Tidewater Oyster Gardeners Association

Growing oysters for a cleaner Bay

www.oystergardener.org

Vision

A bay repopulated with sufficient oysters to improve water quality and sustain a viable oyster industry

Mission

To motivate citizens to help the bay by growing oysters. We accomplish this mission through:

Education:	Float workshops, Annual Oyster Fair, Master Oyster Gardener Course in cooperation with the Virginia Institute of Marine Science (VIMS), creating educational materials, and the TOGA web site: www.oystergardener.org
Experience:	Helping citizens establish oyster gardens in tidal creeks and rivers throughout the bay
Research:	Participate in oyster research, habitat preservation, and restoration initiatives

Education

Master Oyster Gardeners Course

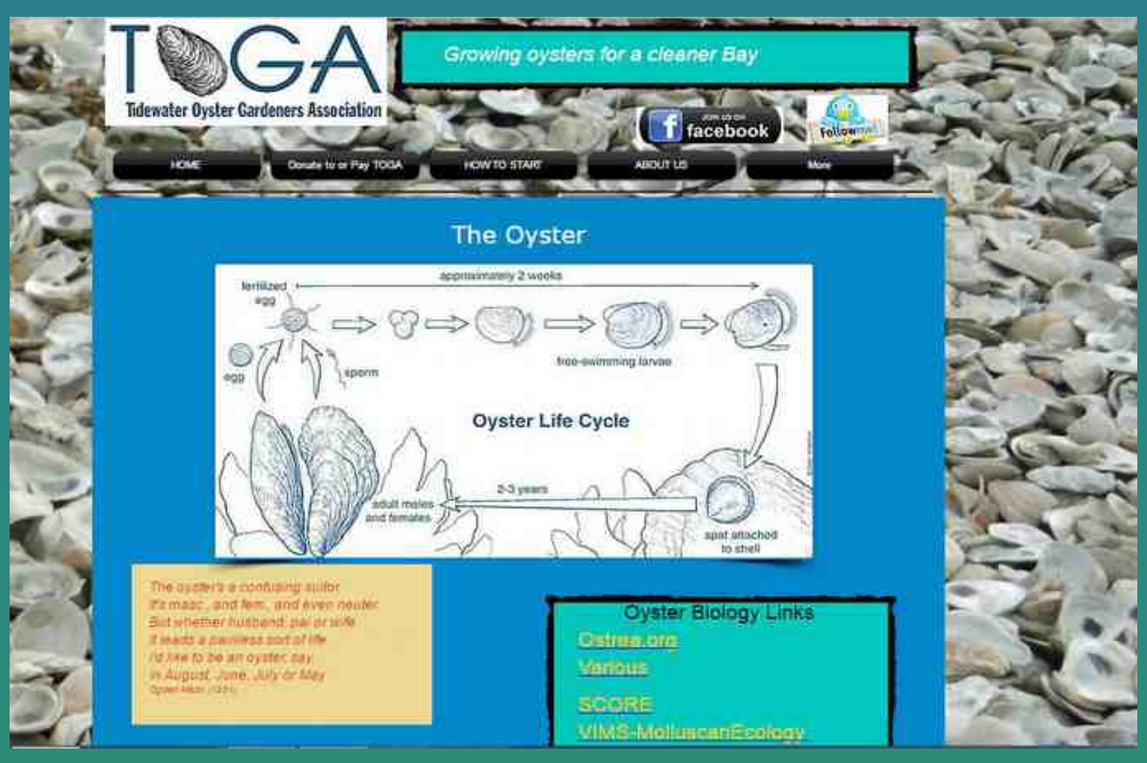
Conducted in cooperation with the Virginia Institute of Marine Science to introduce citizens to the benefits and basic skills to grow oysters

Float Workshop

Learn how to and build your own float to grow and protect the oyster seed you purchase

Oyster Fair

Learn more about oysters from the experts; gardeners share their knowledge; and suppliers present their latest products



