

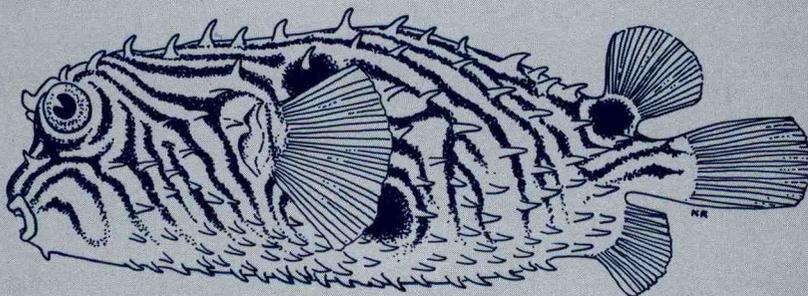
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DAA Technical Memorandum
DS MEMD 25

An Illustrated Field Guide
to The

Fishes

Of Gray's Reef
National Marine Sanctuary



Washington, D.C.
February 1989

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Marine and Estuarine Management Division



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AN ILLUSTRATED FIELD GUIDE TO THE FISHES OF GRAY'S REEF NATIONAL MARINE SANCTUARY

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Savannah, Georgia 31404

Illustrated by **Karen Roeder**

Washington, D.C.
February 1989

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service



REPORT TO
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

NOAA TECHNICAL MEMORANDA SERIES NOS/MEMD

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National Marine Sanctuary Program
Marine and Estuarine Management Division
Office of Ocean and Coastal Resource Management
National Ocean Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

NOTICE

This report has been approved by the National Ocean Service of the National Oceanic and Atmospheric Administration (NOAA) and approved for publication. Such approval does not signify that the contents of this report necessarily represent the official position of NOAA or of the Government of the United States, nor does mention of trade names or commercial products constitute endorsement or recommendation for their use.

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PREFACE

Title III of the Marine Protection, Research, and Sanctuaries Act of 1972 authorizes the Secretary of Commerce to designate ocean waters as marine sanctuaries for the purpose of preserving or restoring their conservational, recreational, ecological and aesthetic values. Sanctuary designation provides for comprehensive management of these exceptional marine resources which involves research, interpretation, and resource protection. The communication of scientific information gained through resource studies is in part provided by the Marine and Estuarine Management Division, National Oceanic and Atmospheric Administration through the production of illustrated field guides.

The Field Guide Series consists of illustrated manuals on the identification and general biology of plants and animals in National Marine Sanctuaries. Field Guides are intended for use by students (high school and college), non-specialist scientists, and sanctuary users who want more information about species of plants and animals that they may encounter in sanctuaries. They also serve as references about the groups of organisms covered.

Federal fishing regulations in the Fishery Conservation Zone of North Carolina, South Carolina, Georgia and the east coast of Florida currently establish minimum lengths, bag limits and occasional closure of the fishery for some species. Contact the South Atlantic Fishery Management Council, 1 Southpark Circle Suite 306, Charleston, South Carolina 29407-4699 or the Coastal Resources Division, Georgia Department of Natural Resources, 1200 Glynn Avenue, Brunswick, Georgia 31523 for current regulations.

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For permission to use illustrations from the FAO Species Identification Sheets (Fisher, 1978), I would like to thank W. Fisher .

For preparation of original fish illustrations, the cover illustration and layout for the guide, I especially thank Karen Roeder. I also thank Carol Johnson for work on illustrations.

For vessel, diving, laboratory and other assistance, I thank the School of Sciences and Technology, Savannah State College, the National Undersea Research Program of the National Oceanic and Atmospheric Administration, the Coastal Resources Division of the Georgia Department of Natural Resources, Polly Andrews, Rick Buchner, Mike Denmark, Guy Gowens, Darryl Reynolds, Dwayne Roberson, Jim Roberts, Gordon Rogers, Bruce Sandefur, Louise Shannon, Tate Shiver, Andre Smith, and Vic Turner.

INTRODUCTION

This pictorial guide is intended to help in the field identification of the common, important and unusual fishes of Gray's Reef National Marine Sanctuary. It also serves as a systematic reference to all of the fishes known from Gray's Reef and may be useful for the identification of fishes at similar natural live bottom and artificial reefs of the inner- and midshelf of the southeast U.S. coast.

The effort to prepare this guide began in 1980. It involved more than 80 SCUBA dives at Gray's Reef by the author in order to conduct fish censuses, underwater still and video photography of fishes, and the collection of fishes for subsequent study, identification, and illustration.

The 91 species illustrated in the guide are those that are most characteristic of Gray's Reef, most likely to be seen by the SCUBA diver or sportfisherman or most distinctive in appearance or habits. The Systematic Checklist contains all the species presently known to occur at Gray's Reef as well as others that have been reported from the area. Each species is also classified by habitat preference and distribution records for its occurrence at Gray's Reef are cited. Following the Introduction, which contains general information on the geology, climatology, oceanography, ecology and fishes of Gray's Reef, is a section on how to use the field guide.

About Gray's Reef

The Gray's Reef National Marine Sanctuary was designated in January 1981. It is located 17.5 nmi (nautical miles) east of Sapelo Island, Georgia and encompasses an area of approximately 17 sq nmi (square nautical miles; Figure 1). Water depth at the sanctuary is 55 to 65 feet (17 - 20 m).

Gray's Reef is a good example of productive marine habitat, also known as live bottom, along the southeast U.S. continental shelf.

The reef was formed from marine sediments (mud, sand, shells) that were deposited during the Pliocene Epoch between 5 and 2 million years ago. The sediments were consolidated into rock by exposure above sea level during subsequent glacial periods between 40,000 and 20,000 years ago (Hunt 1974, Henry pers. comm.). Today, the fossiliferous limestone resembles poorly set concrete or mortar. The rock is soft enough for burrowing and excavating marine organisms, yet hard enough for algae (seaweeds), sponges, hard corals, gorgonians, bryozoans, barnacles, and other organisms to attach or anchor themselves.

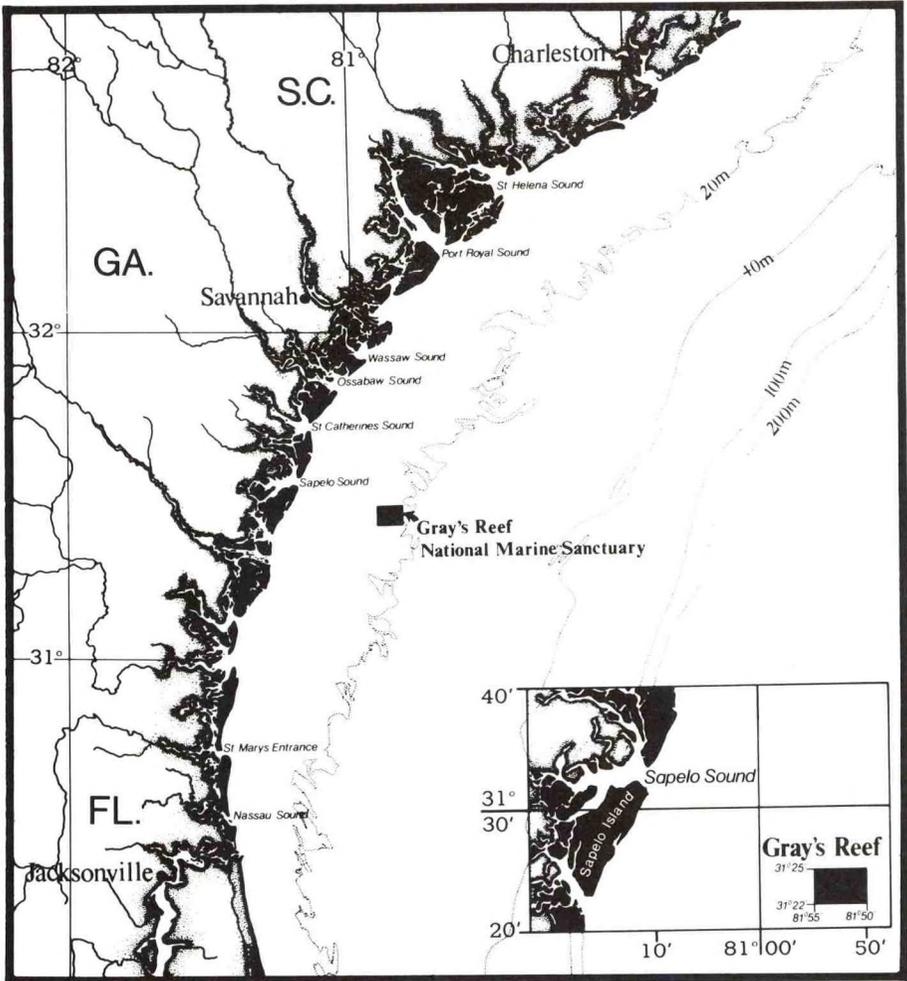


Figure 1. Location of Gray's Reef in relation to the southeast coast of the U.S. Inset shows latitude and longitude of sanctuary boundaries. (depth isobaths in meters)

The reef emerges irregularly from the sand as a series of roughly northeast-southwest aligned rock outcrops of low to moderate relief resembling large platforms. The tops of the platforms are often covered with a thin veneer of sand and their southeast margins often form ledges (shelf-like overhangs) to 6 feet (2 m) in height that may be broken, forming crevices and rubble (Figure 2). There is some evidence that natural transport of sediments periodically shifts the level of sand around the ledges, increasing or decreasing apparent height.

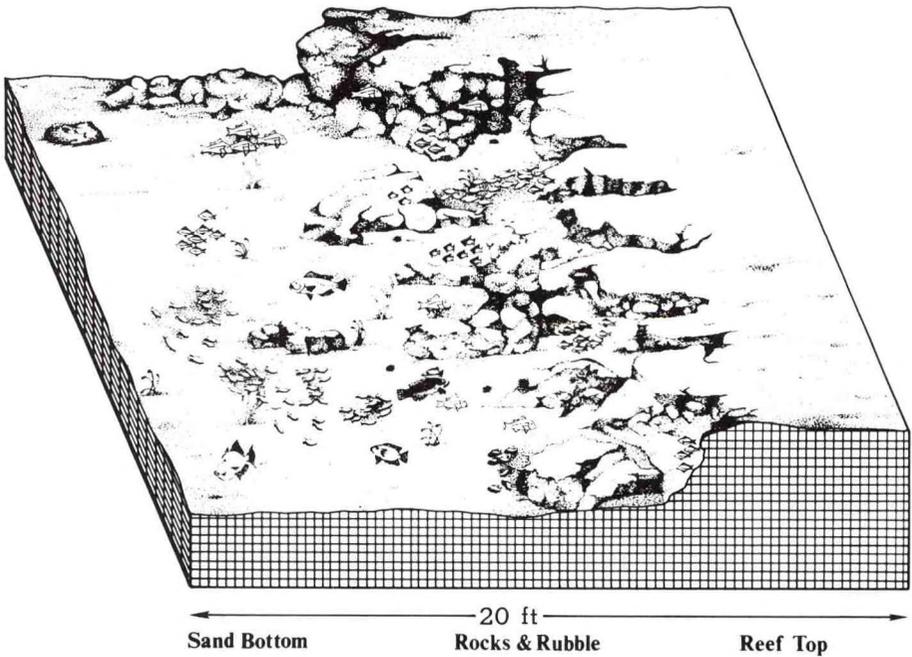


Figure 2. Composite illustration of a typical outcrop at Gray's Reef showing flat reef top, crevices, undercut reef, rocky rubble, and sandy off-reef slope.

The sea conditions at Gray's Reef are generally moderate from the late spring through the fall (winds 0 to 15 knots; seas calm to four feet). During late summer, fall and winter seas can be rough (seven to nine feet) as a result of strong northeasterly winds and storms.

The oceanographic conditions at Gray's Reef have considerable influence upon the kinds of fishes that occur there. The regimes of water temperature, salinity (saltiness), turbidity (water clarity), and ocean currents all influence the dynamics of fish populations. Gray's Reef is closer to shore than to the edge of the continental shelf (see Figure 1) whose margin is 75 nmi offshore. According to Atkinson et al. (1983), the oceanographic properties of the Gray's Reef area are a mixed result of wind, Gulf Stream current, tidal flux and density forcing (salinity-temperature) influences at the margin of the inner- and midshelf. Figure 3 shows a seasonal profile of temperature and salinity for the Gray's Reef area. The lowest salinities occur during periods of peak river runoff (or shortly thereafter) with the remaining months reflecting Gulf Stream rather than inner shelf values (Atkinson et al. 1983).

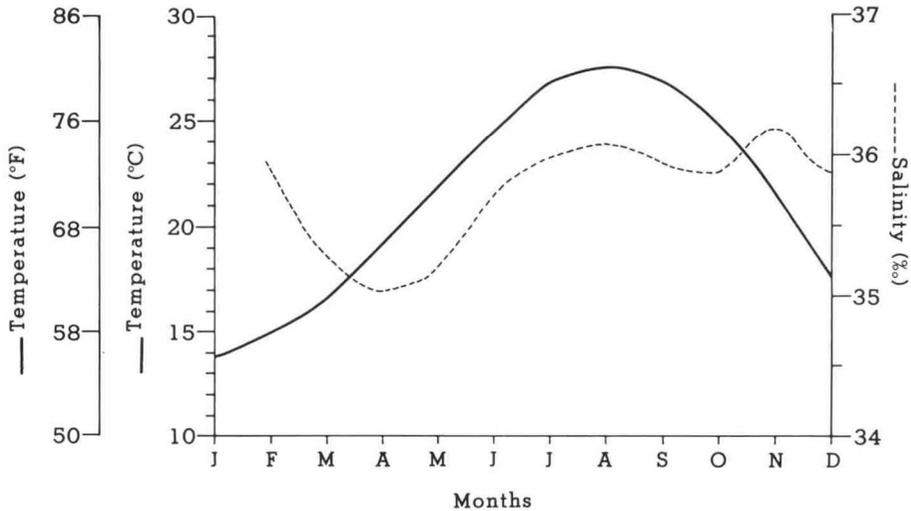


Figure 3. Mean monthly sea temperature and salinity in the vicinity of Gray's Reef. (from Atkinson, pers. comm.)

Sea temperature, the best predictor of the geographic distribution of marine organisms, is, at Gray's Reef, within the tropical range during the summer but may fall below the lethal thermal minimum of many tropical fish species during the winter. Even though tropical reef fishes colonize the reef annually as drifting eggs and larvae, they are often absent during the colder winter months. The larger non-resident fishes probably migrate away from the reef in search of warmer offshore water. But many of the smaller reef residents, that cannot migrate, may not survive the low winter temperature stress.

In terms of its fish fauna, Gray's Reef can be considered intermediate or transitional. The subtropical fauna of the southeast U.S. coast includes a combination of species characteristic of the tropical western Atlantic (Caribbean) and species characteristic of the temperate/sub-tropical western north Atlantic. Its cross-shelf location between more environmentally variable (stressed), inshore habitats, and more environmentally stable, deeper, offshore habitats results in a fish community that is intermediate between lower-diversity inshore and higher-diversity offshore reefs.

The invertebrates that inhabit the exposed rock surfaces and sandy areas of Gray's Reef include bryozoans (moss animals), hydroids, ascidians (sea squirts), barnacles, tube worms, sponges, hard corals and gorgonians (sea whips and sea fans). They form an attached 'turf' of marine life that provides refuges and habitat spaces for the mobile residents of the reef. Mobile invertebrates include sea urchins, sea cucumbers, brittle stars, sea stars, snails and other mollusks, crabs, lobsters, shrimps, worms, octopods, and fishes. Nearby sandy habitats support a different sort of bottom-dwelling invertebrate community. Here, sea pens, sea pansies, sea cucumbers, sea biscuits, worms, mollusks, and crustaceans are adapted to life in soft sediments.

Drifting marine life (plankton) is abundant at Gray's Reef. The larger forms include the comb jellies, the jellyball or cabbage head, the sea nettle, or summer jellyfish, and the Portugese man-of-war. The latter two can produce painful stings but are only rarely encountered.

Loggerhead sea turtles, which nest on all of Georgia's sea island beaches, can be found basking at the surface at the sanctuary. Divers frequently encounter them resting under the reef overhangs. Green, Kemp's ridley, and leatherback sea turtles are also known to occur along the Georgia coast.

Dolphins (spotted and bottlenose) are the most often encountered cetaceans at Gray's Reef. The endangered northern right whale is a regular visitor to Georgia coastal waters in the vicinity of Gray's Reef. The frequency of mother-calf pair sightings suggests that this area may be an important habitat for calving. As such, it is wise to stay clear of whales in this area and report any sightings to The Georgia Conservancy, Savannah, Georgia; Gray's Reef National Marine Sanctuary Headquarters, UGA Marine Extension Center, Savannah, Georgia; or the Coastal Resources Division, Georgia Department of Natural Resources, Brunswick, Georgia.

Sea birds seen in the vicinity of Gray's Reef, include petrels, shearwaters, gannets, phalaropes, jaegers, and terns. Many are migratory species and hence seasonal. The biological interaction between feeding seabirds, baitfish (surface schools of herring or scad), and pelagic predators (mackerels and tunas) is particularly evident in the vicinity of reefs.

The Fishes

Fish are gill-breathing vertebrates (animals with backbones) that typically have scales and fins. Of the estimated 20,000 species of fishes living on the earth today, about 60 percent are marine (live in saltwater), and most of these inhabit the continental shelves of warm seas (Cohen 1970). Based upon lists by Dahlberg (1975), Scott (Unpub.) and Gilligan (Unpub.), it is likely that there are over 300 exclusively marine fish species in Georgia's coastal, inner-shelf, and midshelf areas. Roughly one-third of these are considered reef fishes and many others are indirectly associated with reefs.

The systematic checklist (page 69) contains 150 species in 52 families, 12 orders, and 2 classes. The list contains all the fish species known to occur at Gray's Reef National Marine Sanctuary and species that are known to occur along the Georgia coast at the depth of Gray's Reef but have not yet been reported at the Sanctuary. Species that have been collected, photographed or observed at Gray's Reef are annotated with symbols that are explained in a key at the beginning of the list. Species that were collected or photographed during the study and which have not been previously reported from the inner- and midshelf of Georgia are also included in the list.

The fishes that inhabit Gray's Reef encompass a wide variety of sizes, forms, and ecological roles. Often, the designation of species as a 'reef fish' is unclear because species vary widely in their degree of association with reefs and hard bottoms. It is clear, however, that after their arrival as larvae or juveniles, some fish species are totally dependent upon the reef for food and cover, rarely venturing away from it during their life. Examples include angelfishes, damselfishes, and sedentary reef dwellers such as the seahorse, the soapfish, blennies, and gobies. Though most are day-active, many are nocturnal, seeking refuge within the structure of the reef during the day and emerging at night to feed. These include the bigeyes, cardinalfishes, squirrelfishes, and morays.

Some pelagic (open-water rather than bottom-dwelling) species aggregate near reefs in search of prey. These include the jacks, mackerels, bluefish, cobia, barracuda and schooling fishes. Many gobies, some wrasses, basses, and porgies inhabit the sand near reefs. Finally, some species live in or on other species. Examples include the pearlfish which lives in a sea cucumber, the sharksucker and the pilotfish, that 'hitch rides' on large animals and the silver driftfish, which lives in association with jellyfish.

HOW TO USE THIS FIELD GUIDE

Knowledge of fish classification is not necessary to use the guide. Fishes are presented in groups of species that share body structure, activity or habitat characteristics. Each illustration within a group includes a brief descriptive account containing important characteristics for identification of that species, notes on similar species, notes on natural history or habitat, geographic distribution, and average size of the species.

The best way to use the guide is to become familiar with the arrangement of the species groups and the major external features and descriptive terms used in fish identification (Figure 4 and Glossary). Simply flipping through the pages of illustrations for each group may be the quickest way to find a collected or observed fish. Once a corresponding illustration has been located, the species account should provide enough information to help identify it. A common name may help to locate it using the index at the end of the guide; however, common names are often unreliable since they vary widely from place to place.

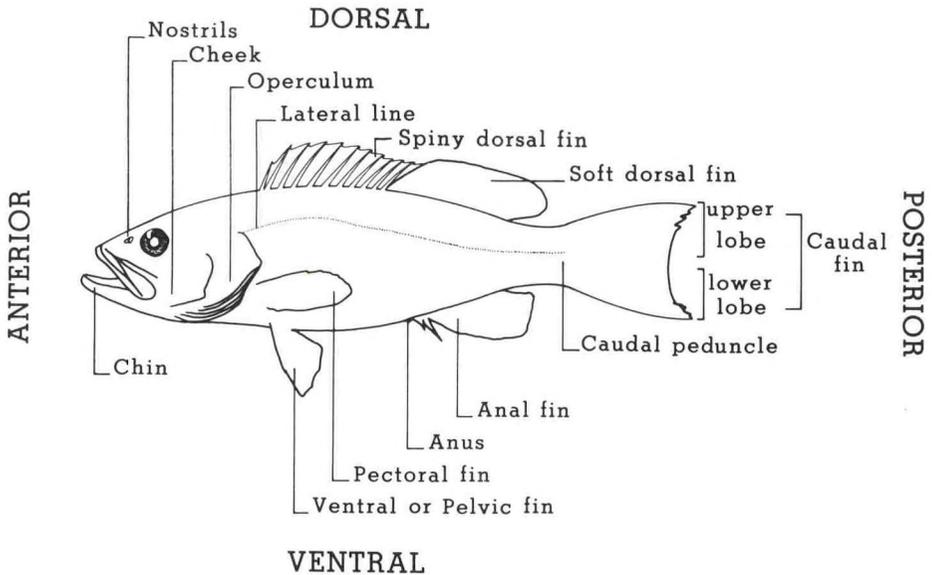


Figure 4. Basic external features of a bony fish.

SCUBA divers will find that knowledge of the fish's shape, coloration, habitat or activity may help to identify it. Written notes and sketches, including behavioral observations are particularly useful.

Each species account contains the American Fisheries Society common name (Robins et al. 1980), local or other common names, scientific name, key characteristics that distinguish that species from related species, natural history notes, geographic distribution and average (not maximum) adult size in inches or feet total length. The index contains both common and scientific names.

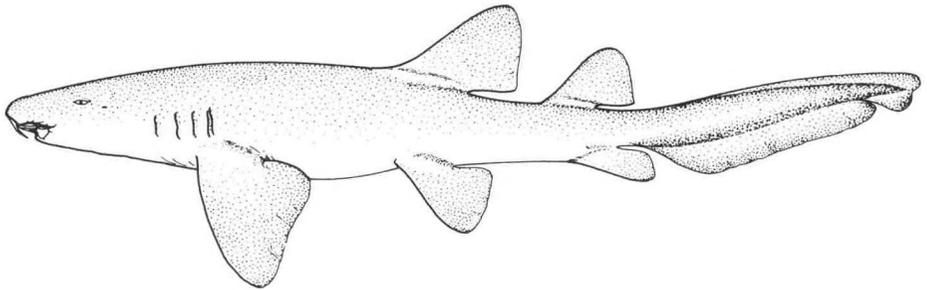
The scientific name consists of a genus name which is always capitalized and italicized (or underlined) and a specific or species name that is never capitalized but always italicized (or underlined). The genus level of a natural classification indicates similarity among closely-related organisms. The species level indicates the differences between closely-related but not interbreeding kinds of living things. For example, young *Scomberomorus cavalla*, king mackerel, closely resemble *Scomberomorus maculatus*, Spanish mackerel, in coloration and shape but the two are distinct species and can be separated easily by looking at the lateral line and gill rakers. Learning to recognize the distinguishing characteristics is the key to knowing the species.

