

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

BIVALVE AQUACULTURE GEAR AND BIOFOULING CONTROL

(Acre)
CODE 400

DEFINITION

Actions that reduce, clean or remove biofouling organisms and other waste from bivalve production areas while minimizing environmental risk.

PURPOSE

- Minimize adverse impacts of shellfish aquaculture operations and gear on water, plant, animal and human resources
- Ensure dependable water quantity and quality to support shellfish production
- Ensure adequate food quantity and quality to support shellfish production

CONDITIONS WHERE PRACTICE APPLIES

Near-shore, intertidal and subtidal areas where bivalve aquaculture occurs.

CRITERIA

General Criteria

Locate all bivalve shellfish aquaculture production sites and associated activities in accordance with regulatory guidance, including marking and recording requirements.

Minimize the impact of sediment manipulation on adjacent and off-site areas.

Maintain adequate water flow through the production area by using husbandry practices including, but not limited to, the following:

- Monitor containment gear and other equipment regularly for biofouling.
- Minimize or avoid detrimental build-up of fouling organisms through such practices as periodic flipping of bottom or surface culture gear, net/screen removal prior to algae fouling season, and/or timing of gear deployment to miss barnacle and other

fouling organism recruitment.

- Clean and remove biofouling organisms frequently to facilitate shellfish health and growth, replacing containment gear with new and/or biofoul free equipment when necessary.
- Cycle off-bottom containment gear used for epifaunal culture with redundant gear for collection, transport and treatment of biofouling.
- Clean gear on-shore when biofouling includes aquatic nuisance species (ANS) that cannot be cleaned in a lethal and environmentally responsible manner on-site, or when biofouling will result in excessive organic loading.
- Avoid the return of fouling organisms and macro algae into surface waters in a manner or volume that may cause local environmental degradation.
- Use only environmentally appropriate biofoul control methods, including, but not limited to: air drying, brine dip, vinegar dip, fresh water dip, sweeping or power washing.
- Collect, transport and dispose of waste gear on-shore, in a manner that is timely and does not cause environmental degradation.

Manage the risk of accidental loss of and/or damage to aquaculture gear within the environment due to inadequate securing, excessive fouling, and ice or hazardous weather damage by adopting the following actions:

- Secure and effectively maintain shellfish containment systems on a regular basis, and especially before hazardous weather.
- Monitor weather conditions (i.e., severe storms, ice masses, very low/high

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

water/air temperatures) to allow proper scheduling of equipment removal, relocation or other alternative measures as appropriate.

- Collect and dispose of waste gear outside of the marine environment as soon as practical after removal from production areas, and especially before hazardous weather.
- Keep records of gear cycling, replacement, removal, and movement to monitor losses that may pose an environmental or navigational hazard.

CONSIDERATIONS

Design gear layout and placement to minimize impact on the natural function of the ecosystem, while allowing for normal aquaculture activities of the producer.

Include buffer zones around and within growing areas to reduce disease transmission and provide corridors for wildlife.

Be aware of locally important, state, federal and tribal listed species that may be encountered in the area. Consider using a wildlife identification field guide and keeping a journal to log interactions of protected wildlife species with the aquaculture operation.

Consider using associated shellfish aquaculture practices to address additional concerns, including: Combustion System Improvement (Code 372), Access Control (Code 472), and Integrated Pest Management (Code 595).

PLANS AND SPECIFICATIONS

Provide site-specific plans and specifications for bivalve aquaculture gear and biofouling control that describe the requirements needed to achieve its intended purpose.

At a minimum, include the following items:

- Plan map, showing gear layout, access points, buffer zones, and any other relevant information
- A subaqueous soils map of the site with soil interpretations, if available
- Identification and location of environmentally sensitive areas

- Location of priority fish and wildlife habitat, and identification of protected wildlife species that may be found in the area
- Recommendations for actions to take or avoid when protected species are observed or expected in the area, and contact information for responsible agency in the event that stranded, injured or otherwise distressed wildlife are sighted
- Plan narrative, describing conservation practices associated with achieving the purposes and criteria of this standard
- Conservation Plan Schedule of Operations
- Guidance documents necessary to aid the grower in implementation of the conservation practice.

OPERATION AND MAINTENANCE

Prepare a plan for the inspection, operation and maintenance (O&M) of all items and practices described in the conservation plan for each site, including, but not limited to, the following:

- Do not exceed the local elevation limit on structures placed on the site.
- Remove all unused or unnecessary equipment from production sites and securely store it in approved areas.
- Mark predominant containment gear left on the production site with distinctive marks for identification (i.e. name and permit number), and secure it properly to minimize risk of offsite movement.
- Inspect growing areas regularly, especially following storm events. Repair any damage to prevent loss of equipment to the environment.
- Dispose of waste/spent gear on-shore, in a manner that is timely and does not cause environmental degradation.
- Monitor and keep records of the following:
 - Notifications filed with local harbor masters and other regulatory authorities
 - Containment gear replacement cycles
 - Potentially harmful interaction events with protected wildlife species, and corrective actions taken

- Invasive species on or adjacent to growing areas.
- In geographic areas where ice is an issue, perform weather-related maintenance:
 - Monitor and keep records of water temperatures and weather conditions.
 - Position intertidal equipment and materials flush with the sediment surface.
 - Carefully secure all gear to the substrate with supplemental attachment devices during winter, or remove materials off-site to an upland or deep water licensed shellfish growing site.
 - Ensure that any gear left on the associated production areas during the winter is free from fouling to reduce the potential for attachment of ice.
 - Replace delineation marker buoys on-site with winter sticks or other marking devices approved by the appropriate authority to minimize the risk of movement by ice.

REFERENCES

Flimlin, Gef, Sandy Macfarlane, Edwin Rhodes and Kathleen Rhodes. 2010. *Best Management Practices for the East Coast Shellfish Aquaculture*. East Coast Shellfish Growers Association in collaboration with the Northeastern Regional Aquaculture Center, USDA National Institute of Food and Agriculture, and USDC National Oceanic and Atmospheric Administration. Accessed March 22, 2011. <http://www.ecsga.org>.

Leavitt, Dale F. (ed.). 2004. *Best Management Practices for the Shellfish Culture Industry in Southeastern Massachusetts*. Massachusetts Shellfish Growers, in collaboration with SouthEastern Massachusetts Aquaculture Center, and Massachusetts Department of Agricultural Resources, Aquaculture Program: Boston. Accessed March 22, 2011. http://www.mass.gov/agr/aquaculture/docs/Shellfish_BMPs_v09-04a.pdf.

Massachusetts Office of Coastal Zone Management. 1996. *Massachusetts Aquaculture White Paper and Strategic Plan*. Boston. Accessed March 22, 2011. <http://www.mass.gov/czm/wptoc.htm>.

Virginia Institute of Marine Science. 2008. *Best Management Practices for the Virginia Shellfish Culture Industry*. Virginia. Accessed March 22, 2011. http://web.vims.edu/adv/aqua/MRR%202008_10.pdf?svr=www.