494, 505<br>S. Ross, Chester, Winslow, J. Ross, Hawkins |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 206, 247<br>Moyer, Manooch, Chester                                                        |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 206, 217, 271, 344, 425, 426, 463, 505<br>S. Ross, Winslow, J. Ross, Hawkins               |
| Black drum<br><i>Pogonias cromis</i>                 | 133, 134, 206, 247, 376, 426, 462<br>Manooch, Moyer                                        |
| Red drum<br><i>Sciaenops ocellatus</i>               | 206, 217, 247, 340, 342, 462, 505<br>Winslow, J. Ross, Chester, S. Ross, Hawkins           |
| Striped mullet<br><i>Mugil cephalus</i>              | 133, 206, 217, 271, 505<br>Moyer, Chester                                                  |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 133, 206, 426, 505<br>Moyer, Manooch                                                       |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 117, 402<br>Moyer, Powell, Chester                                                         |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 206, 400, 402, 505<br>Moyer, Powell, Manooch, Chester                                      |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 118, 119, 206, 217, 271, 400, 402, 426, 505, 581<br>Moyer, Powell, Manooch, Chester        |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | Bogue Sound, NC                                                                                                                      |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilus edulis</i>                      | 46, 272, 325, 554<br>not reviewed                                                                                                    |
| Bay scallop<br><i>Argopecten irradians</i>           | 148, 188, 435, 436, 477, 496<br>Taylor, Freeman                                                                                      |
| American oyster<br><i>Crassostrea virginica</i>      | 27, 57, 75, 76, 77, 185, 553<br>Marshall, Freeman, Taylor                                                                            |
| Common rangia<br><i>Rangia cuneata</i>               | 61, 231, 289, 509, 553, 587, 588<br>Freeman                                                                                          |
| Hard clam<br><i>Mercenaria species</i>               | 72, 75, 138, 398, 479, 553<br>Freeman, Marshall, Taylor                                                                              |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 82, 152.1, 329, 380, 574, 575, 576, 577, 578, 579<br>Taylor, Freeman                                                                 |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 87, 152.1, 329, 380, 574, 575, 576, 577, 578, 579<br>Taylor, Freeman                                                                 |
| White shrimp<br><i>Penaeus setiferus</i>             | 298, 329, 371, 380, 574, 575, 577, 578, 579<br>Taylor, Freeman                                                                       |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 12, 52, 152.1, 284, 319, 513, 578, 579<br>not reviewed                                                                               |
| Blue crab<br><i>Callinectes sapidus</i>              | 122, 123, 258, 523, 578, 579<br>Taylor, Freeman                                                                                      |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 372, 427, 441, 455, 464, 522<br>not reviewed                                                                                         |
| Ladyfish<br><i>Elops saurus</i>                      | 250, 257, 293, 505, 516, 550<br>Hettler, Manooch, Spence                                                                             |
| American eel<br><i>Anguilla rostrata</i>             | 142, 194, 497, 505, 511, 516, 521, 550<br>Spence                                                                                     |
| Blueback herring<br><i>Alosa aestivalis</i>          | 146, 243, 390, 431, 455, 516<br>not reviewed                                                                                         |
| Alewife<br><i>Alosa pseudoharengus</i>               | 146, 243, 390, 455<br>not reviewed                                                                                                   |
| American shad<br><i>Alosa sapidissima</i>            | 141, 205, 243, 455, 456, 506, 516<br>not reviewed                                                                                    |
| Atlantic menhaden<br><i>Brevortia tyrannus</i>       | 218, 243, 259, 291, 293, 294, 295, 420, 423, 463, 510, 511, 516, 550, 573<br>Ahrenholz, Hettler                                      |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 218, 223, 243, 286, 293, 463, 505, 511, 516, 550<br>Mercer, Manooch, Spence, Hettler                                                 |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 194, 218, 220, 243, 505, 516<br>Hettler, Spence                                                                                      |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 194, 218, 243, 274, 282, 505, 516<br>Hettler, Spence                                                                              |
| Atlantic silversides<br><i>Menidia species</i>       | 147, 218, 221, 243, 293, 505, 511, 516<br>Hettler, Spence                                                                            |
| White perch<br><i>Morone americana</i>               | 195, 516<br>not reviewed                                                                                                             |
| Striped bass<br><i>Morone saxatilis</i>              | 149, 195, 205, 448<br>not reviewed                                                                                                   |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 80, 243, 257, 265, 399, 423, 505, 516, 571<br>Manooch, Mercer, Monaghan, Spence                                                      |
| Cobia<br><i>Rachycentron canadum</i>                 | 195, 243, 315<br>Smith, J., Manooch, Monaghan                                                                                        |
| Gray snapper<br><i>Lutjanus griseus</i>              | 195, 243, 505, 516<br>Mercer, Manooch, Spence                                                                                        |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 218, 225, 243, 247, 264, 315, 440, 511, 516<br>Mercer, Spence, Monaghan, Manooch                                                     |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 5, 108, 218, 234, 243, 257, 293, 505, 510, 511, 516, 550<br>Mercer, Monaghan, Spence, Hettler                                        |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 224, 243, 257, 339, 341, 502, 516, 555<br>Manooch, Mercer, Monaghan, Spence                                                          |
| Weakfish<br><i>Cynoscion regalis</i>                 | 224, 243, 257, 338, 343, 346, 423, 516, 555<br>Manooch, Mercer, Monaghan, Spence                                                     |
| Spot<br><i>Leiostomus xanthurus</i>                  | 218, 223, 243, 257, 292, 293, 345, 401, 406, 423, 463, 505, 510, 511, 516, 548, 550, 549<br>Mercer, Monaghan, Spence, Hettler, Lewis |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 224, 243, 247, 423, 516<br>Spence, Mercer                                                                                            |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 218, 223, 243, 257, 292, 293, 344, 406, 423, 463, 511, 516, 548, 550<br>Mercer, Monaghan, Spence, Hettler, Lewis                     |
| Black drum<br><i>Pogonias cromis</i>                 | 243, 247, 315, 376, 423, 462, 516<br>Manooch, Monaghan, Spence, Mercer                                                               |
| Red drum<br><i>Sciaenops ocellatus</i>               | 247, 340, 342, 394, 462, 505<br>Monaghan, Mercer, Manooch, Spence                                                                    |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 218, 243, 293, 315, 319, 505, 511, 516, 550<br>Monaghan, Spence                                                                  |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 80, 157, 225, 243, 511, 516<br>Mercer, Monaghan, Manooch, Spence                                                                     |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 132, 243, 400, 505, 516, 550, 581, 589<br>Powell, Mercer, Monaghan, Spence, Burke                                                    |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 243, 293, 365, 400, 421, 505, 516, 550, 589<br>Powell, Burke, Mercer, Monaghan, Spence                                               |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 132, 243, 400, 505, 516, 550, 589<br>Powell, Manooch, Burke, Mercer, Monaghan, Spence                                                |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | New River, NC                                                                                                  |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilus edulis</i>                      | 46, 272, 325, 554<br>not reviewed                                                                              |
| Bay scallop<br><i>Argopecten irradians</i>           | 148, 188, 435, 436, 477<br>Taylor                                                                              |
| American oyster<br><i>Crassostrea virginica</i>      | 27, 57, 75, 76, 77, 185, 553<br>Marshall, Parker, Taylor                                                       |
| Common rangia<br><i>Rangia cuneata</i>               | 61, 231, 289, 509, 553, 587, 588<br>not reviewed                                                               |
| Hard clam<br><i>Mercenaria species</i>               | 72, 75, 138, 398, 479, 553<br>Marshall, Parker, Taylor                                                         |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 82, 329, 380, 574, 575, 576, 577, 579<br>Allison, Taylor                                                       |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 87, 329, 380, 574, 575, 576, 577, 578, 579<br>Allison, Taylor                                                  |
| White shrimp<br><i>Penaeus setiferus</i>             | 298, 329, 371, 380, 574, 575, 577, 578, 579<br>Allison, Taylor                                                 |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 12, 52, 284, 319, 513, 578, 579<br>Schoolfield                                                                 |
| Blue crab<br><i>Callinectes sapidus</i>              | 122, 123, 258, 523, 578, 579<br>Schoolfield                                                                    |
| Atlantic sturgeon<br><i>Acipenser oxyrhynchus</i>    | 372, 427, 441, 455, 464, 522<br>Schoolfield                                                                    |
| Ladyfish<br><i>Elops saurus</i>                      | 250, 257, 293, 505, 516, 550<br>Schoolfield                                                                    |
| American eel<br><i>Anguilla rostrata</i>             | 142, 194, 497, 505, 511, 516, 521, 550<br>Schoolfield                                                          |
| Blueback herring<br><i>Alosa aestivalis</i>          | 146, 243, 390, 431, 455, 516<br>Schoolfield                                                                    |
| Alewife<br><i>Alosa pseudoharengus</i>               | 146, 243, 390, 455<br>Schoolfield                                                                              |
| American shad<br><i>Alosa sapidissima</i>            | 141, 205, 243, 455, 456, 506, 516<br>Schoolfield                                                               |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 218, 243, 259, 291, 293, 294, 295, 420, 423, 463, 510, 511, 516, 550, 573<br>Ahrenholz, Schoolfield            |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 218, 223, 243, 286, 293, 463, 505, 511, 516, 550<br>Schoolfield                                                |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 194, 218, 220, 243, 505, 516<br>Schoolfield                                                                    |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 194, 218, 243, 274, 282, 505, 516<br>Schoolfield                                                            |
| Atlantic silversides<br><i>Menidia species</i>       | 147, 218, 221, 243, 293, 505, 511, 516<br>Schoolfield                                                          |
| White perch<br><i>Morone americana</i>               | 195, 516<br>Schoolfield, Rohde                                                                                 |
| Striped bass<br><i>Morone saxatilis</i>              | 149, 195, 205, 448<br>Schoolfield                                                                              |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 80, 243, 257, 265, 399, 423, 505, 516, 571<br>Schoolfield                                                      |
| Cobia<br><i>Rachycentron canadum</i>                 | 195, 243, 315<br>Manooch, Smith, J.                                                                            |
| Gray snapper<br><i>Lutjanus griseus</i>              | 195, 243, 505, 516<br>Manooch, Schoolfield                                                                     |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 218, 225, 243, 247, 264, 315, 511, 516<br>Manooch, Schoolfield                                                 |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 5, 108, 218, 234, 243, 257, 293, 505, 510, 511, 516, 550<br>Schoolfield                                        |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 224, 243, 257, 339, 341, 502, 516, 555<br>Manooch, Schoolfield                                                 |
| Weakfish<br><i>Cynoscion regalis</i>                 | 224, 243, 257, 338, 343, 346, 423, 516, 555<br>Manooch, Schoolfield                                            |
| Spot<br><i>Leiostomus xanthurus</i>                  | 218, 223, 243, 257, 292, 293, 345, 401, 406, 423, 463, 505, 510, 511, 516, 548, 550, 549<br>Lewis, Schoolfield |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 224, 243, 247, 423, 516<br>Rohde                                                                               |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 218, 223, 243, 257, 292, 293, 344, 406, 423, 463, 511, 516, 548, 550<br>Rohde, Lewis                           |
| Black drum<br><i>Pogonias cromis</i>                 | 243, 247, 315, 376, 423, 462, 516<br>Manooch, Rohde                                                            |
| Red drum<br><i>Sciaenops ocellatus</i>               | 247, 340, 342, 394, 462, 505<br>Rohde, Manooch                                                                 |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 218, 243, 293, 315, 319, 505, 511, 516, 550<br>Rohde                                                       |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 80, 157, 225, 243, 511, 516<br>Manooch, Rohde                                                                  |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 132, 243, 400, 505, 516, 550, 581, 589<br>Powell, Rohde                                                        |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 243, 293, 365, 400, 421, 505, 516, 550, 589<br>Powell, Rohde                                                   |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 132, 243, 400, 505, 516, 550, 589<br>Powell, Rohde                                                             |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name             | Cape Fear River, NC                              |