The Annotated Bibliography and Literature Cited at the end of the guide contain references for additional information on the identification, natural history, and study of fishes.

Group 1 - SHARKS AND RAYS

Sharks are not particularly abundant at Gray's Reef and, fortunately for divers, the most commonly observed shark at Gray's Reef, the nurse shark, is not considered dangerous to man. At least 19 of the 350 species of sharks worldwide are known to occur on Georgia's shelf waters (see systematic checklist). Based upon longline and trawl samples from sandy bottoms in the Georgia Bight (Low and Ulrich 1984), the sandbar shark appears to be most abundant followed by the tiger, smooth dogfish, Atlantic sharpnose, spiny dogfish, scalloped hammerhead, lemon, dusky, sand tiger, and silky shark. For more information on the identification of sharks and other non-bony (cartilaginous) vertebrates (sawfishes, guitarfishes, electric rays, skates, stingrays, butterfly rays, eagle rays, and manta rays) see Castro (1983), Dahlberg (1975), Garrick (1982), Hoese and Moore (1977), Moore and Farmer (1981), Robins et al. (1986), and Schwartz (1984). Note that the lengths given are average and not maximum reported sizes.

Family Orectolobidae (carpet sharks)

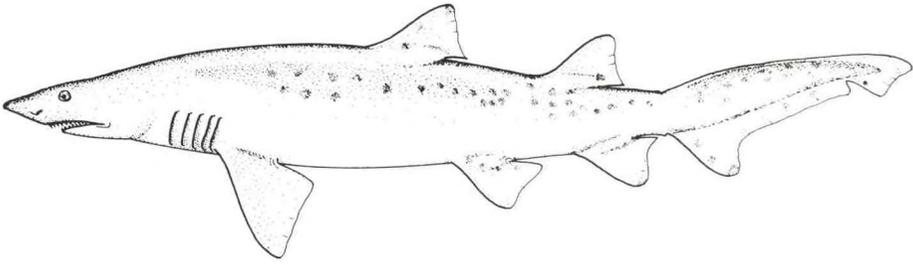


NURSE SHARK

Ginglymostoma cirratum

Nasal barbels, grooves connecting nostrils to mouth, teeth minute, eyes small, no lower lobe of caudal fin, dorsal fins of nearly equal size, color brownish to yellowish gray with small black spots. This sluggish bottom feeder crushes shellfish with its pavement-like teeth. It is commonly seen lying practically motionless on the bottom near or under ledges at Gray's Reef. Rhode Island to Brazil. 8 ft.

Family Odontaspidae (sand tigers)

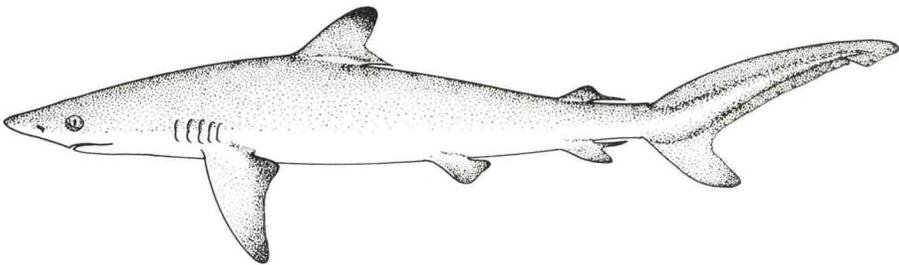


SAND TIGER

Odontaspis (=Eugomphodus) taurus

Gill slits anterior to origin of pectoral fins; second dorsal fin nearly as large as the first; teeth long, narrow, smooth and protrude from the mouth. The single developing fetus feeds on eggs within the maternal uterus. Individuals have been observed and photographed following divers who were carrying speared fish at Gray's Reef in January. Maine to Brazil. 4-9 ft.

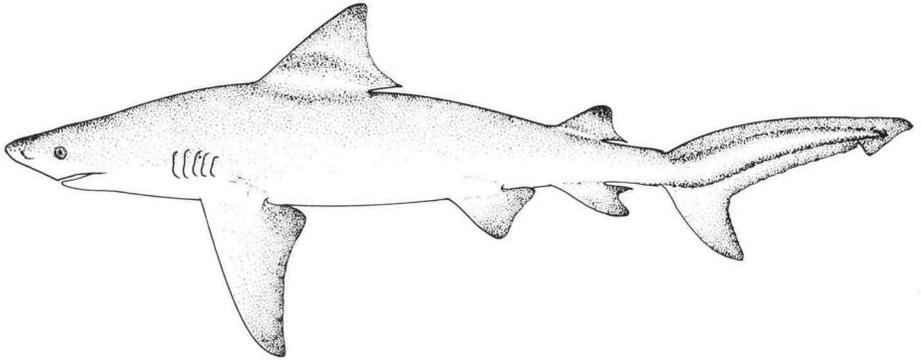
Family Carcharhinidae (requiem sharks)



SILKY SHARK

Carcharhinus falciformis

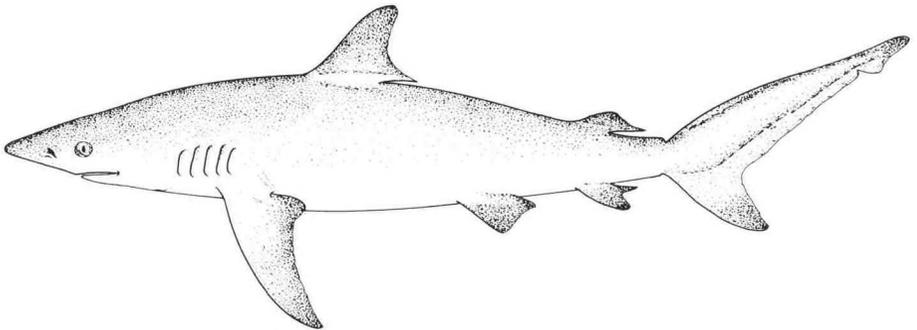
Skin silky, leading edge of first dorsal fin curved, second dorsal fin and anal fin with long posterior tip, serrated triangular teeth more strongly serrated at base becoming more oblique toward the corners of the mouth. Tropical and subtropical seas worldwide, Massachusetts to Brazil in the western Atlantic. 7-8 ft.



BULL SHARK

Carcharhinus leucas

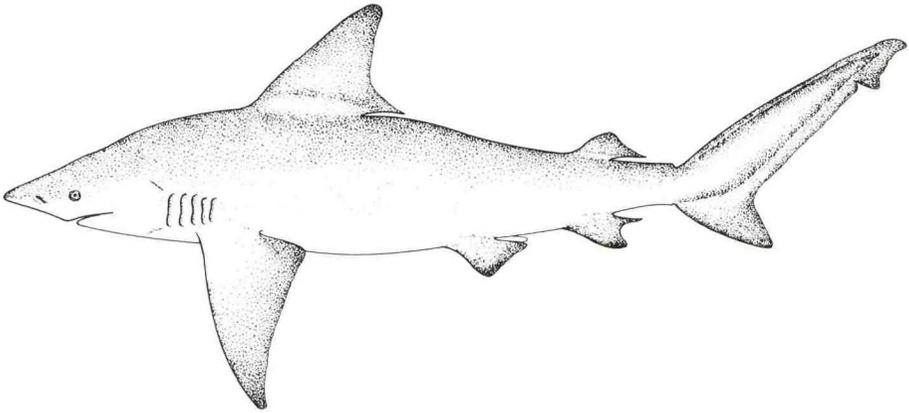
Snout very short and broad, dorsal fin high and triangular, pectoral fins as long as distance from pectoral fin origin to tip of snout, upper teeth triangular and heavily serrated, lower teeth narrower and finely serrated. Tropical coastal waters and freshwater rivers worldwide, New York to Florida and Gulf of Mexico in the western Atlantic. 7-8 ft.



DUSKY SHARK

Carcharhinus obscurus

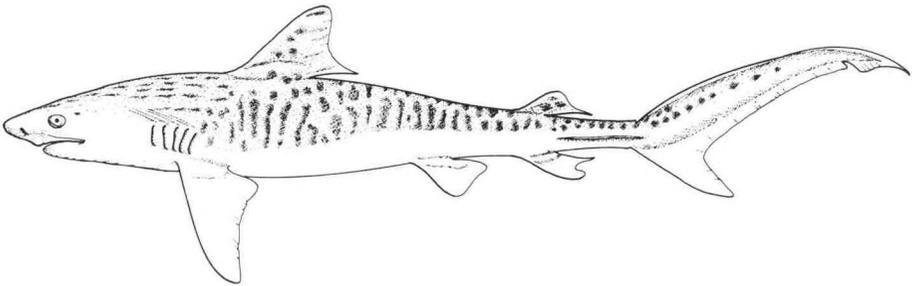
Snout short, raised ridge on back between dorsal fins, origin of first dorsal fin posterior to origin of pelvic fins. Similar to silky shark but first dorsal fin clearly triangular. Tropical seas worldwide except oceanic Pacific; Massachusetts to Brazil in the western Atlantic. 8 ft.



SANDBAR SHARK

Carcharhinus plumbeus

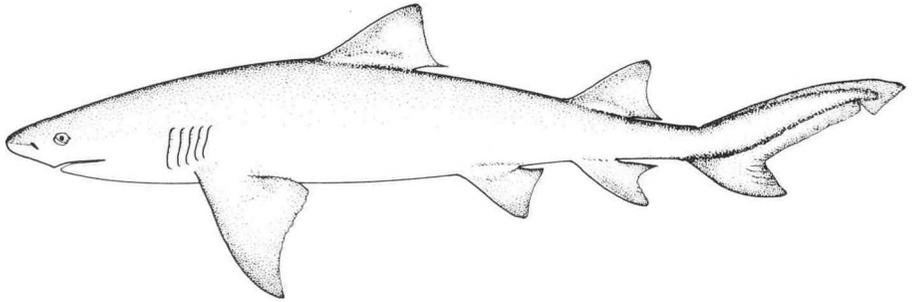
Stocky body, first dorsal fin large and originating over axil of pectoral fin, low ridge on back between dorsal fins, widely spaced dermal denticles (scales) without teeth on free edges. Warm seas worldwide, Massachusetts to Brazil in the western Atlantic. 7 ft.



TIGER SHARK

Galeocerdo cuvieri

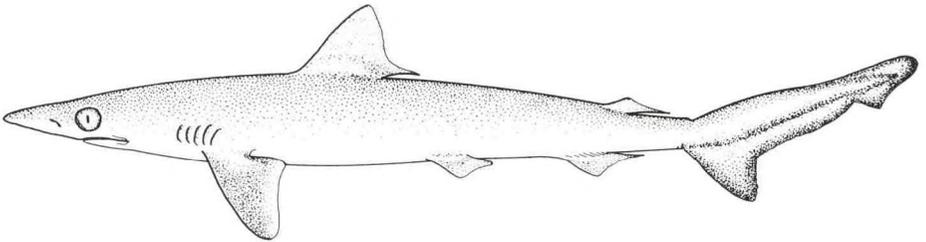
Snout blunt, long labial furrows around corners of mouth, small spiracle behind eye, caudal fin with long upper lobe, slight keel on caudal peduncle, curved short teeth with finely serrated edges and deep outer notch, spots on young, bars on adults. Warm seas worldwide, Cape Cod to Uruguay in the western Atlantic. 11-14 ft.



LEMON SHARK

Negaprion brevirostris

Snout very short; second dorsal fin nearly as large as the first; first dorsal fin begins behind pectoral fin; teeth narrow, triangular, smooth-edged; underside yellowish. New Jersey to Brazil. 8-10 ft.

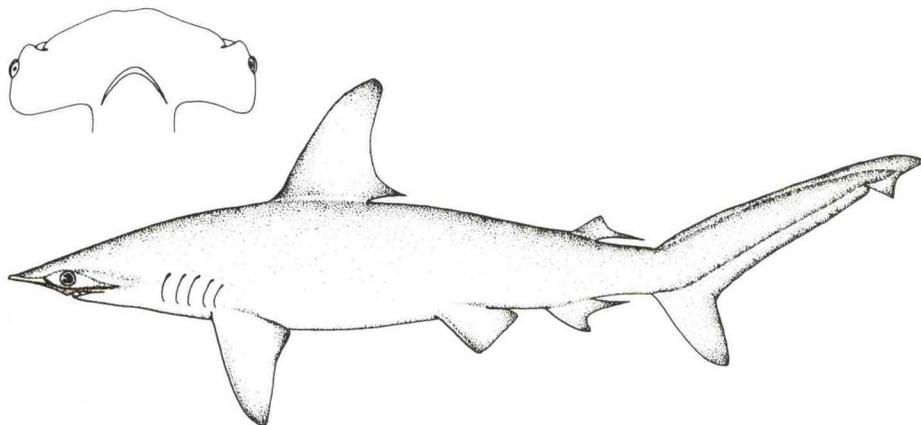


ATLANTIC SHARPNOSE SHARK

Rhizoprionodon terraenovae

Long labial furrows at corners of mouth; snout long and pointed; origin of second dorsal fin behind origin of anal fin; scattered white spots on adults; teeth triangular, oblique, strongly notched, finely serrated only in older individuals. Bay of Fundy to Yucatan. 3 ft.

Family Sphyrnidae (hammerhead sharks)

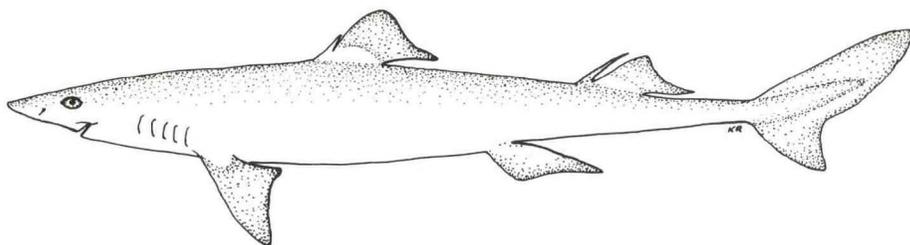


SCALLOPED HAMMERHEAD

Sphyrna lewini

Head wide and flat; central indentation on anterior margin of head; ventral tips of pectoral fins gray-black; teeth triangular, smooth-edged. The indentation on the anterior margin of the head is less pronounced in the great hammerhead (*S. mokarran*) and absent in the smooth hammerhead (*S. zygaena*). The bonnethead (*S. tiburo*) has a narrower, shovel-shaped head. All occur in Georgia shelf waters. New Jersey to Brazil and the Pacific. 7 ft.

Family Squalidae

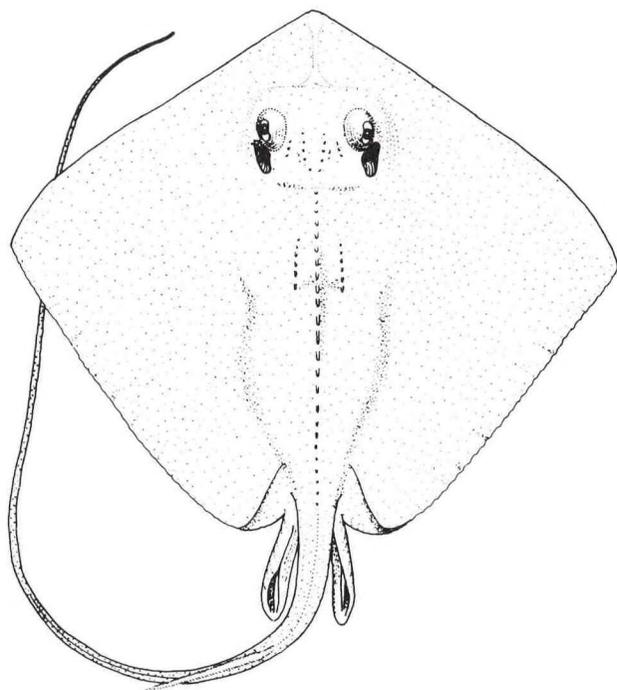


SPINY DOGFISH

Squalus acanthias

Robust spines in front of both the first and smaller second dorsal fin, color slate gray or brownish usually with small white spots scattered over the body. Occasionally abundant near reefs in the winter. Labrador to Cuba. 3-4 ft.

Family Dasyatidae (stingrays)



SOUTHERN STINGRAY

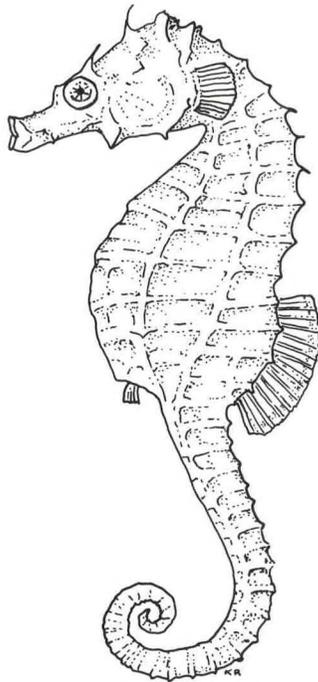
Dasyatis americana

Body flattened into a diamond-shaped but broadly rounded disc; tail narrow, whip-like with a low ridge and one or two sharp serrated spines on the upper surface and a broad ridge on the lower surface. The spine, called the sting, carries a potent toxin secreted by glands in the skin which can produce a painful wound or reaction. The rough-tail stingray (*D. centroura*) also occurs on the Georgia coast and is distinguished by spiny thorns on the tail and lack of upper ridge on the tail. Stingrays often dig into sediments in search of food leaving crater-like depressions. New Jersey to Brazil. 4-5 ft.

Group 2 - SEDENTARY BOTTOM DWELLERS

This group includes a variety of species that live on or close to the bottom often in close association with rocky outcrops at Gray's Reef. Many are cryptically colored or secretive predators that use the reef as cover to hide from predators or prey. Others are night-active feeders that only use the reef as a refuge during daylight hours. Others prefer sandy bottoms but are often seen near rocky outcrops.

Family Syngnathidae (seahorses and pipefishes)

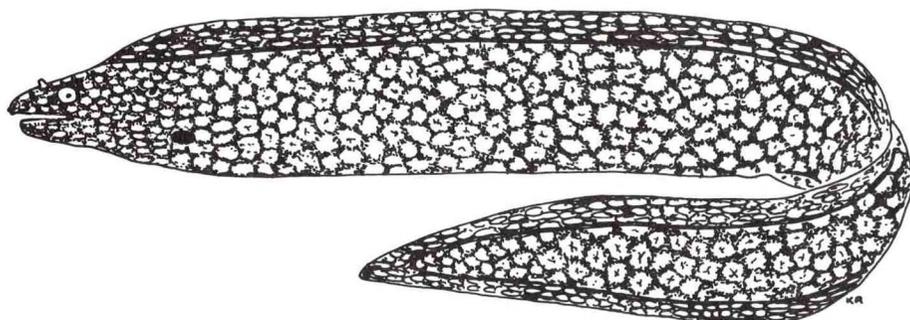


LINED SEAHORSE

Hippocampus erectus

Body encased in bony rings; snout small and tubular; mouth toothless; tail prehensile, caudal fin absent; head projected forward at a right angle to the body. Coloration in this species is highly variable from almost white or orange with blotches, to almost black. Lines are sometimes visible along the sides and back. Two related species which have a caudal fin and straight body, the chain pipefish (*Syngnathus Louisianae*) and the banded pipefish (*Micrognathus crinitis*) have also been found at Gray's Reef. It is effectively camouflaged as it clings nearly motionless by its grasping tail to sea whips, hard corals and other reef growth. It feeds on tiny crustaceans. Nova Scotia to Argentina. 5 in.

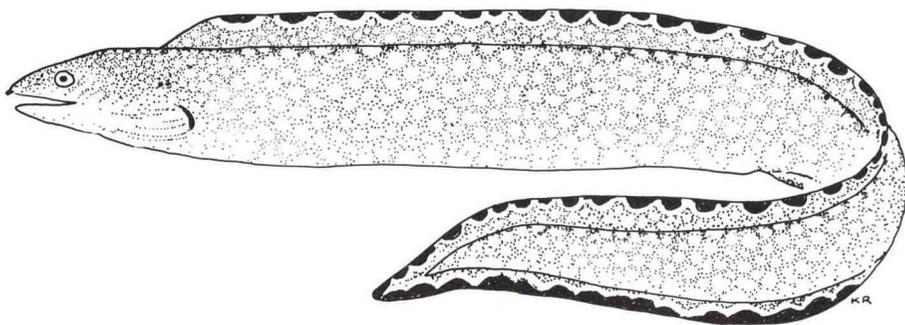
Family Muraenidae (moray eels)



RETICULATE MORAY

Muraena retifera

Body eel-like, mouth and teeth large, pectoral and pelvic fins lacking, well-defined reticulations forming light yellowish brown spots posteriorly, slightly darker head, gill opening dark, dark spot at the angle of the mouth. This genus is distinguished by tubular extensions of both the anterior and posterior nostrils. Despite their fearsome appearance most morays are nocturnal predators that are docile and shy, only their heads projecting from crevices during daylight hours. Massachusetts to eastern Gulf of Mexico. 20 in.

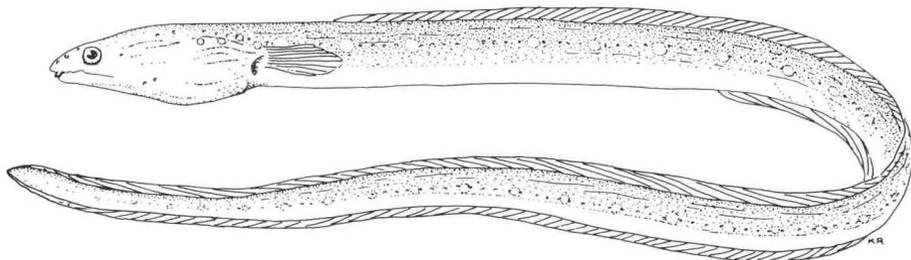


OCELLATED MORAY

Gymnothorax saxicola

Body eel-like, mouth and teeth large, pectoral and pelvic fins lacking, color brownish with whiteish spots becoming lines on the head and distinct black ocellated spots or patches along the margins of the dorsal and anal fins. A similar species, the blackedge moray (*G. nigromarginatus*), occurs in the western Gulf of Mexico. More common on deeper reefs, New Jersey to Florida and eastern Gulf of Mexico. 28-30 in.

