



Florida Fish and Wildlife Conservation Commission

Fish and Wildlife Research Institute

Groupers, members of one of the largest families of fishes found in Florida waters, run the gamut of sizes and shapes, from the diminutive graysby weighing several pounds to the mammoth goliath grouper that can top the scales at 600 pounds or more. Grouper is an important commercial and recreational commodity in Florida. Broiled, fried, or spicy “blackened” grouper is a staple on the menus of seafood restaurants.

GROUPERS

Chameleons of the Sea

(formerly called jewfish) has brown or yellow mottling with small black spots on the head and fins and has a gargantuan mouth with jawbones that

extend well past its small eyes. Its tail is rounded. Its five irregular, dark body bands, or stripes, are most visible on young goliath. They can reach whopping lengths of 8 feet or more, and the Florida record goes to a 680-pound goliath caught off Fernandina Beach in 1961. They were once a popular target of spearfishermen but are now protected from all harvest in Florida. They feed mostly on fish and crustaceans, such as crabs and spiny lobster.

Description

The word “grouper” is thought to be a corruption of the Portuguese “garoupa,” a name given to a perch-like fish found in Portugal. Groupers, along with sea basses and hamlets, are in the seabass family, which is called Serranidae. Worldwide, there are more than 300 species of serranids, with 61 species in North America. More than 40 serranid species are found in Florida waters.

In general, groupers are oblong, large, and chunky fish. Their small scales usually have a saw-toothed edge, and their fins are coarse and spiny. The massive, underslung jaws of these carnivores harbor strong teeth, and many species have two canine teeth at the front of each jaw.

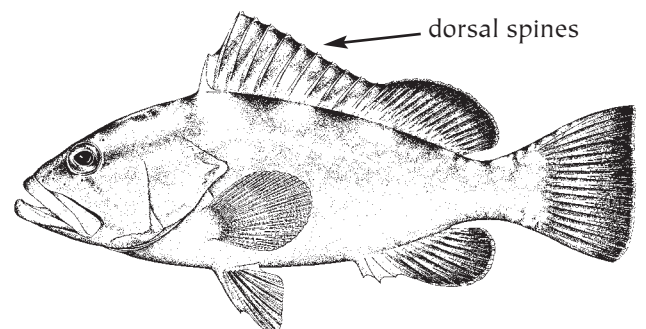
Groupers, like chameleons, vary in color according to species, habitat, water depth, age, or stress. Because the different species are so similar in appearance, identification can be confusing. As with most fish, the skin pigments fade when the fish is removed from the water. Nine grouper species that are found in Florida are described below.

Goliath grouper (*Epinephelus itajara*)

The giant of the grouper family, the goliath

Red Grouper (*Epinephelus morio*)

Red grouper is a brownish-red fish with scattered pale blotches, black dots around the eyes, and dark-tipped dorsal, anal, and tail fins. The membrane between the dorsal spines is not notched, and the tail fin is squared off. Red grouper is the most thoroughly studied of the Florida groupers, and much of what scientists know about groupers is based on research on red grouper. They may grow to 3 feet in length and average 10 pounds, though some reach a hefty 40 pounds.



E. morio art by Diane Peebles



Warsaw Grouper (*Epinephelus nigritus*)

A uniform brown, the adult Warsaw grouper has no spots or stripes to make it stand out from the crowd (juvenile Warsaw groupers have white spots). It is, however, distinguished by its impressive bulk, ten dorsal spines (all other groupers have 11), and by a dorsal fin with a very long second spine. The Warsaw grouper may reach 6 feet in length and weigh 580 pounds.

Snowy Grouper (*Epinephelus niveatus*)

Dark gray all over, the snowy grouper's name derives from the obscure white spots arranged in a definite geometric pattern over the body. It may reach 3 feet in length and weigh 30 pounds. This deep-water species may be found as deep as 1,000 feet.

Nassau Grouper (*Epinephelus striatus*)

This species has five irregular brown or red-brown side bands on a light background. A wide, brown stripe runs on each side of the head from the upper snout to the forward base of the dorsal fin. There is a broad, black patch that rests like a saddle on top of the narrow part of the tail. Nassau groupers may grow to a length of 3 feet and weigh 55 pounds. Their colorful, zebra-like appearance has made them a favorite photo subject for divers' magazines. Nassau grouper form large spawning aggregations, which makes this species highly vulnerable to overharvest. All harvest of this species is prohibited in Florida waters.

