

**Georgia Department of Natural Resources
Coastal Resources Division
Management Plan: Penaeid Shrimp
June 2017**

General Objective:

Manage Georgia's penaeid shrimp (i.e., white, brown and pink shrimp) fishery to ensure the maximum aggregate social, economic, and ecological benefits to the citizens of Georgia.

Life History and Reproductive Biology:

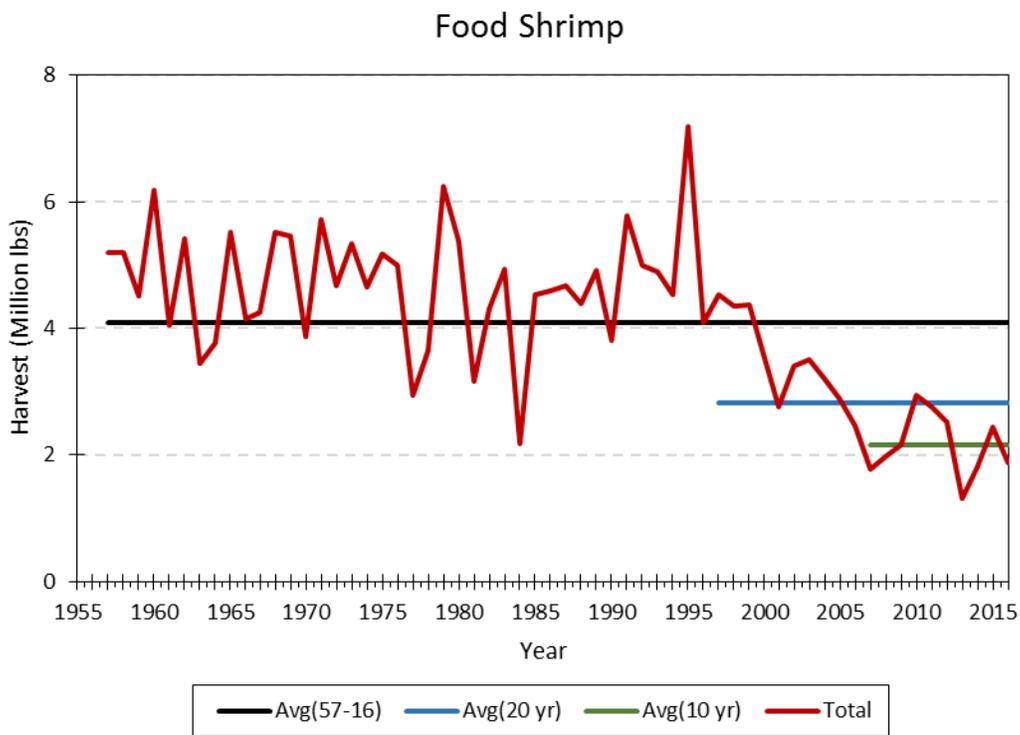
The life cycles of brown, white, and pink shrimp are similar. Mating and spawning occurs in the ocean from the beaches to several miles offshore. Each female produces 500,000 to 1,000,000 eggs that sink to the ocean floor after being released. The eggs hatch within 24 hours and the larvae move freely in the water column and become part of the oceanic plankton. After going through 11 larval stages in ocean water, the young shrimp finally look like miniature versions of adult shrimp called post-larval shrimp. During the second post-larval stage, the young shrimp ride the flood tides to the estuaries where they settle to the bottom of tidal creeks and enter the juvenile stage. Rapid growth marks the juvenile stage - upwards of two inches per month. After reaching about 4 - 4 1/2 inches in length, the juveniles, now called sub-adults, move in to the deeper waters of the estuary and continue to grow though not as rapidly as in the juvenile stage. Sub-adult shrimp may remain in deeper water for several months before moving seaward. When water temperatures and salinity are optimal, the now adult shrimp will move out to the ocean to spawn. This complex and amazing cycle generally takes place over the course of 8 - 9 months. In fact, it is unlikely most shrimp will live longer than one year.