Family Ophichthyidae (snake eels and worm eels)

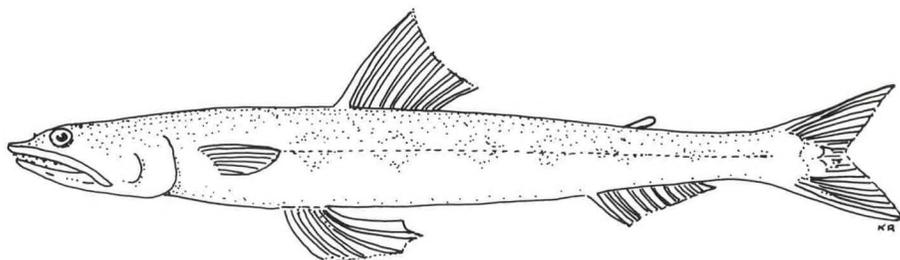


PALESPOTTED EEL

Ophichthus ocellatus

Distinct yellowish-white spots along the dark gray sides of the body, pores on the head rimmed with black, and a hard, pointed tail without a fin distinguish it from the key worm eel (*Ahlia egmontis*) which has a caudal fin, tiny dark spots covering the dorsal surface, long anal fin and lacks teeth on the vomer; the speckled worm eel (*Myrophis punctatus*) which has a caudal fin, small black spots covering the upper body and has an anal fin much shorter than dorsal; the sailfin eel (*Letharchus velifer*) which is uniformly brown with a contrasting white dorsal fin; and the conger eel (*Conger oceanicus*, family Congridae) which has a black medial fin margin and uniserial (a single row of) teeth. It uses its finless pointed tail to burrow backwards into the sand and is occasionally seen swimming snake-like at the surface at night. North Carolina to Brazil and northeastern Gulf of Mexico. 10 in.

Family Synodontidae (lizardfishes)

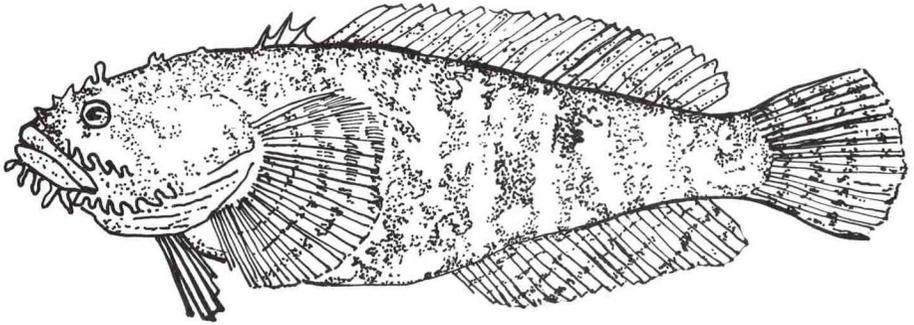


INSHORE LIZARDFISH

Synodus foetens

Body elongate, snout sharp, jaws long, teeth sharp, coloration sandy camouflage with diamond-shapes on the sides of the body, small adipose (fleshy) fin behind the dorsal fin. The snakefish (*Tracinocephalus myops*), another lizardfish that occurs on the coast, is distinguished by a more rounded anterior profile, oblique mouth and a longer anal fin with 14-16 rather than 8-13 rays. Lizardfishes are occasionally seen very near the reef lying partially buried in the sand. Massachusetts to Brazil. 6-14 in.

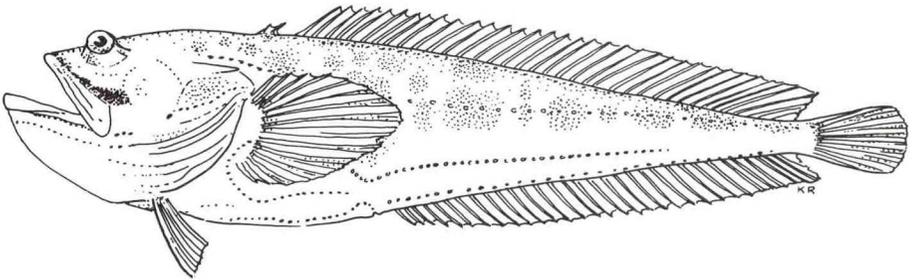
Family Batrachoididae (toadfishes and midshipmen)



LEOPARD TOADFISH

Opsanus pardus

Head large, broad and flat; mouth large; skin scaleless with fleshy projections especially at the margin of the lower jaw, color orange and tan on a lighter background with darker brown markings. Apparently this population is not identical to the leopard toadfish (*O. pardus*) of the Gulf of Mexico and southern Florida (Mr. Steve W. Ross, pers. comm.). Its camouflage coloration and fleshy skin flaps blend well with the sponges and sea squirt colonies encrusting the reef as it lies motionless on the bottom usually under ledges or crevices of the reef during the day. A similar but less colorful species, the oyster toadfish (*O. tau*), is found inshore. 5-10 in.

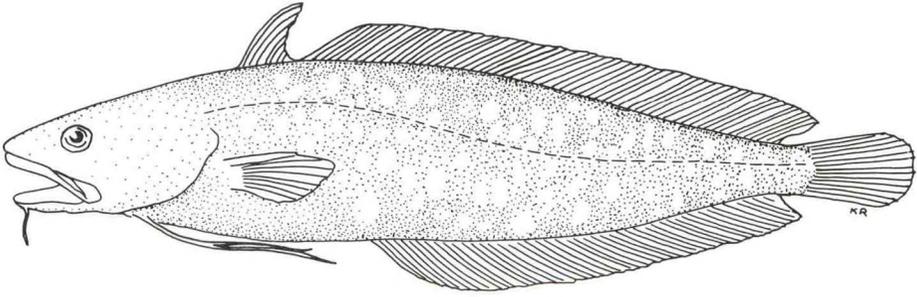


ATLANTIC MIDSHIPMAN

Porichthys plectrodon

Head large, sides of body lined with rows of photophores (light-producing organs), opercle small with one spine, three dorsal spines. This venomous fish carries a toxin on its spines that can cause painful wounds. Its name results from the photophore rows that resemble the buttons on a naval uniform. Unlike most marine fishes, both toadfishes and midshipmen attach their eggs to hard substrates, Virginia to Argentina. 8 in.

Family Gadidae (codfishes)

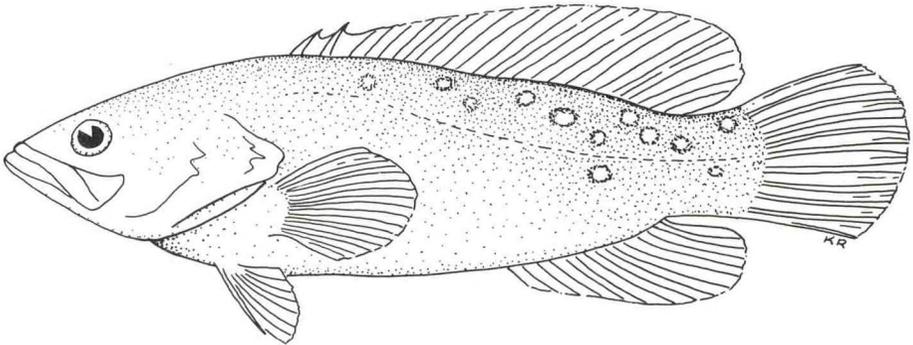


CAROLINA HAKE

Urophycis earlII

Snout blunt, single small chin barbel, pelvic fins filamentous, whitish spots on the sides, no dark blotch or spots on the sides of the head. The spotted hake (*U. regia*) has also been found at Gray's Reef and other hakes are known to occur in the midshelf, but apparently only the Carolina hake uses the reef for cover. Occasionally seen at the reef in crevices, its coloration resembles another common Gray's Reef resident, the finely-scaled whitespotted soapfish (*Rypticus maculatus*). North Carolina to northeast Florida. 7-10 in.

Family Grammistidae (soapfishes)

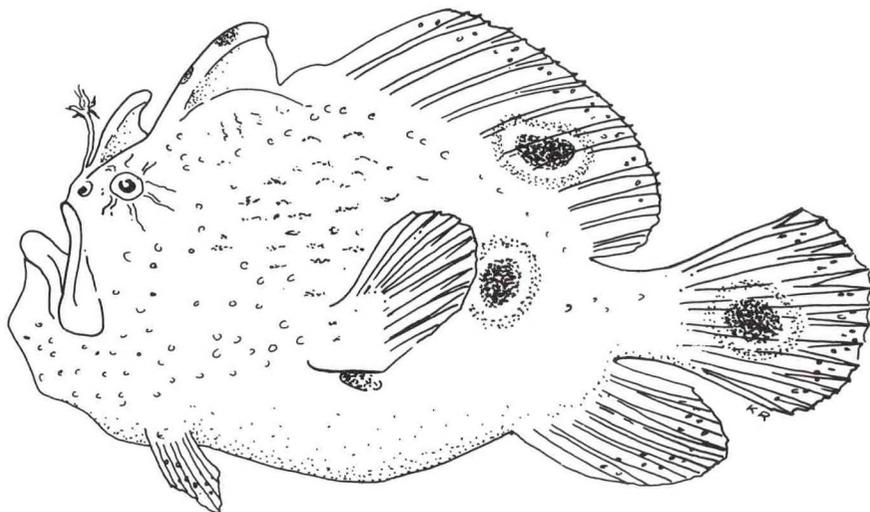


WHITESPOTTED SOAPFISH

Rypticus maculatus

Scales small, color uniformly dark brown to tan with white spots on the sides and a white middorsal bar on the snout. It gets its name from a soapy mucous secretion produced in its skin. These wary reef residents are often seen in pairs in or near crevices and under ledges at Gray's Reef. The coloration of this small bass-like reef predator bears a striking resemblance to the unrelated Carolina hake (*Urophycis earlII*). North Carolina to northern Gulf of Mexico. 5-10 in.

Family Antennariidae (frogfishes)

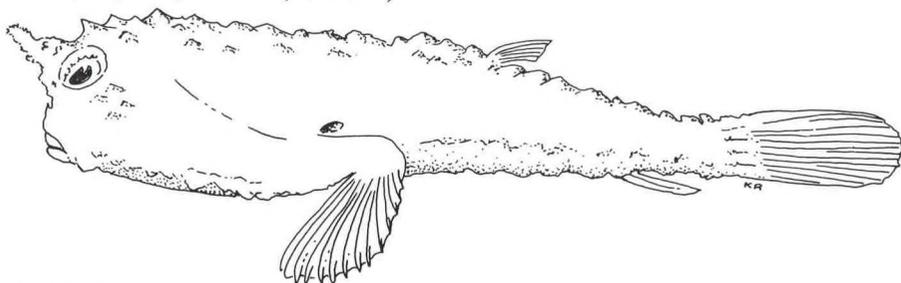


OCELLATED FROGFISH

Antennarius ocellatus

Body short, fat and lumpy; color brown or tan to yellow or pink; three large ocellated spots on the posterior body, dorsal and caudal fin. The single spot frogfish (*A. radiosus*), splitlure frogfish (*A. scaber*), and sargassumfish (*Histrio histrio*) have also been reported from the Georgia coast. Frogfishes, like other anglerfishes, sit motionless on the reef or sand 'fishing' for prey with a fleshy lure (a bulb with many filaments) at the tip of a modified first dorsal spine. Their prey are engulfed whole in a single high-speed motion. North Carolina to Venezuela. 10 in.

Family Ogcocephalidae (batfishes)

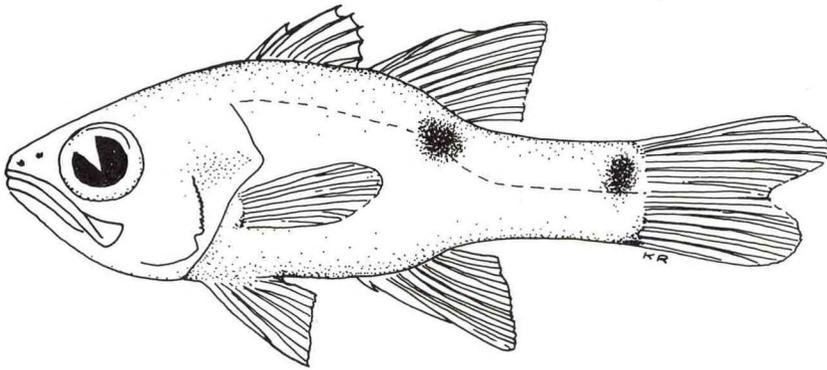


BATFISH

Ogcocephalus spp. and *Halieutichthys* sp.

Body broad and depressed, pectoral fins arm-like, skin with spiny tubercles. Several species in the genus *Ogcocephalus* and one in the genus *Halieutichthys* occur on the coast. Like frogfishes, these grotesque-looking fishes are anglers that use a modified dorsal spine extending just above the mouth to lure prey. They prefer sandy bottoms sitting partially buried in the sand or 'hopping' along on their pectoral fins. Tropical and temperate waters worldwide. 4-7 in.

Family Apogonidae (cardinalfishes)

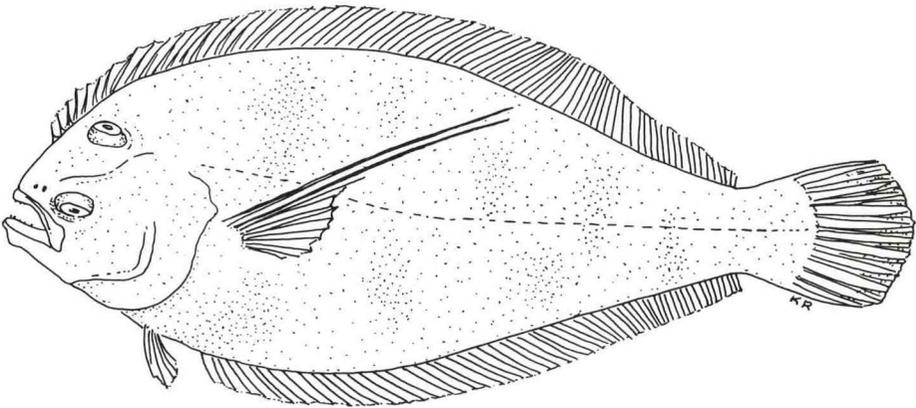


TWOSPOT CARDINALFISH

Apogon pseudomaculatus

Body small, color bright red with distinctive black spots below the second dorsal fin and on the caudal peduncle. Two other cardinalfish species have been found at Gray's Reef: the flamefish (*A. maculatus*) which has a dark saddle across the caudal peduncle and the dusky cardinalfish (*Phaeoptyx pigmentaria*) which has a dark spot on each scale. It is common under ledges and in crevices at Gray's Reef during the day, emerging at night to prey upon worms and other nocturnally active invertebrates. Massachusetts to Brazil. 3 in.

Family Bothidae (lefteye flounders)

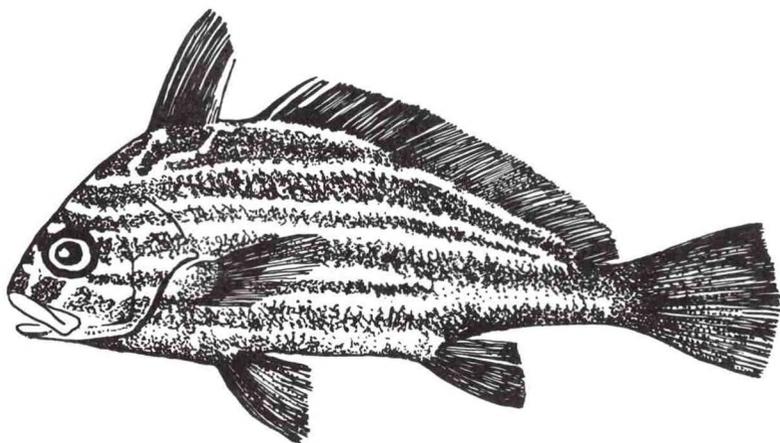


DUSKY FLOUNDER

Syacium papillosum

Both eyes and coloration on the left side of the body, preopercle not covered with skin, gill rakers short and stout, eye side brown without spotting, blind side may have some coloration. A large number of flatfish species in four families occur in sandy areas of the inner and midshelf but few are seen close to reefs. Most are well camouflaged and often lie covered with sand on the bottom. North Carolina to Brazil. 11 in.

Family Sciaenidae (drums, croakers, and sea trouts)

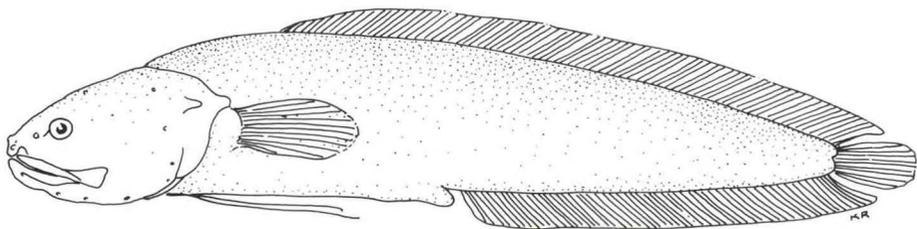


CUBBYU

Pareques umbrosus

Adults are uniformly dark brown with indistinct stripes while juveniles are boldly striped with the middle stripe extending into the caudal fin and a high dorsal fin with black and white bars. Juveniles resemble two other drums that are occasionally seen at Gray's Reef: the highhat (*Equetus acuminatus*) which has dark stripes and a long triangle beneath the dorsal fin, and the jackknife-fish (*E. lanceolatus*), which has a midlateral stripe curving upward to join the dark bar on the dorsal fin. Unlike the cubbyu, the young of both have greatly elongate dorsal and caudal fins. This is one of only a few reef-dwelling drums and is common year-round under ledges and in crevices during the day at Gray's Reef. North Carolina to the Gulf of Mexico. 5-6 in.

Family Bythitidae (cusk-eels and brotulas)

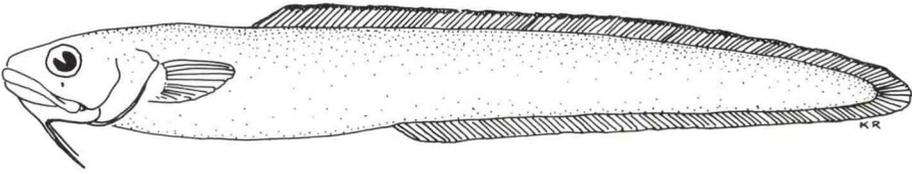


BROTULA

Ogilbia sp.

Head large; body long and tapering; dorsal and anal fins elongate; pelvic fins thread-like with no more than two separate rays located under the posterior part of the head; caudal fin separate from dorsal and anal fins. This secretive reef dweller inhabits small deep crevices of Gray's Reef. Tropical seas worldwide. 2 in.

Family Ophidiidae (cusk-eels)

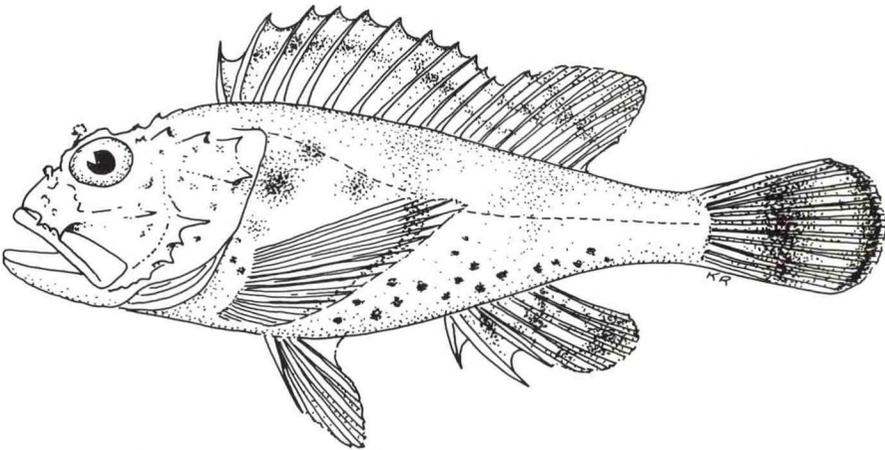


BANK CUSK-EEL

Ophidion holbrooki

Head large; body long and tapering; dorsal and anal fins elongate; pelvic fins thread-like with no more than two separate rays located on the chin; caudal fin continuous with dorsal and anal. Three other genera of cusk eels have been reported from Georgia: *Lepophidium*, *Otophidium*, and *Rissola*. Cusk-eels are more common in deeper water but occasionally occur in the vicinity of Gray's Reef. North Carolina to Gulf of Brazil. 8 in.

Family Scorpaenidae (scorpionfishes)

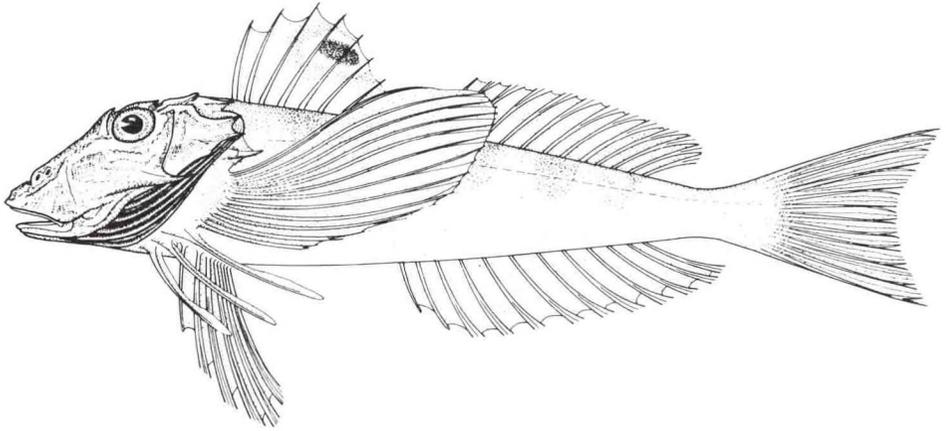


BARBFISH

Scorpaena brasiliensis

Head very spiny, mouth large, large dark spot on shoulder, small dark spots on the axil (inside base of the pectoral fin), camouflage coloration matches the red, orange and white sponge/tunicate growth on the reef. The barbfish and the similar spotted scorpionfish (*S. plumieri*), which has small white spots on the axil, seem to be the commonest scorpionfishes found near reefs in this area. The hunchback scorpionfish (*S. dispar*), the smoothhead scorpionfish (*S. calcarata*) and the longfin scorpionfish (*S. agassizi*) have also been reported from Georgia. Scorpionfishes sit motionless on the bottom to ambush prey that approach too closely; they produce toxic skin secretions that can cause a painful wound if a spine punctures the skin. Virginia to Brazil. 5-7 in.

Family Triglidae (searobins)



NORTHERN SEAROBIN

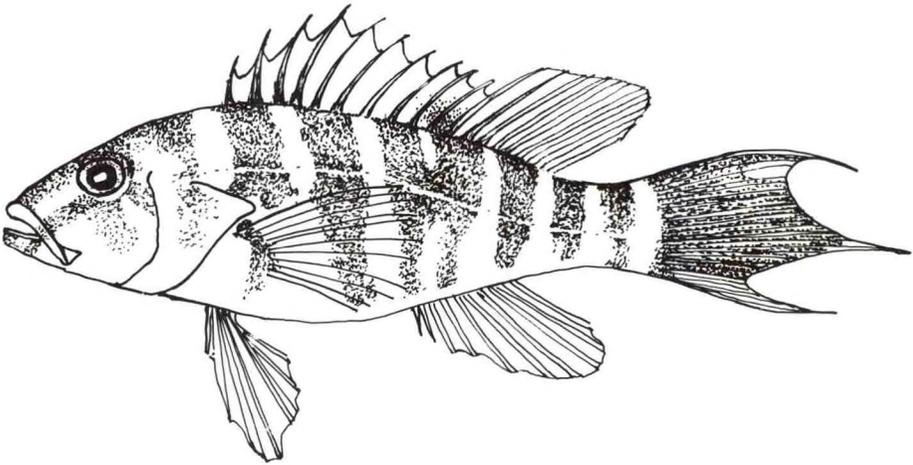
Prionotus carolinus

Pectoral fins large and wing-like with lower rays detached as feelers, head wide and armoured with spines, chest completely scaled, opercular flap naked, reddish spots on body elongate, pectoral fin dusky to nearly black, partly ocellated spot near margin of dorsal fin not extending past fifth spine, second dorsal and caudal fins with many small diffuse spots. At least four other species are fairly common on midshelf sandy bottoms: the striped searobin (*P. evolans*), the bandtail searobin (*P. ophryas*), the bluespotted searobin (*P. roseus*), and the leopard searobin (*P. scitulus*). Their pectoral free rays are used as walking 'legs' and as feelers to find prey in the sand. Nova Scotia to Florida. 12 in.