Website

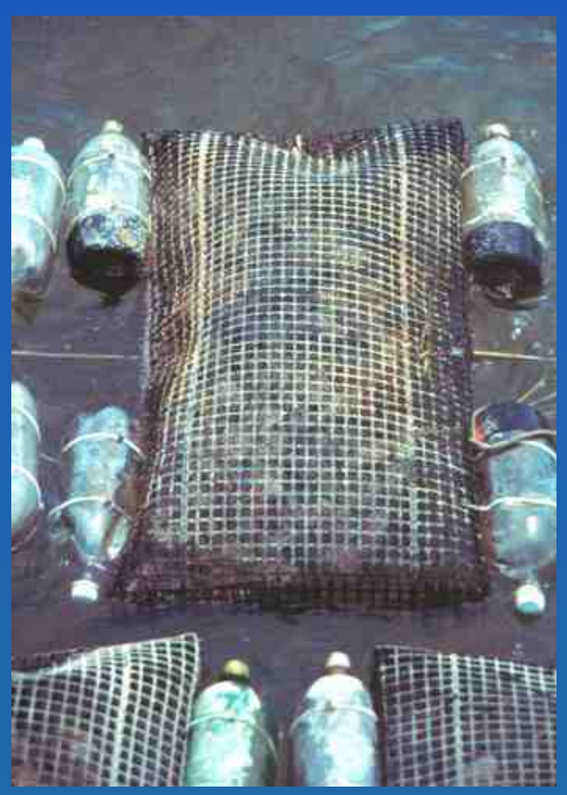
www.oystergardener.org

On Site Assistance

We help citizens establish oyster gardens in tidal creeks and rivers throughout the bay

Experience

Growing oysters to clean bay waters, spawn and eat



Habitat restoration for a sustained oyster population

Shoreline before oyster reef restoration (above), and after habitat restoration (right)

Research

Provide attended grow-out sites in support of VIMS research

Support oyster industry to increase economic value to Virginia economy

How to Grow Oysters in Your Own Waters

Tidewater Oyster Gardeners Association

http://www.oystergardener.org

Seed in bags.

1. Oyster seed (spat), each about ¼" in diameter, are purchased by the thousand. One thousand oyster seeds in a mesh bag are about the size of an orange. These mesh bags of oyster seed are not strong and must not be put into the water as is, not even tied to the dock for a few minutes. Blue crabs will tear the bag open and the oyster seed will spill out and be lost on the bottom.

Oyster spat.

Different sized mesh bags.

2. New oyster seed are put into a durable aquaculture plastic mesh bag with $^{3}/_{16}$" openings. The open end is tied or clipped closed and the mesh bag is laid into a float and tied down.

3. Every two weeks or less, the mesh bag is brought out of the water, hosed off and brushed to remove algae, and the contents of the bag examined. Be careful to remove any small crabs that have gotten into the bag, because they will eat the young oysters.

Cleaning off a mesh bag.

4. When the seed are large enough not to fall thru the mesh, they are transferred to a larger mesh bag. At that time, the young oysters are divided into lots of about 500 per half-inch mesh bags and the bags are put back into the floats.

5. Continue cleaning the bags about every two weeks, always checking for crabs.

6. As soon as the oysters are large enough, move them into the open float, which may be lined with bird netting. You may need to sort them by size, removing the larger ones to the open float and leaving the smaller ones in the mesh bags until they are big enough not to fall through.

7. When oysters go into an open float, a lid should be placed over the float to keep out raccoons, otters, etc.

Bottom of a Taylor float showing build-up of barnacles.

8. **As with the mesh bags, the floats will need to be hauled up and cleaned at intervals, depending on the growth of algae. The openings in the float basket must be kept open to allow free flow of water and food to the oysters.**