FAST FACT

Some groupers, such as snowy, misty, and speckled hind, can be found at a depth of 1,000 feet.

Black Grouper (*Mycteroperca bonaci*)

Although similar in appearance to the gag, the black grouper has a more vivid color pattern that includes brassy, bronze spots on the side of the head and body and, sometimes, dark, rectangular

blotches running the length of the back. Its fins are bordered in black. Black grouper may reach 4 feet and 180 pounds.

Gag Grouper (*Mycteroperca microlepis*)

The brownish-gray body of the gag is covered with thin, dark, wormlike markings often grouped in blotches that give the fish a marbled look. Its pelvic, anal, and tail fins are dark; the anal and tail fins have a white outer margin. Although it may reach 3 feet and 70 pounds, most are much smaller. The gag is often erroneously identified as a black grouper.

Scamp (*Mycteroperca phenax*)

The light gray or brown body of the scamp is covered with reddish-brown spots that tend to be grouped into lines. The corners of the mouth are yellow. The top and bottom edges of the tail of large adults are elongated. Scamp in the Gulf may grow to over 2 feet in length and weigh up to 14 pounds.

Yellowfin Grouper (*Mycteroperca venenosa*)

The yellowfin derives its scientific moniker, *venenosa*, from the toxicity of the flesh of some large specimens in areas where ciguatera poisoning occurs when humans eat toxic fish. Also called the rockfish, the yellowfin is variably colored, commonly olive green with rows of rounded, irregular, dark splotches on its back. Its belly is often salmon pink, and its mouth is yellow inside and along the corners. The outer $\frac{1}{3}$ of the pectoral fin is a brilliant yellow. Yellowfin taken from waters deeper than 100 feet are often bright red with even darker red body blotches. Yellowfin may grow to 30 inches and about 20 pounds.

Range and Habitat

Groupers are found in almost all temperate and tropical seas, usually over hard bottom such as coral reefs. Some species prefer shallow water, whereas others inhabit deep, dark regions far offshore. Some may lead solitary lives, hiding in reef crevices and caves. Young groupers can often be found nearshore.



Red grouper is the most abundant grouper in the Gulf of Mexico. Red groupers under about six years of age reside over shallow nearshore reefs, moving into deeper waters farther offshore as they mature.

Life History

Groupers can change sex—an amazing ability to us but a relatively common occurrence among marine creatures. Some marine animals change from male to female, others (including groupers) change from female to male, and some organisms function as both sexes at one time.

Although all grouper species are probably able to undergo a transformation from female to male, the incidence of individuals that do so is highly variable. Red groupers may change after the first five or ten years of life. Gag groupers may change at about 10 or 11 years of age. Nassau groupers have the potential to change sexes, although apparently few do.

Scientists aren't sure what natural advantage the sex change affords grouper or what specific factors trigger it. Some believe that, for those species in which individuals live close to one another, a causative factor may be the death of the dominant male in the group—an event that prompts the largest female to change sex and then become the dominant male in the group hierarchy. However, because other species of grouper lead essentially solitary lives, some scientists believe the sex change is triggered when the fish gather together as a prelude to spawning.

Grouper species generally have distinct spawning seasons. For example, red grouper off Florida's west coast spawn mainly in April and May in nearshore waters of 90 feet or less. Gag grouper spawn principally from January through March. However, in warmer waters of the southern Atlantic, Gulf of Mexico, and Caribbean, some grouper may spawn throughout the year. "Ripe" female black grouper in the Florida Keys, for instance, have been documented in all months.

When observed in a spawning aggregation,

Nassau grouper swim upward in the water column and release their gametes (eggs or sperm) before descending back to the bottom. This behavior is known as a "spawning rush."

Goliath groupers have a particular courtship style. When they gather together before spawning, the head of the dominant male turns pale white, and he makes a booming sound to threaten other males who invade his territory.

When groupers spawn, eggs and sperm are released into the water at the same time, and their union is by chance. A female red grouper may shed from 1.5 million to 5 million eggs in a spawn and can spawn several times during the spawning season.