Group 3 - SEA BASSES AND GROUPERS

Not highly specialized, all sea basses and groupers belong to one family (Serranidae) which is characterized by three opercular spines, three anal spines, one spine and five soft rays in the pelvic fin, and a continuous lateral line. Many species, perhaps most, are hermaphroditic (individuals may be both sexes). Most species begin life as females and eventually become males but the belted sandfish (*Serranus subligarius*) is functionally both male and female at the same time.

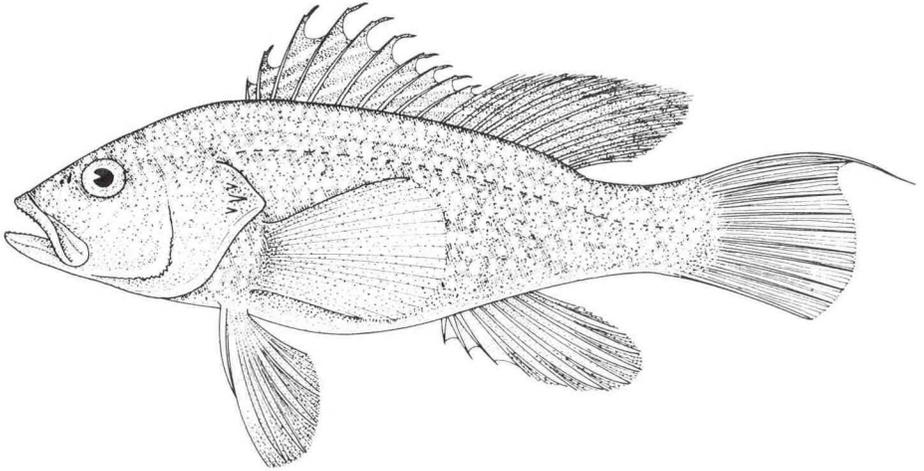
Family Serranidae (sea basses)



ROCK SEA BASS

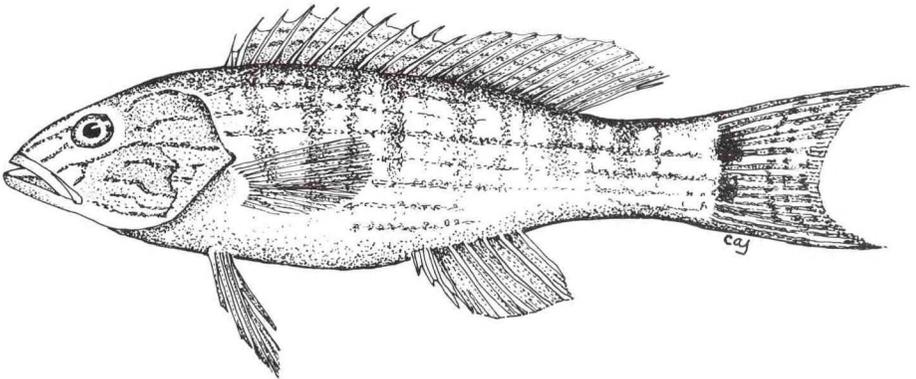
Centropomus philadelphica

The rays of the caudal fin end in three points, the dorsal point often filamentous; indistinct dark vertical bars on a lighter background; belly light; head markings blue and orange; yellowish band on the caudal fin. Similar to the black sea bass (*C. striata*) it is not nearly as abundant as the black sea bass at Gray's Reef. North Carolina to Florida and the Gulf of Mexico. 8 in.



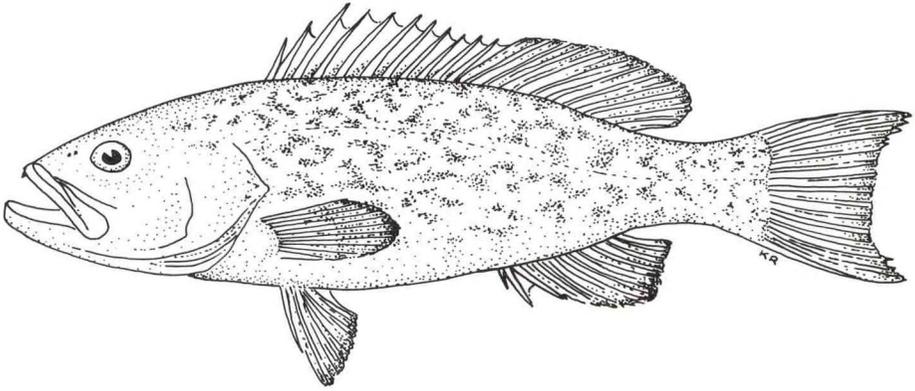
BLACK SEA BASS, BLACKFISH *Centropristis striata*

Generally darker in color than the other basses, adults and juveniles may have a dark spot at the base of the last dorsal spines. A year-round resident, this is the most abundant predator at Gray's Reef. The bank sea bass (*C. ocyurus*) occurs at Gray's Reef in small numbers and is distinguished by distinct rows of evenly spaced blotches often fused into seven dark bars on its sides and an olivaceous head and anterior portion of the body with blue and yellow stripes and spots. Maine to the west coast of Florida. 10-15 in.



SAND PERCH *Diplectrum formosum*

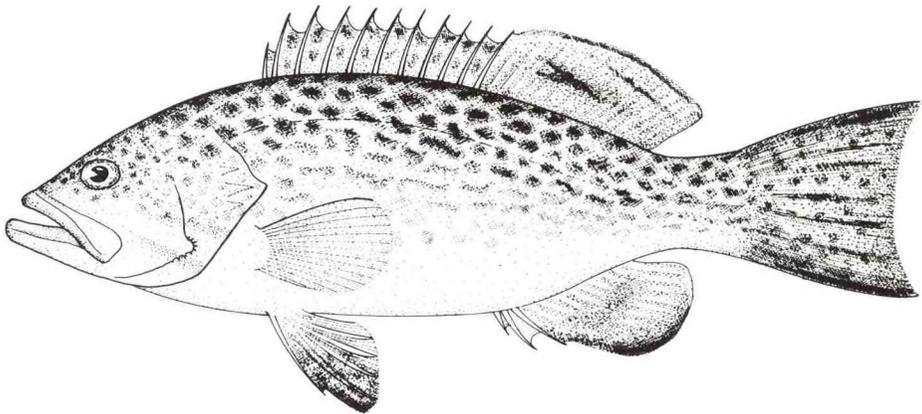
Body small and slender, blackish bars with alternating blue and orange stripes, two groups of spines at the margin of the preoperculum of the gill cover. Common on the sand near reef ledges at Gray's Reef. Like some of the porgies, this small bass will approach divers closely in search of invertebrate prey in sand which has been disturbed. North Carolina to Uruguay. 7-10 in.



GAG, GAG GROUPE

Mycteroperca microlepis

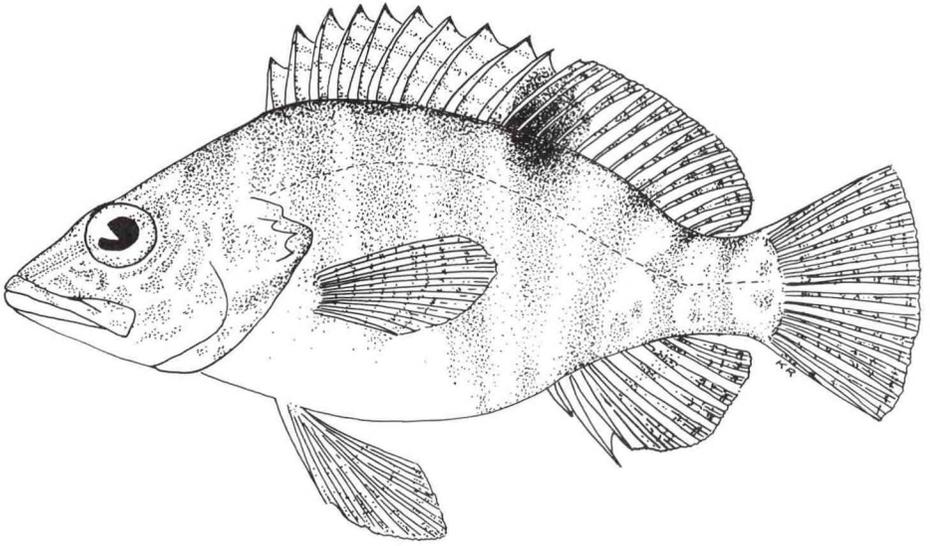
Body color gray with small dark irregular blotches and dark fins with whiteish edges. This is the most common of the large grouper-type sea basses at Gray's Reef. Aggregations of large adults (40 individuals from 27-30 in.) are occasionally seen in the vicinity at reef outcrops and under ledges at Gray's Reef. They apparently move from reef to reef in search of prey since their abundance on a particular reef can vary greatly from week to week. Juveniles (2-3 in.) are occasionally seen in rubble areas and larger individuals (12-15 in.) near larger crevices. Massachusetts to Brazil. 29 in.



SCAMP, SAMP GROUPE

Mycteroperca phenax

Similar to the gag (*M. microlepis*), it has a slightly sharper snout, incised (frayed or broom-like) caudal fin and small brown spots rather than blotches on a tan background. Unlike the gag at Gray's Reef, the scamp is usually seen individually or in small groups rather than in large aggregations. Massachusetts to Venezuela. 27 in.



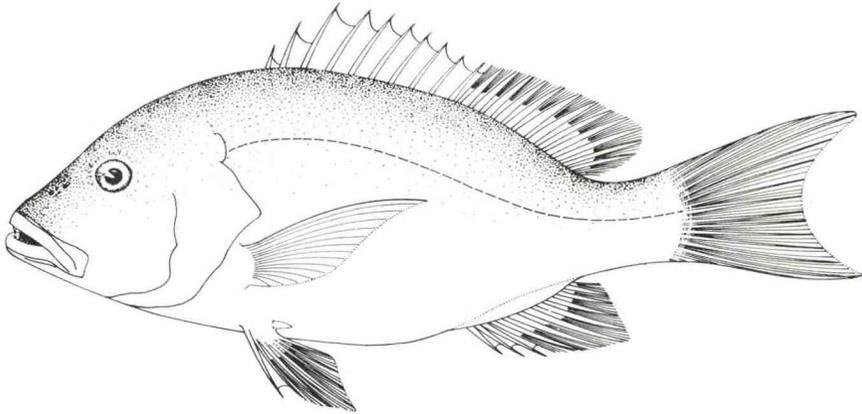
BELTED SANDFISH

Serranus subligarius

Body small, distinct white belly saddle, a large black spot covering the first part of the soft dorsal fin and back, faint bars on the sides of the body. This diminutive bass is a common resident of Gray's Reef and offshore reefs where it normally sits or swims among the sponges and soft corals of reef outcrops. Many sea basses are known to change sex during their life (usually female to male) but this one is a synchronous hermaphrodite (both male and female at the same time). Individuals are capable of self-fertilization but cross-fertilization is the usual mode of reproduction (Hastings and Bortone 1980). The larger individual of a pair spawns preferentially as the female. The tattler (*S. phoebe*) which has a bold bar and stripe occurs in deeper water further offshore. North Carolina to Mexico. 3-4 in.

Group 4 - SNAPPERS, BIGEYES, AND SQUIRRELFISH

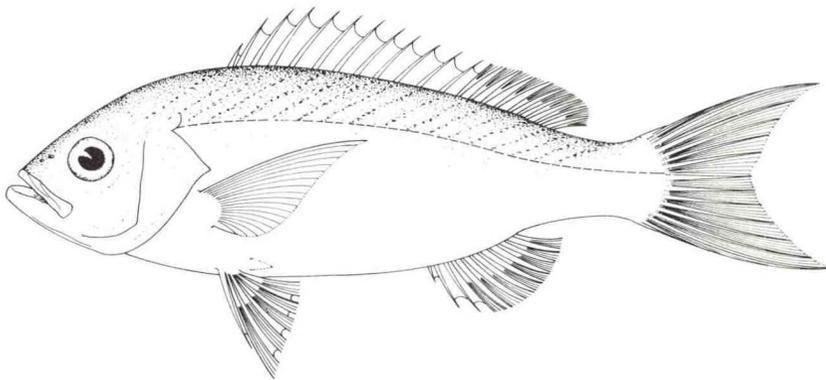
Family Lutjanidae (snappers)



RED SNAPPER

Lutjanus campechanus

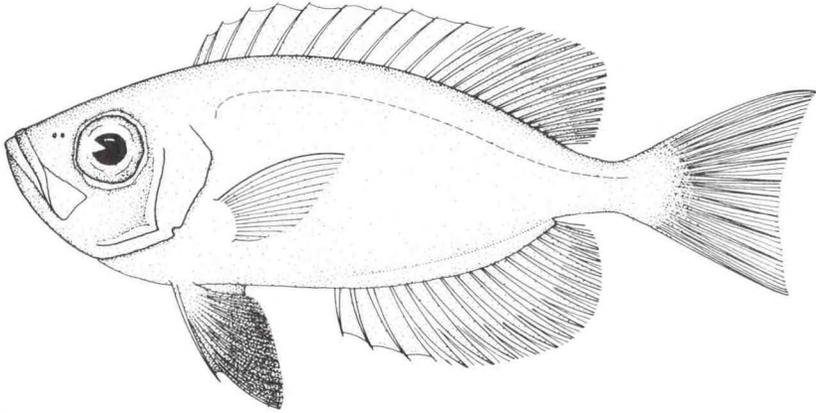
Body large, color pinkish-red, vomerine tooth patch on the roof of the mouth anchor-shaped. Canine teeth and a maxilla (external upper jaw bone) that slips into a groove in the cheek distinguish snappers from the porgys (e.g. red porgy, *Pagrus pagrus*). More common on deeper reefs, it is occasionally seen at Gray's Reef. Massachusetts to Yucatan. 30 in.



VERMILION SNAPPER, BEE LINER *Rhomboplites aurorubens*

Body small and relatively slender, color vermilion red to pink color above becoming silvery whitish below, large number of dorsal spines (12 instead of 10), and rhomboid-shaped vomerine tooth patch on the roof of the mouth. Like the red snapper (*Lutjanus campechanus*) it is more common on deeper reefs but schools of juveniles are not uncommon at Gray's Reef. North Carolina to Brazil. 15 in.

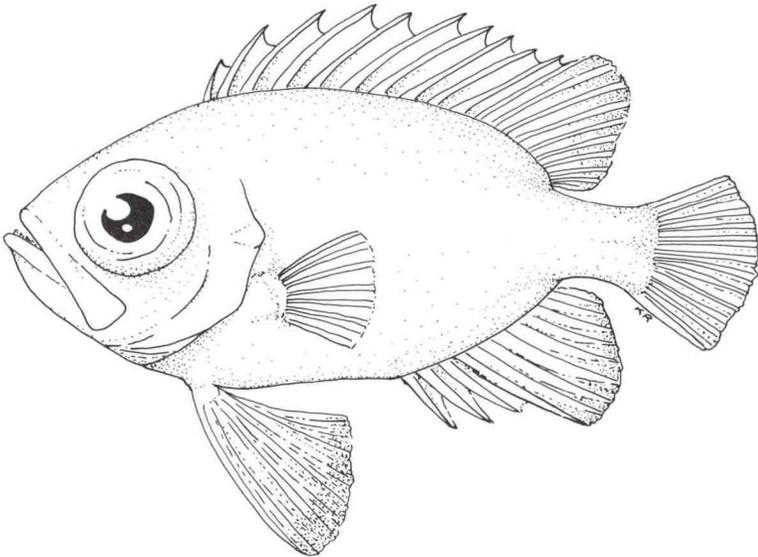
Family Priacanthidae (bigeyes)



BIGEYE

Priacanthus arenatus

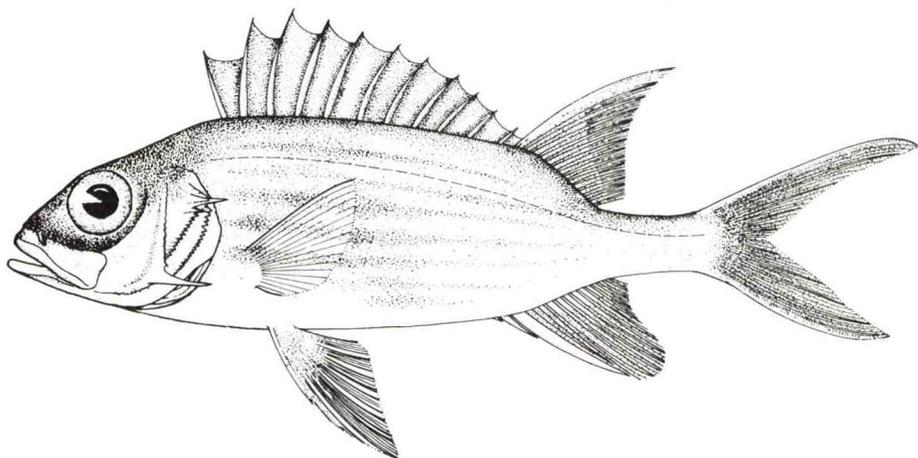
Eyes large, body compressed, color reddish, mouth oblique, dorsal and anal fins each with 12-15 rays and scales small (more than 60 in lateral line). The glass-eye snapper (*Priacanthus cruentatus*), another bigeye, has also been reported from the Georgia coast and is easily distinguished by a strong preopercular (anterior gill cover) spine. A nocturnal predator, it seeks cover during the day. Massachusetts to Argentina. 11 in.



SHORT BIGEYE *Pseudopriacanthus* (= *Pristigenys*) *alta*

Similar to the bigeye (*Priacanthus arenatus*) it has a deeper body, fewer rays in the dorsal and anal fins (9-11 in each), and bigger scales (fewer than 40 in lateral line). Like the bigeye it is a nocturnal predator, preferring the cover of small depressions in the reef by day. Maine to South America. 9 in.

Family Holocentridae (squirrelfishes)



SQUIRRELFISH

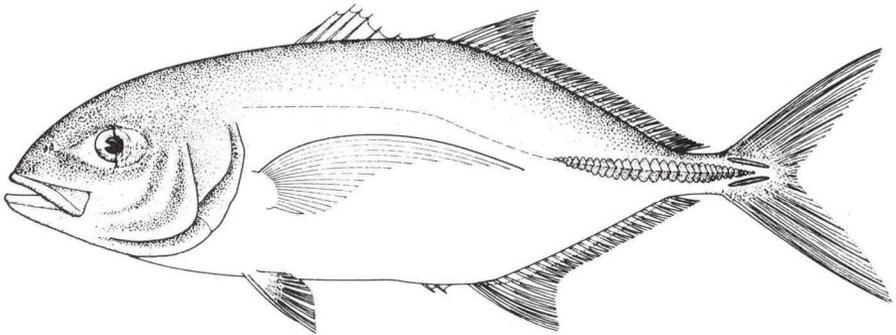
Holocentrus ascensionis

Eyes large, scales large and spiny, dorsal and anal fin spines and spines on the preoperculum robust, color reddish, dorsal fin yellowish orange. Normally seen under ledges or in crevices during the day, it is a nocturnal predator that feeds on worms and invertebrates that emerge from the reef and sand at night. New York to Brazil. 7-9 in.

GROUP 5 - JACKS AND MACKERELS

This group includes most of the large, streamlined, silvery, schooling, midwater, predators that are seen or caught in the vicinity of Gray's Reef. Many are highly regarded food and game fishes. Jacks have a narrow caudal peduncle and two free spines preceding the anal fin; the tunas and mackerels have two or three keels on the caudal peduncle, a lunate caudal fin, and a series of finlets behind second dorsal and anal fins.

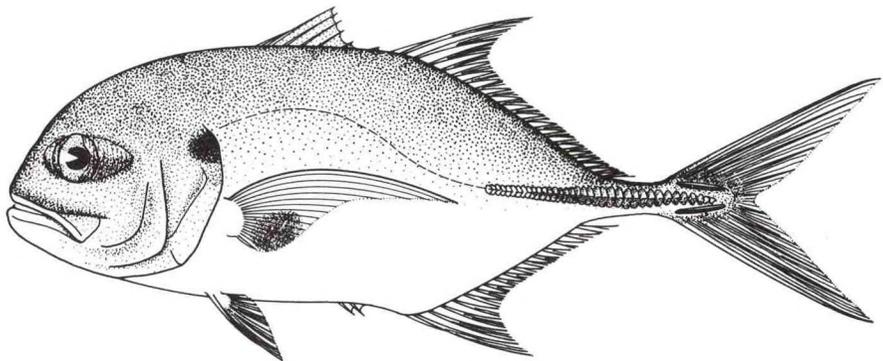
Family Carangidae (Jacks)



YELLOW JACK

Caranx bartholomaei

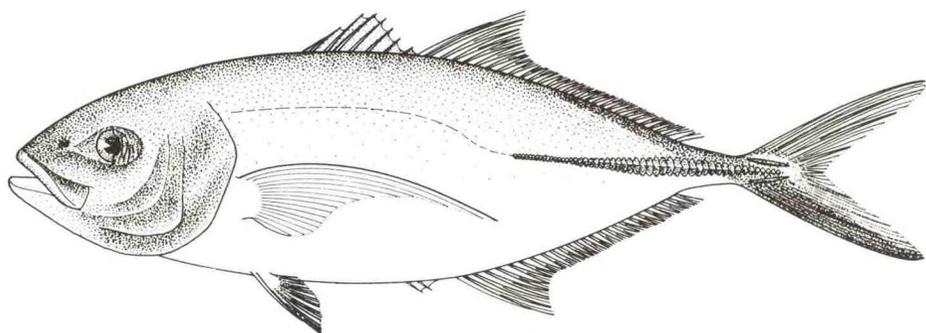
Body deep, fins distinctly yellowish in adults, juveniles silvery-yellow and may have whiteish blotches or a dark bar through the eye. Young are occasionally seen in large schools near rocky outcrops at Gray's Reef. Massachusetts to Brazil. 30 in.



