

Department of Environmental Protection

Florida Marine Research Institute

A secretive bivalve that spends most of its short life hiding in underwater grasses, the bay scallop is a prized dinner entree for many Floridians and an important component of the marine ecosystem. Although bay scallops historically were a valuable seafood commodity, declining populations in many coastal areas of Florida have prompted restrictions that now allow only recreational harvests. Scallops are highly sensitive to changes in water quality and therefore are an accurate barometer of an ecosystem's health. Just as coal miners used canaries to detect waning oxygen levels or the presence of dangerous gases, the bay scallop provides an early-warning system for scientists monitoring the quality of Florida's coastal waters.

BAY SCALLOPS

Underwater Canaries

shells. Its upper valve is a dark mottled color, occasionally bright yellow or orange, and its lower valve is typically white. Bay scallops may reach a shell height of two inches and live two years, although in Florida their life span is generally only one year.

The bay scallop feeds continuously by "vacuuming" or filtering small particles of algae and organic matter from the water. It does this by funneling water over open pathways called gills. One of these pathways takes in water and skin off particles, while another expels the filtered water along with digestive wastes.

Scallops open their valves when feeding or

Description

The bay scallop is a member of the shellfish family known as bivalves—for its two valves, or

FAST FACT

An adult bay scallop can pump as much as 15.5 quarts of water per hour.

AT A GLANCE	Scientific name	<i>Argopecten irradians</i>
	Size	2 inches
	Range	Throughout the Florida Gulf Coast and on the Atlantic Coast as far north as West Palm Beach
	Habitat	Seagrass meadows in shallow waters
	Status	No commercial harvest is permitted. Recreational harvest is allowed north of the Suwannee River from July through September 10th only.

Scallop art after Pete Carmichael photo; used with permission.



breathing and close them when predators approach. The shell can also be slammed shut to avoid silt, which can clog the animal's delicate gills. Many tiny blue eyes arrayed along the outer rim of the shell detect movement near the animal and serve as a warning system. When threatened, the scallop can swim backwards by clapping its valves and expelling water rapidly. Generally, most people eat only the large adductor muscle of the scallop. Scientists advise against eating the other parts unless the scallop is harvested from approved shellfishing waters, because these viscera may contain waterborne contaminants that can cause illness.

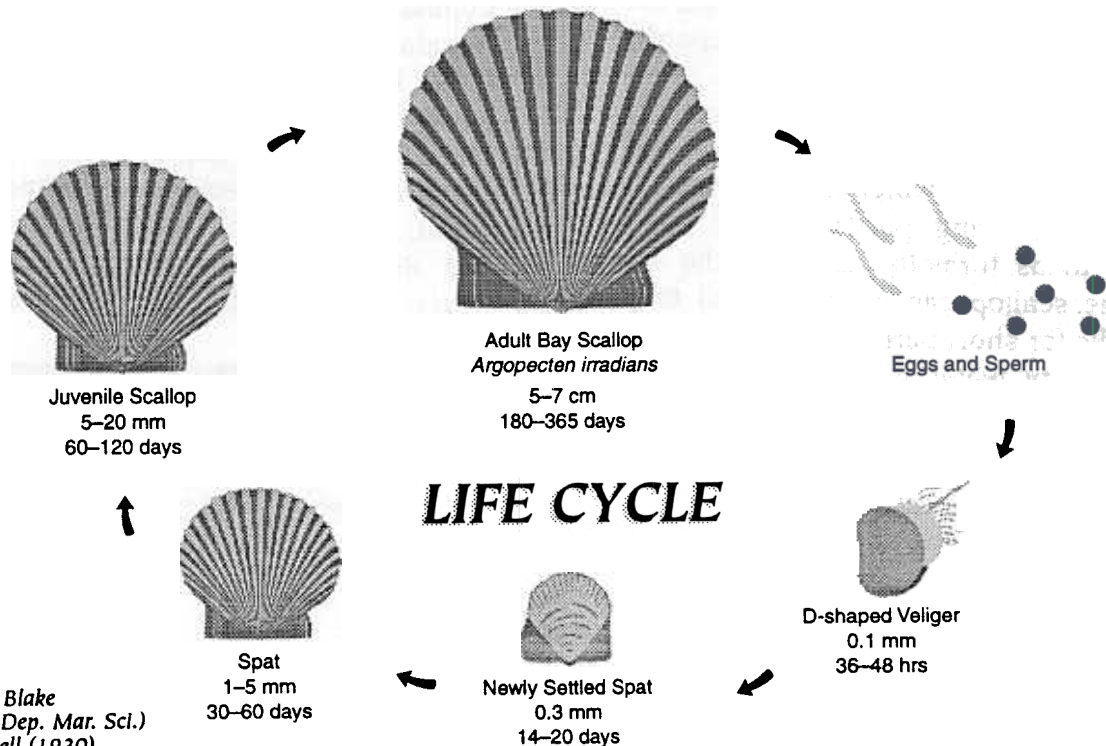
Life History

A bay scallop has the remarkable ability to develop both male and female sexual organs; consequently, the scallop produces both eggs and sperm. An interval occurs between the release of sperm and eggs so that self-fertilization is unlikely to occur; this interval helps to prevent inbreeding. Development of the repro-

ductive organs is influenced by the amount of food available and the surrounding water temperature. If too little food is present, the scallop will direct all its energy toward survival and will forego reproduction.

A change in water temperature may trigger spawning. In Florida, spawning occurs in the fall when the temperature drops, although elsewhere in their range, bay scallops typically spawn earlier in the year when the temperature rises. Each scallop is capable of producing millions of eggs at once, but the mortality rate is extremely high. Only one egg out of 12 million may survive to adulthood.

