



Florida Fish and Wildlife Conservation Commission

Fish and Wildlife Research Institute

One of Florida's most spectacular game fish, the tarpon is a feisty foe whose powerful leaps from the water and bone-jarring bursts of speed test the skill and fortitude of even the most experienced angler. A hardy giant that can survive in a variety of habitats and salinities, the tarpon can even gulp air for extended periods when not enough oxygen is present in the water to sustain it. Despite its popularity among sport fishermen, many aspects of this extremely long-lived fish's life cycle and behavior remain a mystery.

# TARPON

## Silver King of the Coast

along with their impressive size, is likely responsible for their nickname, "silver king." The huge mouth of the tarpon has a projecting, upturned lower jaw that contains an elongated bony plate. The tarpon's single short

dorsal fin originates just behind the origin of the pelvic (or belly) fin. The last ray on the dorsal fin is very long and thin. Tarpon have a deeply forked tail fin and very large, platelike scales.

### FAST FACT

*One tarpon, captured in 1935 and kept on display at the Shedd Aquarium in Chicago, was 63 years old at the time of its death in 1998.*

### Description

Tarpon share an ancient lineage with such seemingly disparate fish as bonefish, ladyfish, and eels. Indeed, tarpon-like fish have been discovered in fossils dating to the Cretaceous period, 100 million years ago. In prehistoric times, there were many more species of tarpon; today, there are just two: one that frequents the Atlantic and another found in the Indo-Pacific area.

Tarpon are silvery colored with blue-gray backs. Underwater, they appear to shimmer like huge gray ghosts as they swim sedately by. This appearance,

Until recently, tarpon were thought to have a life span of only about 15 years. However, using more accurate techniques to count annually deposited rings in the earbones (otoliths) of fish, researchers found one individual that had lived 55 years. Many of the fish caught in the fishery are 15 to 30 years old.

The world's fishing record for a tarpon was set in 2003 when a tarpon weighing 286 pounds, 9 ounces was landed in Guinea-Bissau, Africa. The Florida record for tarpon caught with conventional tackle

<b>AT A GLANCE</b>	Scientific name	<i>Megalops atlanticus</i>
	Size	To 8 feet, approximately 280 pounds
	Range	In the western Atlantic, from Virginia to central Brazil and throughout the Caribbean Sea and Gulf of Mexico; in the eastern Atlantic, along the western coast of Africa
	Habitat	Most abundant in estuaries and coastal waters but also occurs in freshwater lakes and rivers, offshore marine waters, and occasionally on coral reefs
	Status	In Florida, recreational fishery only. Anglers must purchase a special tag to possess and kill a tarpon

Tarpon art after Diane Rome Peebles painting.





was a 243-pound fish captured off Key West in 1975.

## Range and Habitat

Tarpon have been reported as far north as Nova Scotia and have also been found off the coast of Ireland. However, they prefer tropical and subtropical waters and are most common from Virginia to central Brazil and throughout the Caribbean Sea and Gulf of Mexico. Because tarpon are sensitive to cold water, their range is generally limited to temperate climates. In Florida, they are found in water depths ranging from less than 3 feet to more than 80 feet.

Although scientists believe the western Atlantic stock is genetically uniform, they have observed regional differences in behavior and size. Tarpon in Costa Rica, for example, are generally smaller than Florida tarpon, and Costa Rica tarpon spawn throughout the year rather than seasonally as Florida tarpon do.

Tarpon thrive in a variety of habitats. Adults are believed to move offshore to marine waters to spawn, and the larvae gradually make their way back inshore to marshes and mangrove embayments in estuaries. Adults frequent a range of habitats, from offshore and nearshore coastal waters to stagnant pools off of riverine habitats. They can often be seen patrolling the coral reefs of the Florida Keys. In Costa Rica and Nicaragua, tarpon are frequently caught in freshwater lakes and rivers miles from the coast.

Although tarpon do migrate, little is known about the frequency or extent of their travels. Scientists do know that tarpon captured in Florida have later been recaptured as far west as Louisiana and as far north as South Carolina. Several projects are underway to learn more about the migratory patterns of tarpon. Pop-up archival transmitting tags and orbiting satellites are being used to help track migratory paths along Florida's east and west coasts. Researchers are also examining more local movements by sonic-tagging tarpon captured during catch-and-release fishing events and tracking these fish after their release.