CREVALLE JACK, COMMON JACK

Caranx hippos

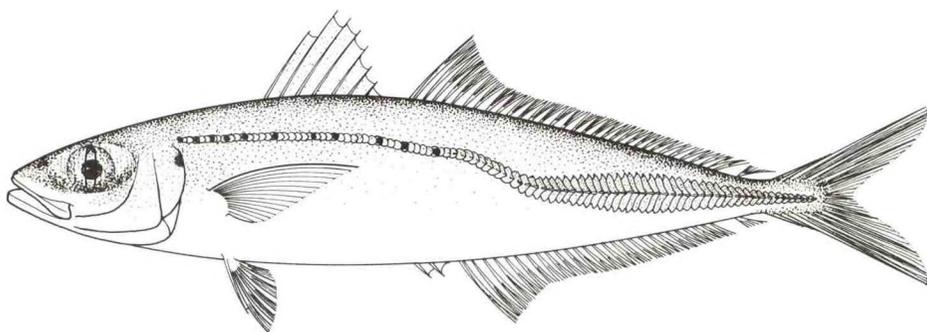
Steep head, deep body, first rays of the second dorsal and anal fins greatly elongated, color metallic green. The young have dark bars and are sometimes confused with other species (e.g. pilotfish). Also called the common jack because of its worldwide distribution and abundance, it is one of the largest jacks and a powerful gamefish. Nova Scotia to Uruguay. 38 in.



BAR JACK

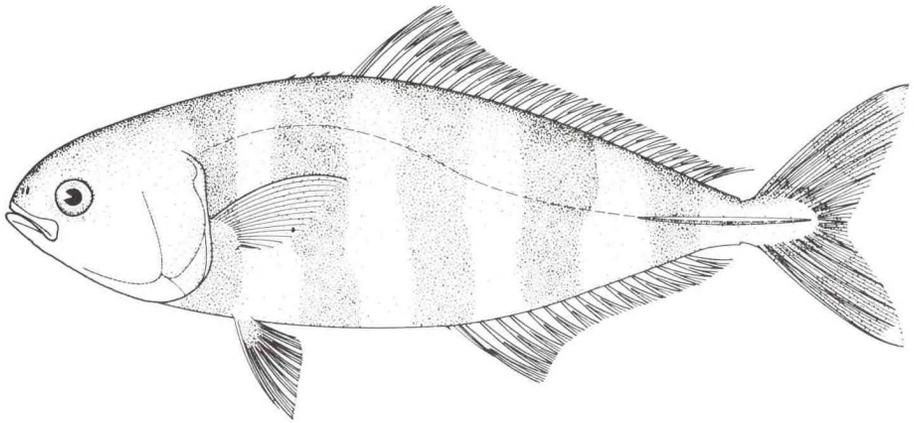
Caranx ruber

Body small, a pair of stripes (light blue and dark) runs along the base of the dorsal fin across the caudal peduncle into the lower lobe of the caudal fin. They are frequently seen near rocky outcrops at Gray's Reef in small schools that tend to sweep upward and downward more than other jacks. New Jersey to Brazil. 20 in.



ROUND SCAD, CIGARFISH, CIGAR MINNOW *Decapterus punctatus*

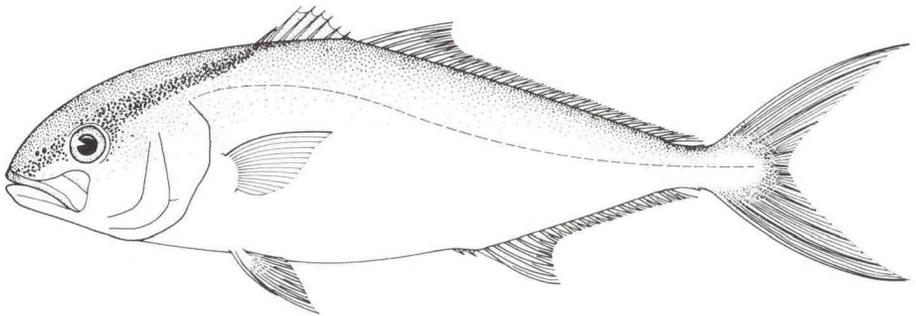
Body small, slender and silvery; thickened scales (scutes) forming a keel along the posterior lateral line; a dorsal and ventral finlet; two fleshy projections of the shoulder girdle under the gill cover; small black spots spaced on pored scales of curved lateral line. The mackerel scad (*D. macarellus*), which lacks spots on lateral line, and the rough scad (*Trachurus lathami*), which lacks terminal finlets, spots and has scutes present on curved portion of lateral line, also occur at Gray's Reef but are less common. This small jack is the commonest of the densely schooling baitfish at Gray's Reef. Schools of hundreds to thousands are common near rocky outcrops. Nova Scotia to Brazil. 5-7 in.



PILOTFISH

Naucrates ductor

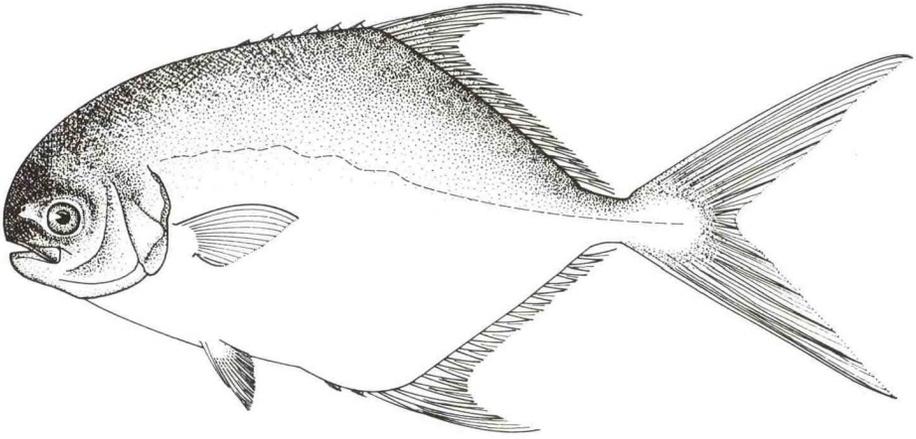
Six or seven black bars on a silvery white background (the bars can fade under the fish's control), long lateral keel on the caudal peduncle, snout blunt, upper jaw narrow. Principally an oceanic species, this is another fish that is found in close association with large fish, turtles, and ships. Juveniles are often found in *Sargassum* seaweed and other floating material. Worldwide; Nova Scotia to Argentina in the western Atlantic. 14 in.



GREATER AMBERJACK

Seriola dumerili

Body large, oblique darkish band through the eye extending to the base of the first dorsal fin, amber stripe extending from the eye along the midline of the body. The body color is darker drab above and silvery whitish below occasionally with 7 dusky bars. The almaco jack (*S. rivoliana*) is similar but has a deeper body with longer second dorsal and anal fin rays. Largest of the jacks, it schools near reefs and will circle close to divers. Though not a reef fish, big amberjacks have been observed venturing into large crevice overhangs in search of reef-fish prey at Gray's Reef, Massachusetts to Brazil. 36 in.

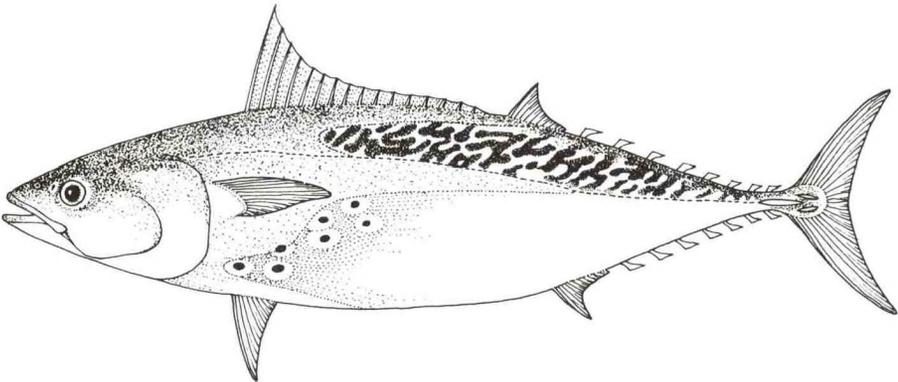


PERMIT, ROUND POMPANO

Trachinotus falcatus

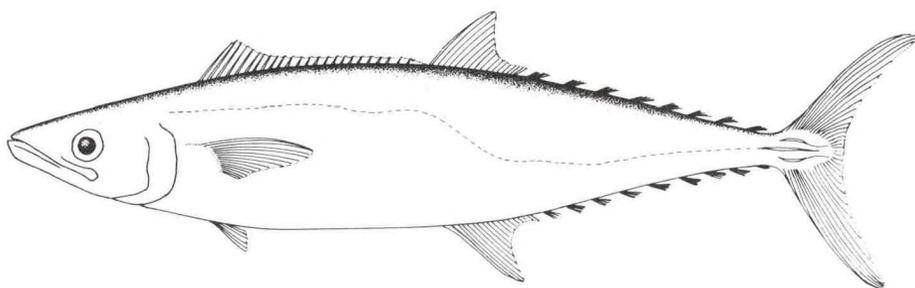
Body deep, compressed; color silvery; tail deeply forked; anterior dorsal and anal fins elongate. The palometa or longfinned pompano (*T. goodii*) and the Florida pompano (*T. carolinus*) also occur on the Georgia coast. The former is distinguished by several thin, dark bars and very elongate dorsal and anal fins, the latter by shorter fins and a less deep, more ovoid body. Massachusetts to Argentina. 8-10 in.

Family Scombridae (Tunas and Mackerels)



LITTLE TUNNY, FALSE ALBACORE, BONITO *Euthynnus alleteratus*

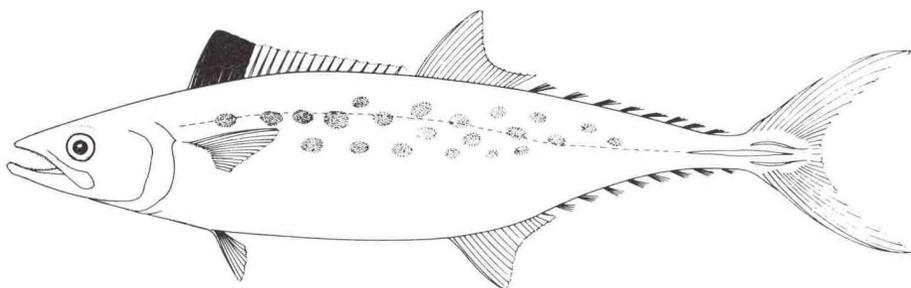
Body robust, bullet-shaped; first dorsal fin high, concave; scales lacking except for a corselet of thickened scales around the pectoral fin; distinct dark spots between the pectoral and pelvic fins. This pelagic predator is often caught on hook and line by trolling with lures near reefs. Massachusetts to Brazil. 30 in.



KING MACKEREL

Scomberomorus cavalla

Body large, elongate; lateral line curves sharply downward below the second dorsal fin; 15 to 16 dorsal spines; 8-9 short gill rakers on lower first gill arch. Young have yellow-bronze spots and are sometimes confused with the Spanish mackerel (*S. maculatus*). It is caught on hook and line with live bait or by trolling. It is occasionally seen far above rocky outcrops by divers at Gray's Reef. Maine to Brazil. 48 in.



SPANISH MACKEREL

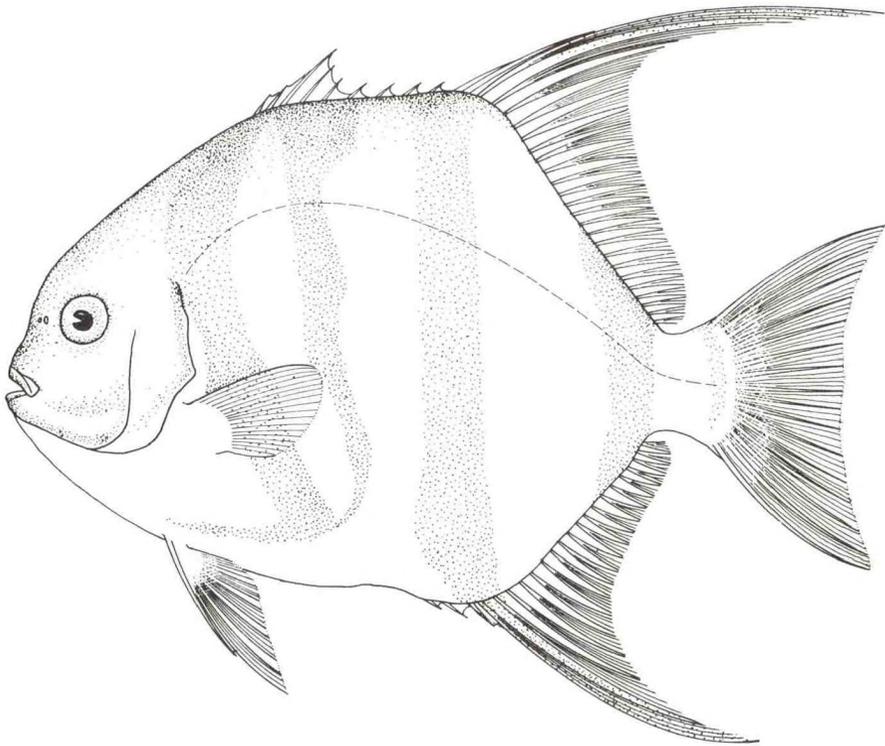
Scomberomorus maculatus

Body elongate, laterally compressed; lateral line does not curve sharply downward below the second dorsal fin; 13-15 rakers on lower first gill arch; numerous yellow-bronze spots on a silvery iridescent bluish-green body, anterior third of its dorsal fin black. Young king mackerel (*S. cavalla*) resemble spanish mackerel. It is caught on hook and line by trolling. Divers occasionally observe rapidly swimming schools far above the rocky outcrops at Gray's Reef. Maine to Brazil. 27 in.

Group 6 - MIDWATER AND SCHOOLING FISHES

This group contains a variety of fishes that are commonly seen or caught at Gray's Reef but which are only indirectly or occasionally associated with rocky reef structures. Like jacks and mackerels, most are pelagic or midwater species that tend to aggregate or orient themselves near reefs temporarily. The role of reefs, both natural and artificial, in attracting pelagic fishes is not fully understood but Gray's Reef provides a good example of the phenomenon.

Family Ehippidae (spadefishes)

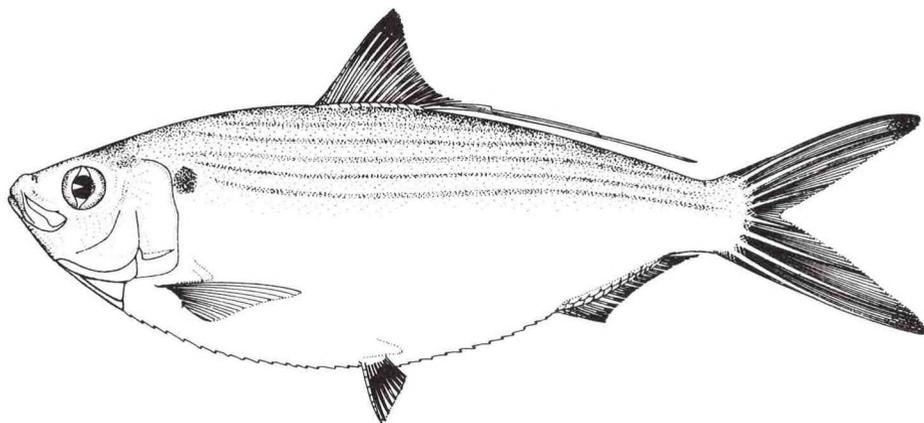


ATLANTIC SPADEFISH

Chaetodipterus faber

Body very deep, compressed; relatively long second dorsal and anal fins; distinct broad dark bands on body which are less distinct in large adults and very small juveniles. Often mistaken for an angelfish, it is common in schools of from 10 to 100 or more individuals near rocky outcrops at Gray's Reef and is often seen near or at the surface. Spadefish feed on jellyfish and other gelatinous plankton and, at times, graze on reef organisms. Massachusetts to Brazil. 12-25 in.

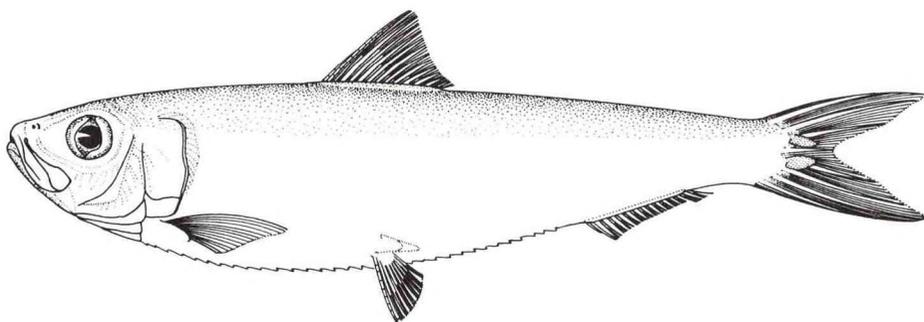
Family Clupeidae (herrings)



ATLANTIC THREAD HERRING

Opisthonema oglinum

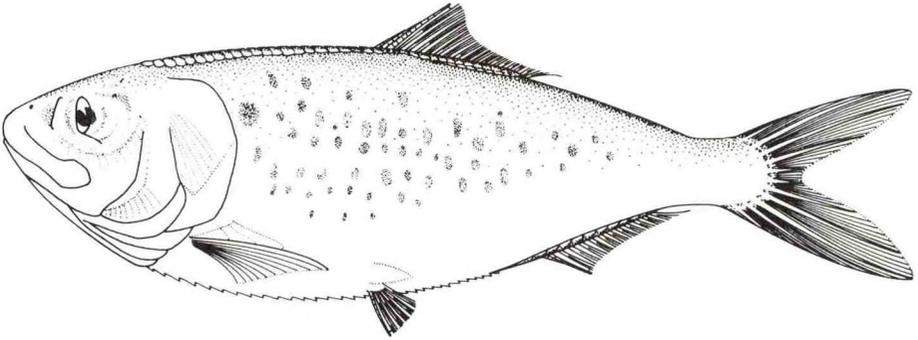
Body color silvery with a dark shoulder spot; sharp keel on the belly (bony scutes); no teeth; gill rakers long, filamentous; last dorsal fin ray elongate; anterior edge of the shoulder girdle under the gill cover bi-lobed. Large schools of this silvery baitfish are common at the surface at Gray's Reef. Cape Cod to Brazil. 7 in.



SPANISH SARDINE

Sardinella aurita

Body slender, color silvery, scutes (thickened scales) on belly form a sharp keel, elongated last two anal fin rays resembling a finlet. A densely schooling baitfish, it is common in the vicinity of Gray's Reef. Massachusetts to Brazil. 4-6 in.

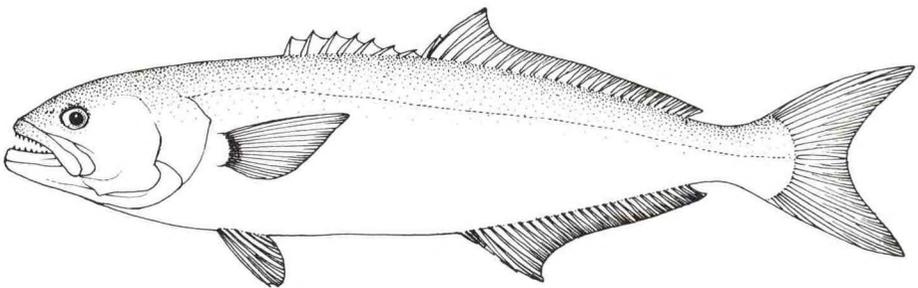


ATLANTIC MENHADEN

Brevoortia tyrannus

Body silvery with brassy tint, darker above, numerous spots in adults and larger dark shoulder spot, fins yellowish. Schools of hundreds to hundreds of thousands visible as dark patches at the surface. Commercial harvest exceeds all other species in the U.S. North Carolina to Florida. 10 in.

Family Pomatomidae (bluefish)

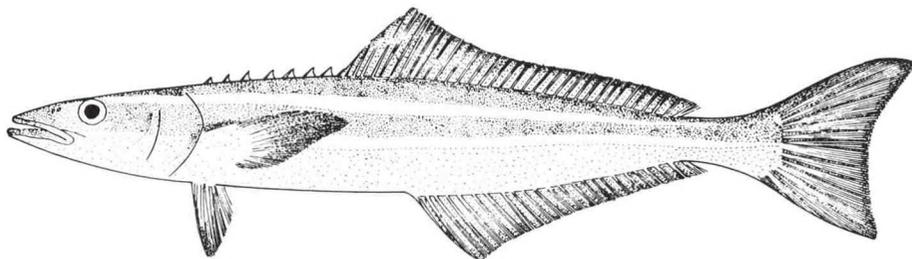


BLUEFISH

Pomatomus saltatrix

Lower jaw projects forward, dorsal fin folds into a groove, a pair of free spines precede the anal fin, preopercle serrated, second dorsal and anal fins similarly shaped. Known for its voracity, the jack-like bluefish is the only member of its family and is a prized gamefish. Nova Scotia to Argentina. 36 in.

Family Rachycentridae (cobias)

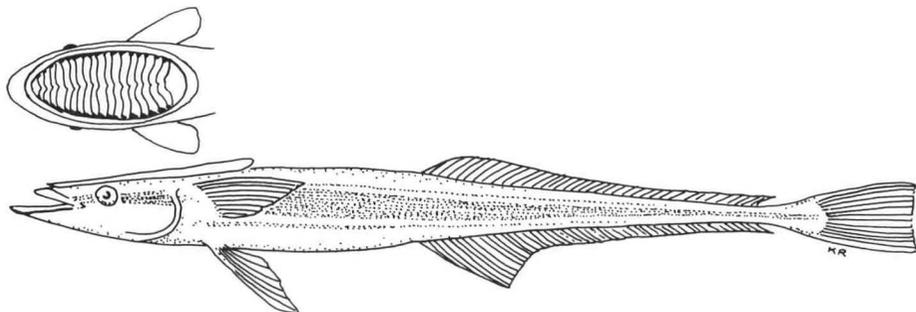


COBIA

Rachycentron canadum

Body elongate, head broad and flat, dorsal and anal fins low and long, caudal fin lunate (concave), color brownish with a broad lateral stripe (more contrasting in juveniles). It is often seen swimming shark-like in pairs or small groups near the surface at Gray's Reef. The cobia is superficially similar to the sharksucker (*Echeneis naucrates*). New Jersey to Brazil. 40-50 in.

Family Echeneidae (remoras)

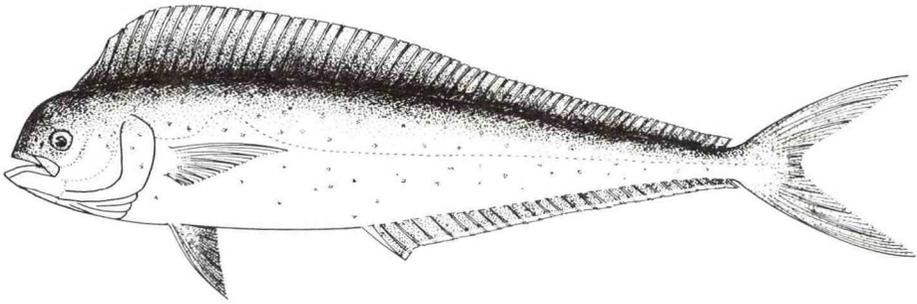


SHARKSUCKER, REMORA

Echeneis naucrates

Body elongate, flat adhesive disc on the top of the head, fleshy flap on the lower jaw, dark stripe along the sides. The sucking disc, characteristic of all remoras, is a highly modified spinous dorsal fin which is used to attach to whales, dolphins, sharks, rays, bony fish, turtles, and even ships. They do not damage their hosts but merely hitch a ride. The attachment is so firm that sailfish and sharks have been landed with their guest remora still attached. They are frequently seen attached to nurse sharks at Gray's Reef. Nova Scotia to Uruguay. 30 in.