|------------------------------------|--------------------------------------------------|
| Mussel                             | 554                                              |
| <i>Mytilus edulis</i>              | not reviewed                                     |
| Bay scallop                        | 148                                              |
| <i>Argopecten irradians</i>        | Taylor, Parker                                   |
| American oyster                    | 27, 57, 69                                       |
| <i>Crassostrea virginica</i>       | Parker                                           |
| Common rangia                      | 1, 231, 289                                      |
| <i>Rangia cuneata</i>              | Lindquist                                        |
| Hard clam                          | 138                                              |
| <i>Mercenaria species</i>          | Parker                                           |
| Brown shrimp                       | 69, 70, 227, 240, 551                            |
| <i>Penaeus aztecus</i>             | Allison, Cooke, Lindquist                        |
| Pink shrimp                        | 70, 227, 551                                     |
| <i>Penaeus duorarum</i>            | Allison, Cooke, Lindquist                        |
| White shrimp                       | 70, 371, 578, 579                                |
| <i>Penaeus setiferus</i>           | Allison, Cooke, Lindquist                        |
| Grass shrimp                       | 12, 47                                           |
| <i>Palaemonetes pugio</i>          | Pollard                                          |
| Blue crab                          | 122, 304, 428, 523, 578, 579                     |
| <i>Callinectes sapidus</i>         | Pollard, Schoolfield, Lindquist                  |
| Atlantic sturgeon                  | 41, 250, 315, 427, 442, 443, 444                 |
| <i>Acipenser oxyrhynchus</i>       | Schoolfield, Lindquist, Thompson, Moser, S. Ross |
| Ladyfish                           | 250, 442                                         |
| <i>Elops saurus</i>                | Schoolfield, Thompson, Lindquist                 |
| American eel                       | 143, 442, 521                                    |
| <i>Anguilla rostrata</i>           | Schoolfield, Lindquist                           |
| Blueback herring                   | 109, 151, 315, 441, 442                          |
| <i>Alosa aestivalis</i>            | Schoolfield, Thompson, Lindquist, Moser          |
| Alewife                            | 109, 151, 315, 442                               |
| <i>Alosa pseudoharengus</i>        | Schoolfield, Thompson, Lindquist, Moser          |
| American shad                      | 109, 151, 315, 442, 457                          |
| <i>Alosa sapidissima</i>           | Pollard, Schoolfield, Lindquist, Moser           |
| Atlantic menhaden                  | 6, 69, 70, 83, 259, 291, 428, 442, 551           |
| <i>Brevoortia tyrannus</i>         | Ahrenholz, Smith, J.                             |
| Bay anchovy                        | 70, 240, 428, 442, 514, 551                      |
| <i>Anchoa mitchilli</i>            | Schoolfield, Cooke, Lindquist                    |
| Sheepshead minnow                  | 194, 220, 442                                    |
| <i>Cyprinodon variegatus</i>       | Lindquist                                        |
| Mummichog                          | 194, 428, 442                                    |
| <i>Fundulus heteroclitus</i>       | Schoolfield, Pollard, Lindquist                  |
| Atlantic silversides               | 70, 147, 442                                     |
| <i>Menidia species</i>             | Schoolfield, Cooke, Lindquist                    |
| White perch                        | 195, 315, 442                                    |
| <i>Morone americana</i>            | Rohde, Lindquist                                 |
| Striped bass                       | 151, 442, 457                                    |
| <i>Morone saxatilis</i>            | Rohde, Thompson, Lindquist, Moser, S. Ross       |
| Bluefish                           | 80, 442                                          |
| <i>Pomatomus saltatrix</i>         | Rohde, Benedict, Lindquist                       |
| Cobia                              | 315, 442                                         |
| <i>Rachycentron canadum</i>        | Rohde, Lindquist, J. Smith, Herring              |
| Gray snapper                       | 240, 315, 442                                    |
| <i>Lutjanus griseus</i>            | Manooch, Herring, Lindquist, Rohde               |
| Sheepshead                         | 143, 264, 315, 442, 440                          |
| <i>Archosargus probatocephalus</i> | Rohde, Herring, Lindquist                        |
| Pinfish                            | 108, 442, 443, 444                               |
| <i>Lagodon rhomboides</i>          | Rohde, Herring, Lindquist                        |
| Spotted seatrout                   | 227, 240, 247, 315, 442                          |
| <i>Cynoscion nebulosus</i>         | Benedict, Rohde, Lindquist                       |
| Weakfish                           | 70, 240, 338, 346, 442, 443, 444                 |
| <i>Cynoscion regalis</i>           | Schoolfield, Benedict, Lindquist                 |
| Spot                               | 47, 70, 99, 227, 428, 443, 444, 549, 551, 552    |
| <i>Leiostomus xanthurus</i>        | Schoolfield, Cates, Lindquist                    |
| Southern kingfish                  | 247, 376, 442                                    |
| <i>Menticirrhus americanus</i>     | Schoolfield, Cates, Lindquist                    |
| Atlantic croaker                   | 47, 70, 99, 240, 442, 443, 444, 548              |
| <i>Micropogonias undulatus</i>     | Cates, Schoolfield, Lindquist                    |
| Black drum                         | 247, 315, 376, 442, 462                          |
| <i>Pogonias cromis</i>             | Lindquist, Benedict, Schoolfield                 |
| Red drum                           | 240, 442, 462, 551                               |
| <i>Sciaenops ocellatus</i>         | Schoolfield, Benedict, Lindquist                 |
| Striped mullet                     | 69, 79, 442, 551                                 |
| <i>Mugil cephalus</i>              | Pollard, Schoolfield, Lindquist                  |
| Spanish mackerel                   | 80, 240, 442                                     |
| <i>Scomberomorus maculatus</i>     | Schoolfield, Pollard, Lindquist                  |
| Gulf flounder                      | 84, 442                                          |
| <i>Paralichthys albigutta</i>      | Rohde, Herring                                   |
| Summer flounder                    | 70, 84, 376, 421, 442, 443, 444, 551             |
| <i>Paralichthys dentatus</i>       | Powell, Herring, Rohde, Lindquist                |
| Southern flounder                  | 84, 117, 240, 442, 443, 444                      |
| <i>Paralichthys lethostigma</i>    | Rohde, Herring, Lindquist                        |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | Winyah Bay, SC                                                                                                 |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilus edulis</i>                      | 1, 153, 433, 593<br>Allen, Ogburn, Anderson                                                                    |
| Bay scallop<br><i>Argopecten irradians</i>           | 63, 153, 184, 593<br>Allen, Ogburn, Anderson                                                                   |
| American oyster<br><i>Crassostrea virginica</i>      | 8, 27, 57, 183, 226, 262, 263, 269, 307, 335, 476<br>Allen, Ogburn, Anderson                                   |
| Common rangia<br><i>Rangia cuneata</i>               | 61, 289, 593<br>Allen, Ogburn, Anderson                                                                        |
| Hard clam<br><i>Mercenaria species</i>               | 8, 13, 138, 139, 140, 184, 226, 317<br>Allen, Ogburn, Anderson                                                 |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 9, 34, 38, 82, 144, 145, 226, 329, 385, 387, 512, 559, 564, 579<br>Whitaker, Delancey, Allen, Ogburn           |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 9, 38, 87, 130, 144, 226, 329, 385, 387, 512, 559, 564, 579<br>Whitaker, Delancey, Allen, Ogburn               |
| White shrimp<br><i>Penaeus setiferus</i>             | 8, 9, 34, 130, 144, 226, 297, 298, 329, 371, 385, 387, 512, 559, 564, 579<br>Whitaker, Delancey, Allen, Ogburn |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 8, 9, 10, 12, 284, 387, 452, 459, 559, 564, 579<br>Whitaker, Delancey, Allen, Ogburn                           |
| Blue crab<br><i>Callinectes sapidus</i>              | 8, 9, 131, 226, 304, 328, 385, 449, 452, 523, 564, 579<br>Whitaker, Delancey, Allen, Ogburn                    |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 33, 290, 372, 470, 472, 473, 522, 564<br>Allen, Ogburn, Moore                                                  |
| Ladyfish<br><i>Elops saurus</i>                      | 8, 9, 33, 59, 60, 222, 250, 315, 593<br>Allen, Ogburn, Moore                                                   |
| American eel<br><i>Anguilla rostrata</i>             | 8, 9, 59, 60, 192, 194, 197, 232, 449, 521, 564<br>Allen, Ogburn, Moore                                        |
| Blueback herring<br><i>Alosa aestivalis</i>          | 8, 9, 59, 60, 146, 250, 336, 385, 390, 451, 452, 519, 564<br>Allen, Ogburn, Moore                              |
| Alewife<br><i>Alosa pseudoharengus</i>               | 146, 250, 390<br>Allen, Ogburn, Moore                                                                          |
| American shad<br><i>Alosa sapidissima</i>            | 96, 97, 141, 519, 520, 533, 564<br>Allen, Ogburn, Moore                                                        |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 7, 8, 9, 50, 59, 385, 411, 420, 451, 452, 564<br>Allen, Ogburn, Moore                                          |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 7, 8, 9, 50, 59, 60, 226, 385, 449, 451, 452, 564<br>Allen, Ogburn, Moore                                      |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 9, 59, 60, 194, 593<br>Allen, Ogburn, Moore                                                                    |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 7, 9, 59, 60, 194, 385, 452<br>Allen, Ogburn, Moore                                                         |
| Atlantic silversides<br><i>Menidia species</i>       | 8, 9, 59, 60, 147, 221, 349, 351, 452<br>Allen, Ogburn, Moore                                                  |
| White perch<br><i>Morone americana</i>               | 8, 195, 336, 385, 564<br>Allen, Ogburn, Moore                                                                  |
| Striped bass<br><i>Morone saxatilis</i>              | 8, 149, 195, 474, 519, 564<br>Allen, Ogburn, Moore                                                             |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 9, 33, 38, 59, 60, 80, 68.1, 305, 385, 399, 564<br>Allen, Ogburn, Moore                                        |
| Cobia<br><i>Rachycentron canadum</i>                 | 9, 33, 195, 385<br>Allen, Ogburn, Moore                                                                        |
| Gray snapper<br><i>Lutjanus griseus</i>              | 8, 9, 59, 195, 385, 564, 593<br>Allen, Moore, Ogburn                                                           |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 9, 59, 60, 225, 247, 305, 564, 593<br>Allen, Ogburn, Moore                                                     |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 7, 8, 9, 33, 50, 59, 60, 385, 452, 564<br>Allen, Ogburn, Moore                                                 |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 7, 9, 33, 59, 60, 247, 305, 339, 341, 385, 405, 502, 564<br>Allen, Ogburn, Moore                               |
| Weakfish<br><i>Cynoscion regalis</i>                 | 7, 8, 9, 308, 338, 343, 385, 449, 451, 564<br>Allen, Ogburn, Moore                                             |
| Spot<br><i>Leiostomus xanthurus</i>                  | 7, 8, 9, 50, 59, 60, 111, 305, 345, 385, 449, 451, 452, 564<br>Allen, Ogburn, Moore                            |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 8, 9, 33, 35, 385, 451, 465, 564<br>Allen, Ogburn, Moore                                                       |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 7, 8, 9, 36, 50, 59, 60, 305, 333, 352, 385, 449, 564<br>Allen, Ogburn, Moore                                  |
| Black drum<br><i>Pogonias cromis</i>                 | 7, 9, 38, 247, 376, 564<br>Allen, Ogburn, Moore                                                                |
| Red drum<br><i>Sciaenops ocellatus</i>               | 7, 8, 9, 33, 38, 59, 60, 247, 305, 342, 564<br>Allen, Ogburn, Moore                                            |
| Striped mullet<br><i>Mugil cephalus</i>              | 8, 9, 14, 50, 59, 60, 385, 452, 564<br>Allen, Ogburn, Moore                                                    |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 33, 59, 60, 80, 157, 225, 305, 385, 593<br>Allen, Ogburn, Moore                                                |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 50, 132, 385, 451, 452, 593<br>Allen, Ogburn, Moore                                                            |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 7, 8, 9, 33, 50, 59, 60, 385, 421, 452, 564<br>Allen, Ogburn, Moore                                            |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 7, 8, 9, 50, 59, 60, 385, 452, 564<br>Allen, Ogburn, Moore                                                     |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | North and South Santee Rivers, SC                                                        |
|------------------------------------------------------|------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilis edulis</i>                      | 1, 153, 593<br>Anderson                                                                  |
| Bay scallop<br><i>Argopecten irradians</i>           | 153, 593<br>Anderson                                                                     |
| American oyster<br><i>Crassostrea virginica</i>      | 27, 57, 64, 183, 262, 263, 335, 476<br>Stender, Anderson                                 |
| Common rangia<br><i>Rangia cuneata</i>               | 61, 289, 593<br>Anderson                                                                 |
| Hard clam<br><i>Mercenaria species</i>               | 13, 56, 64, 138, 139, 140, 184, 317, 414<br>Stender, Anderson                            |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 34, 38, 64, 82, 130, 144, 329, 387, 512, 559, 560, 579<br>Stender, Whitaker, Delancey    |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 87, 130, 144, 329, 387, 512, 559, 563, 579<br>Stender, Whitaker, Delancey                |
| White shrimp<br><i>Penaeus setiferus</i>             | 64, 130, 144, 297, 298, 329, 371, 387, 512, 559, 563, 579<br>Stender, Whitaker, Delancey |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 10, 12, 64, 284, 387, 459, 559, 563, 579<br>Stender, Whitaker, Delancey                  |
| Blue crab<br><i>Callinectes sapidus</i>              | 64, 131, 304, 328, 523, 559, 563, 579<br>Stender, Whitaker, Delancey                     |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 33, 290, 372, 470, 472, 473, 522<br>Stender, Moore                                       |