Unfortunately, it is difficult to distinguish one species of grouper larvae from another, so much information about the egg and larval development of groupers remains a mystery. In general, the eggs hatch into larvae that drift with the currents for the next 30 to 40 days before transforming into juveniles. Little is known about the range and behavior of most juvenile grouper, but red and gag grouper juveniles have been studied.

Red grouper juveniles remain in the plankton for about a month, until they reach $\frac{3}{4}$ to 1 inch in length. Then, they take up life on rocky bottoms and stick close to nearshore reefs, where they eventually become a mainstay of Florida's party boat industry. Juvenile gag grouper enter bays and estuaries in the spring and hide among seagrasses or gather near rocky outcroppings until, at about three years old, they leave these sanctuaries to reside in deeper waters. Groupers are considered to be adults when they become sexually mature, which for most species occurs between four and six years of age.

All groupers are meat-eaters. Most eat fish, although the larger goliath also dine on crustaceans and even juvenile sea turtles. It is believed that many groupers do not actively search for prey but lie in ambush waiting for a suitable meal to swim near; then they strike at it with lightning speed.

Groupers maintain a mutually beneficial relationship with small "cleaner" fish. A grouper



will permit these tiny janitors to pluck dead tissue, parasites, and scales from its gills and body and even to enter its mouth to remove parasites. When a grouper wants to be “scrubbed,” it opens its mouth and assumes a non-threatening position to attract its fastidious helpers.

FAST FACT

One female goliath on display at The Florida Aquarium in Tampa has been observed to sit on her food when she is not hungry, presumably to keep other fish who share her tank from eating it.

Economic and Management Considerations

Once considered a by-product of the red snapper fishery, grouper, in recent years, has soared in popularity among seafood consumers. Florida currently produces about 80% of all the grouper caught in the U.S. Historically, recreational catches were much higher than commercial landings were, but that situation has reversed in recent decades.

The surge of interest in grouper has resulted in regulations that limit harvest. Any harvest of Nassau or goliath grouper is prohibited in Florida waters. Some commercial restrictions have quotas based on the water depth at which selected species are typically found. Restrictions are also placed on recreational anglers. They must abide by both bag and size limits, which vary depending on the species of grouper being targeted. Because fishing regulations are subject to change annually, anglers should consult the FWC Division of Law Enforcement for the most recent information.

In 1995, about 9.3 million pounds of grouper were harvested by commercial fishermen and had an estimated value of \$16.6 million. That year, grouper ranked third in total pounds of seafood landed in Florida and fourth in market value. The

bulk of Florida’s grouper harvest occurs in the Gulf of Mexico, and red grouper is the species that is most frequently caught.

Recreational fishermen use hook and line gear and lay the bait on the bottom in order to snare groupers. Commercial fishermen use longlines—extensive lengths of fishing lines with baited hooks at regular intervals. The lines are retrieved with mechanical reels.

Grouper yield a high quantity of edible meat compared to their body weight. An 8-pound grouper, for instance, will produce more than 3 pounds of edible flesh. Because the meat has little oil and a fat content of only 1%, grouper are considered a lean fish.

Scientists at the Florida Fish and Wildlife Conservation Commission have conducted research on several species of groupers. In 1991, the FWC Fish and Wildlife Research Institute printed a publication about the distribution of serranids in the eastern Gulf of Mexico. Results from a study on the reproduction of the yellowedge grouper have also been published. Research has been completed on the age, growth, and reproduction of the black grouper and on the life history of goliath grouper, yellowmouth grouper, gag grouper, and red grouper. We hope that learning more about this diverse group will let us continue to enjoy it as a menu item and as another of nature’s intriguing marine creatures.

Fishing license revenue and the federal Sport Fish Restoration Program are important sources of funding for sport fish research. The Sport Fish Restoration Program is a “user pays/user benefits” system funded by a tax on sales of recreational fishing equipment and boat fuel. The program supplies three dollars for every one dollar provided by the state for projects that improve fishing and boating opportunities.



June 2005



Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute
100 8th Avenue SE, St. Petersburg, FL 33701 • (727) 896-8626 • <http://research.MyFWC.com>