Family Coryphaenidae (dolphins)

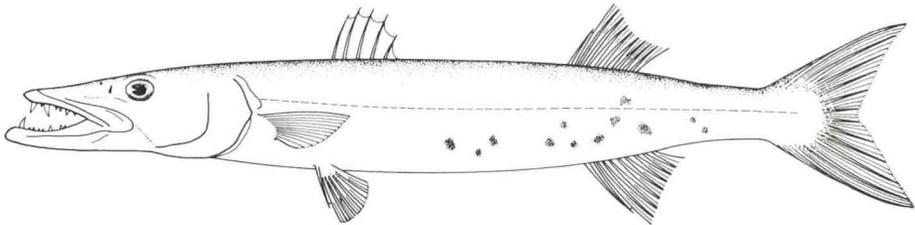


DOLPHIN, DOLPHINFISH

Coryphaena hippurus

Body elongate, compressed; dorsal fin long; head profile steep (older males with very steep bony crest); brilliant metallic gold and blue coloration. A smaller species, the pompano dolphin (*C. equiselis*), has a deeper body, a concave rather than forked caudal fin, short (less than 1/2 head) non-pigmented pectoral fins, and a broad square rather than oval tooth patch on the tongue. Mainly an oceanic and Gulf stream predator, this prized food and game fish is occasionally seen or caught near Gray's Reef, especially near large floating patches of *Sargassum* seaweed. Tropical and sub-tropical seas worldwide. 60-70 in.

Family Sphyraenidae (barracudas)



GREAT BARRACUDA

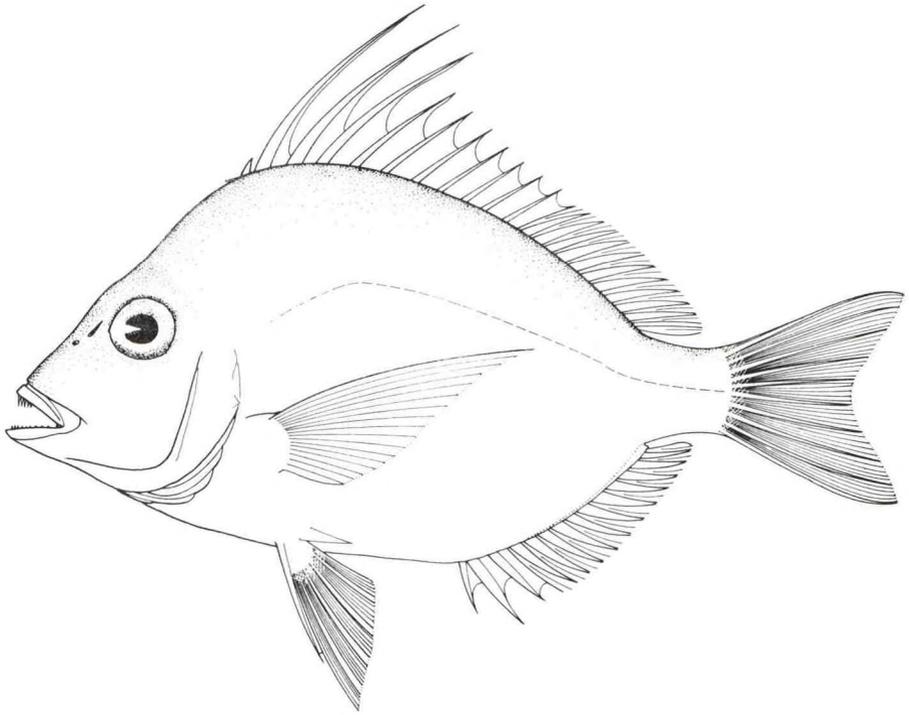
Sphyraena barracuda

Body slender; jaws long with narrow pointed teeth; back gray-green, sides silvery with dark irregular spots and blotches. Often seen in aggregations near the surface and near the reef itself, they are regularly abundant at Gray's Reef. The barracuda's fearsome reputation is largely based upon its appearance rather than actions since attacks on humans are rare. Small individuals are similar to the guaguanche (*S. guachancho*), the northern sennet (*S. borealis*) or the southern sennet (*S. picudilla*). Massachusetts to southern Brazil, eastern Atlantic, and western Indo-Pacific. 2-4 ft.

Group 7 - PICKERS, GRAZERS, AND BOTTOM GRUBBERS

The fishes in this group tend to stay close to the bottom near rocky outcrops at Gray's Reef but are mobile, often traveling in loose aggregations or multi-species schools. They feed on benthic invertebrates inhabiting rocky surfaces of the reef or in the sand near the reef. The group includes porgies, grunts, goatfishes and wrasses.

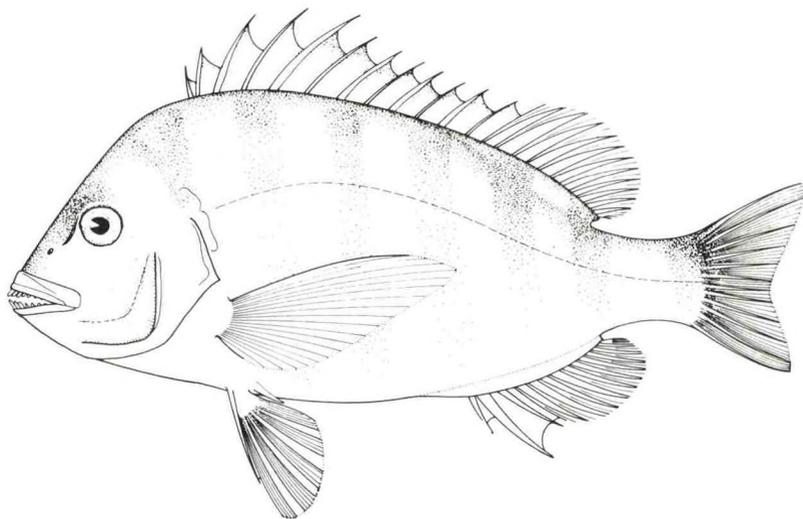
Family Sparidae (porgies)



LONGSPINE PORGY

Stenotomus caprinus

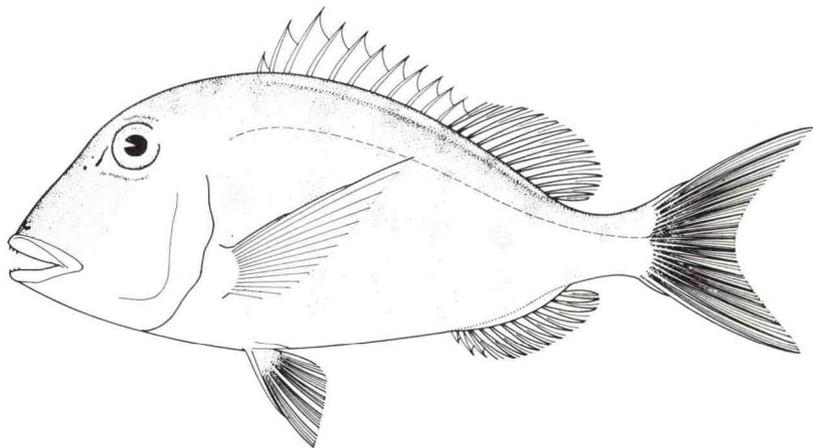
Third, fourth, and fifth dorsal spines long; body oval and compressed; mouth small; teeth small, close set in bands; color silvery white sometimes with irregular wide dark blotches or bars. A short-spine form is also common at Gray's Reef and is virtually identical to the scup (*S. chrysops*) which occurs from Nova Scotia to North Carolina. Both forms school loosely with tomtates, wrasses and other porgies close to the sand near rocky outcrops. They often follow divers in search of prey in disturbed sand. North Carolina to Georgia and Gulf of Mexico to Yucatan. 4-5 in.



SHEEPSHEAD

Archosargus probatocephalus

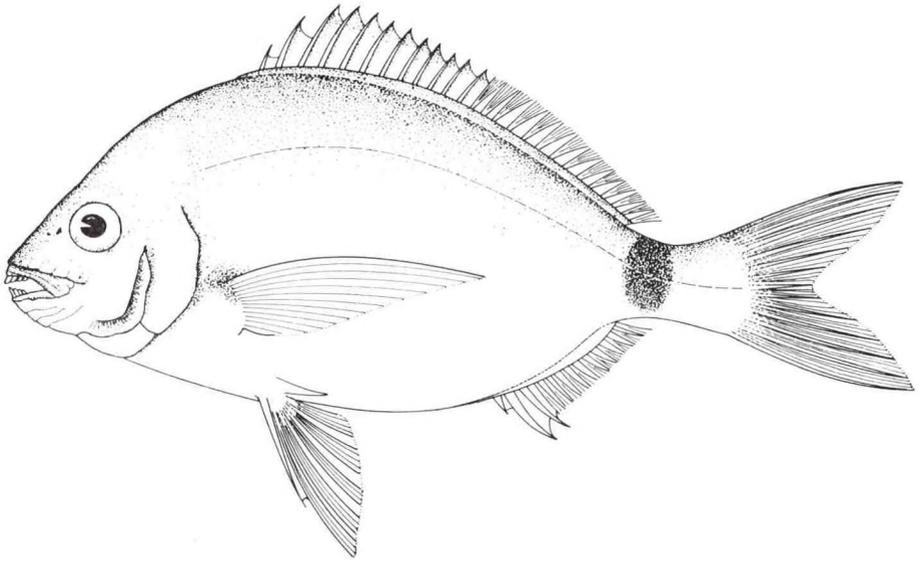
Body moderately deep, five to six dark vertical bars on a silvery background, anterior teeth incisor-like, other teeth rounded (molariform). Its molariform teeth are used for crushing mollusks and crustaceans. Largest of the porgies, it is normally found close to the reef or under ledges. It is a year-round resident at Gray's Reef, but may be relatively inactive under ledges during cold winter periods. The Atlantic spadefish (*Chaetodipterus faber*) also has dark bars but has a deeper body, long median fins and is usually seen in schools. Nova Scotia to Brazil. 23 in.



WHITEBONE PORGY

Calamus leucosteus

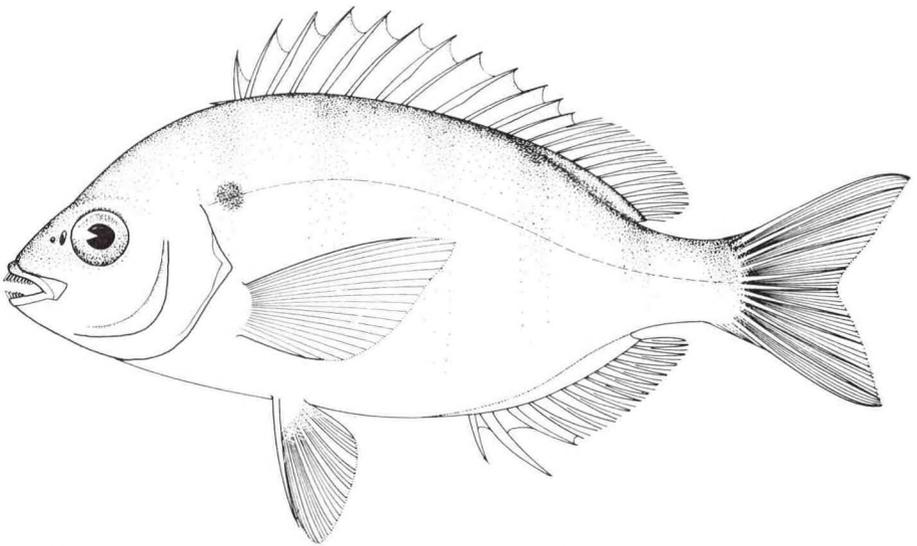
Anterior teeth conical rather than incisor-like, posterior nostril slit-like rather than round, color silvery with irregular blotches and bars that may fade rapidly under the fish's control. This is the largest of the silvery whitish porgies at Gray's Reef. North Carolina to Florida and the Gulf of Mexico. 13 in.



SPOTTAIL PINFISH

Diplodus holbrooki

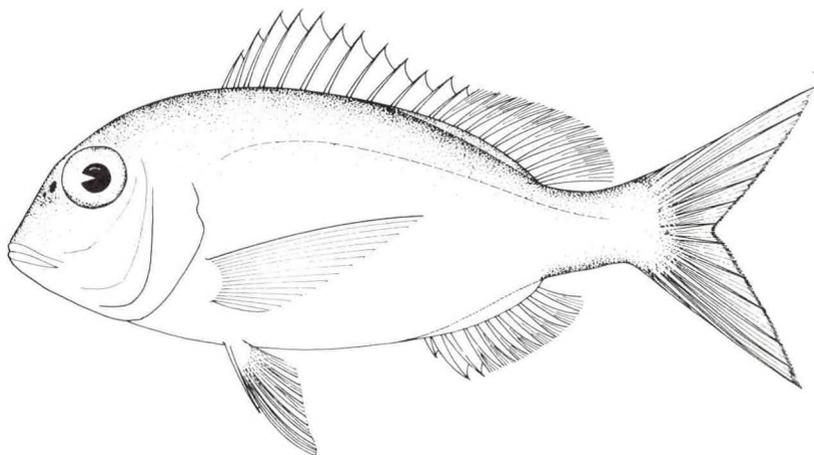
Dorsal and ventral profile equally curved, muted stripes that roughly follow the scale rows, a large dark spot or saddle on the caudal peduncle. It is abundant at Gray's Reef and usually seen schooling loosely with scups and the tomtates. Chesapeake Bay to Florida and the Gulf of Mexico. 6-7 in.



PINFISH

Lagodon rhomboides

Numerous yellow and blue stripes and spots; traces of six vertical bars in adults; a prominent dark spot above the pectoral fin on the lateral line; caudal, anal, and pectoral fins yellow. Massachusetts to Mexico. 7-10 in.

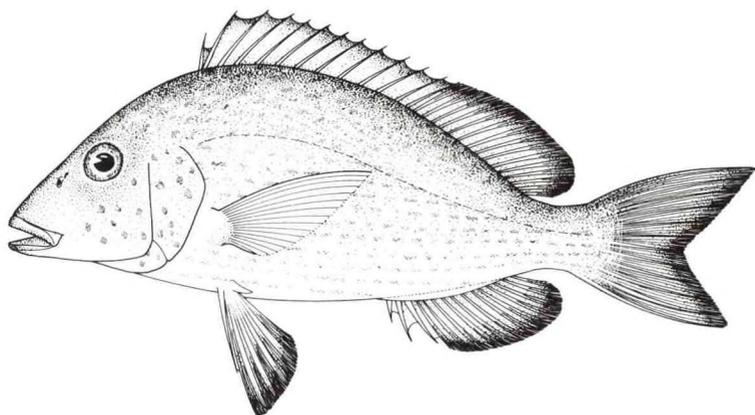


RED PORGY, SILVER SNAPPER

Pagrus pagrus

Similar to the whitebone pogy (*Calamus leucosteus*), its teeth are conical rather than incisor-like but, unlike the whitebone pogy, it has a rounded rather than slit-like posterior nostril and its body color is silvery pinkish-white. A smaller mouth and an upper jaw (maxilla) which does not slip into a cheek groove distinguish it from the red snapper (*Lutjanus campechanus*). New York to Argentina. 16 in.

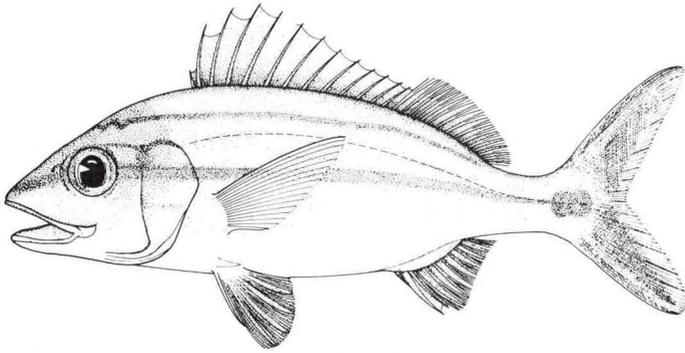
Family Haemulidae (grunts)



PIGFISH

Orthopristis chrysoptera

Dorsal profile more convex than ventral profile, mouth small, dorsal and anal fin spines fold into sheaths, color silvery to blue-gray with blue-bronze scale spots forming oblique rows above the lateral line and stripes below it, bronze spots on the head. Often considered a sandy shore species, they seek refuge and act fiercely territorial toward each other under ledges at Gray's Reef. Massachusetts to Yucatan. 8-12 in.

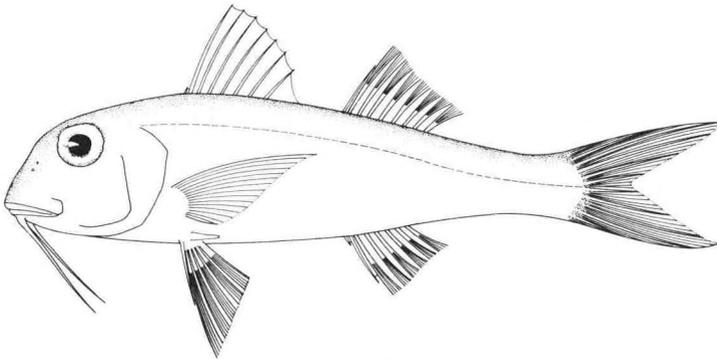


TOMTATE

Haemulon aurolineatum

Adults silvery with a yellow or bronze midlateral stripe, dark spot at the base of the caudal fin, inside of the mouth bright red-orange. Juveniles have 2-3 dark stripes and very small juveniles have bars. This is one of the most abundant fishes at Gray's Reef. Juveniles often aggregate in small groups near crevices while adults roam just above the reef during the day in schools as large as several hundred individuals. The similar white grunt (*H. plumieri*), which occurs from Chesapeake Bay to Brazil, is absent or very rare at Gray's Reef. It is silvery white with a yellow bronze head above and has a series of distinctive dark blue stripes margined with bronze on the head and anterior portion of the body. Massachusetts to Brazil. 7-8 in.

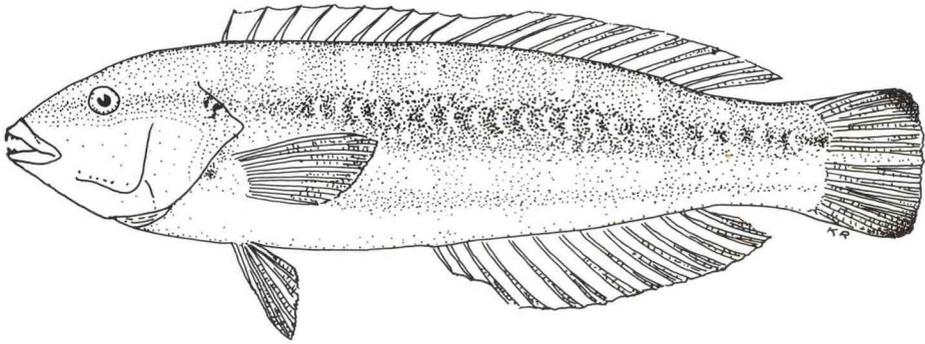
Family Mullidae (goatfishes)



RED GOATFISH

Mullus auratus

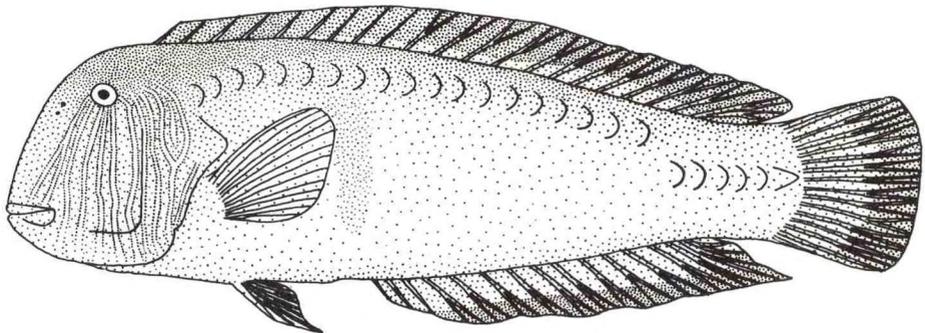
Two distinct dorsal fins, two prominent chin barbels, no teeth on the roof of the mouth, color generally whitish with reddish blotches or bars, two yellowish stripes on body and two dark stripes on dorsal fin. The spotted goatfish (*Pseudupeneus maculatus*), which may also occur here, has teeth on the roof of the mouth, an opercular spine and three large blackish blotches on the sides of the body. Individuals, pairs and small schools are occasionally observed near rocky outcrops at Gray's Reef probing the sand for food with their long chin barbels. Nova Scotia to Central America. 8 in.



SLIPPERY DICK

Halichoeres bivittatus

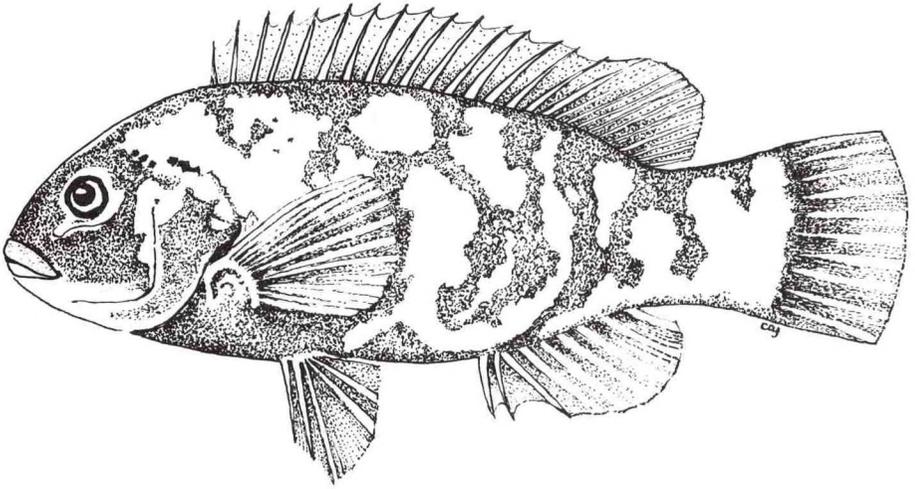
Body compressed, cigar-shaped; nipping canine teeth prominent; two longitudinal stripes sometimes broken into spots (the ventral stripe is sometimes faint); dark spot at the upper anterior margin of the opercle; axil dark; dark spot on the caudal base; anal fin dark with light edge; terminal phase adult covered with subtle markings in pastel shades of red, yellow, green, and iridescent blue. The painted wrasse (*H. caudalis*), which also occurs at Gray's Reef, has one rather than 2-3 pores on each anterior lateral line scale, a dark spot posterior to the eye rather than on the opercular margin, and a light axil and anal fin. Most wrasses swim using the pectoral fins, dragging the tail behind. Ubiquitous at Gray's Reef. North Carolina to Brazil. 7-8 in.



PEARLY RAZORFISH

Hemipteronotus novacula

Body compressed, head steep, scales large, color pale with pastel pink and yellow with thin blue and pink bars below the eye on the cheek and on the anal and caudal fins. Occasionally seen near reefs over coarse sandy bottoms, this wrasse dives into the sand when threatened. North Carolina to Brazil. 7-8 in.