Description of the Fishery:

With an annual consumption of 3.6 pounds shrimp per person, shrimp has become America's most popular seafood product. Georgia's contribution to the tables of shrimp lovers consists primarily of brown, white, and pink shrimp along with a small amount of rock shrimp, royal reds, and sea bobs. For the 10 year period of 2007-2016, average annual commercial landings of white, brown, and pink shrimp in Georgia were 2.1 million pounds valued at 8.3 million dollars (Figure 1). Approximately 280 commercial vessels ranging in length from 12 feet to just over 100 feet ply the waters off Georgia in search of these succulent shrimp each year.

Food and bait shrimp in Georgia are harvested with seines, castnets and trawl nets with recreational and commercial license. Seines are fished in shallow waters along the beach; whereas, castnets are thrown by hand from a stationary boat and trawl nets are pulled behind boats motoring slowly.

All trawl nets are required to use a bycatch reduction device (BRD) that allows fish to escape by swimming up through an opening in the top of the net. Additionally, any shrimp net that is mechanically retrieved (as opposed to pulled onto the boat by hand) is required to have a TED or turtle excluder device installed. The TED is designed to guide sea turtles out of the shrimp net in order to prevent their being trapped and drowning. Turtle excluder devices also help prevent shrimp nets from clogging with jellyfish and debris.



Food shrimp comprises white, brown, pink, rock, royal, seabob, and unclassified. Pounds in tails (multiply by 1.60 for heads-on).

Figure 1. Commercial harvest of food shrimp in Georgia. 2016 data is preliminary.

Current Regulations:

Georgia Regulations

Commercial

	Food Shrimp Trawls	Bait Shrimp Trawls	Commercial Cast Nets	Seines
Gear	TEDs/BRDs. 220-ft max. foot rope/vessel, excluding trynet	20-ft net size max, with 1 – 1 3/8-inch mesh size. Teds/BRDs not required	5/8-inch min. bar mesh	Less than 100-ft 1 ¼-inch min. stretched mesh
Seasons/Hours	State waters can be opened May 15 through Dec. 31 (30 minutes before sunrise to 30 minutes after sunset), extension possible (Jan – Feb)	Restricted to designated "Bait Zone" areas(30 minutes before sunrise to 30 minutes after sunset)	Generally, same as food shrimp trawler season (30 minutes before sunrise to 30 minutes after sunset)	Generally, same as food shrimp trawler season (30 minutes before sunrise to 30 minutes after sunset)
Catch Limits	None	50 qts. "live" per boat (no more than 10% dead); 200 qts. per facility; allows for packaged dead bait	150 qts. heads-on per person or boat. Beginning Dec. 1 - 75 qts. heads-on per person or boat	24 qts. heads-on per person
Areas	Sounds closed; Beaches: sound limit boundaries to three miles offshore	Specified zones: creeks and rivers only	No closed areas unless noted during season extension	Any sand beach of any barrier island. Inlets and sloughs are closed
Licenses	Commercial fishing and trawler vessel	Commercial fishing and trawler vessel	Commercial cast net (limited entry); Non-trawler vessel	Commercial fishing
Bonds	Required; \$5,000	Required; \$2,000	Not required	Not required

