PROJECT OYSTER
A Mission to Improve Local Water Quality

A Little about Oysters

Oyster reefs are an important component of our local ecology and found throughout northern Gulf of Mexico estuaries and bayous. Oysters filter water to obtain food and oxygen by pumping large quantities of water across their gills. During feeding, oysters take in phytoplankton, algae, bacteria, viruses, sediments and chemical contaminants. This improves water quality by reducing suspended sediments and contaminants. Rejected material is excreted as waste matter which is deposited as bottom sediments; oysters can also accumulate contaminants such as metals in their tissues. An adult oyster can filter approximately 35-50 gallons of water in a day under optimum conditions! Oysters create their own habitat by making oyster reefs, which offer protection, food, and habitat to many types of estuarine organisms.

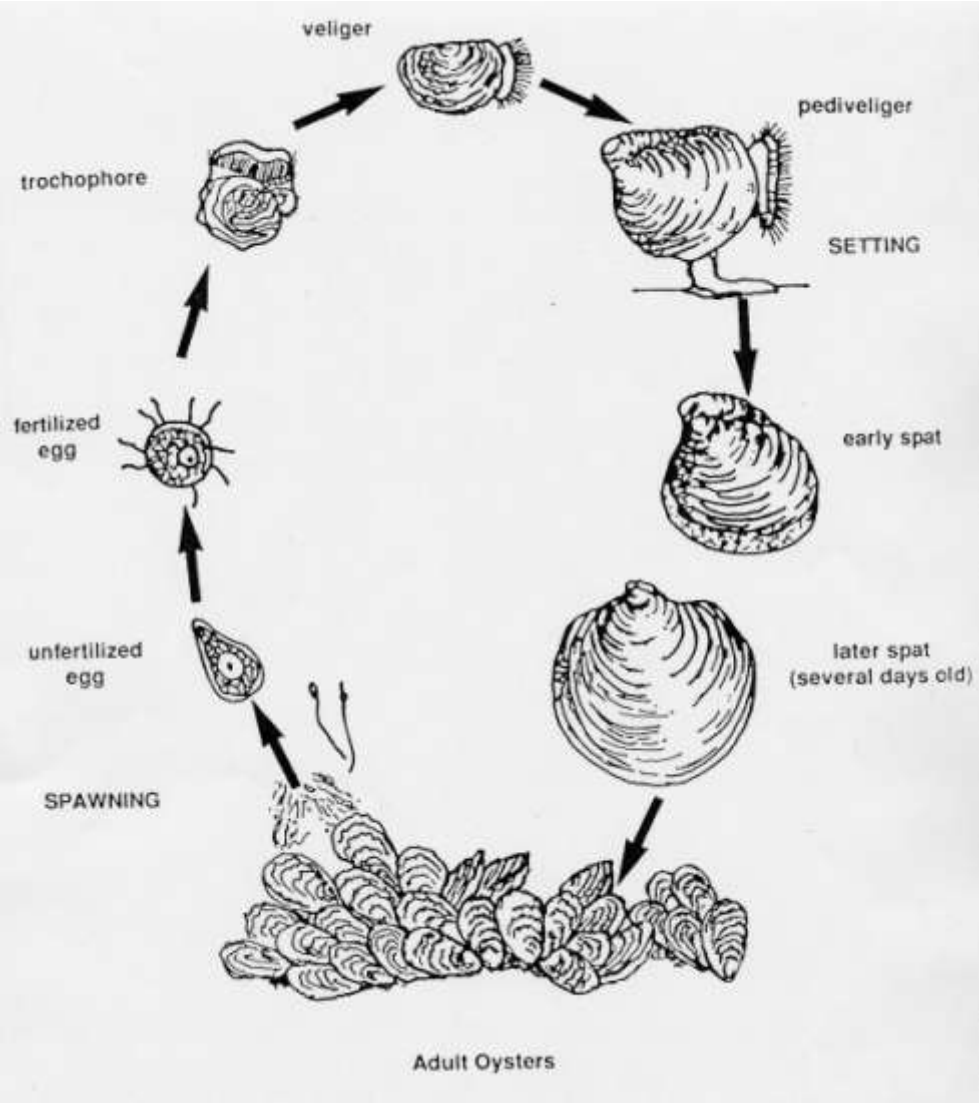
Wild oyster with small barnacles and baby oyster spat attached to the shell. *Photo by Chris Verlinde*.

Oysters are found throughout the Pensacola Bay system where salinities range from 8-25 parts per thousand (ppt). Baby oysters are known as spat and settle in a variety of locations, preferring shell and calcium carbonate materials (known as cultch) but will settle for piers and rock jetties. These oysters are known to colonize dock pilings, rock jetties, and other areas wherever there is firm footing to support their weight.

The growth rate of the spat may be as high as 10 mm/month (1/4 “). This rate will slow as the oysters grow. The spat will take on the contour of the cultch material and will begin to resemble an adult oyster in a short time. Oyster growth is influenced by temperature, salinity, food availability, and periods of exposure to air and

population density. The Eastern oyster (*Crassostrea virginia*), found throughout the Gulf of Mexico and along the Eastern coast of North America can live to be 25 to 30 years old.