| Ladyfish<br><i>Elops saurus</i>                      | 33, 222, 250, 326, 557, 593<br>Stender, Moore                                            |
| American eel<br><i>Anguilla rostrata</i>             | 192, 194, 232, 326, 521, 557, 563<br>Moore                                               |
| Blueback herring<br><i>Alosa aestivalis</i>          | 54, 146, 250, 336, 390, 519, 563<br>Stender, Moore                                       |
| Alewife<br><i>Alosa pseudoharengus</i>               | 146, 250, 390, 519, 593<br>Stender, Moore                                                |
| American shad<br><i>Alosa sapidissima</i>            | 96, 97, 141, 519, 520, 533, 563<br>Stender, Moore                                        |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 326, 411, 420, 557, 563<br>Stender, Moore                                                |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 7, 326, 412, 449, 451, 557, 563<br>Stender, Moore                                        |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 194, 326, 557, 593<br>Moore                                                              |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 60, 194, 326, 412, 557<br>Moore                                                       |
| Atlantic silversides<br><i>Menidia species</i>       | 147, 221, 326, 349, 350, 351, 363, 412, 557, 563<br>Stender, Moore                       |
| White perch<br><i>Morone americana</i>               | 195, 336, 557, 563<br>Stender, Moore                                                     |
| Striped bass<br><i>Morone saxatilis</i>              | 149, 195, 320, 445, 446, 474, 484, 519, 557, 563<br>Stender, Moore                       |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 9, 33, 80, 68.1, 305, 399, 557, 563<br>Stender, Moore                                    |
| Cobia<br><i>Rachycentron canadum</i>                 | 33, 195<br>Stender, Moore                                                                |
| Gray snapper<br><i>Lutjanus griseus</i>              | 9, 195, 326, 557, 563<br>Stender, Moore                                                  |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 9, 247, 326, 557, 563, 593<br>Stender, Moore                                             |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 108, 326, 557, 563<br>Stender, Moore                                                     |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 33, 247, 305, 326, 339, 341, 405, 502, 557, 563<br>Stender, Moore                        |
| Weakfish<br><i>Cynoscion regalis</i>                 | 308, 326, 338, 343, 449, 451, 557, 563<br>Stender, Moore                                 |
| Spot<br><i>Leiostomus xanthurus</i>                  | 111, 326, 345, 449, 451, 557, 563<br>Stender, Moore                                      |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 33, 35, 247, 326, 451, 465, 557, 563<br>Stender, Moore                                   |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 36, 326, 352, 449, 451, 557, 563<br>Stender, Moore                                       |
| Black drum<br><i>Pogonias cromis</i>                 | 7, 38, 247, 326, 376, 557<br>Stender, Moore                                              |
| Red drum<br><i>Sciaenops ocellatus</i>               | 33, 247, 305, 326, 342, 557, 148<br>Stender, Moore                                       |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 326, 557, 563<br>Stender, Moore                                                      |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 33, 80, 157, 225, 305, 593<br>Stender, Moore                                             |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 326, 557<br>Stender, Moore                                                               |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 33, 326, 421, 557, 563<br>Stender, Moore                                                 |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 326, 449, 451, 557, 563<br>Stender, Moore                                                |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name             | Charleston Harbor, SC                                                         |
|------------------------------------|-------------------------------------------------------------------------------|
| Mussel                             | 1, 153, 593                                                                   |
| <i>Mytilus edulis</i>              | Anderson, Martone                                                             |
| Bay scallop                        | 153, 593                                                                      |
| <i>Argopecten irradians</i>        | Anderson, Martone, VanDolah                                                   |
| American oyster                    | 27, 57, 183, 184, 262, 263, 335, 476, 524                                     |
| <i>Crassostrea virginica</i>       | Anderson, Martone                                                             |
| Common rangia                      | 61, 289, 593                                                                  |
| <i>Rangia cuneata</i>              | Anderson, Martone                                                             |
| Hard clam                          | 13, 138, 139, 140, 184, 317, 524                                              |
| <i>Mercenaria species</i>          | Anderson, Martone                                                             |
| Brown shrimp                       | 38, 82, 329, 450, 483, 512, 524, 560, 565, 562, 579                           |
| <i>Penaeus aztecus</i>             | Whitaker, Delancey, Martone, Archambault, Wenner, Van Dolah                   |
| Pink shrimp                        | 87, 130, 144, 329, 483, 524, 560, 565, 562, 579                               |
| <i>Penaeus duorarum</i>            | Whitaker, Delancey, Martone, Archambault, Wenner, Van Dolah                   |
| White shrimp                       | 34, 130, 144, 145, 297, 298, 329, 371, 450, 483, 512, 524, 560, 565, 562, 579 |
| <i>Penaeus setiferus</i>           | Whitaker, Delancey, Martone, Archambault, Wenner, Van Dolah                   |
| Grass shrimp                       | 10, 12, 284, 459, 483, 517, 565, 562, 579                                     |
| <i>Palaemonetes pugio</i>          | Whitaker, Delancey, Martone, Archambault, Wenner, Van Dolah                   |
| Blue crab                          | 19, 20, 304, 328, 337, 450, 483, 517, 523, 524, 565, 562, 579                 |
| <i>Callinectes sapidus</i>         | Whitaker, Delancey, Martone, Archambault, Wenner, Van Dolah                   |
| Atlantic sturgeon                  | 33, 290, 372, 449, 470, 472, 473, 522, 565                                    |
| <i>Acipenser oxyrinchus</i>        | Martone, VanDolah                                                             |
| Ladyfish                           | 9, 33, 222, 250, 326, 565, 593                                                |
| <i>Elops saurus</i>                | Martone                                                                       |
| American eel                       | 191, 192, 194, 196, 197, 232, 517, 521, 565                                   |
| <i>Anguilla rostrata</i>           | Martone, VanDolah                                                             |
| Blueback herring                   | 54, 146, 250, 336, 390, 451, 517, 519, 565                                    |
| <i>Alosa aestivalis</i>            | Martone, VanDolah                                                             |
| Alewife                            | 146, 250, 390                                                                 |
| <i>Alosa pseudoharengus</i>        | Martone                                                                       |
| American shad                      | 96, 97, 141, 450, 519, 520, 533, 565                                          |
| <i>Alosa sapidissima</i>           | Martone, VanDolah                                                             |
| Atlantic menhaden                  | 411, 420, 450, 451, 483, 517, 524, 565                                        |
| <i>Brevoortia tyrannus</i>         | Martone, VanDolah                                                             |
| Bay anchovy                        | 7, 250, 412, 450, 451, 483, 517, 524, 565                                     |
| <i>Anchoa mitchilli</i>            | Martone, VanDolah                                                             |
| Sheepshead minnow                  | 194, 593                                                                      |
| <i>Cyprinodon variegatus</i>       |                                                                               |
| Mummichog                          | 2, 60, 194, 517                                                               |
| <i>Fundulus heteroclitus</i>       | Martone                                                                       |
| Atlantic silversides               | 147, 221, 349, 351, 517, 565                                                  |
| <i>Menidia species</i>             | Martone, VanDolah                                                             |
| White perch                        | 195, 336, 565                                                                 |
| <i>Morone americana</i>            | Martone, VanDolah                                                             |
| Striped bass                       | 149, 195, 320, 445, 446, 474, 484, 517, 519, 565                              |
| <i>Morone saxatilis</i>            | VanDolah                                                                      |
| Bluefish                           | 33, 80, 68.1, 399, 517, 565                                                   |
| <i>Pomatomus saltatrix</i>         | Martone, VanDolah                                                             |
| Cobia                              | 33, 195                                                                       |
| <i>Rachycentron canadum</i>        | Martone, VanDolah                                                             |
| Gray snapper                       | 195, 565                                                                      |
| <i>Lutjanus griseus</i>            | VanDolah                                                                      |
| Sheepshead                         | 247, 565, 593                                                                 |
| <i>Archosargus probatocephalus</i> | Martone, VanDolah                                                             |
| Pinfish                            | 9, 50, 108, 326, 565                                                          |
| <i>Lagodon rhomboides</i>          | Martone, VanDolah                                                             |
| Spotted seatrout                   | 33, 107, 247, 339, 341, 406, 451, 502, 517, 565, 558                          |
| <i>Cynoscion nebulosus</i>         | Martone, VanDolah                                                             |
| Weakfish                           | 308, 338, 343, 451, 483, 524, 565                                             |
| <i>Cynoscion regalis</i>           | Martone, VanDolah                                                             |
| Spot                               | 111, 345, 451, 483, 517, 524, 565                                             |
| <i>Leiostomus xanthurus</i>        | Martone, VanDolah                                                             |
| Southern kingfish                  | 33, 35, 465, 565                                                              |
| <i>Menticirrhus americanus</i>     | Martone, VanDolah                                                             |
| Atlantic croaker                   | 36, 333, 352, 451, 483, 517, 524, 565                                         |
| <i>Micropogonias undulatus</i>     | Martone, VanDolah                                                             |
| Black drum                         | 7, 247, 326, 376, 451, 565                                                    |
| <i>Pogonias cromis</i>             |                                                                               |
| Red drum                           | 33, 107, 247, 342, 565, 558                                                   |
| <i>Sciaenops ocellatus</i>         | Martone, VanDolah                                                             |
| Striped mullet                     | 14, 517, 565                                                                  |
| <i>Mugil cephalus</i>              | Martone, VanDolah                                                             |
| Spanish mackerel                   | 33, 80, 157, 225, 565, 593                                                    |
| <i>Scomberomorus maculatus</i>     | Martone, VanDolah                                                             |
| Gulf flounder                      | 132, 593                                                                      |
| <i>Paralichthys albigutta</i>      | Martone                                                                       |
| Summer flounder                    | 7, 8, 326, 421, 483, 517, 565, 558                                            |
| <i>Paralichthys dentatus</i>       | Martone, VanDolah                                                             |
| Southern flounder                  | 7, 8, 33, 326, 451, 483, 517, 565, 593, 558                                   |
| <i>Paralichthys lethostigma</i>    | Martone, VanDolah                                                             |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | St. Helena Sound, SC                                                                                            |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilus edulis</i>                      | 1, 153, 5<br>Anderson, Stokes, Hopkins, Holloway, Hamilton                                                      |
| Bay scallop<br><i>Argopecten irradians</i>           | 63, 153, 184, 593<br>Anderson, Stokes                                                                           |
| American oyster<br><i>Crassostrea virginica</i>      | 27, 57, 183, 262, 263, 330, 335, 476<br>Anderson, Stokes, Hopkins, Holloway, Hamilton                           |
| Common rangia<br><i>Rangia cuneata</i>               | 61, 289, 593<br>Anderson, Stokes, Hopkins, Holloway, Hamilton                                                   |
| Hard clam<br><i>Mercenaria species</i>               | 13, 138, 139, 140, 184, 306<br>Anderson, Stokes, Hopkins, Holloway, Hamilton                                    |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 34, 38, 82, 130, 144, 329, 449, 512, 579<br>Stokes, Whitaker, Delancey, Wenner                                  |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 34, 38, 87, 130, 144, 329, 449, 512, 579<br>Stokes, Hopkins, Whitaker, Delancey, Wenner                         |
| White shrimp<br><i>Penaeus setiferus</i>             | 34, 38, 62, 63, 130, 144, 145, 297, 298, 329, 371, 449, 512, 579<br>Stokes, Hopkins, Whitaker, Delancey, Wenner |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 10, 12, 284, 449, 452, 459, 579<br>Stokes, Hopkins, Whitaker, Delancey, Wenner                                  |
| Blue crab<br><i>Callinectes sapidus</i>              | 304, 449, 523, 579<br>Stokes, Hopkins, Whitaker, Delancey, Wenner                                               |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 290, 372, 449, 470, 472, 473, 522, 593<br>Stokes, Hopkins, Holloway, Moore                                      |