Recreational

	Sport Bait Shrimping with Power-Drawn Nets	Castnetting for Food Shrimp	Castnetting for Bait Shrimp	Seines
Gear	Nets must be 10 feet or smaller, with a stretched mesh <1 3/8-inch TEDs/BRDs not required.	Modified cast nets are legal. No length restriction. Minimum 5/8-inch bar mesh.	Minimum bar mesh 3/8 inch	12 feet or smaller, with depth of four feet, a maximum stretch mesh of 1 inch. Less than 100 feet long, minimum stretch mesh of 1 1/4 inches used on sand beaches of any barrier island. Seines 100 to 300 feet long, minimum mesh size of 2 1/2 inches used only on the oceanfront sides of beaches. Seines over 300 feet long are also prohibited.
Seasons/Hours	Year-round; Daylight*	Same as food shrimp trawler season.	Same as food shrimp trawler season.	Same as food shrimp trawler and cast net season.
Catch Limits	2 qts at any time, with no more than 1/2 pint dead. 4 qts/24-hours. 2 or more people: 4 qts at any time, with no more than 1 pint dead. 8 qts/24-hours.	48 qts heads-on or 30 qts tails per day. 2 or more persons: 48 qts heads-on or 30 qts tails at any time.	2 quarts per person at any time, maximum of 4 qts/24 hours. 2 or more people: 4 qts at any time, with no more than 1 pint dead. 8 qts/24-hours	2 quarts per person at any time with no more than 4 qts/24 hours. No one person taking food shrimp solely by means of a seine, whether such person is acting alone or in a group of persons, may possess more than 24 quarts of shrimp with heads on or 15 quarts of tails taken by such seine in any 24-hour period
Areas	Specified zones: creeks and rivers only	No closed areas	No closed areas	Any sand beach of any barrier island. Inlets and sloughs are closed to seines over 12 feet.
Licenses	Georgia Fishing License	Georgia Fishing License	Georgia Fishing License	Georgia Fishing License

* - Daylight is defined to be 1/2 hour before official sunrise to 1/2 hour after official sunset

Federal Regulations

Exclusive Economic Zone (3 – 200 miles offshore)

The South Atlantic Fishery Management Council's Shrimp Fishery Management Plan allows North and South Carolina, Georgia and east Florida to request a closure in federal waters adjacent to closed state waters for brown, pink or white shrimp following severe cold weather that results in an 80% or greater reduction in the population of white shrimp (whiting, royal red and rock shrimp fisheries are exempt from a federal closure for white shrimp). During a federal closure, a buffer zone is established extending seaward from shore to 25 nautical miles, inside of which no trawling is allowed with a net having less than 4" stretch mesh. Vessels trawling inside this buffer zone cannot have a shrimp net aboard (i.e., a net with less than 4" stretch mesh) in the closed portion of the federal zone. Transit of the closed federal zone with less than 4" stretch mesh aboard while in possession of a *Penaeus* (white, brown and pink) species will be allowed provided that the nets are in an unfishable condition, which is defined as stowed below deck. The Council has established a control date of December 10, 2003, for the penaeid shrimp fishery in the South Atlantic EEZ. The Council is concerned about the potential for excess harvesting capacity in the fishery. A control date means that, in the future, the Council may consider management measures that limit the participation or effort in the fishery and may use this control date as part of a management strategy.

Beginning April 11, 2006 vessel owners or operators of a trawler that harvests or possesses brown, pink, or white shrimp (penaeid shrimp) in or from the exclusive economic zone (EEZ) off the southern Atlantic states to obtain a commercial vessel permit for South Atlantic penaeid shrimp.

Owners and operators of vessels with permits for South Atlantic penaeid shrimp who are selected by the Science and Research director, Southeast Fisheries Science center, NOAA Fisheries Service (SRD), will be required to maintain and submit catch and effort reports. Forms for such reporting would be available from the SRD. These records must be submitted to the SRD postmarked no later than 7 days after the end of each fishing trip. If no fishing occurred during the calendar month, a report so stating must be submitted on one of the forms postmarked no later than 7 days after the end of that month. Information to be reported is indicated on the form.

Owners and operators of vessels with permits for South Atlantic penaeid shrimp will be required to carry NMFS-approved observers on trips selected by the SRD. Observers will collect data on the catch, bycatch, effort, and gear characteristics of the shrimp fishery in the region.

Chronology of Georgia Regulations:

- 1977 Sounds closed to commercial trawling.
- 1978 Bait Zones established (June).
- 1989 Turtle excluder devices (TEDs) required in all shrimp trawls by the National Marine Fisheries Service (NMFS).
- 1990 TED's required in state waters. (11/15/90)
- 1996 Bycatch reduction devices (BRDs) required in state waters by GA DNR. (6/1/96)
- 1997 NMFS required BRDs in all shrimp nets fishing in federal waters. (4/21/97)
- 1998 Cast net fishery - limited entry (200 max.). 60 qt. limit. Defined food shrimp and bait shrimp cast nets (no net modifications).
- 2001 Prohibited the use of trawl nets with a footrope length of greater than 220ft.
- 2002 Vessels with less than a 7-ft draft exempted from the 220-ft length rule.
- 2007 Modified cast nets allowed. Cast net limit increased to 150 qt. through Nov. and 75 qt. after Dec. 1. Trawl vessels permitted to unload at facilities with bait licenses.
- 2012 The Georgia Legislature repealed O.C.G.A. 27-4-130.1 and authorized the board to set size limits, open seasons, creel and possession limits and possession and landing specifications on a state-wide, regional and local basis. The Commissioner of the Department was empowered to close waters to recreational and commercial fishing by species for a period of up to six months within a calendar year. Finally, O.C.G.A. 27-4-118 was amended to require all commercial harvesters "landing" seafood in Georgia to report landings.
- 2017 License requirements were amended by the Georgia legislature to include a vessel crew license, species endorsements, and a seafood dealer license.

Data Sources:

Fishery Dependent Data Sources

Cooperative Statistics Program (CSP)

Cooperative Statistics Program (CSP) is part of a joint State-Federal partnership between the National Marine Fisheries Service (NMFS) and the State of Georgia. Originally implemented in 1989, the primary objective is to eliminate duplication of effort and standardizing data collection. In 1995, the Atlantic Coastal Cooperative Statistics Program (ACCSP) was conceived with 23 Atlantic federal, regional, and state fisheries management agencies agreeing to cooperatively collect, manage and disseminate fishery statistical information. With funding from NMFS, Georgia cooperates fully with both programs. To achieve the goals set by CSP and ACCSP, Georgia implemented a trip ticket program in April 1999. All sales of seafood products landed in Georgia must be recorded on a trip ticket at the time of the sale. Both the seafood dealer and the seafood harvester are responsible for insuring the ticket is completed in full. The data collected via trip tickets are:

Trip start and unloading dates	Number of Crew
Vessel number	Harvester Identifier
Dealer Identifier	Area Fished
Actual Fishing Time	Number of Sets
Gear Type	Quantity of Gear
County Landed	Species
Pounds	Ex-vessel value
Market Size	Market Grade

The data collected by these trip tickets are used not only to manage Georgia's fisheries but also to demonstrate their cultural and economic importance to coastal Georgia.

Fishery Independent Data Sources

Several fisheries independent datasets are available for use, each with their strengths and shortcomings (Table 1). Consistent funding for these surveys will provide better information for management in the years to come.

Table 1. Fisheries independent datasets.

Survey	Time Frame	Gear	Periodicity	Comments
Juvenile Trawl Survey	1978-1986, 2006 – present	78-86: 10 ft trawl with 1/8 mesh. 2006-: 20 ft trawl, 1.875 mesh, 0.25-inch liner	Monthly	Presently, 6 sites in Altamaha River and 6 sites in Ogeechee River
National Coastal Assessment	2000–2006	20 ft trawl, 1.875-inch mesh	July-Sep	50 sites conducted annually to assess community structure, toxins, water quality, etc.
Beach Seine	2004 – 2011	100x6ft seine 1-inch mesh	Monthly	4 sites in St. Simons and St. Andrew
Ecological Monitoring Trawl Survey	1976-present	40ft flat trawl with 1.875-inch mesh	Monthly	Presently, 6 sound systems with 42 fixed stations stratified by creek, sound, and offshore – Wassaw, Ossabaw, Sapelo, St. Simons, St. Andrew, Cumberland

Ecological Monitoring Trawl Survey (EMTS)

GADNR’s Coastal Resources Division has conducted a trawl survey to monitor shrimp and blue crab abundance since 1976. The monthly survey is a fixed site design stratified on creek, sound, and offshore locations in the various sound systems of Georgia. Total weights are recorded for each shrimp species. When the total weight of a species exceeds 3 pounds, a 3-pound subsample is processed to estimate number per pound and a random sample of 30 individuals are processed for size, sex, maturity, reproductive stage, and health (disease) data. The survey provides information on monthly and annual trends of abundance for white (Figure 2) and brown shrimp (Figure 3).