TAUTOG

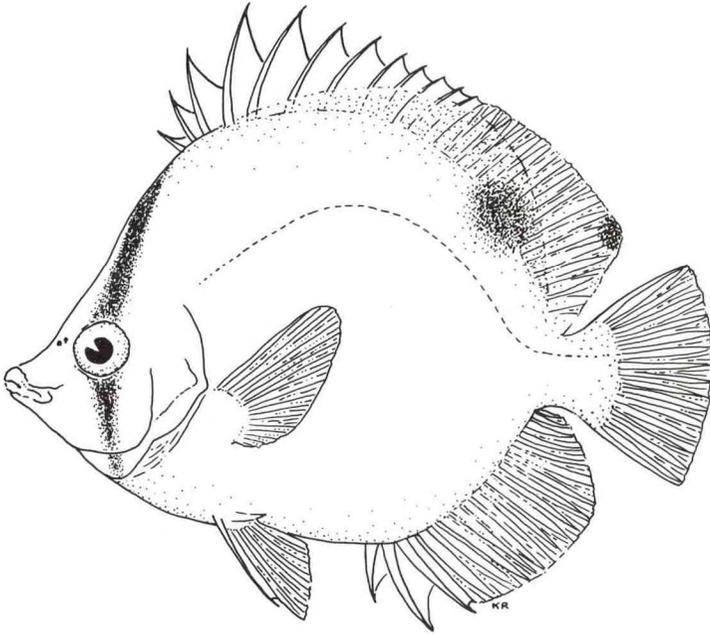
Tautoga onitis

Body robust, scales and lips large, mouth protrusible, color brown to dark gray with indistinct blotches of tan. Large adults are occasionally seen close to rocky outcrops at Gray's Reef which is roughly the southernmost limit of this northern wrasse. Nova Scotia to Georgia. 15 in.

Group 8 - BUTTERFLYFISHES, ANGELFISHES, DAMSELFISHES AND SURGEONFISHES

Most of these colorful reef residents have deep, compressed bodies and stay close to the rocky surfaces at Gray's Reef. The angelfishes are characterized by a strong spine on the anterior gill cover. Damselfishes are strongly territorial, and surgeonfishes are mobile grazers. The Atlantic spadefish (Group 6 - Midwater and schooling fishes) may resemble an angelfish but is unrelated.

Family Chaetodontidae (Butterflyfishes)

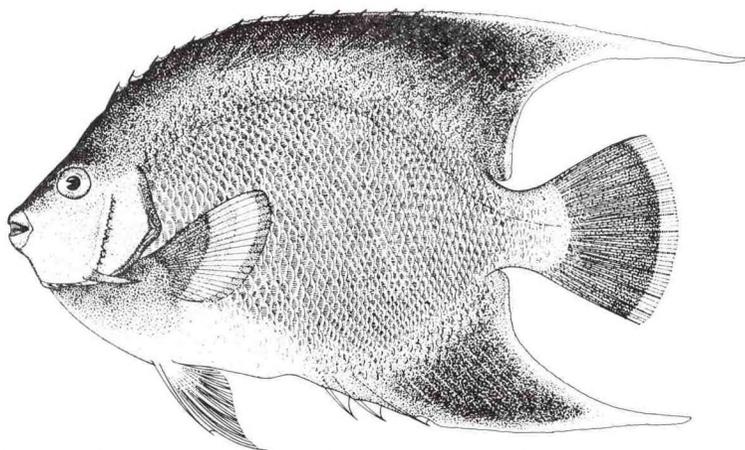


SPOTFIN BUTTERFLYFISH

Chaetodon ocellatus

Body deep; strongly compressed; color silvery-white with yellow fins, a dark bar through the eye, a large dark spot at the base of the soft dorsal fin and, in males, another small dark spot on the posterior margin of the soft dorsal fin. Three other butterflyfishes are known to occur at Gray's Reef but are more common on deeper reefs farther offshore: the bank butterflyfish (*C. aya*), which has two diverging dark bands, the reef butterflyfish (*C. sedentarius*), which has a dark bar through the eye and another across the caudal peduncle and anal fin, and the banded butterflyfish (*C. striatus*) which has four dark bands. Spotfin adults are often seen in pairs on rocky outcrops at Gray's Reef and have been observed as nearshore as the Savannah Navigational Light Tower (8 nmi offshore). Juveniles have been seen under marina docks in Savannah. Massachusetts to Brazil. 5-7 in.

Family Pomacanthidae (angelfishes)

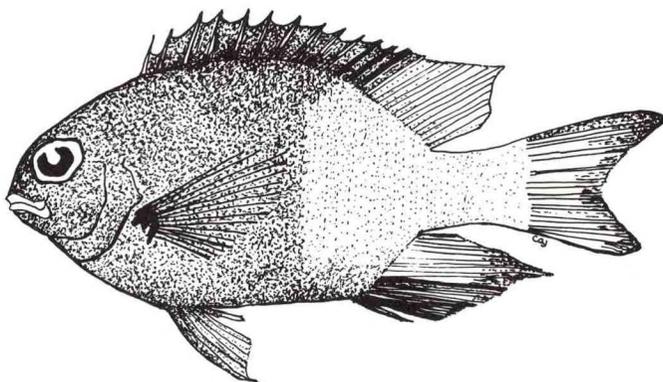


BLUE ANGELFISH

Holacanthus bermudensis

Body deep, mouth small, a large subopercular spine, soft dorsal and anal fins long, adult color blue-gray to purple with yellow fin margins and distinct iridescent blue markings on the head. Juveniles are gold and blue with white bars. The blue angelfish and the queen angelfish (*H. ciliaris*), which has a median dark spot edged with blue above the eyes anterior to the dorsal fin, interbreed, producing intermediate offspring. This attractive reef resident occurs regularly at Gray's Reef but is abundant on deeper reefs offshore. North Carolina to Mexico. 18 in.

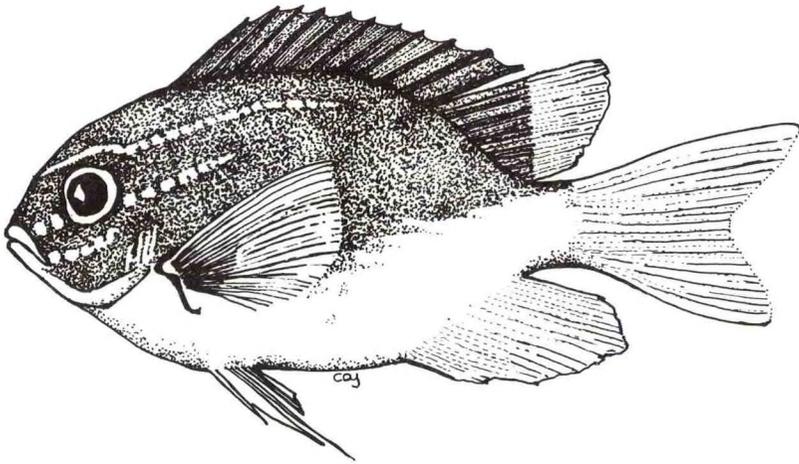
Family Pomacentridae (damsel-fishes)



BICOLOR DAMSELFISH

Pomacentrus partitus

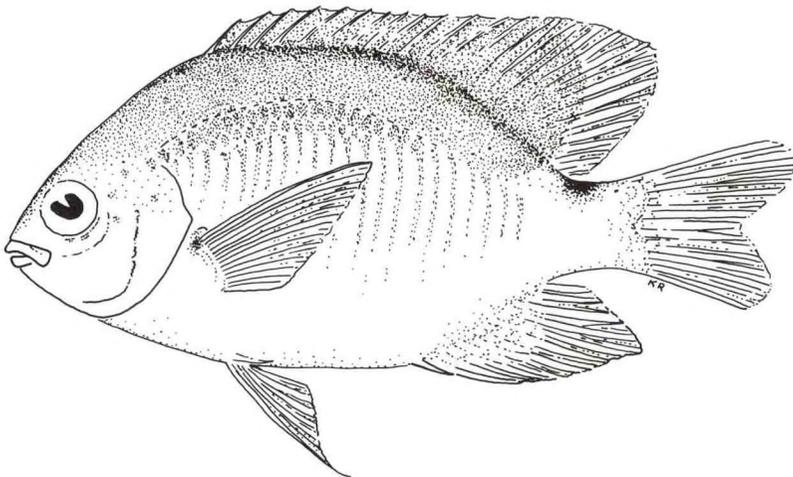
A sharp vertical demarcation between the dark front half of the body and the light, almost white posterior part of the body; median fin margins dark. Like the other damselfishes at Gray's reef, its abundance varies widely from year to year and is often absent in the winter. North Carolina to Caribbean. 5 in.



YELLOWTAIL REEFFISH

Chromis enchrysurus

Upper part of the body including the soft dorsal, anal and caudal fins yellowish; a light blue line extends from the upper lip over the eye to a point above the lateral line. The yellowtail reef fish is a common damselfish on deeper reefs and is occasionally observed at Gray's Reef. Like most damselfishes it fiercely defends its territory on the reef. North Carolina to West Indies. 4 in.

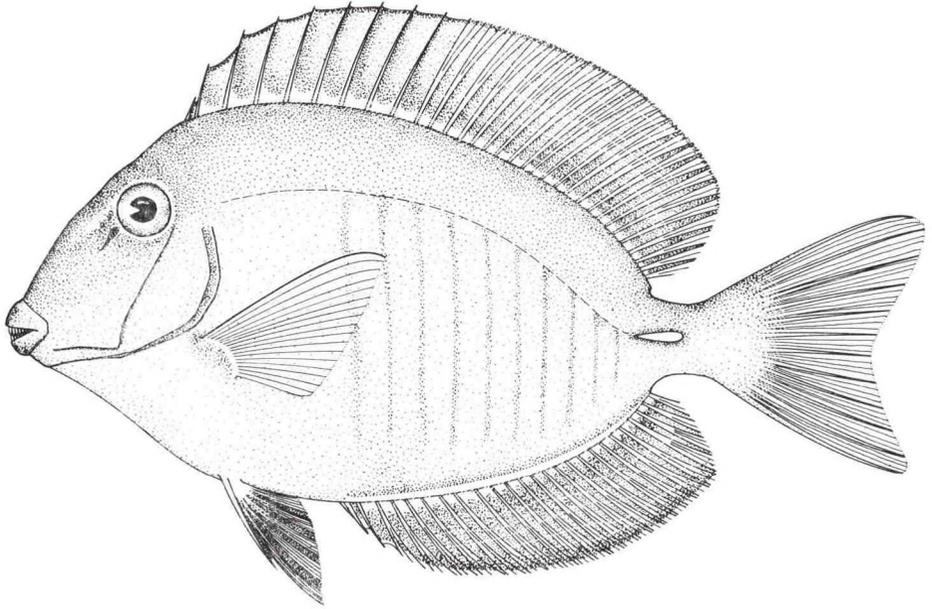


COCOA DAMSELFISH

Pomacentrus variabilis

The anterior part of the body to a point just beyond a black spot at the junction of the spinous and soft dorsal fins is blue and the rest of the body is yellow. A small, dark, saddle-like spot on the caudal peduncle distinguishes it from the beaugregory (*P. leucostictus*) which lacks the spot and has not been found at Gray's Reef. The colorful juveniles are occasionally common at Gray's Reef in the summer, adults are rarely seen here. North Carolina to Brazil. 4 in.

Family Acanthuridae (surgeonfishes)



DOCTORFISH

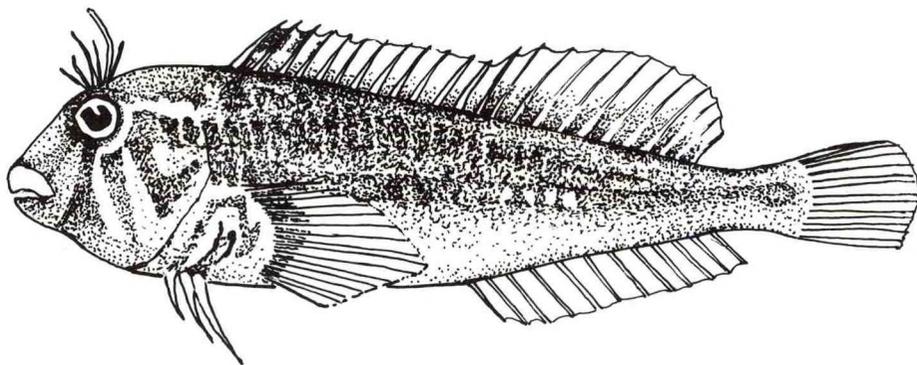
Acanthurus chirurgus

Body deep, compressed; a blade-like bony spine projects from each side of the caudal peduncle; caudal fin slightly forked; color gray to brown with thin dark bars; caudal peduncle light in the young only. The ocean surgeonfish (*A. bahianus*) lacks the bars and has a lunate (concave) caudal fin. Both species have been observed at Gray's Reef but only as young during the summer. New York to Brazil. 12 in.

Group 9 - BLENNIES AND GOBIES

Small and often inconspicuous, the blennies and gobies are the smallest fishes (two inches or less) at Gray's Reef. Blennies generally sit on their filamentous pelvic fins on the encrusted rocky surfaces of the reef. Gobies generally sit on their cone-like fused pelvic fins in sandy areas or hover above sand-covered rocky areas. Some gobies and blennies live deep in rocky crevices and are rarely seen.

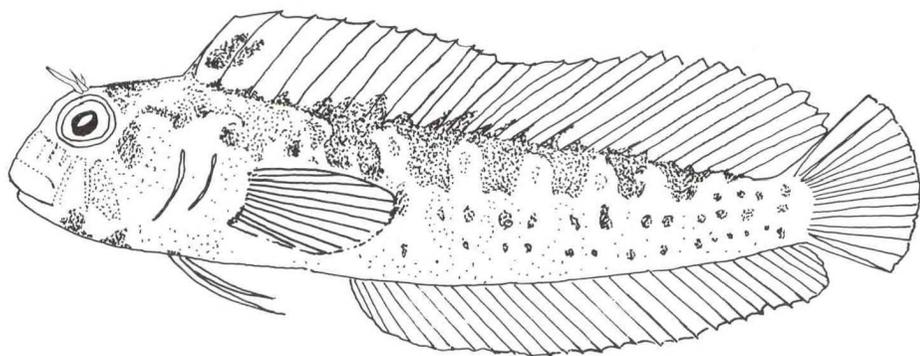
Family Bleniidae (combtooth blennies)



CRESTED BLENNY

Hypoleurochilus geminatus

Color uniformly brownish to tan with cream, gold and black spots forming dark bars along the body; orbital cirri (longer in males than females); groove between elevated bony ridges above the eyes. One of the most common blennies at Gray's Reef, it usually sits alertly on its pelvic and pectoral fins among the sponges, sea squirts and gorgonians of the reef, darting quickly to a new spot if threatened. North Carolina to Gulf of Mexico. 3 in.

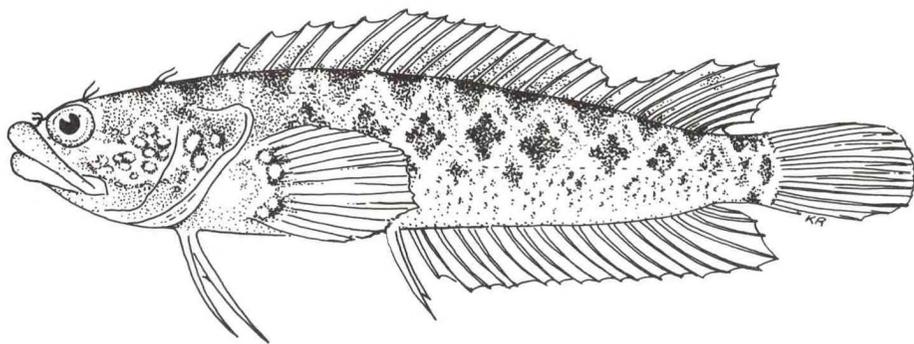


SEAWEED BLENNY

Parablennius marmoratus

Head rounded, color light with dark blotches resembling stripes of bars, orbital cirri and dorsal fin stripe greenish. Nearly as abundant as the crested blenny (*Hypoleurochilus geminatus*) at Gray's Reef, they usually sit motionless on the reef or dart for cover in the profuse growth if threatened. New York to Venezuela. 3 in.

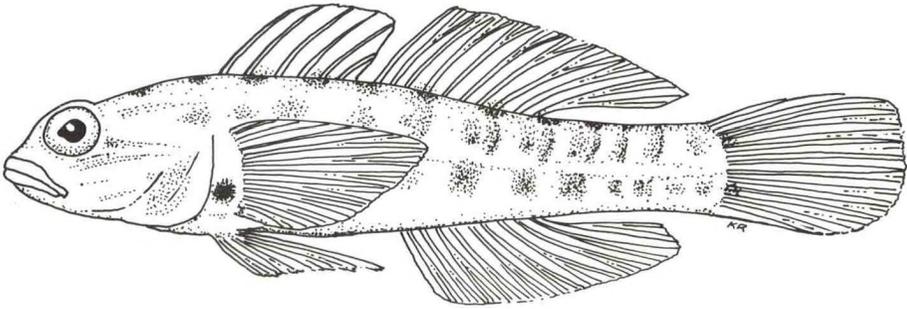
Family Clinidae (scaled blennies)



CHECKERED BLENNY

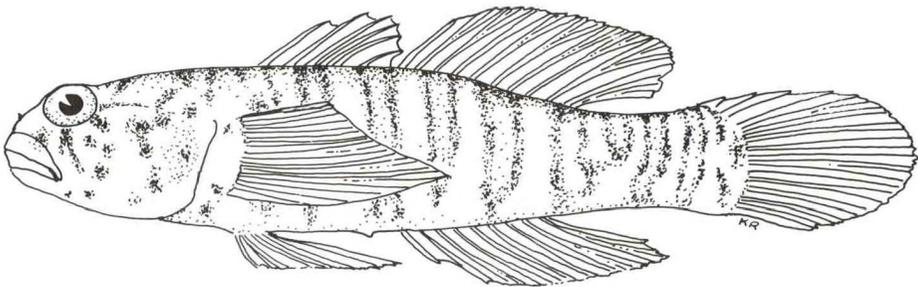
Starksia ocellata

Color brownish with darker irregular blotches arranged in rows giving it a checkered appearance; distinct gold-orange spots with contrasting brown margins highlight the head, cheeks and pectoral fin base. An extremely secretive crevice dweller, it is rarely observed but quite common at Gray's Reef. North Carolina to Gulf of Mexico. 2 in.



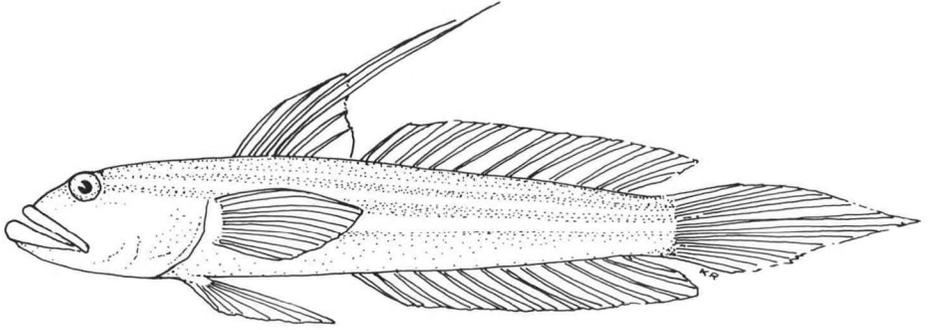
SPOTTED GOBY *Coryphopterus punctipectophorus*

Body very small; color light, almost translucent; two rows of reddish and yellow blotches on the sides of the body; light blue iridescent oblique stripe below the eye on the cheek; prominent dark reddish brown spot on the lower half of the pectoral fin base. The similar colon goby (*C. dicrus*) which also occurs here, has two small spots, one above the other, on the base of the pectoral fin. Both species normally rest on fused pelvic fins (characteristic of most gobies) in the sand near reef rubble and crevices. North Carolina to Florida. 2 in.



CONVICT GOBY *Lythrypnus phorellus*

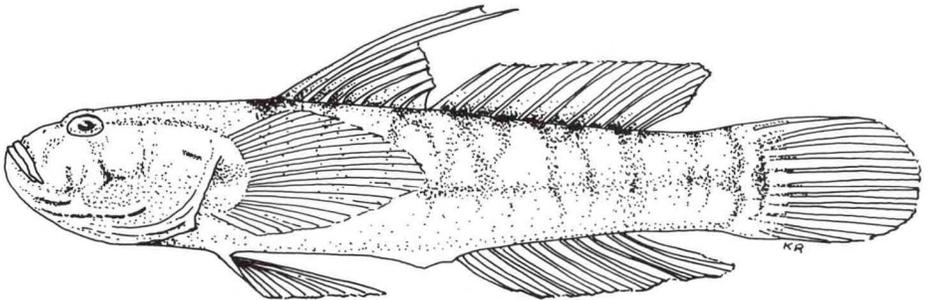
Body very small, a series of dark and pale bars along the body with dark center lines in the pale bars, two spots at the base of the pectoral fin. The similar spotwing goby (*L. spilus*) has a single dark spot at the pectoral fin base, dark centerlines in the dark bands, and elongate first two dorsal spines. Scales on the body, fused pelvic fins, six or fewer dorsal spines, and the lack of pores on the head characterize this genus which includes some of the smallest fishes in the world (less than one inch). Both species are found at Gray's Reef. North Carolina to Venezuela. 0.4 in.



SEMINOLE GOBY

Microgobius carri

Pelvic fins fused; seven dorsal spines; mouth large, oblique; orange-yellow midlateral stripe continuing onto caudal fin with iridescent blue stripes above and below it. Often seen hovering in pairs just above flat reef areas that are partially covered with coarse sand, they dive head first into their inconspicuous burrow hole if threatened. Pairs usually mate within the burrow and attach the eggs under a shell roofing the burrow hole. Another hovering type goby (*Ioglossus* sp.) also occurs at Gray's Reef and further offshore. North Carolina, Gulf of Mexico to Lesser Antilles. 2 in.



HIGHSPINE GOBY

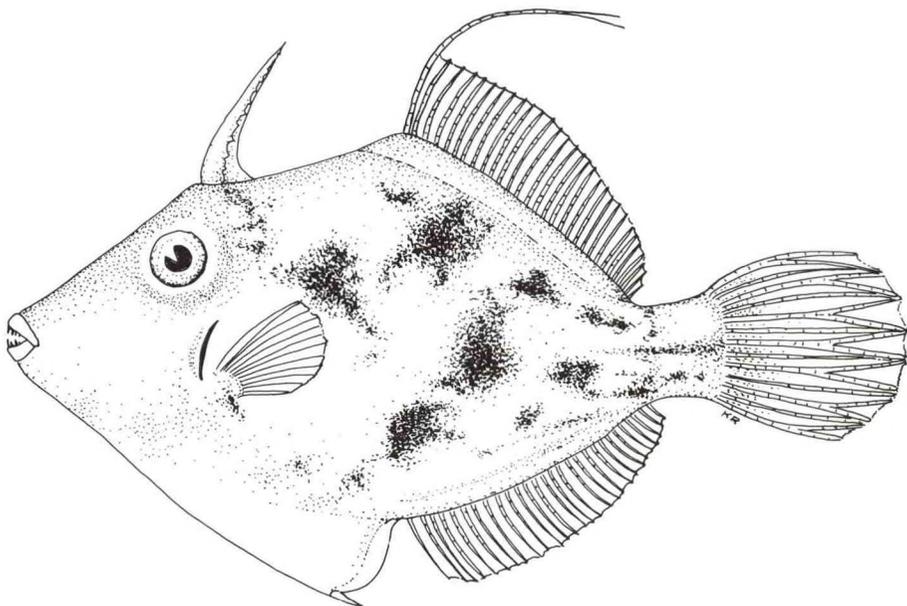
Pslotris celsus

First two dorsal spines elevated, color dusky, five to seven bars or saddles, black spot at the anterior base of the dorsal fin. Completely separate pelvic fins, lack of pores on the head and no scales on the body distinguishes this genus. Georgia to Bahamas, and Virgin Islands. 2 in.

