Marine Extension Bulletin

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Cape Cod Cooperative Extension

Restoring Oysters Through Remote Set

Oyster-covered shells line this coastal embankment.

Of the various methods of oyster restoration available, natural resource managers are increasingly turning to oyster remote set. In this method, oysters are reared in tanks, attached to material put in the tanks and moved to another, or remote, location. It is a decades-old technique that has been used for both restoration efforts and private aquaculture, particularly in the Pacific Northwest.

The technique provides bags of juvenile oyster-covered shell prepared to be deployed in the field. In addition to providing juvenile oysters, the shell material often improves the habitat for subsequent set by wild oysters. For these reasons, natural resource managers are often interested in trying this approach.

Here we provide an overview of the remote set process, provide tips on improving oyster survival and growth in the field, and present examples of potential uses. This bulletin is intended for natural resource managers, coastal decision makers and interested citizens.

Bags of juvenile oyster-covered bags are transported to the field site and then arranged to maximize survival and growth.

Allowing shell to age will improve the oyster set.

Bags should not be overpacked.

Shell is bagged for ease of transport.

The bagged shell is stacked into a tank.

Millions of oyster larvae, ready to 'set' or attach to shell.

Overview

In remote set, setting material, or cultch, is obtained and bagged. The cultch is usually aged shell of some sort, as oyster larvae prefer to set on calcium carbonate-rich material. A shellfish hatchery then conducts a spawn of oysters, using routine rearing methods. Once these "eyed larvae" are ready to set or attach, the cultch bags are placed in setting tanks and filled with filtered, aerated seawater. Subsequently, the eyed larvae are added to the tank and larval set on the cultch is monitored.

After setting, the juvenile oysters, or spat, are fed a micro-algal diet and allowed to grow for 2-3 weeks. After this period, the juvenile oysters are hardy enough to be transported. The set tank is drained and the bags of shell, loaded with young oysters, are transported to the field planting site. There, the bags are often kept on racks or trays, allowing the oysters to grow. Before the oysters grow into the mesh of the bags, however, the bags are opened and the shell is spread out on the seabed at the designated location. If successful, this will establish a bed of oysters that continue to grow, survive, and reproduce.

Of course, natural resource managers running these operations can significantly improve the chances of success of a remote set effort. While some variables are beyond the manager's control (e.g., the hatchery operations, predators, storms, etc.), there are a number of points where the outcome can be influenced.

Acquire and Bag Good Cultch

The remote set process starts by obtaining good material for the oysters to set upon. A variety of materials can be used, but oysters seem to prefer aged (at least six months), dry, clean shell. Ideally, oyster shell seems to work best but finding a reliable, clean supply of oyster shells can be difficult. As an alternative to oyster shell, large shucking houses may be able to provide sea clam shell instead.

Shell can come in many shapes and sizes. Crushed or highly broken shell does not perform as well in the field as larger pieces of shells. Juvenile oysters seem to make use of the nooks and crannies in larger pieces of shell, perhaps by keeping them out of the mud.

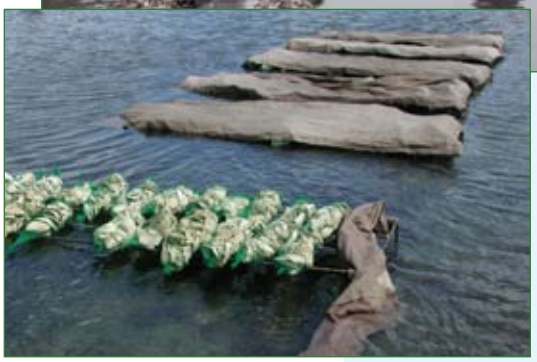
Aging shell should be done in a location where the odor will not be a problem for neighbors. Additionally, aging can be improved by reworking the pile (ideally with heavy equipment) so that previously buried shell is exposed to the air and sun. Care should be taken not to overly crush the shell stock when turning it over. Black bait-bag mesh, which can be purchased in 1,000-foot rolls, can be used for making bags and works best for the larger shell cultch. It is relatively light in weight and the black color blends in well with the environment – helping to minimize visual impact.