| Ladyfish<br><i>Elops saurus</i>                      | 33, 222, 250, 315, 593<br>Stokes, Hopkins, Moore                                                                |
| American eel<br><i>Anguilla rostrata</i>             | 192, 194, 197, 232, 521<br>Stokes, Hopkins, Moore                                                               |
| Blueback herring<br><i>Alosa aestivalis</i>          | 146, 250, 336, 390, 451, 519<br>Stokes, Hopkins                                                                 |
| Alewife<br><i>Alosa pseudoharengus</i>               | 146, 250, 390, 593<br>Stokes, Holloway, Hopkins, Hamilton, Moore                                                |
| American shad<br><i>Alosa sapidissima</i>            | 141, 519, 520, 533, 593<br>Stokes, Holloway, Hopkins, Moore                                                     |
| Atlantic menhaden<br><i>Brevortia tyrannus</i>       | 50, 336, 411, 420, 451<br>Stokes, Holloway, Hopkins, Moore                                                      |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 50, 60, 95, 250, 412, 450, 451, 452<br>Stokes, Hopkins, Moore                                                   |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 60, 95, 194, 593<br>Stokes, Hopkins, Moore                                                                      |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 60, 95, 194, 412<br>Stokes, Holloway, Hopkins, Moore                                                         |
| Atlantic silversides<br><i>Menidia species</i>       | 60, 95, 147, 221, 349, 351, 363, 412, 452<br>Stokes, Holloway, Hopkins, Moore                                   |
| White perch<br><i>Morone americana</i>               | 195, 336<br>Stokes, Holloway, Hopkins, Hamilton                                                                 |
| Striped bass<br><i>Morone saxatilis</i>              | 149, 195, 449, 474, 519<br>Stokes, Holloway, Hamilton                                                           |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 33, 38, 305, 399, 450, 451, 593<br>Stokes, Holloway, Hamilton                                                   |
| Cobia<br><i>Rachycentron canadum</i>                 | 33, 38, 195, 305<br>Stokes, Holloway, Hamilton, Moore                                                           |
| Gray snapper<br><i>Lutjanus griseus</i>              | 60, 95, 195, 449, 593<br>Holloway, Moore                                                                        |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 38, 247, 593<br>Stokes, Holloway, Hamilton, Moore                                                               |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 50, 60, 108, 452<br>Stokes, Hopkins, Holloway, Moore                                                            |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 33, 247, 308, 339, 341, 405, 502, 558<br>Stokes, Holloway, Hopkins, Hamilton, Moore                             |
| Weakfish<br><i>Cynoscion regalis</i>                 | 308, 338, 343, 406, 449, 451<br>Stokes, Hamilton, Holloway, Moore                                               |
| Spot<br><i>Leiostomus xanthurus</i>                  | 95, 111, 345, 449, 451<br>Stokes, Hamilton, Holloway, Moore                                                     |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 35, 449, 451, 465<br>Stokes, Holloway, Moore                                                                    |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 36, 333, 352, 449, 451<br>Stokes, Hamilton, Holloway, Moore                                                     |
| Black drum<br><i>Pogonias cromis</i>                 | 38, 247, 376, 451<br>Stokes, Holloway, Moore                                                                    |
| Red drum<br><i>Sciaenops ocellatus</i>               | 33, 38, 247, 342, 558<br>Stokes, Holloway, Moore                                                                |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 50, 60, 95<br>Stokes, Holloway, Hopkins, Hamilton, Moore                                                    |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 38, 80, 157, 593<br>Stokes, Holloway, Hamilton, Moore                                                           |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 50, 60, 451, 593<br>Stokes, Hamilton, Moore                                                                     |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 33, 38, 50, 60, 421, 451, 558, 593<br>Stokes, Holloway, Hamilton, Moore                                         |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 38, 50, 60, 449, 451, 558, 593<br>Moore, Stokes                                                                 |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name             | Broad River, SC                                        |
|------------------------------------|--------------------------------------------------------|
| Mussel                             | 1, 153, 593                                            |
| <i>Mytilus edulis</i>              | Anderson, Stokes, Hopkins, Holloway, Hamilton          |
| Bay scallop                        | 63, 153, 184, 593                                      |
| <i>Argopecten irradians</i>        | Anderson, Stokes, Hopkins, Holloway, Hamilton          |
| American oyster                    | 27, 37, 57, 183, 262, 263, 335, 476                    |
| <i>Crassostrea virginica</i>       | Anderson, Stokes, Hopkins, Holloway, Hamilton          |
| Common rangia                      | 61, 289, 593                                           |
| <i>Rangia cuneata</i>              | Anderson, Stokes, Hopkins, Holloway                    |
| Hard clam                          | 13, 37, 138, 139, 140, 184                             |
| <i>Mercenaria species</i>          | Anderson, Stokes, Hopkins, Holloway                    |
| Brown shrimp                       | 34, 37, 38, 82, 144, 145, 329, 449, 512, 517, 570, 579 |
| <i>Penaeus aztecus</i>             | Stokes, Hopkins, Holloway, Whitaker, Delancey, Wenner  |
| Pink shrimp                        | 34, 37, 38, 87, 130, 144, 329, 512, 579                |
| <i>Penaeus duorarum</i>            | Stokes, Hopkins, Holloway, Whitaker, Delancey, Wenner  |
| White shrimp                       | 34, 37, 130, 144, 145, 297, 298, 371, 449, 512, 579    |
| <i>Penaeus setiferus</i>           | Stokes, Hopkins, Holloway, Whitaker, Delancey, Wenner  |
| Grass shrimp                       | 10, 12, 284, 452, 459, 515, 579                        |
| <i>Palaemonetes pugio</i>          | Stokes, Hopkins, Holloway, Whitaker, Delancey, Wenner  |
| Blue crab                          | 37, 131, 304, 328, 449, 515, 523, 579                  |
| <i>Callinectes sapidus</i>         | Stokes, Hopkins, Holloway, Whitaker, Delancey, Wenner  |
| Atlantic sturgeon                  | 219, 290, 372, 470, 473, 522                           |
| <i>Acipenser oxyrinchus</i>        | Stokes, Hopkins, Holloway                              |
| Ladyfish                           | 33, 219, 222, 250, 515, 593                            |
| <i>Elops saurus</i>                | Stokes, Hopkins, Holloway                              |
| American eel                       | 37, 192, 194, 197, 232, 515, 521                       |
| <i>Anguilla rostrata</i>           | Stokes, Hopkins, Holloway                              |
| Blueback herring                   | 37, 146, 250, 336, 390, 449, 519                       |
| <i>Alosa aestivalis</i>            | Stokes, Holloway                                       |
| Alewife                            | 146, 250, 390                                          |
| <i>Alosa pseudoharengus</i>        | Stokes, Holloway                                       |
| American shad                      | 141, 519, 533                                          |
| <i>Alosa sapidissima</i>           | Stokes, Hopkins, Holloway                              |
| Atlantic menhaden                  | 37, 50, 219, 336, 411, 420, 449, 515                   |
| <i>Brevoortia tyrannus</i>         | Stokes, Hopkins, Holloway, Hamilton                    |
| Bay anchovy                        | 37, 250, 327, 449, 451, 515                            |
| <i>Anchoa mitchilli</i>            | Stokes, Holloway                                       |
| Sheepshead minnow                  | 37, 194, 593                                           |
| <i>Cyprinodon variegatus</i>       | Stokes, Hopkins, Holloway                              |
| Mummichog                          | 2, 37, 60, 194, 412, 515                               |
| <i>Fundulus heteroclitus</i>       | Stokes, Hopkins, Holloway                              |
| Atlantic silversides               | 37, 60, 147, 221, 327, 349, 363, 452, 515              |
| <i>Menidia species</i>             | Stokes, Hopkins, Holloway                              |
| White perch                        | 37, 195, 336                                           |
| <i>Morone americana</i>            | Stokes, Hopkins, Holloway, Hamilton                    |
| Striped bass                       | 149, 195, 474, 519                                     |
| <i>Morone saxatilis</i>            | Stokes, Hopkins, Holloway, Hamilton                    |
| Bluefish                           | 33, 37, 38, 80, 219, 68.1, 305, 399, 449, 515          |
| <i>Pomatomus saltatrix</i>         | Stokes, Hopkins, Holloway                              |
| Cobia                              | 33, 37, 38, 195, 305                                   |
| <i>Rachycentron canadum</i>        | Stokes, Hopkins, Holloway                              |
| Gray snapper                       | 60, 195, 515, 593                                      |
| <i>Lutjanus griseus</i>            | Stokes, Hopkins, Holloway                              |
| Sheepshead                         | 37, 38, 60, 225, 247, 515, 593                         |
| <i>Archosargus probatocephalus</i> | Stokes, Hopkins, Holloway                              |
| Pinfish                            | 33, 37, 50, 108, 452, 515                              |
| <i>Lagodon rhomboides</i>          | Stokes, Hopkins, Holloway                              |
| Spotted seatrout                   | 33, 37, 219, 247, 339, 341, 405, 502, 515              |
| <i>Cynoscion nebulosus</i>         | Stokes, Hamilton, Holloway                             |
| Weakfish                           | 37, 219, 308, 338, 343, 449, 451, 515                  |
| <i>Cynoscion regalis</i>           | Stokes, Hamilton, Holloway                             |
| Spot                               | 37, 50, 111, 219, 345, 449, 451, 515                   |
| <i>Leiostomus xanthurus</i>        | Stokes, Holloway                                       |
| Southern kingfish                  | 33, 35, 37, 247, 449, 451, 465                         |
| <i>Menticirrhus americanus</i>     | Stokes, Holloway                                       |
| Atlantic croaker                   | 36, 37, 50, 219, 333, 352, 449, 451, 515               |
| <i>Micropogonias undulatus</i>     | Stokes, Hopkins, Holloway                              |
| Black drum                         | 37, 38, 219, 247, 376, 515                             |
| <i>Pogonias cromis</i>             | Stokes, Holloway                                       |
| Red drum                           | 33, 37, 38, 219, 247, 342, 515                         |
| <i>Sciaenops ocellatus</i>         | Stokes, Holloway                                       |
| Striped mullet                     | 14, 37, 50, 515                                        |
| <i>Mugil cephalus</i>              | Stokes, Hamilton, Holloway                             |
| Spanish mackerel                   | 37, 80, 157, 515, 593                                  |
| <i>Scomberomorus maculatus</i>     | Stokes, Hopkins, Holloway                              |
| Gulf flounder                      | 37, 132, 451, 515                                      |
| <i>Paralichthys albigutta</i>      | Stokes, Hamilton                                       |
| Summer flounder                    | 33, 37, 38, 50, 60, 219, 421, 515, 593                 |
| <i>Paralichthys dentatus</i>       | Stokes, Hamilton, Holloway                             |
| Southern flounder                  | 33, 37, 38, 219, 449, 515, 593                         |
| <i>Paralichthys lethostigma</i>    | Stokes, Hamilton, Holloway                             |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | Savannah River, GA                                                                                                            |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilus edulis</i>                      | 1, 378                                                                                                                        |
| Bay scallop<br><i>Argopecten irradians</i>           | 211, 229<br>Music                                                                                                             |
| American oyster<br><i>Crassostrea virginica</i>      | 57, 67, 200, 208, 210, 228, 300, 384, 528, 540<br>Music                                                                       |
| Common rangia<br><i>Rangia cuneata</i>               | 289<br>Music                                                                                                                  |
| Hard clam<br><i>Mercenaria species</i>               | 21, 138, 209, 241, 368, 397, 528, 534, 535, 536, 538, 540, 541, 542, 543, 546<br>Music, Walker                                |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 16, 68, 199, 288, 312, 313, 374, 377, 486, 487, 489, 490<br>Music                                                             |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 16, 45, 312, 313, 367, 374, 377, 487, 489<br>Music                                                                            |
| White shrimp<br><i>Penaeus setiferus</i>             | 68, 199, 290, 312, 313, 371, 374, 377, 486, 487, 489, 490, 529, 567<br>Music                                                  |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 101, 127, 154, 189, 207, 238, 239, 276, 277, 280, 281, 376, 415, 416                                                          |
| Blue crab<br><i>Callinectes sapidus</i>              | 21, 67, 208, 312, 313, 314, 374, 377, 389, 453, 486, 487, 490, 523, 540<br>Music                                              |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 42, 103, 105, 290, 312, 313, 372, 430, 438, 522<br>Music                                                                      |
| Ladyfish<br><i>Elops saurus</i>                      | 103, 164, 312, 313, 377, 388, 438                                                                                             |
| American eel<br><i>Anguilla rostrata</i>             | 42, 103, 105, 312, 313, 377, 388, 410, 438, 467, 468, 521<br>Music                                                            |
| Blueback herring<br><i>Alosa aestivalis</i>          | 42, 51, 103, 105, 312, 313, 377, 390, 430, 438, 467, 468, 492, 495, 518<br>Music                                              |
| Alewife<br><i>Alosa pseudoharengus</i>               | 51, 105, 390<br>Music, Schmitt                                                                                                |