Group 10 - LEATHERJACKETS, TRUNKFISH, PUFFERS

Among the oddest looking of fishes at Gray's Reef, these slow swimming reef residents employ defenses other than speed to escape predation by larger fishes. Filefishes and triggerfishes (leatherjackets) have a tough skin and strong dorsal spine that can lock in an upright position. The body of trunkfishes is encased in bony plates and the puffers (including porcupinefishes and burrfishes) can inflate their bodies.

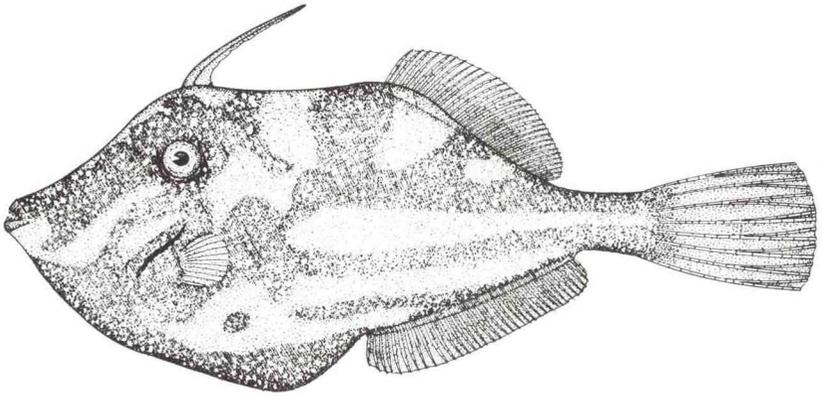
Family Balistidae (leatherjackets)



PLANEHEAD FILEFISH

Monacanthus hispidus

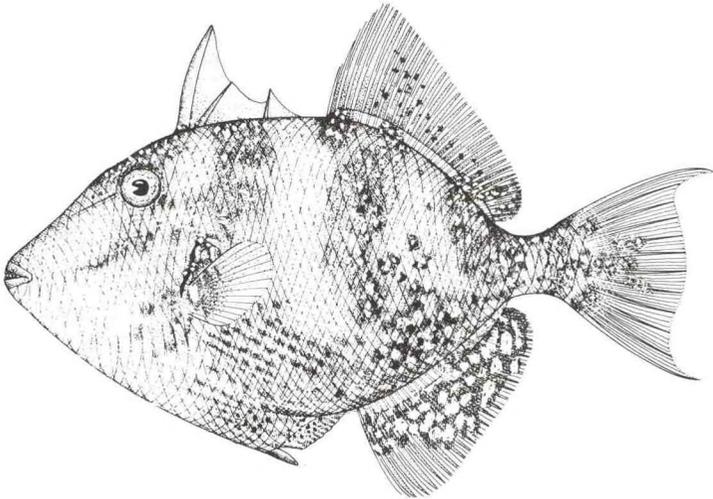
Body deep, compressed; mouth small; pelvic fins lacking; prominent spine on the pelvic bone; two dorsal spines; scales small, skin sandpaper-like; more than 30 rays each in the dorsal and anal fins; some males have an elongated greenish yellow first dorsal fin ray; color gray to tan with irregular markings. The pygmy filefish (*M. setifer*), which occurs further offshore, differs only in size (to 5 in.) and number of fin rays (less than 30 rays each in the dorsal and anal fins). Filefishes use their small but strong jaws to nip and crush reef encrusting organisms. Common at Gray's Reef. Nova Scotia to Brazil. 9 in.



ORANGE FILEFISH

Aluterus schoepfi

Body deep, compressed; mouth small; pelvic fins lacking; no prominent spine on the pelvic bone; two dorsal spines; scales small, skin sandpaper-like; color orange or black with orange spots; snout flattened. The dotted filefish (*A. heudeloti*), which is purplish with large barbs on the dorsal spine, and the orangespotted filefish (*Cantherhines pullus*), which has a deep groove into which the dorsal spine folds, have been found at Gray's Reef but are more common further offshore in deeper water. Nova Scotia to Brazil. 12-15 in.

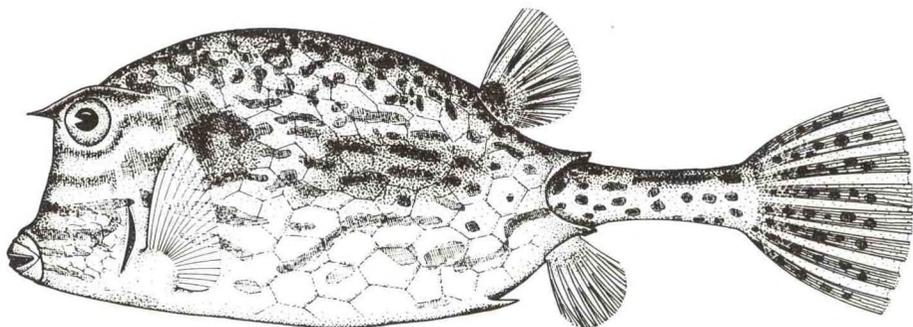


GRAY TRIGGERFISH

Balistes capriscus

Body deep, compressed; mouth small; pelvic fins lacking; three dorsal spines; scales large, platelike; color gray with a few markings on the head. The second dorsal spine is used to lock the first, and strongest, dorsal spine into an upright position. The spine is used to wedge its narrow body securely into a crevice of the reef if attacked by a predator. Unlike most fishes, triggerfish swim by undulations of the second dorsal and anal fins. Common at Gray's Reef. Nova Scotia to Argentina. 11 in.

Family Ostraciidae (trunkfishes)

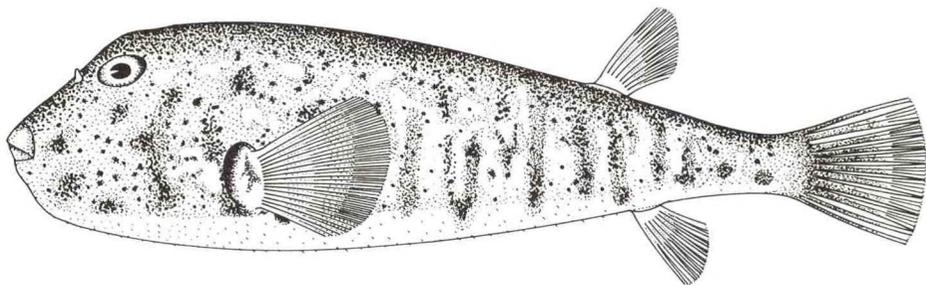


SCRAWLED COWFISH

Lactophrys quadricornis

Body encased in a bony carapace, frontal profile triangular, spinous dorsal and pelvic fins lacking, strong spines projecting forward over the eyes, color grayish brown to yellowish green with prominent bright blue markings on the head and body. Armored for protection, it is often seen near sponges and gorgonians of flat reef areas at Gray's Reef. The smooth trunkfish (*L. triqueter*), which lacks the horns, has white and yellow spots and has black around the mouth and base of the dorsal fin, has also been observed at Gray's Reef. Massachusetts to Brazil. 16 in.

Family Tetraodontidae (puffers)

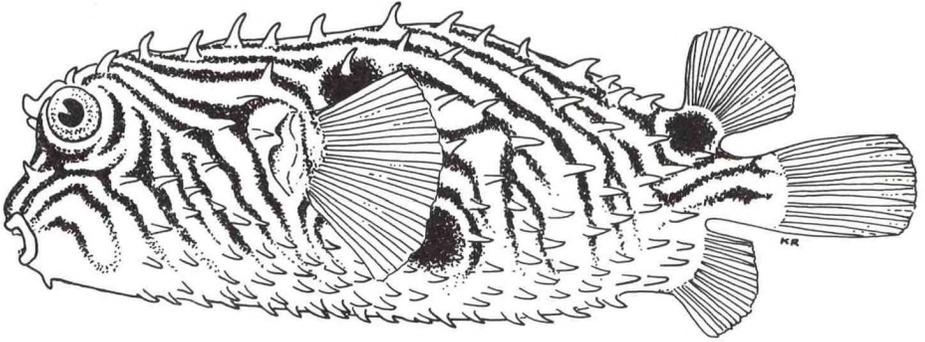


NORTHERN PUFFER

Sphoeroides maculatus

Head large, dorsal and anal fins located toward the caudal fin, skin covered with small prickles, teeth beak-like with a median division, series of seven or eight vertically elongate oblique bars on the sides of the body, capable of inflating the body by gulping water into the stomach. Five other species have been reported from the Georgia: the Florida puffer (*S. nephelus*), the bandtail puffer (*S. spengleri*), the checkered puffer (*S. testudineus*), the marbled puffer (*S. dorsalis*), and the smooth puffer (*Lagocephalus laevigatus*). Puffers produce a toxin in the skin and viscera. Newfoundland to Northeastern Florida. 5-12 in.

Family Diodontidae (porcupinefishes and burrfishes)



STRIPED BURRFISH

Chilomycterus schoepfi

Head large; body covered with short, erect spines; median division between the beak-like teeth lacking; adults have dark wavy or curved lines and spots on the body; juveniles are darker without distinct lines. The related porcupinefishes (*Diadon* spp.) have long spines that lie along the sides of the body and erect only when the body is inflated. Both burrfishes and porcupinefishes discourage predators by gulping water or air into the stomach. Maine to Brazil. 9 in.

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A good summary of the oceanographic data collected over many years for this area.

Barans, C.A. and V.J. Henry. 1984. A description of the shelf edge groundfish habitat along the southeastern United States. *Northeast Gulf Science* 7(1):77-96.

A good description of reef morphology and rocky outcrop habitats of this area; some data on the fishes from surface-tended underwater video observations.

Böhlke, J.E. and C.G. Chaplin. 1968. *Fishes of the Bahamas and Adjacent Tropical Waters*. Livingston Press. 771 pp.

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Dahlberg, M.D. 1975. *Guide to the Coastal Fishes of Georgia and Nearby States*. University of Georgia Press. 187 pp.

Fairly comprehensive guide to Georgia's inshore and salt marsh fishes (226 species); includes keys for many. Black and white photos of preserved specimens and line drawings in appendix; no index to scientific names or families.

Fischer, W. (Ed.) (1978) Rome pag. var. *FAO Species Identification Sheets for Fishery Purposes. Western Central Atlantic (Fishing Area 31). Vol.I-VI*.

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Greenberg, I. and J. Greenberg. 1977. *Waterproof Guide to the Corals and Fishes of Florida, the Bahamas and the Caribbean*. Seahawk Press. 64pp.

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Harris, C.D. 1978. *The fisheries resources on selected artificial and live bottom reefs on Georgia's continental shelf*. Georgia Department of Natural Resources, Coastal Resources Division. May 1978. 55 pp.

Results of 76 SCUBA diving observations; over 80 species reported; information on abundance, sizes and seasonality .

Henry, V.J. and S.B. Van Sant. 1982. *Results of reconnaissance mapping of the Gray's Reef National Marine Sanctuary*. A report prepared for the Georgia Department of Natural Resources, Coastal Resources Division, Brunswick, Georgia under cooperative agreement with Sanctuary Programs Division, National Oceanic and Atmospheric Administration. (No. NA81AAHC2098, Amendment 1)

This technical report includes some information on the fishes and invertebrates of Gray's Reef from underwater video studies.

Hoese, H.D. and R.H. Moore. 1977. *Fishes of the Gulf of Mexico, Texas, Louisiana, and Adjacent Waters*. Texas A & M University Press 327pp.

Excellent compendium including keys, species accounts, distributions, sizes, color photographs of live or fresh specimens and line drawings. Includes many species found along Georgia.

Hunt, J.L. 1974. *The Geology and Origin of Gray's Reef, Georgia Continental Shelf*. M.S. Thesis. University of Georgia. Athens, Georgia. 83pp.

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Contains color illustrations and detailed information on the habits, fishing and preparation of 150 freshwater and marine fishes. Includes glossary, 1984 IGFA world records, recipes index, scientific names index, common name index.

Nelson, J.S. 1984. *Fishes of the World*. John Wiley and Sons. 523 pp.

Classification of fishes at the family level and above including evolutionary and geographic information. Good systematic reference.

Randall, J.E. 1983. Caribbean Reef Fishes T.F.H. Publications. 350 pp.

Many color Photographs of the 300 illustrated species. One hundred other species mentioned.

Robins, C.R., R.M. Bailey, C.E. Bond, J.R. Brooker, E.A. Lachner, R.N. Lea, and W.B. Scott. 1980. A List of Common and Scientific Names of Fishes from the United States and Canada. American Fisheries Society Special Publication No. 12. 174pp.

Standard reference for common names; contains useful information on taxonomy of some species and groups.

Robins, C.R., G.C. Ray and J, Douglass. 1986. A Field Guide to Atlantic Coast Fishes of North America Houghton Mifflin Company. 354pp.

This Peterson Field Guide is comprehensive; over 1,100 illustrations, 420 in color; species accounts include identification notes, size and geographic range, index to common and scientific names.

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Reviews background and purpose of sanctuary designation, describes Gray's Reef, and presents resource protection, interpretation and research plans.

GLOSSARY

Adipose fin - small fleshy finlet between dorsal and caudal fin.

Anal fin - see Figure 4.

Anterior - toward the head.

Axil - base of the pectoral fin.

Barbel - fleshy protuberance or extension of the chin.

Bars - broad dark vertical markings along the sides of the body.

Blotch - irregularly shaped dark spot.

Caudal fin - tail fin (see figure 4).

Caudal peduncle - narrowest part of the body between the caudal fin base and the anal fin.

Cirri(us) - fleshy branched or unbranched skin filaments, usually on the head.

Compressed -laterally flattened.

Cryptic - camouflaged or inconspicuous.

Deep (-bodied) - high dorso-ventral profile.

Denticles - minute tooth-like scales of sharks and rays.

Dorsal - toward the back or upper surface.

Fin ray (soft ray) - segmented and usually branched fin-supporting element.

Fin spine (spine) - hard unsegmented and unbranched fin element.

Finlets - small median fins posterior to dorsal or anal fins.

Gill rakers - tooth-like, spine-like, or filament-like anterior projections of gill arches.

Gill slits - multiple gill openings seen externally on sharks, rays and some jawless fishes.

Lateral line - part of the sensory system of fishes often seen externally as a series of pores (pored or channeled scales in fishes with scales) along sides of the body.

Margin - edge or fringe.

Maxilla - bone forming the most posterior part of the upper jaw.

Medial - along the midline that separates the body into right and left halves.

Median fins - dorsal, anal, caudal, finlets).

Oblique - at an angle.

Ocelli(us) - spots with contrasting rings or margins.

Operculum - gill cover of bony fishes.

Pectoral fin - lateral paired fins (see Figure 4).

Pelvic fins - ventral paired fins (see Figure 4).

Posterior - toward the tail.

Preoperculum - anteriormost bone of the gill cover with free edge in bony fish.

Scute - modified scale usually forming a ridge or keel.

Serrated - having saw-like notches along an edge.

Spiracle - rudimentary gill slit found behind the eye in rays and in some sharks.

Stripes - horizontal markings along the sides of the body.

Ventral - toward the belly.

Ventral fins - pelvic fins.

Vomerine teeth - teeth on the vomer (anterior or midline roof of the mouth).

SYSTEMATIC CHECKLIST

- R - Reef resident; always found in close association with reefs or hard bottoms.
 S - Generally associated with sandy bottom habitats near reefs.
 P - Pelagic; generally found in the water above the reefs.
 O - Other; incidentally or indirectly associated with reefs.

Gray's Reef fish records:

- A - Fish Collection at Savannah State College.
 B - Photograph or underwater video by the author.
 C - Mr. Steve W. Ross, Marine Fishery Division, North Carolina Department of Natural Resources and Community Development.
 D - Dr. Donald Scott, Department of Zoology, University of Georgia.
 E - Sedburry and Van Dolah (1984) site IS02.
 F - Harris (1978) site SLB (Sapelo Live Bottom).
 G - Video study by Nelson and Parker (in prep.)

Phylum Chordata

Subphylum Vertebrata

Class Chondrichthyes

Order Squaliformes

Family Orectolobidae

Ginglymostoma cirratum (Bonnaterre)..... S B

Family Odontaspidae

Odontaspis (= *Eugomphodus*) *taurus* (Rafinesque)..... S B

Family Carcharhinidae

Carcharhinus acronotus (Poey)..... O

C. brevipinna (Müller and Henle)..... O

C. falciformis (Bibron)..... O

C. isodon (Valenciennes)..... O

C. leucas (Valenciennes)..... O

C. limbatus (Valenciennes)..... O

C. obscurus (Lesueur)..... O

C. plumbeus (Nardo)..... O

Galeocerdo cuvieri (Peron and Lesueur)..... O

Mustelus canis (Mitchill)..... O

Negaprion brevirostris (Poey)..... O

Rhizoprionodon terraenovae (Richardson)..... O

Family Sphyrnidae

Sphyrna lewini (Griffith and Smith)..... O

S. mokarran (Rüppell)..... O

S. tiburo (Linnaeus)..... O

S. zygaena (Linnaeus)..... O

Family Squalidae

Squalus acanthias Linnaeus..... S

Order Rajiformes	
Family Dasyatidae	
<i>Dasyatis americana</i> Hildebrand and Schroeder.....	S G
<i>D. centroura</i> (Mitchell).....	S
Class Osteichthyes	
Order Anguilliformes	
Family Anguillidae	
<i>Anguilla rostrata</i> (Lesueur).....	O
Family Muraenidae	
<i>Gymnothorax saxicola</i> Jordan and Davis.....	R A
<i>Muraena retifera</i> Goode and Bean.....	R A,B,D
Family Congridae	
<i>Conger oceanicus</i> (Mitchill).....	O
Family Ophichthyidae	
<i>Ahlia egmontis</i> (Jordan).....	S A
<i>Letharchus velifer</i> Goode and Bean.....	S D
<i>Myrophis punctatus</i> Lütken.....	S G
<i>Ophichthus ocellatus</i> (Lesueur).....	S A
Order Clupeiformes	
Family Clupeidae	
<i>Opisthonema oglinum</i> (Lesueur).....	P A
<i>Sardinella aurita</i> Valenciennes.....	P A,G
<i>Brevoortia tyrannus</i> (Latrobe).....	P B,G
Order Myctophiformes	
Family Synodontidae	
<i>Synodus foetens</i> (Linnaeus).....	S E,G
<i>Trachinocephalus myops</i> (Forster).....	S D,G
Order Batrachoidiformes	
Family Batrachoididae	
<i>Opsanus pardus</i> (Goode and Bean).....	R A,B
<i>Porichthys plectrodon</i> Jordon and Gilbert.....	S E
Order Lophiiformes	
Family Antennariidae	
<i>Antennarius ocellatus</i> (Bloch and Schneider).....	R B
Family Ogcocephalidae	
<i>Ogcocephalus</i> spp.....	O
<i>Haliutichthys</i> sp.....	O
Order Gadiformes	
Family Gadidae	
<i>Urophycis earlli</i> (Bean).....	R A,C
<i>U. regia</i> (Walbaum).....	S E
Family Bythitidae	
<i>Ogilbia</i> sp.....	R A
<i>Ophidion holbrookii</i> (Putnam).....	S E
Order Beryciformes	
Family Holocentridae	
<i>Holocentrus ascensionis</i> (Osbeck).....	R B,G
Order Gasterosteiformes	

Family Syngnathidae	
<i>Hippocampus erectus</i> Perry.....	R D,G
<i>Syngnathus Louisianae</i> Günther	R G
<i>Micrognathus crinitis</i> (Jenyns)	R G
Order Perciformes	
Family Serranidae	
<i>Centropristis ocyurus</i> (Jordan and Evermann)	R B,E,G
<i>C. philadelphia</i> (Linnaeus).....	R A,B,E,F,G
<i>C. striata</i> (Linnaeus)	R A,B,F,G
<i>Diplectrum formosum</i> (Linnaeus).....	S A,B,E,F,G
<i>Mycteroperca microlepis</i> (Goode and Bean).....	R A,B,F,G
<i>M. phenax</i> Jordan and Swain.....	R B,G
<i>Serranus subligarius</i> (Cope)	R A,B,G
Family Grammistidae	
<i>Rypticus maculatus</i> Holbrook.....	R A,B,G
Family Priacanthidae	
<i>Priacanthus arenatus</i> Cuvier	R D,E,G
<i>P. cruentatus</i> (Lacepède).....	R D
<i>Pseudopriacanthus</i> (= <i>Pristigenys</i>) <i>alta</i> (Gill).....	R D,G
Family Apogonidae	
<i>Apogon maculatus</i> (Poey).....	R A,G
<i>A. pseudomaculatus</i> Longley.....	R A,B,C,E
<i>Phaeoptyx pigmentaria</i> (Poey)	R A,G
Family Pomatomidae	
<i>Pomatomus saltatrix</i> (Linnaeus).....	P A
Family Rachycentridae	
<i>Rachycentron canadum</i> (Linnaeus)	P B
Family Echeineidae	
<i>Echeneis naucrates</i> Linnaeus	P B
Family Carangidae	
<i>Caranx bartholomaei</i> Cuvier	P A,G
<i>C. hippos</i> (Linnaeus)	P
<i>C. ruber</i> (Bloch).....	P B
<i>Decapterus macarellus</i> (Cuvier)	P A
<i>D. punctatus</i> (Agassiz).....	P A,B,F,G
<i>Naucrates ductor</i> (Linnaeus).....	P
<i>Seriola dumerili</i> (Risso).....	P B,F,G
<i>S. rivoliana</i> Valenciennes.....	P
<i>Trachinotus carolinus</i> (Linnaeus)	P D
<i>T. falcatus</i> (Linnaeus).....	P D
<i>T. goodei</i> Jordan and Evermann	P D
<i>Trachurus lathamii</i> Nichols	P D
Family Coryphaenidae	
<i>Coryphaena equisetis</i> Linnaeus.....	P
<i>C. hippurus</i> Linnaeus	P
Family Lutjanidae	
<i>Lutjanus campechanus</i> (Poey)	R F,G
<i>Rhomboplites aurorubens</i> (Cuvier)	R E

Family Haemulidae

- Haemulon aurolineatum* Cuvier R A,B,E,F,G
- H. plumieri* (Lacepède) O
- Orthopristis chrysoptera* (Linnaeus) R A,B,E,F,G

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- Calamus leucosteus* Jordan and Gilbert..... R B,E,G
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