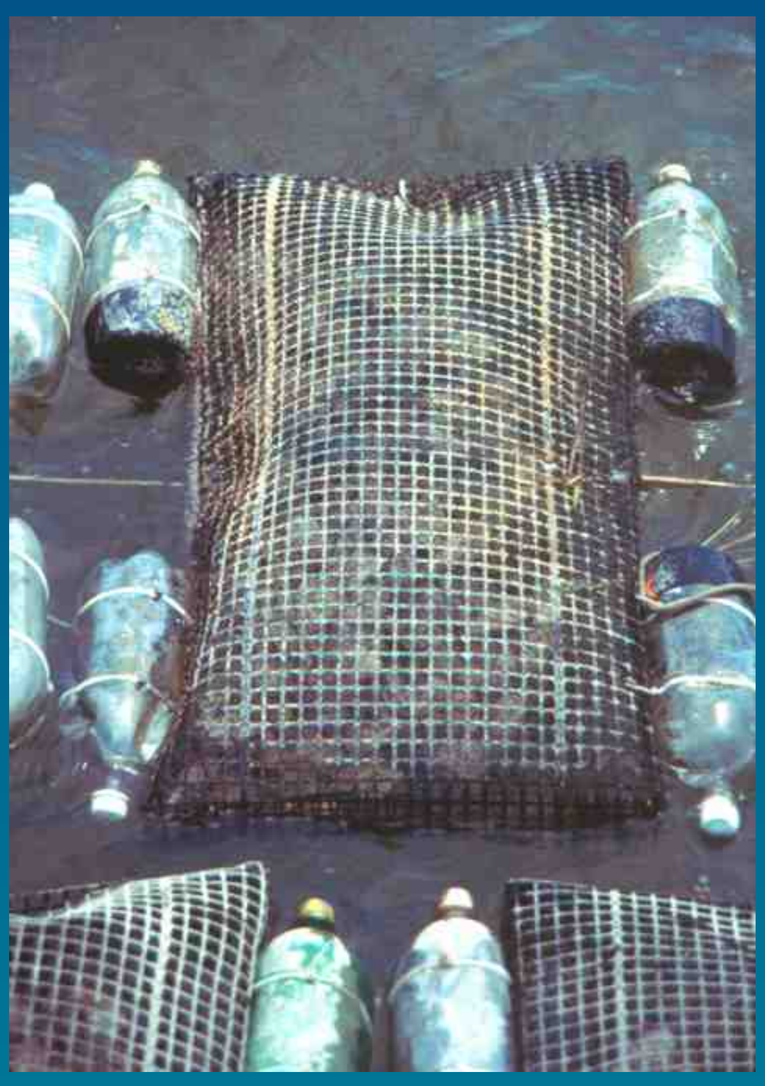
9. **Oysters feed and grow when the water temperature is 50°F or warmer.**

Blue crab damage.

10. Oysters grow best at a salinity of 12 ppt and above. They will grow, however, in water with a salinity as low as 6 ppt, but slower in less salty water.

11. The worst predators for oysters are blue crabs. Since the oysters grow very rapidly, the shells are thin and easy for even small crabs to break.

Blue crab on an oyster reef.



12. Oysters 1 ½" or larger may be grown out into a number of structures: Taylor Floats, plastic bags suspended by soda bottles, bottom racks.

Predators of Oyster Gardens And Other Threats

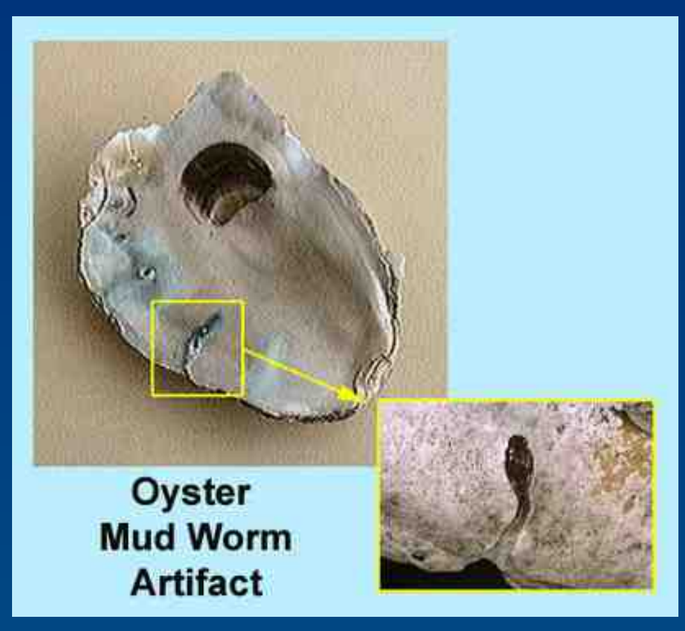
TOGA

Tidewater Oyster Gardeners Association

http://www.oystergardener.org

Other Threats

BURROWING WORM: Polydora is a small worm that burrows into the oyster shell for protection. While it doesn't consume the oyster, the oyster will try to wall off the worm penetrations by forming a blister on the inside of the shell. The blisters, brown to black in color, are unsightly and can break during the shucking process, releasing mud into the oyster flesh and liquor. The more the oyster works to wall off the worm infestation, the more energy not being used for growth.