| American shad<br><i>Alosa sapidissima</i>            | 42, 67, 103, 105, 135, 141, 176, 193, 375, 410, 430, 438, 467, 468, 487, 518, 533<br>Music, Schmitt                           |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 103, 283, 312, 313, 377, 410, 420, 438, 467, 468, 486, 487, 489, 490<br>Music                                                 |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 103, 312, 313, 377, 410, 438, 467, 468, 486, 487, 489, 490<br>Music                                                           |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 103, 220, 438                                                                                                                 |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 103, 278, 313, 438                                                                                                         |
| Atlantic silversides<br><i>Menidia species</i>       | 103, 147, 312, 313, 377, 410, 467, 468<br>Music                                                                               |
| White perch<br><i>Morone americana</i>               | 103<br>Music                                                                                                                  |
| Striped bass<br><i>Morone saxatilis</i>              | 42, 103, 105, 124, 125, 126, 165, 312, 313, 323, 324, 388, 410, 430, 438, 467, 468, 469, 474, 490, 518, 568<br>Music, Schmitt |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 103, 261, 283, 312, 313, 377, 386, 388, 438, 487, 489, 490, 571<br>Music                                                      |
| Cobia<br><i>Rachycentron canadum</i>                 | 103, 195, 312, 313, 388<br>Music                                                                                              |
| Gray snapper<br><i>Lutjanus griseus</i>              | 49, 312, 313, 388, 438, 487<br>Music                                                                                          |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 103, 261, 312, 313, 376, 377, 388, 438<br>Music                                                                               |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 103, 108, 312, 313, 377, 388, 438, 487<br>Music                                                                               |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 103, 249, 261, 285, 312, 313, 339, 376, 377, 388, 438, 487<br>Music                                                           |
| Weakfish<br><i>Cynoscion regalis</i>                 | 103, 261, 283, 312, 313, 338, 343, 376, 377, 388, 486, 487, 489, 490, 572<br>Music                                            |
| Spot<br><i>Leiostomus xanthurus</i>                  | 103, 190, 261, 283, 312, 313, 345, 376, 377, 388, 438, 486, 487, 488, 489, 490<br>Music                                       |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 67, 103, 261, 283, 312, 313, 376, 377, 388, 460, 487, 489, 490<br>Music                                                       |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 103, 120, 261, 283, 312, 313, 344, 376, 377, 388, 486, 487, 489, 490<br>Music                                                 |
| Black drum<br><i>Pogonias cromis</i>                 | 103, 155, 247, 261, 312, 313, 376, 388, 438, 461<br>Music                                                                     |
| Red drum<br><i>Sciaenops ocellatus</i>               | 53, 103, 261, 312, 313, 340, 341, 376, 377, 388, 438, 490<br>Music                                                            |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 79, 103, 105, 312, 313, 377, 388, 410, 438, 467, 468, 487, 489, 490<br>Music, Schmitt                                     |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 80, 103, 173, 261, 283, 312, 313, 377, 388, 487, 489, 490<br>Music                                                            |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 67, 103, 132, 164, 569<br>Music                                                                                               |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 67, 103, 164, 312, 313, 376, 377, 388, 421, 487, 569<br>Music                                                                 |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 67, 103, 132, 164, 283, 312, 313, 376, 377, 388, 410, 438, 486, 487, 489, 490, 569<br>Music                                   |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | Ossabaw Sound, GA                                                                                                   |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilus edulis</i>                      | 1, 378                                                                                                              |
| Bay scallop<br><i>Argopecten irradians</i>           | 211, 229<br>Music                                                                                                   |
| American oyster<br><i>Crassostrea virginica</i>      | 57, 67, 88, 200, 228, 267, 300, 384, 528<br>Music                                                                   |
| Common rangia<br><i>Rangia cuneata</i>               | 289<br>Music                                                                                                        |
| Hard clam<br><i>Mercenaria species</i>               | 138, 368, 528, 543<br>Music, Walker                                                                                 |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 16, 68, 156, 199, 288, 312, 313, 374, 377, 486, 487<br>Music                                                        |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 16, 45, 156, 312, 313, 367, 377, 453<br>Music                                                                       |
| White shrimp<br><i>Penaeus setiferus</i>             | 68, 156, 199, 267, 290, 312, 313, 371, 374, 377, 453, 486, 487, 529, 567<br>Music                                   |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 101, 127, 154, 189, 207, 238, 239, 276, 277, 280, 281, 376, 415, 416                                                |
| Blue crab<br><i>Callinectes sapidus</i>              | 67, 156, 312, 313, 374, 377, 389, 453, 486, 487, 523<br>Music                                                       |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 103, 312, 313, 372, 430, 522                                                                                        |
| Ladyfish<br><i>Elops saurus</i>                      | 103, 164, 312, 313, 377, 388<br>Schmitt                                                                             |
| American eel<br><i>Anguilla rostrata</i>             | 103, 312, 313, 377, 388, 410, 437, 453, 521<br>Music, Schmitt                                                       |
| Blueback herring<br><i>Alosa aestivalis</i>          | 51, 103, 312, 313, 377, 390, 430, 453, 467, 468, 492, 518<br>Music                                                  |
| Alewife<br><i>Alosa pseudoharengus</i>               | 51, 105, 390<br>Music, Schmitt                                                                                      |
| American shad<br><i>Alosa sapidissima</i>            | 67, 103, 135, 141, 193, 233, 347, 375, 407, 410, 430, 437, 453, 467, 468, 487, 498, 507, 518, 533<br>Music, Schmitt |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 103, 283, 312, 313, 377, 410, 420, 422, 453, 467, 468, 486, 487<br>Music                                            |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 103, 312, 313, 377, 410, 453, 467, 468, 486, 487<br>Music                                                           |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 103, 220, 313                                                                                                       |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 103, 278, 313, 453, 467, 468, 487                                                                                |
| Atlantic silversides<br><i>Menidia species</i>       | 103, 147, 312, 313, 377, 453, 467, 468, 487<br>Music                                                                |
| White perch<br><i>Morone americana</i>               | 103, 388<br>Music                                                                                                   |
| Striped bass<br><i>Morone saxatilis</i>              | 103, 161, 162, 230, 233, 312, 313, 323, 324, 388, 410, 430, 437, 467, 468, 469, 474, 518, 568<br>Music, Schmitt     |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 103, 261, 283, 312, 313, 377, 386, 388, 453, 487, 571<br>Music                                                      |
| Cobia<br><i>Rachycentron canadum</i>                 | 103, 195, 312, 313, 388<br>Music                                                                                    |
| Gray snapper<br><i>Lutjanus griseus</i>              | 49, 312, 313, 388, 453<br>Music                                                                                     |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 103, 261, 312, 313, 376, 377, 388, 453<br>Music                                                                     |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 103, 108, 312, 313, 377, 388, 453, 487<br>Music                                                                     |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 103, 156, 162, 233, 249, 261, 285, 312, 313, 339, 376, 377, 388, 453, 487<br>Music                                  |
| Weakfish<br><i>Cynoscion regalis</i>                 | 103, 156, 261, 283, 312, 313, 338, 343, 376, 377, 388, 453, 486, 487, 572<br>Music                                  |
| Spot<br><i>Leiostomus xanthurus</i>                  | 103, 156, 190, 261, 283, 312, 313, 345, 376, 377, 388, 422, 437, 453, 467, 468, 486, 487, 488, 489<br>Music         |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 67, 103, 261, 283, 312, 313, 376, 377, 388, 453, 460, 487<br>Music                                                  |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 103, 120, 156, 261, 267, 283, 312, 313, 344, 376, 377, 388, 422, 453, 467, 468, 486, 487<br>Music                   |
| Black drum<br><i>Pogonias cromis</i>                 | 103, 155, 247, 261, 312, 313, 376, 388, 453, 461<br>Music                                                           |
| Red drum<br><i>Sciaenops ocellatus</i>               | 53, 103, 162, 233, 261, 312, 313, 340, 341, 376, 377, 388, 437, 453<br>Music                                        |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 79, 103, 312, 313, 377, 388, 410, 422, 437, 453, 467, 468, 487<br>Music                                         |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 80, 103, 173, 261, 283, 312, 313, 377, 388, 487<br>Music                                                            |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 67, 103, 132, 164<br>Music                                                                                          |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 67, 103, 164, 312, 313, 376, 377, 388, 421, 453, 487<br>Music                                                       |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 67, 103, 132, 164, 283, 312, 313, 376, 377, 388, 410, 422, 453, 467, 468, 486, 487<br>Music                         |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | St. Catherine/Sapelo Sound, GA                                                                                              |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilis edulis</i>                      | 1, 378                                                                                                                      |
| Bay scallop<br><i>Argopecten irradians</i>           | 211, 229<br>Music                                                                                                           |
| American oyster<br><i>Crassostrea virginica</i>      | 26, 57, 67, 128, 154, 158, 200, 207, 228, 238, 239, 299, 300, 384, 485, 528, 583<br>Music                                   |
| Common rangia<br><i>Rangia cuneata</i>               | 289<br>Music                                                                                                                |
| Hard clam<br><i>Mercenaria species</i>               | 127, 138, 178, 207, 241, 368, 528, 538, 544, 543<br>Music, Walker                                                           |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 16, 68, 101, 156, 199, 207, 229, 238, 239, 276, 287, 288, 311, 313, 322, 374, 377<br>Music                                  |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 16, 45, 156, 207, 229, 311, 313, 367, 377<br>Music                                                                          |
| White shrimp<br><i>Penaeus setiferus</i>             | 68, 101, 106, 154, 156, 199, 207, 229, 238, 239, 276, 287, 290, 311, 313, 322, 371, 374, 377, 415, 416, 567<br>Kneib, Music |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 101, 127, 154, 189, 207, 238, 239, 276, 277, 280, 281, 376, 415, 416<br>Kneib                                               |
| Blue crab<br><i>Callinectes sapidus</i>              | 67, 101, 154, 156, 229, 238, 239, 276, 299, 311, 313, 314, 322, 374, 377, 389, 415, 416, 453, 523, 583<br>Music             |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 103, 311, 313, 372, 430, 522<br>Music                                                                                       |
| Ladyfish<br><i>Elops saurus</i>                      | 100, 101, 103, 164, 238, 239, 311, 313, 377, 388, 415, 416                                                                  |
| American eel<br><i>Anguilla rostrata</i>             | 101, 103, 104, 105, 311, 313, 377, 388, 521<br>Music                                                                        |
| Blueback herring<br><i>Alosa aestivalis</i>          | 51, 101, 103, 311, 313, 377, 390, 430, 518<br>Music                                                                         |
| Alewife<br><i>Alosa pseudoharengus</i>               | 51, 105, 390<br>Music                                                                                                       |
| American shad<br><i>Alosa sapidissima</i>            | 67, 101, 103, 104, 105, 135, 141, 430, 518, 533<br>Music                                                                    |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 100, 101, 103, 104, 238, 239, 283, 311, 313, 377, 382, 383, 415, 416, 420<br>Kneib, Music                                   |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 100, 101, 103, 104, 229, 311, 313, 322, 377, 415, 416, 447<br>Music                                                         |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 101, 103, 220, 415, 416                                                                                                     |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 101, 103, 104, 154, 238, 239, 275, 276, 278, 279, 280, 322, 409, 415, 416<br>Kneib                                       |
| Atlantic silversides<br><i>Menidia species</i>       | 100, 103, 104, 147, 311, 313, 322, 377<br>Music                                                                             |
| White perch<br><i>Morone americana</i>               | 103, 388<br>Music                                                                                                           |
| Striped bass<br><i>Morone saxatilis</i>              | 101, 103, 388, 430, 474, 518<br>Music                                                                                       |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 101, 103, 104, 229, 261, 283, 311, 313, 377, 386, 388, 571<br>Music                                                         |
| Cobia<br><i>Rachycentron canadum</i>                 | 103, 195, 388<br>Music                                                                                                      |