Black gill, a parasitic infestation that affects the gills of shrimp, was first recorded in Georgia in the fall of 1996 and has been observed in every year since with the exception of 1997, 1998, and 2001. The typical spread of the disease is from north to south beginning in August, peaking in September and October, and declining through December as waters cool. Sea Grant funds were initially issued to the Skidaway Institute of Oceanography in 2014 to identify the organism causing black gill and the potential environmental parameters that may cause outbreaks. Work done during the project involved collaborations with Mercer University and the Coastal Resources Division. As the spatial scale of affected animals includes most of the Southeast, the current network of agencies has recently expanded to include additional partners: South Carolina Department of Natural Resources, North Carolina Division of Marine Fisheries, Virginia Institute of Marine Science, and Florida Fish and Wildlife Conservation Commission.

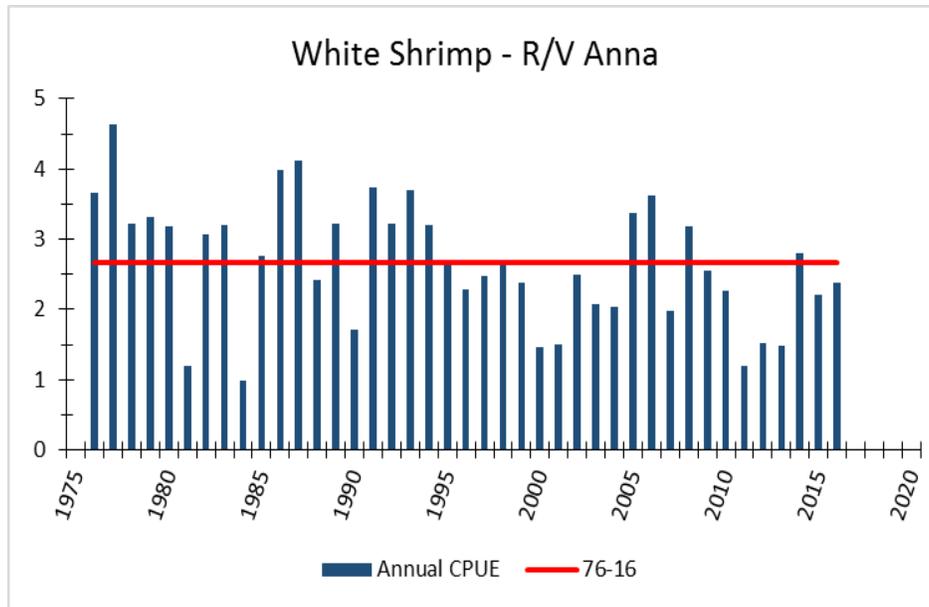


Figure 2. Annual catch-per-unit-effort (CPUE) estimates from trawling activities onboard the R/V *Anna* for white shrimp. CPUE is in kilograms per 15-minute trawl. Red line is long-term (76-16) CPUE.