Hard shell protrusions

Blisters: Examples of a heavy Polydora infestation. The worms burrow in at the shell margins and the oyster responds by forming blisters to wall off the penetration. Note the multiple blisters on the inner surface of the shell and the protrusions at the adductor muscle site (a vertical manifestation of the blister). Early stage blisters are light brown in color and paper thin. Later stage blisters are harder and dark brown in color. Eventually the area will recover completely.

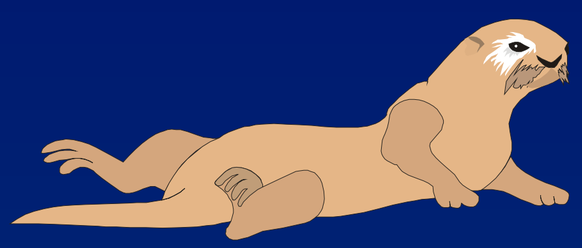
DISEASES: Wild Chesapeake Bay oysters die at a high rate due to MSX *(Haplosporidium nelsoni)* and Dermo *(Perkinsus marinus)*. Now, oyster gardeners as well as commercial oyster growers use aquaculture oyster strains (developed by VIMS) which are highly resistant to these diseases.

Perkinsus marinus *(Dermo)* in oyster tissue.

CRABS: Crabs can attack oysters from seed size (6 to 12mm) to market size.

Green crab

Crab damage to oysters



OTTERS AND RACCOONS: These animals will use oysters as a food source.

Knobbed whelk

Oyster drill

WHELKS AND OYSTER DRILLS: These gastropods will attack all sizes of oysters.

HUMANS: This animal will remove and consume oysters of all sizes. Also known to pollute garden site.

Cownosed ray

OTHER VERTEBRATES: Other vertebrates (rays, fish and birds) will attack and consume oysters in the wild. Few will bother the oyster gardener, because the oysters generally are grown in cages that protect them.

Osprey

Control

Routine inspection of the integrity of your oyster growing container (float, bottom cage etc.) is important to prevent the entry of larger oyster predators. At the same time, any predators that have entered your growing container must be removed. Predator removal is especially important when oysters are small.

In the past, soaking oysters in a brine concentrate was used to clear up Polydora. Recently it has been learned that the most effective and convenient method of controlling Polydora and other fouling organisms is periodic exposure to air. For a severe case, placing your cages on the dock overnight once a week will help. Alternatively, hanging a float/cage about one foot above the average low tide level will expose the oysters on every tide cycle.

Thanks to VIMS, most modern aquaculture oysters are disease resistant and live sufficiently long to be harvested.

Tidewater Oyster Gardeners Association

Designs & Devices

TOGA - Tidewater Oyster Gardeners Association

www.oystergardener.org

TOGA aims to make oyster-gardening equipment available to oyster gardeners. We do this by adopting existing designs, creating new designs, and fabricating devices for sale from time to time. We also teach interested gardeners how to build their own devices through our Annual Float-building Workshop. At other TOGA events, we invite local vendors to make their products available for purchase. We also maintain a list of vendors and helpful resources at www.oystergardener.org.

How to select oyster gardening equipment

It is important for you to select equipment that is convenient for you to work with. For example, the Taylor float can contain a relatively large number of oysters and is usually too heavy to be raised to a dock surface by hand. Gardeners using Taylor floats use several strategies to get the float in position so the oysters can be accessed. Some gardeners, on a site with a firm bottom, can wade into the water to work with the oysters. Others use a boat lift, boat ramp or winch system of some type to get the float in a position for cleaning and harvesting. The Taylor float should be kept in a near horizontal position when being raised to a dock.

The flip-float and bottom cage, while containing fewer oysters than the Taylor, are easier to lift to a dock. These devices may weigh up to 90 pounds when fully loaded, so you may still need a lift of some type. The tidal tumbler can be hung from your dock on a line. It is the lightest and can usually be raised to a dock surface by hand. All of the oyster floats/cages need to be washed off from time to time to prevent the heavy buildup of algae and barnacles.

The oysters grow fast, so avoid overloading and prepare to transfer the oysters to additional floats/cages. Overcrowded cages can restrict growth, and cause floats to sink. As a general rule, no more than 1/3 of the volume of a cage should be filled.