## Life History

In May and June, tarpon begin gathering together in areas near the coast in preparation for the journey to their offshore spawning grounds. In these coastal

staging areas, scientists and fishermen have observed schools of tarpon swimming in a circular, rotating motion. This behavior, known as a "daisy chain," may be a sort of prenuptial tarpon tango that prepares the fish for spawning. The actual exodus to the offshore spawning areas is probably triggered by lunar phases and tides.

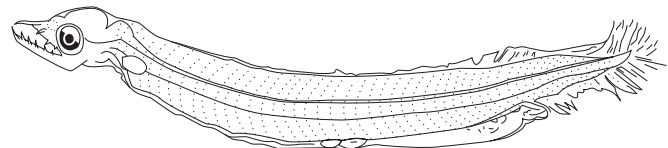
## FAST FACT

*During aerial surveys conducted by researchers with the Fish and Wildlife Research Institute in 1989, 33 tarpon "daisy chains," each containing from 25 to 200 individual fish, were observed along a 12-mile stretch of Florida's west coast.*

During one spawning season, it is estimated that a mature female may produce from 4.5 to 20.7 million eggs. The larger and heavier the fish, the more eggs she is likely to shed.

Scientists have never observed tarpon spawning or collected their fertilized eggs. Although no one knows exactly where tarpon spawn, tarpon larvae only a few days old have been collected as far as 125 miles offshore in the Gulf of Mexico. Some local anglers claim to have seen spawning in inshore waters near the passes, but this has yet to be proven. Spawning in Florida occurs mainly in May, June, and July.

The eggs hatch into larvae called leptocephali. These bizarre-looking creatures have a transparent, ribbonlike body with slender, fanglike teeth. The leptocephali drift with the currents toward the shore, reaching estuarine areas within about 20 to 30 days. Storms may assist in pushing the larvae toward their inshore nurseries.



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Larva illustration after B. Eldred, 1972; Fla. Dep. Nat. Resour. Mar. Res. Lab. Leaflet Ser. Vol. 4 Pt. 1 No. 22.



By the time the larvae reach these inshore areas, they are about an inch long. At this point, they begin an amazing transformation in which they lose their teeth and begin shrinking in length, winding up as miniature versions of the behemoths they will eventually become. Scientists do not yet know how long this metamorphosis takes, but they are getting closer to making a determination.

The juvenile tarpon make their way into marshes and mangrove swamps, where they will spend the remainder of the first year of their lives. They are often found in stagnant pools. They grow rapidly and are about a foot long within one to two years. Females usually grow more quickly and are larger than males, and both reach sexual maturity at around 10 years of age. The sex of a tarpon cannot reliably be determined until their second or third year and then only by an internal examination.

Tarpon are often found in schools with other tarpon and are opportunistic eaters that feed on a variety of fish and crabs. They can tolerate various salinities, but they are vulnerable to cold snaps and become stressed when water temperatures fall below 55° Fahrenheit. Although adults can often seek refuge from the cold in deep holes and channels, young fish are less able to escape cold waters.

*F A S T* FACT

*Tarpon appear to resort to air-breathing more when water temperatures and hydrogen sulfide concentrations rise and dissolved oxygen levels plummet.*

One particularly remarkable facet of tarpon physiology is the fish's ability to breathe both underwater and out of the water. When dissolved oxygen levels in the water are adequate, tarpon breathe like most fish, through their gills. When oxygen levels are depleted, however, they can also breathe by gulping air, which is then passed along to their highly specialized swim bladder. The swim bladder functions as an accessory lung and even resembles that organ, with its spongy, highly vascular tissue. The swim bladder can also be filled with air as needed to help the fish maintain its desired depth in the water. Scientists believe the tarpon's ability to breathe air is a nifty adaptation that allows it to survive in the stagnant, oxygen-poor

pools and ditches it frequents and may have contributed to its survival since prehistoric times.

### Fishery History and Management

Tarpon have long been a target for Florida anglers. While they are not considered good to eat, tarpon are still consumed in some parts of the world, particularly in Central and South America. In "old Florida," the muscle was cut into strips and dried to make jerky. Today, it is their size and fighting prowess that have made them one of the state's most coveted sportfish. As long ago as the late 1800s, fishermen in canoes hunted tarpon with a variety of equipment, from harpoons to hand lines. Killing multiple tarpon for sport was extremely popular. Tarpon were also commonly harvested for fish mounts (taxidermy).