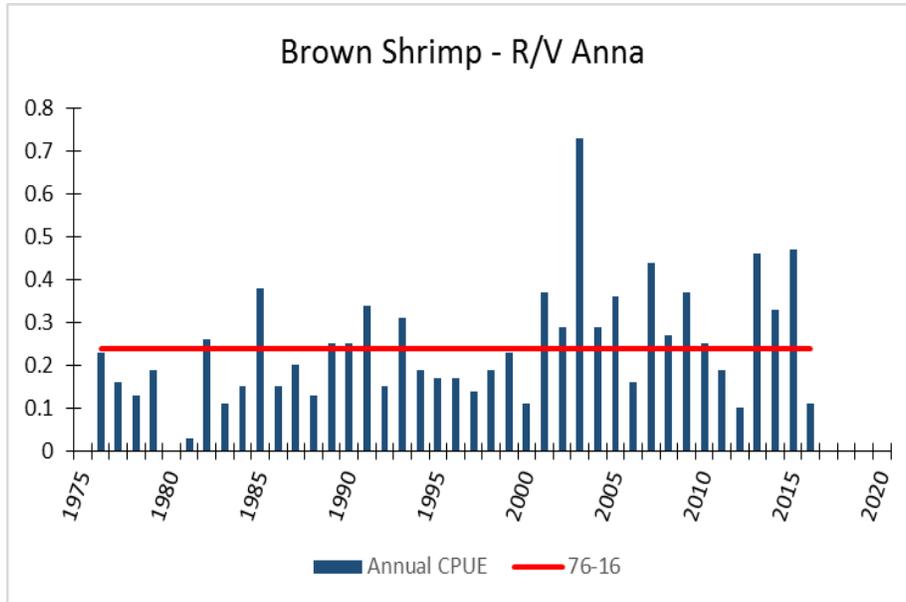


Figure 3. Annual catch-per-unit-effort (CPUE) estimates from trawling activities onboard the R/V *Anna* for brown shrimp. CPUE is in kilograms per 15-minute trawl. Red line is long-term (76-16) CPUE.

Beach Seine Survey was initiated in 2004 until 2011 in response to declining crab abundance associated with a prolonged drought. Shrimp were encountered in this gear as well. Sampling was conducted at four sites in the entrances of St. Simons and St. Andrew sounds using a 100' x 6' monofilament seine with 1" stretched mesh. All species were enumerated and subsamples measured. Information collected on penaeid shrimp was similar to that of the EMTS and the survey was abandoned in 2011.

The National Coastal Assessment (NCA) Program was designed to be a five-year effort of data collecting and compiling was completed in the months of July and August. The NCA program sampling design focuses on characterizing broad spatial differences. To estimate geographic extent of the nation's ecological resources. Program objectives were developed to estimate current status, trends, and changes in the environmental condition of those resources, seek association between natural and anthropogenic stresses and the condition of ecological resources, provide annual statistical summaries and periodic assessments of the Nation's ecological resources.

Prioritized Issues of Concern:

1. The population of coastal Georgia continues to increase with concomitant urbanization of areas adjacent to the estuary.
2. Inland land and water use patterns are changing so that the quality and quantity of freshwater entering the estuaries may be altered to the point that estuarine ecosystem function is degraded.
3. Loss of infrastructure (e.g. working waterfronts, processing plants) to other uses such as residential communities and private marinas.
4. Impact of black gill disease.
5. Illegal disposal (e.g. abandonment) of vessels in coastal marshes and waterways.
6. No current information on economic impact of commercial fishing in Georgia.
7. Under and misreporting of catch and effort by commercial fishers
8. No information on recreational catch and effort.

Goals and Objectives for Management:

1. Develop methods to address latent fishing effort.
2. Develop methods to assess the recreational component of the fishery.
3. Identify and protect Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC).

Prioritized Research and Monitoring Needs:

1. Continue current monitoring surveys.

Methods

Utilize existing and ongoing trawl surveys (EMTS and juvenile) to evaluate catch, distribution, size, sex, gonadal development and health of the populations.

Analytical Methods

Data will be used for management of the fishery (i.e., season opening and closing).

2. Identifying methods to assess recreational catch and effort.

Methods

Presently there are no methods to assess the recreational effort for penaeid shrimp in Georgia. An invertebrate recreational catch stamp (to include shrimp, crab, and whelk) would identify the universe of potential users and a phone survey targeting these individuals would allow for the potential development of annual estimates of these species for recreational harvest.

3. Develop a method to sample the juvenile portion of penaeid populations.

Methods

Collect information on recruiting juveniles to determine periodicity and recruitment success.

4. Continue to document and monitor the effects of diseases on penaeid shrimp.

Methods

Continue to monitor fishery-independent surveys for the presence and prevalence of diseases such as black gill, white spot and yellowhead.

Proposed Activities for FYs 2017 – 2022:

Collection of fishery-independent catch/harvest/effort and life history data.

Purpose

To describe the size distribution, maturity rates and relative abundance of penaeid shrimp in coastal waters.

Method

Continue collecting penaeid shrimp information from the following surveys:

1. Ecological Monitoring Trawl Survey
2. Juvenile Trawl Survey