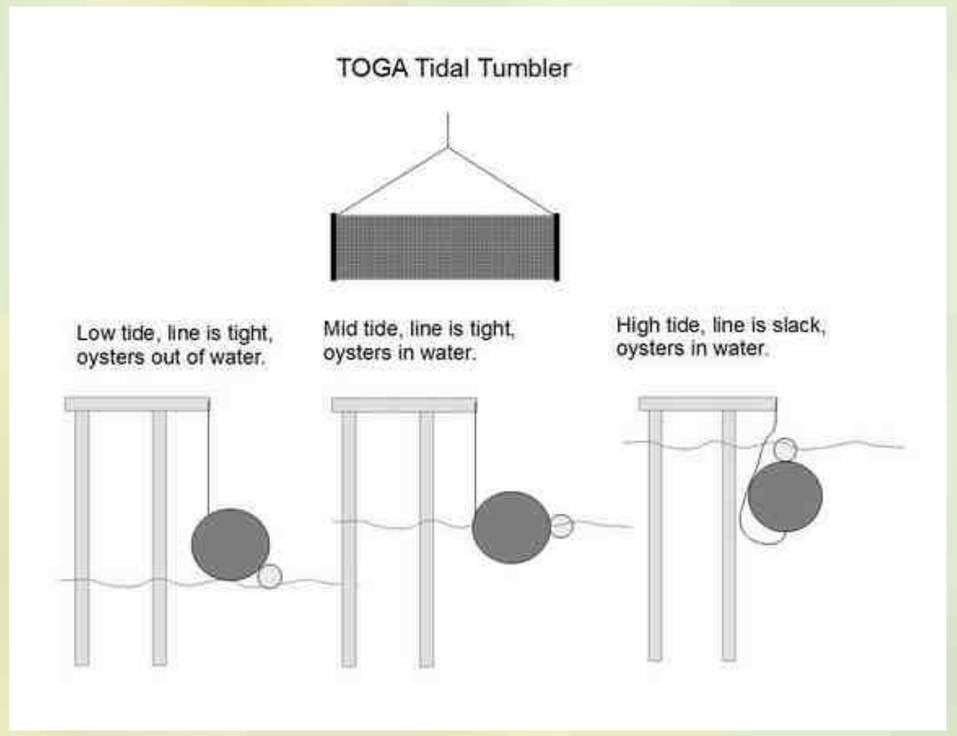
Shown below are devices available at occasional TOGA sales events and workshops.

<u>Taylor float</u> - 3 ft. x 2 ft. x 1 ft.
Holds up to 400 market-size oysters.
Use with standard ADPI bags.
Option- with wire mesh lid.

<u>Flip-float</u>- 39" x 23" x 6"
Holds up to 300 market-size oysters. Use with standard ADPI bags. Option- with additional flotation devices on ends. To help minimize fouling, flip the float in the water every few weeks and the sun will help clean the exposed topside.

<u>Bottom cage</u> - 39" x 23" x 6"
Holds up to 300 market-size oysters.
Use only with firm bottom.

<u>Tidal tumbler-</u> 36 " long by 12 " diameter. Holds up to 150 market-size oysters. Hangs on line beneath dock. Can be set to tumble automatically with tide change. See diagram below.



Shown below are devices available at occasional TOGA sales events and workshops.

<u>Wire Bender</u> - Handy for making your own floats and cages. Options- 42" or 48". The 42" bender is designed for the flip-float and bottom cage. It will also work for the Taylor float. The 48" bender can be used for any of these floats and cages, but is designed for the Taylor float.

<u>Grow-out Bags</u> - The photo shows two popular bags for containing young oysters. The bags can be placed in the floats or cages. The fine mesh bag is for spat ranging in size from ¼" to ¾". The large mesh bag is for oysters ¾" up to 1.5". After oysters reach 1.5", they should be removed from bags and left in the cage or float.

<u>Tools</u> - The photo shows most of the hand tools typically used for float and cage building. The flotation devices are made with 4" PVC drain pipe (thin wall). Hand or power saws are used to cut the pipe. Purple primer and heavy-duty PVC cement are used to attach the elbows and caps. Pig rings and a pig ring tool are used to "stitch" the cages together. Bungee cord and hooks are used to secure the hinged hatches. A good quality leveraged, spring-loaded wire cutter is used for cutting the wire.