Once the shell is chalky and soft tissues have decayed, the cultch can be bagged. It is important to not overpack the bags, as the nooks and crannies will create room for oyster settlement and growth, as well as allowing maxi-

Oyster larvae are added to a tank, filled with shell.

Choose long lived, fast growing oysters as broodstock.

Keeping the bags off the bottom improves survival.



Covering the bags with burlap may protect the oysters from sun.

mum water flow and food delivery to oysters found in deeper bag recesses. Typically, bags are ~30 inches long and 6-8 inches in diameter and weigh in at the 6-8 pound range.

Select Broodstock Wisely

When selecting a hatchery, investigate the reputation of the performance of their broodstock. If you have access to broodstock that you think will perform well, ask whether the hatchery will do a customized spawn for you using these oysters. It may be advantageous to use local broodstock that has shown to do well in your local growing waters.

Protect the Spat During Transport

The very young oysters, likely just visible as specks when they come out of the tank, are vulnerable to desiccation. During transport, it is helpful if the bags are protected from the wind and sun, even by a tarp or burlap. Transit time should be minimized as much as possible and plan to return oysters to the water in a timely fashion. Lastly, while handling is a part of the process, unnecessarily rough handling of the bags can harm the oysters.

A coir mat helps keep the oysters from burying.

Nurse the Oysters Along

When the oysters first come out of the tank, they are both fragile and very small, easily smothered by silt. Spreading the shells out on the bottom or even putting the bags flat on the bottom is not recommended, as large numbers of oysters will be smothered. Alternatively, it is recommended that the bags be placed on racks or trays when first deployed at the site. This will maximize flow of water to oysters throughout the bags, and help reduce losses to siltation.

Many natural resource managers opt to protect the young oysters for the first couple weeks from drying out

The bags are opened and the oysters spread on the bottom.

In some areas, shells are spread out in trays.

Juvenile oysters cover the underlying shells.

Tracking survival of the juvenile oysters.

in the sun by covering the bags with burlap, which keeps the animals damp and shaded.

The length of time the oysters may remain in the mesh cultch bags will vary somewhat by site and growth rate. It is advisable to monitor oyster growth to avoid having them grow into the mesh since many oysters perish when trying to remove them from the bags. Usually, the bags may be opened and the oyster-laden cultch spread out on the bottom after about a month. If the bottom type is less than suitable it may be appropriate to lay out burlap or coir matting on top of the sediment before spreading out the cultch from the bags onto the bottom.

Location, Location, Location

One of the largest determinants of success of a remote set project is the selection of a field plant location. Soft, muddy bottom generally gives poor results, as the shells are quickly buried. If freshwater sources are present nearby, consider that they might transport very fine sediments during rain events. High current areas can also be a problem, washing away loose shells or sanding in the oysters.

Good bottom is firm, unrippled sediment, while gravelly or shelly bottom works well. In addition to bottom type, sites should be selected considering food supply, predators, and episodic events (storms, ice, etc.).

In some cases, bottom can be improved prior to spreading out the remote set oysters. This can be done by spreading clean cultch out across the area as a shell base. Additionally, mats of burlap or coir material can be spread out on the bottom, again providing a base for the remote set oysters.

Live and Learn

Importantly, there is a great deal to be learned from experience. In many cases, an observant natural resource manager can identify the reasons why a particular remote set planting did not work as well as hoped. In some of those cases, changes can be made to improve the success of subsequent attempts.

Conclusion

Oyster remote set is a useful restoration tool, but can be challenging at times to even the most experienced natural resource managers. The biggest hurdles are choosing optimal sites with good water quality and substate as well as choosing sites without abundant predators. This technology provides not only a viable means to jump-start an oyster restoration project but also helps create and improve nearshore habitat.

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