In 1953, Florida officials established a fishing limit of two tarpon per day and prohibited their sale. In 1989, the Florida legislature established a "tagging" system in which the Florida Fish and Wildlife Conservation Commission (FWC) determined the number of tags that can be sold; a tag is required if the angler wishes to possess and/or kill the fish. In 1996, the tag cost \$50 for a year. By 1997, landings of tarpon had declined to less than 100 a year. The fishery is now largely a catch-and-release endeavor, for which a tag is not required.\*

Statistics on the number of tarpon caught by sport fishermen are not precise, but one survey indicates that 50,000 to 88,000 tarpon were hooked by anglers from 1992 to 1995. Scientists believe the tarpon population in Florida is stable, as it is predominantly a catch-and-release fishery. It is important, however, to note that a catch-and-release fishery does not imply 100% survival. Current research using ultrasonic telemetry is underway to estimate catch-and-release mortality rates for tarpon caught recreationally. Researchers stress that a downward trend in the recruitment of juveniles into the fishery would be difficult to detect because this fish lives so long. A

\*Fishing regulations may change annually. Contact the FWC's Division of Law Enforcement for information about current regulations. You can also view the current saltwater fishing regulations at the Web site for the FWC Division of Marine Fisheries Management, located at <http://MyFWC.com/marine>



decrease in adult populations would signal a decline in the recruitment of juveniles into the fishery, but it would be many years before a decrease in the adult populations of this long-lived fish could be seen.

Tarpon tournaments are popular in Florida, with at least a dozen held in the state each year. One tournament in the Tampa Bay area has been conducted since before World War II. Perhaps the most famous tournament is the Gold Cup, a fly fishing competition held in the Florida Keys. Among its winners was baseball legend Ted Williams.

The premier tarpon fishing “hot spots” in Florida are Boca Grande Pass, which is in southwest Florida, Homosassa, and the Florida Keys. In general, more tarpon are caught on the state’s west coast than on the east. Tarpon are most abundant in the months of May through July, but records show that they are caught in all months.

Although tarpon appear to be sensitive to noise and boat traffic and may become skittish and reluctant to take bait when the waters are crowded with boaters, tarpon are unlike many other fish in that they can frequently be found in highly urbanized areas with poor water quality. They will take a variety of live and dead bait, as well as artificial lures and flies. Many fishing guides specialize in tarpon fishing, and it is thought to be one of the most economically valuable recreational fisheries in Florida.

## Research Efforts

Scientists at the Florida Fish and Wildlife Conservation Commission’s Fish and Wildlife Research Institute (FWRI) have been at the forefront of pioneering research into the life cycle, health, and behavior of tarpon. Among their accomplishments are studies that have shown that tarpon live as long as 55 years. In these studies on otoliths, the rings (deposited annually much like those on a tree) are counted. Scientists remove the otoliths from the fish, cut a cross-section through them with a special diamond-bladed saw, and examine the rings under a microscope to

estimate the ages of a variety of tarpon. FWRI researchers also are participating in a study to refine tarpon-aging techniques by using natural radio isotopes found within the otoliths. By measuring the rate at which these radio isotopes decay, scientists can estimate the age of the fish, much as paleontologists use carbon dating to age dinosaur fossils. Otolith samples have also been collected as part of a microchemistry study to help determine where an individual fish may have dwelled for its larval and juvenile life. Based on the unique chemical composition of certain bodies of water and the concentration of those same chemicals in the otolith, scientists may be able to determine the exact location a fish lived during its early years.

To help determine the diversity of tarpon in Florida’s estuaries, researchers are collecting samples of the tips of the long dorsal threadfin to be used for DNA analysis. This technique is also being used to further evaluate the relation of tarpon in Florida, the Gulf of Mexico, and the Caribbean, to determine whether populations of tarpon from Florida are “mixing” with populations from other geographic areas.

Scientists are also trying to pin down how long the larval phase lasts in tarpon, how larval fish reach the estuaries, what factors determine how many recruit into these inshore nurseries, and where they first spawned.

Despite its fame and familiarity with anglers, many questions about the lifestyle and behavior of the state’s “silver kings” remain unanswered.

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



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