Oysters have many predators including starfish; oyster drills (gastropods); Oyster Catcher (birds); various crabs and the drum (fish).



Life cycle of the eastern oyster, *Crassostera virginica. (Diagram courtesy of Chris Verlinde)*

Native Wild Oysters (diploid) versus Hatchery Reared (triploid) Oysters

Oysters found in nature normally have two sets of chromosomes and are Diploid. During reproduction, the egg and sperm each contribute one set of chromosomes to produce the **Diploid oyster**. This diploid oyster is therefore viable and can produce future offspring.

Triploid oysters are created under laboratory conditions in which oyster spawning is induced and causes the egg to contribute two sets of chromosomes and the sperm one set, resulting in a Triploid oyster. Triploid oysters can occur naturally, although they comprise only a very small percentage of the natural population. Triploid oysters

are sterile and put the majority of their energy towards shell and meat growth. Consequently, these triploid oysters will not contribute any genetic material to the wild population.

Using Oysters to Improve Water Quality

Water quality in coastal estuaries, bayous, creeks and bays reflects changes in the landscape. When landscape systems change from rural areas such as the Blackwater River State Forest to urban area (such as downtown Pensacola), the quality of the runoff after rain events shifts from healthy (natural filtration through leaves and sand) to stormwater runoff (carrying nutrients, oil and gas from vehicles, metals from car brakes, detergents, lawn care chemicals, etc) which enters our creeks, bayous and bays.

Plants and animals living in these areas may not thrive under these stressful conditions but oysters may play a role in improving water quality. Runoff of dissolved nutrients such as nitrogen fuels growth of algae, which die and fall to the bottom where decay occurs. The decay process consumes oxygen, leaving the water with too little oxygen to support fish and other marine life. "Putting shellfish out in the system is a lot like putting sheep in an overgrown pasture. The sheep are going to graze down the excess plants," said Bill Walton, a marine biologist with Auburn University who studies oysters.

Encouraging growth of oysters and other shellfish can be part of a biological based strategy for managing nitrogen pollution, but cannot solve pollution problems alone. Also, oysters grown in impaired waters should not be eaten, as they may concentrate harmful bacteria which can cause illness in people.

The Project

The project is based on the Oyster Gardening for Restoration and Education courses developed by the Chesapeake Oyster Alliance. We propose community involvement in deploying oyster cages on private docks throughout the smaller bayous in the Pensacola Bay System. The cages will be provided along with 75 triploid oysters which will be counted, weighed and measured before deployment.

Students and citizen volunteers will collect data to assist with this pilot project. Interested homeowners, individuals or those wishing to sponsor a class or student must attend a 3-hour workshop which will provide basic information on maintaining oysters under the best possible condition for your location. Our program partners include the FL Fish and Wildlife Conservation Commission (FFWCC, FWC), SeaGrant and the University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS).

Participants will receive an oyster cage, 75 triploid oysters, a rain gauge, log book and instructions on cleaning and maintaining the cage as well as a point of contact should questions arise. Oysters will be grown out in cages for 9-12 months and returned to the BFA organization for survival counts and measurements. Adult oysters will be measured and weighed before being installed in a living shoreline project within the same water body. Interested participants can receive another 75 juvenile oyster spat and begin the grow-out cycle again.

Help Improve Local Water Quality – Hang an Oyster Cage off your Dock

Please join the BFA & Pensacola Bay Oyster Company in cleaning up local waters by implementing a living biologically based strategy using oysters in cages to filter waters off your dock. Seventy-five oysters filtering 50 gallons per day could make a difference at your dock. Oyster cages on each dock in a bayou could make a big difference for that system.

The Partners

The Bream Fishermen Association (BFA) is a well-known and highly respected organization which has assisted the city, county, state, and region in protecting northwest Florida and south Alabama waters for over 50 years. The BFA promotes environmental stewardship through water quality monitoring by implementing programs that educate and improve the quality of our environment for all persons, plants and animals; from the headwaters of creeks to the Gulf of Mexico. Originally organized in the 1970s, the BFA worked closely with the newly formed University of West Florida, the US Environmental Protection Agency, and the FL Dept of Health to identify and coordinate a monitoring program that continues to this day. For more information please visit www.BreamFishermen.org.

The Pensacola Bay Oyster Company was founded in 2013, when local Pensacola businessman and entrepreneur Donnie McMahon realized a market for premium Florida oysters. McMahon grew up in Pensacola and remembers when the Bay supported an ample supply of oysters. Hurricanes and the BP Deepwater Horizon oil spill have damaged wild beds, causing the local oyster growing market to dry up. For more information please visit https://PensacolaBayOyster.com.

How can you participate?

Register for the workshop and reserve an oyster cage by sending an email to TheBreamFishermen@gmail.com or calling 850.384.6696.

A workshop will be held in early December and again midyear. Interested participants will be notified as dates and times are secured.

Area schools can participate in this project as a STEAM or STEM curriculum. **STEAM** fields are **s**cience, **t**echnology, **e**ngineering, and typically either **a**rt and **m**athematics, or applied mathematics. **STEAM** is designed to integrate **STEM** subjects into various relevant disciplines in education. ... **STEAM** programs add art to **STEM** curriculum by drawing on design **principles** and encouraging creative solutions.