| Gray snapper<br><i>Lutjanus griseus</i>              | 49, 311, 313, 388<br>Music                                                                                                  |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 101, 103, 261, 299, 311, 313, 376, 377, 388<br>Music                                                                        |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 101, 103, 108, 229, 238, 239, 311, 313, 377, 388<br>Music                                                                   |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 101, 103, 104, 156, 229, 238, 239, 249, 261, 285, 311, 313, 322, 339, 376, 377, 388, 415, 416, 447<br>Kneib, Music          |
| Weakfish<br><i>Cynoscion regalis</i>                 | 100, 103, 104, 106, 156, 229, 261, 283, 311, 313, 338, 343, 376, 377, 388, 447, 572<br>Music                                |
| Spot<br><i>Leiostomus xanthurus</i>                  | 101, 103, 104, 156, 190, 229, 238, 239, 261, 283, 311, 313, 322, 345, 376, 377, 388, 416, 447, 488, 583<br>Kneib, Music     |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 67, 100, 101, 103, 104, 229, 261, 283, 311, 313, 376, 377, 388, 447, 460<br>Music                                           |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 101, 103, 104, 106, 120, 156, 229, 261, 283, 311, 313, 322, 344, 376, 377, 388<br>Music                                     |
| Black drum<br><i>Pogonias cromis</i>                 | 101, 103, 104, 106, 155, 247, 261, 299, 311, 313, 376, 388, 461<br>Music                                                    |
| Red drum<br><i>Sciaenops ocellatus</i>               | 53, 101, 103, 238, 239, 261, 311, 313, 340, 341, 376, 377, 388, 447<br>Music                                                |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 55, 101, 103, 104, 105, 154, 238, 239, 311, 313, 322, 377, 382, 383, 388, 409, 415, 416<br>Kneib, Music                 |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 80, 101, 103, 173, 261, 283, 311, 313, 377, 388<br>Music                                                                    |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 67, 101, 103, 104, 132, 164<br>Music                                                                                        |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 67, 100, 101, 103, 104, 164, 229, 238, 239, 311, 313, 376, 377, 388, 421<br>Music                                           |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 67, 100, 101, 103, 104, 132, 164, 229, 283, 311, 313, 376, 377, 388<br>Music                                                |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | Altamaha River, GA                                                                                                                |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilis edulis</i>                      | 1, 378                                                                                                                            |
| Bay scallop<br><i>Argopecten irradians</i>           | 211, 229<br>Music                                                                                                                 |
| American oyster<br><i>Crassostrea virginica</i>      | 57, 67, 200, 228, 238, 239, 299, 300, 384, 528, 583<br>Music                                                                      |
| Common rangia<br><i>Rangia cuneata</i>               | 174, 175, 289<br>Music                                                                                                            |
| Hard clam<br><i>Mercenaria species</i>               | 138, 174, 368, 528, 543<br>Music, Walker                                                                                          |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 16, 68, 238, 239, 288, 311, 313, 377, 453<br>Music                                                                                |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 16, 45, 229, 311, 313, 367, 377<br>Music                                                                                          |
| White shrimp<br><i>Penaeus setiferus</i>             | 68, 238, 239, 290, 311, 313, 371, 374, 377, 567, 591<br>Music                                                                     |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 101, 127, 154, 189, 207, 238, 239, 276, 277, 280, 281, 376, 415, 416                                                              |
| Blue crab<br><i>Callinectes sapidus</i>              | 67, 229, 238, 239, 311, 313, 314, 374, 377, 389, 453, 523, 583<br>Music                                                           |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 103, 105, 235, 311, 313, 372, 430, 522                                                                                            |
| Ladyfish<br><i>Elops saurus</i>                      | 103, 164, 238, 239, 253, 311, 313, 353, 377, 388                                                                                  |
| American eel<br><i>Anguilla rostrata</i>             | 103, 105, 212, 213, 214, 235, 253, 311, 313, 353, 377, 388, 467, 468, 521<br>Music                                                |
| Blueback herring<br><i>Alosa aestivalis</i>          | 3, 4, 51, 103, 105, 179, 235, 253, 311, 313, 353, 377, 390, 430, 466, 467, 468, 492, 493, 495, 518<br>Music                       |
| Alewife<br><i>Alosa pseudoharengus</i>               | 51, 105, 390<br>Music                                                                                                             |
| American shad<br><i>Alosa sapidissima</i>            | 3, 67, 103, 105, 135, 141, 176, 180, 179, 193, 235, 253, 347, 348, 353, 375, 407, 430, 466, 467, 468, 495, 518, 527, 533<br>Music |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 103, 238, 239, 253, 283, 311, 313, 353, 377, 420, 591<br>Music                                                                    |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 103, 229, 253, 311, 313, 353, 377, 467, 468, 591<br>Music                                                                         |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 103, 220, 253, 353                                                                                                                |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 103, 238, 239, 253, 278, 313, 353, 591                                                                                         |
| Atlantic silversides<br><i>Menidia species</i>       | 103, 147, 253, 311, 313, 353, 377, 467, 468, 591<br>Music                                                                         |
| White perch<br><i>Morone americana</i>               | 103, 388<br>Music                                                                                                                 |
| Striped bass<br><i>Morone saxatilis</i>              | 103, 105, 235, 323, 388, 430, 466, 467, 468, 474, 518, 568<br>Music                                                               |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 103, 253, 261, 283, 311, 313, 353, 377, 386, 388, 571<br>Music                                                                    |
| Cobia<br><i>Rachycentron canadum</i>                 | 103, 195, 388<br>Music                                                                                                            |
| Gray snapper<br><i>Lutjanus griseus</i>              | 49, 235, 253, 311, 312, 353, 388<br>Music                                                                                         |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 103, 253, 261, 313, 353, 376, 377, 388<br>Music                                                                                   |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 103, 108, 229, 238, 239, 253, 311, 313, 353, 377, 388, 591<br>Music                                                               |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 103, 229, 235, 238, 239, 249, 253, 261, 285, 311, 313, 339, 353, 376, 377, 388, 447, 591<br>Music                                 |
| Weakfish<br><i>Cynoscion regalis</i>                 | 103, 229, 253, 261, 283, 311, 313, 338, 343, 353, 376, 377, 388, 447, 572, 591<br>Music                                           |
| Spot<br><i>Leiostomus xanthurus</i>                  | 103, 190, 229, 238, 239, 253, 261, 283, 311, 313, 345, 353, 373, 376, 377, 388, 447, 467, 468, 488, 583<br>Music                  |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 67, 103, 229, 253, 261, 283, 311, 313, 353, 376, 377, 388, 447, 460, 591<br>Music                                                 |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 103, 120, 229, 253, 261, 283, 311, 313, 344, 353, 376, 377, 388, 447, 467, 468<br>Music                                           |
| Black drum<br><i>Pogonias cromis</i>                 | 103, 155, 247, 253, 261, 311, 313, 353, 376, 388, 461, 591<br>Music                                                               |
| Red drum<br><i>Sciaenops ocellatus</i>               | 53, 103, 235, 238, 239, 253, 261, 311, 313, 340, 341, 353, 376, 377, 388, 447<br>Music                                            |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 79, 103, 105, 235, 238, 239, 253, 311, 313, 377, 388, 467, 468<br>Music                                                       |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 80, 103, 173, 253, 261, 283, 311, 313, 353, 377, 388<br>Music                                                                     |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 67, 103, 132, 164, 353<br>Music                                                                                                   |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 67, 103, 164, 229, 235, 238, 239, 253, 311, 313, 353, 376, 377, 388, 421, 591<br>Music                                            |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 67, 103, 132, 164, 229, 235, 253, 283, 311, 313, 353, 376, 377, 388, 467, 468, 591<br>Music                                       |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | St. Andrew/St. Simon Sound, GA                                                              |
|------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilus edulis</i>                      | 1, 378                                                                                      |
| Bay scallop<br><i>Argopecten irradians</i>           | 211, 229<br>Music                                                                           |
| American oyster<br><i>Crassostrea virginica</i>      | 57, 67, 200, 228, 266, 267, 300, 321, 376, 384, 528<br>Music                                |
| Common rangia<br><i>Rangia cuneata</i>               | 174, 266, 289<br>Music                                                                      |
| Hard clam<br><i>Mercenaria species</i>               | 138, 177, 178, 241, 267, 368, 376, 528, 543<br>Music, Walker                                |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 16, 68, 156, 189, 199, 266, 267, 288, 310, 313, 374, 376, 377<br>Music                      |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 16, 45, 156, 310, 313, 367, 376, 377<br>Music                                               |
| White shrimp<br><i>Penaeus setiferus</i>             | 68, 156, 189, 199, 267, 290, 310, 313, 371, 374, 376, 377, 567, 591<br>Music                |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 101, 127, 154, 189, 207, 238, 239, 266, 276, 277, 280, 281, 376, 415, 416                   |
| Blue crab<br><i>Callinectes sapidus</i>              | 67, 156, 189, 266, 310, 313, 314, 374, 376, 377, 389, 453, 523<br>Music                     |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 15, 103, 267, 310, 313, 372, 430, 522                                                       |
| Ladyfish<br><i>Elops saurus</i>                      | 103, 164, 310, 313, 376, 377, 388                                                           |
| American eel<br><i>Anguilla rostrata</i>             | 103, 189, 310, 313, 376, 377, 388, 521<br>Music                                             |
| Blueback herring<br><i>Alosa aestivalis</i>          | 51, 103, 310, 313, 377, 390, 430, 518<br>Music                                              |
| Alewife<br><i>Alosa pseudoharengus</i>               | 51, 105, 390<br>Music                                                                       |
| American shad<br><i>Alosa sapidissima</i>            | 67, 103, 135, 141, 193, 430, 518, 533<br>Music                                              |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 15, 103, 189, 283, 309, 310, 313, 376, 377, 420, 591<br>Music                               |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 15, 103, 189, 309, 310, 313, 376, 377, 591<br>Music                                         |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 103, 220, 309, 376                                                                          |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 103, 189, 278, 309, 310, 313, 376, 591                                                   |
| Atlantic silversides<br><i>Menidia species</i>       | 103, 147, 310, 313, 376, 377, 591<br>Music                                                  |
| White perch<br><i>Morone americana</i>               | 103, 388<br>Music                                                                           |
| Striped bass<br><i>Morone saxatilis</i>              | 103, 310, 313, 388, 430, 474, 518, 568<br>Music                                             |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 15, 103, 261, 283, 310, 313, 377, 386, 388, 571<br>Music                                    |
| Cobia<br><i>Rachycentron canadum</i>                 | 15, 103, 195, 310, 313, 388<br>Music                                                        |
| Gray snapper<br><i>Lutjanus griseus</i>              | 49, 189, 310, 313, 376, 388<br>Music                                                        |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 103, 189, 261, 310, 313, 376, 377, 388<br>Music                                             |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 15, 103, 108, 189, 310, 313, 376, 377, 388, 591<br>Music                                    |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 15, 103, 156, 189, 249, 261, 267, 285, 310, 313, 339, 376, 377, 388, 591<br>Music           |
| Weakfish<br><i>Cynoscion regalis</i>                 | 15, 103, 156, 189, 261, 283, 309, 310, 313, 338, 343, 376, 377, 388, 572, 591<br>Music      |
| Spot<br><i>Leiostomus xanthurus</i>                  | 15, 103, 156, 189, 190, 261, 267, 283, 310, 313, 345, 373, 376, 377, 388, 488, 591<br>Music |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 15, 67, 103, 189, 261, 283, 310, 313, 376, 377, 388, 460, 591<br>Music                      |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 15, 103, 120, 156, 189, 261, 266, 267, 283, 310, 313, 344, 376, 377, 388, 591<br>Music      |
| Black drum<br><i>Pogonias cromis</i>                 | 15, 103, 155, 189, 247, 261, 266, 310, 313, 376, 388, 461, 591<br>Music                     |