In about 36 hours, the fertilized eggs become tiny larvae that float in the water for about 14 days before attaching to the base of seagrass blades. At this time, larvae are transformed into juvenile scallops, commonly called spat. The spat gradually move up the seagrass blades, out of the reach of bottom-dwelling predators such as crabs. But even then, survival is uncertain. As many as 90% of the spat will die within six



Art after N. J. Blake
(Univ. S. Fla. Dep. Mar. Sci.)
and J. S. Gutsell (1930).



weeks of latching on to seagrasses. Those that do grow large enough to avoid consumption by predators will eventually drop off and fall to the bottom, where they will remain the rest of their lives.

Even as adults, scallops live a precarious existence. A variety of marine creatures, including blue crabs, stone crabs, and whelks, are able to pry the scallop shells open and extract the tender meat within. Sometimes the scallop can escape this fate by swimming away. Occasionally, the algae, tunicates, and other organisms that attach to scallop shells may conceal them from predators—although this is not a reliable defense.

f a s t FACT

Researchers frequently find the outside of stone crab burrows littered with broken scallop shells.

One creature, the pea crab, manages to live in harmony with the bay scallop; this little crab finds protection within the scallop's shells. While the pea crab does steal some food from the scallop, it doesn't take enough to jeopardize the health of its host.

Bay scallops are very sensitive to changes in temperature and salinity. They are also vulnerable to changes in water quality. Water made cloudy by floating particles and sediments, referred to as turbidity, can clog the scallop's gills. The scallop can close its shell to protect these gills for short periods but is unable to shut out the dirty water for more than about two hours.

Threats to Bay Scallops

Bay scallops were once plentiful throughout Florida's west coast but have virtually disappeared in some areas. An extensive scallop fishery existed in Tampa Bay as recently as the 1960s, but scallops are rarely found there now. Charlotte Harbor also supported a commercial scallop fishery some 30 years ago. Scientists

believe poor water quality is responsible for these declines. Currently, the most extensive bay scallop populations are located north and west of the Suwannee River, particularly near the fishing hamlet of Steinhatchee and in St. Joseph Bay.

Once a population is depleted, it may not be able to recover on its own, even with improved water quality and restrictions on harvest. Scallops are broadcast spawners, sequentially releasing eggs and sperm to maximize fertilization by other scallops. If no other scallops are nearby, reproduction may not be successful. Consequently, a depleted scallop population may have to rely on neighboring populations to replenish its losses.

Fishing Regulations*

Restrictions enacted to enhance the natural recovery of scallop populations have been placed on scallop harvesting. No commercial harvest of bay scallops is allowed anywhere in the state, and recreational catches are now limited.

Before the restrictions were adopted, telephone surveys of scallopers and aerial surveys of popular harvesting areas were conducted by the Florida Department of Environmental Protection's Florida Marine Research Institute. Those surveys revealed that the intense fishing pressure placed on already depleted scallop populations hindered natural recovery of some stocks. As a result, all scalloping areas south of the Suwannee River, including Homosassa and Crystal rivers, were closed, and scalloping north of the

f a s t FACT

Aerial surveys of the Homosassa and Crystal rivers at the start of the scallop season showed the presence of 600 to 800 boats per weekend, each carrying an average of four people.

*Fishing regulations may change annually. Contact the Florida Marine Patrol for information about current regulations.



Suwannee was restricted to the period from July through September 10th.

In areas where scalloping is permitted in July and August, each person is limited to a maximum of 2 gallons of whole scallops, or 1 pint of scallop meat per day. A boatload of five or more people can take no more than 10 gallons of whole scallops or 4 pints of scallop meat per day. These regulations, which took effect in 1995, will be reevaluated in 1998 (unless modified in the interim) to determine how effective they are at protecting scallop populations.

All scallopers operating from a boat must have a valid saltwater fishing license from the state. People who gather scallops by wading into shallow areas at low tide do not need a license, but they cannot use dive masks or snorkels to help them find the scallops.

Researchers have suggested the sale of a special "scallop stamp," which could be affixed to fishing licenses. Information derived from such sales would provide researchers with valuable information on the extent and locations of scallop harvests.

Research

Scientists at the Florida Marine Research Institute conduct a variety of studies to assess scallop populations and to learn more about their environmental needs. In conjunction with other researchers, they are also attempting to "jump-start" depleted scallop populations in Tampa Bay and other west coast estuaries by rearing scal-

lops in laboratories and releasing juveniles into the wild. Tampa Bay was selected for this project because researchers believe water quality there has improved enough to again support bay scallops.

In the laboratory, scientists are experimenting with a variety of materials that mimic the natural seagrass meadows scallops require during their development. In fact, scallops have already been successfully reared on artificial turf like that used on football fields. When they are transplanted in the wild, the juvenile scallops are often placed in protective cages—dubbed "scallop condos" by one researcher. The cages help shield them from predators until they are large enough to spawn. Although the scallops die soon after spawning, it is hoped that the eggs they release will survive in the wild and eventually replenish the local area.

In Tampa Bay, citizens help assess the success of the transplants by participating in "The Great Bay Scallop Search." During this one-day event, teams of snorkelers swim along defined transects in the bay's seagrass beds and search for scallops hidden among the thick grass carpets. Although few adult scallops have been found by the volunteers so far, this event provides valuable baseline information with which to compare the ultimate success of restocking efforts. Just as importantly, the Great Bay Scallop Search is a highly successful way to raise public awareness of the plight of these "underwater canaries" in Tampa Bay and throughout Florida.



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