| Red drum<br><i>Sciaenops ocellatus</i>               | 53, 103, 106, 261, 310, 313, 340, 341, 376, 377, 388<br>Music                               |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 15, 79, 103, 106, 189, 310, 313, 377, 388, 591<br>Music                                 |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 80, 103, 173, 261, 283, 310, 313, 377, 388<br>Music                                         |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 67, 103, 132, 164, 376<br>Music                                                             |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 15, 67, 103, 164, 310, 313, 376, 377, 388, 421, 591<br>Music                                |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 67, 103, 106, 132, 164, 189, 283, 310, 313, 376, 377, 388, 591<br>Music                     |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | St. John's River, FL                                                                                        |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilis edulis</i>                      | 1, 378<br>A.Q. White                                                                                        |
| Bay scallop<br><i>Argopecten irradians</i>           | 152<br>A.Q. White                                                                                           |
| American oyster<br><i>Crassostrea virginica</i>      | 27, 57, 150, 152, 244, 302<br>A.Q. White                                                                    |
| Common rangia<br><i>Rangia cuneata</i>               | 94, 289<br>A.Q. White                                                                                       |
| Hard clam<br><i>Mercenaria species</i>               | 138, 152, 215<br>A.Q. White                                                                                 |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 82, 150, 254, 255, 288, 329, 579<br>DeMort. A.Q. White                                                      |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 87, 126.1, 254, 255, 268, 329, 579<br>DeMort. A.Q. White                                                    |
| White shrimp<br><i>Penaeus setiferus</i>             | 112, 150, 152, 254, 255, 297, 298, 329, 371, 579<br>DeMort. A.Q. White                                      |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 12, 74, 90, 579<br>A.Q. White                                                                               |
| Blue crab<br><i>Callinectes sapidus</i>              | 92, 126.1, 150, 152, 361, 503, 523, 579<br>DeMort. A.Q. White                                               |
| Atlantic sturgeon<br><i>Acipenser oxyrinchus</i>     | 31, 89, 91, 152, 331, 361, 372, 522<br>A.Q. White                                                           |
| Ladyfish<br><i>Elops saurus</i>                      | 31, 71, 74, 89, 90, 91, 92, 94, 129, 150, 152, 250, 331, 360, 504<br>DeMort. A.Q. White                     |
| American eel<br><i>Anguilla rostrata</i>             | 31, 74, 89, 90, 91, 92, 93, 94, 150, 152, 194, 331, 360, 361, 362, 504, 521<br>DeMort. A.Q. White           |
| Blueback herring<br><i>Alosa aestivalis</i>          | 31, 74, 89, 90, 91, 92, 94, 146, 250, 331, 360, 361, 504<br>DeMort. A.Q. White                              |
| Alewife<br><i>Alosa pseudoharengus</i>               | 146, 250, 361<br>DeMort. A.Q. White                                                                         |
| American shad<br><i>Alosa sapidissima</i>            | 31, 74, 89, 90, 91, 94, 110, 141, 152, 331, 360, 361, 379, 532, 533, 582<br>DeMort. A.Q. White              |
| Atlantic menhaden<br><i>Brevoortia tyrannus</i>      | 31, 71, 74, 90, 91, 92, 150, 152, 259, 420, 504<br>DeMort. A.Q. White                                       |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 71, 74, 89, 90, 91, 92, 250, 331, 361, 504<br>DeMort. A.Q. White                                            |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 31, 71, 89, 90, 91, 92, 93, 94, 194, 331, 361, 504<br>DeMort. A.Q. White                                    |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 31, 71, 194, 331, 361, 504<br>DeMort. A.Q. White                                                         |
| Atlantic silversides<br><i>Menidia species</i>       | 31, 74, 89, 90, 91, 92, 93, 94, 147, 221, 331, 361, 504<br>DeMort. A.Q. White                               |
| White perch<br><i>Morone americana</i>               | 195<br>A.Q. White                                                                                           |
| Striped bass<br><i>Morone saxatilis</i>              | 31, 74, 89, 90, 91, 92, 94, 149, 195, 331, 360, 361, 474, 504<br>DeMort. A.Q. White                         |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 150, 152, 386<br>DeMort. A.Q. White                                                                         |
| Cobia<br><i>Rachycentron canadum</i>                 | 152, 195<br>A.Q. White                                                                                      |
| Gray snapper<br><i>Lutjanus griseus</i>              | 31, 49, 71, 90, 152, 195, 331, 360, 361, 504<br>DeMort. A.Q. White                                          |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 31, 71, 90, 152, 247, 331, 360, 361, 504<br>DeMort. A.Q. White                                              |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 31, 71, 90, 92, 108, 150, 331, 360, 361, 504<br>DeMort. A.Q. White                                          |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 31, 71, 74, 89, 92, 126.1, 150, 152, 247, 249, 331, 339, 341, 360, 361, 501, 503<br>DeMort. A.Q. White      |
| Weakfish<br><i>Cynoscion regalis</i>                 | 31, 74, 90, 150, 152, 338, 343, 504<br>DeMort. A.Q. White                                                   |
| Spot<br><i>Leiostomus xanthurus</i>                  | 31, 71, 74, 150, 152, 331, 345, 360, 361, 362, 504<br>DeMort. A.Q. White                                    |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 31, 224, 247, 465, 504<br>DeMort. A.Q. White                                                                |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 31, 71, 74, 89, 90, 91, 92, 94, 150, 152, 331, 344, 360, 361, 362, 504<br>DeMort. A.Q. White                |
| Black drum<br><i>Pogonias cromis</i>                 | 31, 71, 150, 152, 247, 331, 360, 376, 504<br>DeMort. A.Q. White                                             |
| Red drum<br><i>Sciaenops ocellatus</i>               | 31, 71, 74, 90, 94, 126.1, 150, 152, 247, 246, 331, 340, 342, 360, 361, 394, 504, 592<br>DeMort. A.Q. White |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 31, 71, 74, 79, 89, 90, 91, 92, 93, 94, 116, 150, 152, 331, 360, 361, 362, 504<br>DeMort. A.Q. White    |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 31, 40, 152, 157, 173, 403, 504, 590<br>DeMort. A.Q. White                                                  |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 31, 152, 164, 504<br>DeMort. A.Q. White                                                                     |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 31, 150, 152, 164, 421, 504<br>DeMort. A.Q. White                                                           |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 31, 71, 74, 89, 90, 91, 94, 152, 164, 331, 360, 361, 504<br>DeMort. A.Q. White                              |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name                               | Indian River, FL                                                                                                                                      |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mussel<br><i>Mytilis edulis</i>                      | 1, 378<br>Hall, Provencha, C. White                                                                                                                   |
| Bay scallop<br><i>Argopecten irradians</i>           | 30, 152, 270<br>Hall, Provencha, C. White                                                                                                             |
| American oyster<br><i>Crassostrea virginica</i>      | 27, 57, 152, 159, 186.1, 244, 270, 302, 413, 568.1<br>Hall, Provencha, C. White                                                                       |
| Common rangia<br><i>Rangia cuneata</i>               | 187, 289, 413, 568.1<br>C. White                                                                                                                      |
| Hard clam<br><i>Mercenaria species</i>               | 58, 138, 152, 172, 216, 215, 270, 318, 413, 568.1<br>Hall, Provencha, C. White                                                                        |
| Brown shrimp<br><i>Penaeus aztecus</i>               | 18, 82, 112, 181, 182, 187, 255, 270, 288, 329, 579<br>Hall, Provencha, C. White                                                                      |
| Pink shrimp<br><i>Penaeus duorarum</i>               | 18, 87, 98, 112, 181, 182, 186, 187, 254, 255, 268, 270, 329, 579<br>Hall, Provencha, C. White                                                        |
| White shrimp<br><i>Penaeus setiferus</i>             | 18, 112, 152, 186, 187, 254, 255, 270, 297, 298, 329, 367, 579<br>Hall, Provencha, C. White                                                           |
| Grass shrimp<br><i>Palaemonetes pugio</i>            | 12, 18, 112, 181, 182, 186, 187, 270, 530, 568.1, 579<br>Hall, Provencha, C. White                                                                    |
| Blue crab<br><i>Callinectes sapidus</i>              | 17, 18, 152, 181, 182, 186, 187, 270, 391, 503, 523, 579<br>Hall, Provencha, C. White                                                                 |
| Atlantic sturgeon<br><i>Acipenser oxyrhynchus</i>    | 152, 169, 170, 372, 522<br>Gilmore, Hall, Provencha                                                                                                   |
| Ladyfish<br><i>Elops saurus</i>                      | 17, 129, 152, 166, 167, 169, 171, 187, 198, 250, 252, 270, 296, 369, 370, 475, 547<br>Gilmore                                                         |
| American eel<br><i>Anguilla rostrata</i>             | 78, 152, 166, 167, 169, 194, 270, 475, 478, 521<br>Gilmore, Hall, Provencha                                                                           |
| Blueback herring<br><i>Alosa aestivalis</i>          | 146, 250<br>Gilmore, Hall, Provencha                                                                                                                  |
| Alewife<br><i>Alosa pseudoharengus</i>               | 146, 250<br>Gilmore, Hall, Provencha                                                                                                                  |
| American shad<br><i>Alosa sapidissima</i>            | 136, 141, 152, 166, 167, 169, 270, 533<br>Gilmore, Hall, Provencha                                                                                    |
| Atlantic menhaden<br><i>Brevortia tyrannus</i>       | 78, 136, 152, 166, 167, 169, 187, 270, 420, 475, 478, 547<br>Hall, Provencha                                                                          |
| Bay anchovy<br><i>Anchoa mitchilli</i>               | 18, 78, 166, 167, 168, 169, 171, 187, 250, 252, 270, 296, 332, 369, 370, 439, 475, 478, 547<br>Gilmore, Hall, Provencha                               |
| Sheepshead minnow<br><i>Cyprinodon variegatus</i>    | 136, 166, 167, 168, 169, 187, 194, 198, 270, 296, 332, 439, 475, 547<br>Gilmore, Hall, Provencha                                                      |
| Mummichog<br><i>Fundulus heteroclitus</i>            | 2, 136, 167, 169, 194, 270, 332, 475<br>Gilmore, Hall, Provencha                                                                                      |
| Atlantic silversides<br><i>Menidia species</i>       | 147, 166, 167, 169, 171, 187, 221, 252, 270, 296, 332, 439, 475, 547<br>Gilmore, Hall, Provencha                                                      |
| White perch<br><i>Morone americana</i>               | 195<br>Gilmore, Hall, Provencha                                                                                                                       |
| Striped bass<br><i>Morone saxatilis</i>              | 149, 169, 170, 195, 474<br>Gilmore, Hall, Provencha                                                                                                   |
| Bluefish<br><i>Pomatomus saltatrix</i>               | 17, 78, 136, 152, 166, 167, 169, 252, 270, 386, 475<br>Gilmore, Hall, Provencha                                                                       |
| Cobia<br><i>Rachycentron canadum</i>                 | 78, 152, 166, 167, 169, 195, 270<br>Gilmore, Hall, Provencha                                                                                          |
| Gray snapper<br><i>Lutjanus griseus</i>              | 17, 49, 78, 152, 166, 167, 169, 171, 187, 195, 252, 270, 296, 369, 370, 475, 478, 481, 491<br>Gilmore, Hall, Provencha                                |
| Sheepshead<br><i>Archosargus probatocephalus</i>     | 17, 18, 78, 136, 152, 166, 167, 169, 171, 187, 247, 252, 270, 296, 369, 370, 475, 478<br>Gilmore, Hall, Provencha                                     |
| Pinfish<br><i>Lagodon rhomboides</i>                 | 17, 18, 78, 108, 136, 166, 167, 169, 171, 187, 252, 270, 296, 332, 334, 369, 370, 439, 475, 478, 491<br>Gilmore, Hall, Provencha                      |
| Spotted seatrout<br><i>Cynoscion nebulosus</i>       | 17, 78, 136, 152, 166, 167, 169, 171, 187, 247, 249, 252, 270, 339, 341, 369, 370, 439, 475, 478, 499, 500, 501, 502, 547<br>Gilmore, Hall, Provencha |
| Weakfish<br><i>Cynoscion regalis</i>                 | 152, 166, 167, 169, 187, 270, 338, 343, 369, 370, 475, 478<br>Gilmore, Hall, Provencha                                                                |
| Spot<br><i>Leiostomus xanthurus</i>                  | 17, 18, 78, 136, 152, 166, 167, 169, 171, 187, 252, 270, 296, 332, 345, 369, 370, 439, 478<br>Gilmore, Hall, Provencha                                |
| Southern kingfish<br><i>Menticirrhus americanus</i>  | 18, 136, 166, 167, 169, 187, 224, 247, 270, 369, 370, 439, 465, 475<br>Gilmore, Hall, Provencha                                                       |
| Atlantic croaker<br><i>Micropogonias undulatus</i>   | 17, 18, 78, 136, 152, 166, 167, 169, 187, 252, 270, 296, 332, 344, 369, 370, 475, 478<br>Gilmore, Hall, Provencha                                     |
| Black drum<br><i>Pogonias cromis</i>                 | 17, 78, 136, 152, 166, 167, 169, 187, 247, 252, 270, 296, 369, 370, 376, 439, 475<br>Gilmore, Hall, Provencha                                         |
| Red drum<br><i>Sciaenops ocellatus</i>               | 17, 78, 136, 152, 166, 167, 169, 171, 187, 247, 246, 252, 270, 296, 340, 342, 394, 439, 475, 592<br>Gilmore, Hall, Provencha                          |
| Striped mullet<br><i>Mugil cephalus</i>              | 14, 17, 78, 79, 116, 136, 152, 166, 167, 169, 171, 187, 198, 296, 332, 439, 475, 547<br>Gilmore, Hall, Provencha                                      |
| Spanish mackerel<br><i>Scomberomorus maculatus</i>   | 40, 136, 152, 157, 166, 167, 169, 173, 252, 270, 403, 475, 590<br>Gilmore, Hall, Provencha                                                            |
| Gulf flounder<br><i>Paralichthys albigutta</i>       | 18, 78, 152, 164, 166, 167, 169, 270, 369, 370, 475<br>Gilmore                                                                                        |
| Summer flounder<br><i>Paralichthys dentatus</i>      | 152, 164, 166, 167, 169, 270<br>Gilmore                                                                                                               |
| Southern flounder<br><i>Paralichthys lethostigma</i> | 78, 136, 152, 164, 166, 167, 169, 270, 475<br>Gilmore                                                                                                 |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

Appendix 2, continued. Table of references and personal communications.

| Common/Scientific Name             | Biscayne Bay, FL                                                                |
|------------------------------------|---------------------------------------------------------------------------------|
| Mussel                             | 1, 378                                                                          |
| <i>Mytilus edulis</i>              | Rutledge                                                                        |
| Bay scallop                        | 22, 23, 24, 25, 30, 152, 419, 418                                               |
| <i>Argopecten irradians</i>        | Rutledge, Curry, Tilmant                                                        |
| American oyster                    | 25, 27, 57, 152, 244, 302, 419, 418                                             |
| <i>Crassostrea virginica</i>       | Rutledge, Curry                                                                 |
| Common rangia                      | 289                                                                             |
| <i>Rangia cuneata</i>              | Rutledge                                                                        |
| Hard clam                          | 138, 152, 172                                                                   |
| <i>Mercenaria species</i>          | Rutledge, Tilmant                                                               |
| Brown shrimp                       | 22, 23, 25, 82, 255, 288, 419, 418, 434, 531, 579                               |
| <i>Penaeus aztecus</i>             | Rutledge, Tilmant                                                               |
| Pink shrimp                        | 22, 23, 24, 25, 43, 66, 87, 255, 268, 419, 418, 434, 531, 579                   |
| <i>Penaeus duorarum</i>            | Rutledge, Tilmant                                                               |
| White shrimp                       | 152, 255, 298, 367, 579                                                         |
| <i>Penaeus setiferus</i>           | Rutledge, Tilmant                                                               |
| Grass shrimp                       | 12, 22, 23, 43, 419, 418, 579                                                   |
| <i>Palaemonetes pugio</i>          | Rutledge                                                                        |
| Blue crab                          | 22, 24, 25, 43, 152, 419, 418, 458, 523, 579                                    |
| <i>Callinectes sapidus</i>         | Rutledge                                                                        |
| Atlantic sturgeon                  | 470, 522                                                                        |
| <i>Acipenser oxyrhynchus</i>       | Rutledge                                                                        |
| Ladyfish                           | 43, 113, 129, 152, 250, 303, 359, 531                                           |
| <i>Elops saurus</i>                | Rutledge, Tilmant                                                               |
| American eel                       | 113, 152, 194, 521, 531                                                         |
| <i>Anguilla rostrata</i>           | Rutledge, Tilmant                                                               |
| Blueback herring                   | 146, 250                                                                        |
| <i>Alosa aestivalis</i>            | Rutledge                                                                        |
| Alewife                            | 146, 250                                                                        |
| <i>Alosa pseudoharengus</i>        | Rutledge                                                                        |
| American shad                      | 141, 533                                                                        |
| <i>Alosa sapidissima</i>           | Rutledge                                                                        |
| Atlantic menhaden                  | 40, 152, 236, 303, 420, 526                                                     |
| <i>Brevoortia tyrannus</i>         | Rutledge, Schmidt                                                               |
| Bay anchovy                        | 11, 22, 23, 25, 31, 43, 113, 114, 236, 237, 250, 303, 531                       |
| <i>Anchoa mitchilli</i>            | Rutledge, Schmidt                                                               |
| Sheepshead minnow                  | 43, 113, 194, 303, 359, 531                                                     |
| <i>Cyprinodon variegatus</i>       | Rutledge, Schmidt                                                               |
| Mummichog                          | 2, 194                                                                          |
| <i>Fundulus heteroclitus</i>       | Rutledge, Schmidt                                                               |
| Atlantic silversides               | 115, 147, 221, 531                                                              |
| <i>Menidia species</i>             | Rutledge, Schmidt                                                               |
| White perch                        | 195                                                                             |
| <i>Morone americana</i>            | Rutledge                                                                        |
| Striped bass                       | 149, 195                                                                        |
| <i>Morone saxatilis</i>            | Rutledge                                                                        |
| Bluefish                           | 43, 113, 115, 152, 359, 386, 458, 531                                           |
| <i>Pomatomus saltatrix</i>         | Rutledge, Tilmant                                                               |
| Cobia                              | 43, 113, 152, 195, 359, 531                                                     |
| <i>Rachycentron canadum</i>        | Rutledge                                                                        |
| Gray snapper                       | 22, 23, 25, 43, 44, 49, 65, 113, 115, 152, 195, 303, 418, 458, 482, 531         |
| <i>Lutjanus griseus</i>            | Rutledge                                                                        |
| Sheepshead                         | 43, 113, 114, 152, 247, 303, 359, 418, 458, 531                                 |
| <i>Archosargus probatocephalus</i> | Rutledge                                                                        |
| Pinfish                            | 22, 23, 24, 25, 44, 49, 65, 108, 113, 114, 115, 303, 359, 418, 458              |
| <i>Lagodon rhomboides</i>          | Rutledge                                                                        |
| Spotted seatrout                   | 11, 23, 43, 44, 113, 152, 236, 247, 249, 303, 339, 341, 359, 418, 465, 502, 531 |
| <i>Cynoscion nebulosus</i>         | Rutledge                                                                        |
| Weakfish                           | 113, 152, 338, 531                                                              |
| <i>Cynoscion regalis</i>           | Rutledge                                                                        |
| Spot                               | 113, 114, 152, 303, 345, 531                                                    |
| <i>Leiostomus xanthurus</i>        | Rutledge                                                                        |
| Southern kingfish                  | 113, 224, 247, 531                                                              |
| <i>Menticirrhus americanus</i>     | Rutledge                                                                        |
| Atlantic croaker                   | 11, 113, 152, 236, 303, 344, 531                                                |
| <i>Micropogonias undulatus</i>     | Rutledge                                                                        |
| Black drum                         | 43, 113, 115, 152, 247, 376, 458                                                |
| <i>Pogonias cromis</i>             | Rutledge                                                                        |
| Red drum                           | 115, 152, 247, 340, 342, 359, 394, 531, 592                                     |
| <i>Sciaenops ocellatus</i>         | Rutledge                                                                        |
| Striped mullet                     | 14, 43, 79, 113, 114, 116, 152, 303, 359, 458, 478, 531                         |
| <i>Mugil cephalus</i>              | Rutledge, Tilmant                                                               |
| Spanish mackerel                   | 40, 43, 113, 114, 115, 152, 157, 173, 273, 303, 359, 403, 458, 531, 590         |
| <i>Scomberomorus maculatus</i>     | Rutledge                                                                        |
| Gulf flounder                      | 22, 25, 43, 44, 113, 114, 152, 164, 236, 303, 418, 531                          |
| <i>Paralichthys albigutta</i>      | Rutledge                                                                        |
| Summer flounder                    | 152, 164                                                                        |
| <i>Paralichthys dentatus</i>       | Rutledge                                                                        |
| Southern flounder                  | 152, 164                                                                        |
| <i>Paralichthys lethostigma</i>    | Rutledge, Schmidt, Tilmant                                                      |

Numbers correspond to references in Appendix 4, p. 141-167.

Names correspond to individuals in Appendix 3, p. 138-140.

### Appendix 3. Personal communications

| <u>Name</u>       | <u>Affiliation</u>                                                                     |
|-------------------|----------------------------------------------------------------------------------------|
| D. Ahrenholz      | NOAA / National Marine Fisheries Service, Beaufort Lab., Beaufort, NC                  |
| D. Allen          | Univ. of South Carolina, Belle Baruch Marine Lab., Georgetown, SC                      |
| M. Allison        | North Carolina Div. of Marine Fisheries, Wilmington Dist. Ofc., Wilmington, NC         |
| W. Anderson       | South Carolina Wildlife and Marine Resources, Charleston, SC                           |
| J. Archambault    | South Carolina Wildlife and Marine Resources, Charleston, SC                           |
| C. Benedict       | Carolina Power & Light Co., Brunswick Biological Lab., Southport, NC                   |
| G.F. Booth        | Carolina Power & Light Co., Brunswick Biological Lab., Southport, NC                   |
| J. Burke          | NOAA / National Marine Fisheries Service, Beaufort Lab., Beaufort, NC                  |
| K.N. Cates        | Carolina Power & Light Co., Brunswick Biological Lab., Southport, NC                   |
| S.E. Chester      | NOAA / National Marine Fisheries Service, Beaufort Lab., Beaufort, NC                  |
| D.S. Cooke        | Carolina Power & Light Co., Brunswick Biological Lab., Southport, NC                   |
| R. Curry          | US Natl. Park Serv, Biscayne Bay Natl. Park, Homestead, FL                             |
| L. Delancey       | South Carolina Wildlife and Marine Resources, Charleston, SC                           |
| C. DeMort         | Univ. of N. Florida, Coastal Fisheries Lab., Jacksonville, FL                          |
| D. Freeman        | North Carolina Div. of Marine Fisheries, Morehead City, NC                             |
| R.G. Gilmore      | Harbor Branch Oceanographic Institute, Fort Pierce, FL                                 |
| C. Hall           | Bionetic Corp. Environmental Labs., Kennedy Space Center, FL                           |
| D. Hamilton       | South Carolina Wildl. & Marine Res., Waddell Mariculture Ctr., Bluffton, SC            |
| J. Hawkins        | North Carolina Div. of Marine Fisheries, Washington Dist. Ofc., Washington, NC         |
| L. Henry          | North Carolina Div. of Marine Fisheries, Elizabeth City Dist. Ofc., Elizabeth City, NC |
| W.E. Herring, Jr. | Carolina Power & Light Co., Brunswick Biological Lab., Southport, NC                   |
| W. Hettler        | NOAA / National Marine Fisheries Service, Beaufort Lab., Beaufort, NC                  |
| J. Holloway       | South Carolina Wildl. & Marine Res., Waddell Mariculture Ctr., Bluffton, SC            |
| S. Hopkins        | South Carolina Wildl. & Marine Res., Waddell Mariculture Ctr., Bluffton, SC            |
| R.T. Kneib        | Univ. of Georgia, Marine Inst., Sapelo Island, GA                                      |
| R.M. Lewis        | NOAA / National Marine Fisheries Service, Beaufort Lab., Beaufort, NC                  |

Appendix 3, continued. Personal communications

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|                |                                                                                |
|----------------|--------------------------------------------------------------------------------|
| D. Lindquist   | Univ. of North Carolina - Wilmington, Dept. of Biol. Sci., Wilmington, NC      |
| C. Manooch     | NOAA / National Marine Fisheries Service, Beaufort Lab., Beaufort, NC          |
| P. Marraro     | NOAA / National Marine Fisheries Service, Beaufort Lab., Beaufort, NC          |
| M. Marshall    | North Carolina Div. of Marine Fisheries, Morehead City, NC                     |
| R. Martore     | South Carolina Wildlife and Marine Resources, Charleston, SC                   |
| S. McKenna     | North Carolina Div. of Marine Fisheries, Washington Dist. Ofc., Washington, NC |
| L. Mercer      | North Carolina Div. of Marine Fisheries, Morehead City, NC                     |
| R. Monaghan    | North Carolina Div. of Marine Fisheries, Morehead City, NC                     |
| R. Moore       | Univ. of South Carolina, Coastal Carolina College, Conway, SC                  |
| M. Moser       | North Carolina State Univ., Zoology Dept., Raleigh, NC                         |
| D. Moyer       | North Carolina Div. of Marine Fisheries, Washington Dist. Ofc., Washington, NC |
| J. Music       | Georgia Dept. Nat. Res., Coastal Resources Div., Brunswick, GA                 |
| G. Ogburn      | Univ. of South Carolina, Belle Baruch Marine Lab., Georgetown, SC              |
| J. Parker      | North Carolina Div. of Marine Fisheries, Wilmington Dist. Ofc., Wilmington, NC |
| L.W. Pollard   | Carolina Power & Light Co., Brunswick Biological Lab., Southport, NC           |
| A. Powell      | NOAA / National Marine Fisheries Service, Beaufort Lab., Beaufort, NC          |
| M. Provencha   | Bionetic Corp. Environmental Labs., Kennedy Space Center, FL                   |
| F. Rohde       | North Carolina Div. of Marine Fisheries, Wilmington Dist. Ofc., Wilmington, NC |
| J. Ross        | North Carolina Div. of Marine Fisheries, Manteo Field Ofc., Manteo, NC         |
| S. Ross        | North Carolina State Univ., Zoology Dept., Raleigh, NC                         |
| T. Rutledge    | US Natl. Park Serv, Biscayne Bay Natl. Park, Homestead, FL                     |
| T. Schmidt     | US Natl. Park Serv, Everglades Natl. Park, Homestead, FL                       |
| D.N. Schmitt   | Georgia Dept. Nat. Res., Game & Fish Div., Richmond Hill, GA                   |
| J. Schoolfield | North Carolina Div. of Marine Fisheries, Wilmington Dist. Ofc., Wilmington, NC |
| J. Smith       | NOAA / National Marine Fisheries Service, Beaufort Lab., Beaufort, NC          |
| S. Spence      | North Carolina Div. of Marine Fisheries, Morehead City, NC                     |
| B. Stender     | South Carolina Wildlife and Marine Resources, Charleston, SC                   |
| A. Stokes      | South Carolina Wildl. & Marine Res., Waddell Mariculture Ctr., Bluffton, SC    |
| D. Taylor      | North Carolina Div. of Marine Fisheries, Morehead City, NC                     |

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|               |                                                                                        |
|---------------|----------------------------------------------------------------------------------------|
| T.E. Thompson | Carolina Power & Light Co., Brunswick Biological Lab., Southport, NC                   |
| J. Tilmant    | US Natl. Park Service, Everglades Natl. Park, Homestead, FL                            |
| R. VanDolah   | South Carolina Wildlife and Marine Resources, Charleston, SC                           |
| R.L. Walker   | Univ. of Georgia, Marine Extension Service, Savannah, GA                               |
| E. Wenner     | South Carolina Wildlife and Marine Resources, Charleston, SC                           |
| D. Whitaker   | South Carolina Wildlife and Marine Resources, Charleston, SC                           |
| A.Q. White    | Jacksonville Univ., Div. of Sci. & Math, Jacksonville, FL                              |
| C. White      | Brevard County Ofc. of Nat. Res. Mgt., Merrit Island, FL                               |
| S. Winslow    | North Carolina Div. of Marine Fisheries, Elizabeth City Dist. Ofc., Elizabeth City, NC |

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