Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

BIVALVE AQUACULTURE GEAR AND BIOFOULING CONTROL

CODE 400

(ac)

DEFINITION

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

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Reduce adverse impacts of shellfish aquaculture operations and gear on water, plant, animal, and human resources
- Improve dependable water quantity and quality to support shellfish production
- Improve 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 Applicable to All Purposes

Locate 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 offsite areas.

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

- Monitoring containment gear and other equipment regularly for biofouling.
- Minimizing or avoiding detrimental buildup 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.
- Cleaning and removing biofouling organisms frequently to facilitate shellfish health and growth, replacing containment gear with new and/or biofoul-free equipment when necessary.
- Cycling off-bottom containment gear used for epifaunal culture with redundant gear for collection, transport, and treatment of biofouling.
- Cleaning gear onshore when biofouling includes aquatic nuisance species that cannot be cleaned in a lethal and environmentally responsible manner onsite, or when biofouling will result in excessive organic loading.
- Avoiding the return of fouling organisms and macroalgae into surface waters in a manner or volume

that may cause local environmental degradation.

- Using only environmentally appropriate biofoul control methods, including, but not limited to—
  - Air drying,
  - Brine dip,
  - Vinegar dip,
  - Fresh water dip,
  - Wweeping, or
  - Power washing.
- Collecting, transporting, and disposing of waste gear onshore, 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—

- Securing and effectively maintaining shellfish containment systems on a regular basis, and especially before hazardous weather.
- Monitoring weather conditions (i.e., severe storms, ice masses, very low and high water and air temperatures) to allow proper scheduling of equipment removal, relocation, or other alternative measures as appropriate.
- Collecting and disposing of waste gear outside of the marine environment as soon as practical after removal from production areas, and especially before hazardous weather.
- Keeping records of gear cycling, replacement, removal, and movement to monitor losses that may pose an environmental or navigational hazard.

Acquire all required permits and licenses for beach access to aquaculture production sites and follow specific area regulations regarding driving in tidal zones. Follow all Federal, State, and local boating regulations and acquire all required permits and licenses for operation of a boat for a shellfish operation.

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 but not limited to NRCS Conservation Practice Standards (CPSs) Combustion System Improvement (Code 372), Access Control (Code 472), Integrated Pest Management (Code 595), and Heavy Use Area Protection (Code 561).

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—

- Plan map designating production site boundaries with a polygon, buoy coordinates, important buffer zones, and any required access points.

- 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, State species of concern, and 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 and operation and maintenance of all items and practices described in the conservation plan for each site, including, but not limited to—

- Not exceeding the local elevation limit on structures placed on the site.
- Removing all unused or unnecessary equipment from production sites and securely storing it in approved areas.
- Marking predominant containment gear left on the production site with distinctive marks for identification (i.e., name and permit number), and securing it properly to minimize risk of offsite movement.
- Inspecting growing areas regularly, especially following storm events. Repair any damage to prevent loss of equipment to the environment.
- Disposing of waste/spent gear onshore in a manner that is timely and does not cause environmental degradation.
- Monitoring and keeping records of—
    - Notifications filed with local harbor masters and other regulatory authorities.
    - Containment gear replacement cycles.
    - Tracking of labor hours and specific tasks.
    - 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, including—

- Monitoring and keeping records of water temperatures and weather conditions.
- Positioning intertidal equipment and materials flush with the sediment surface.
- Carefully securing all gear to the substrate with supplemental attachment devices during winter, or removing materials offsite to an upland or deep water licensed shellfish growing site.
- Ensuring that any gear left on the associated production areas during the winter is free from fouling to reduce the potential for attachment of ice.
- Replacing delineation marker buoys onsite with winter sticks or other marking devices approved by the appropriate authority to minimize the risk of movement by ice.

REFERENCES

DeFrancesco, J. and K. Murray. 2010. Pest Management Strategic Plan for Bivalves in Oregon and Washington. Western Integrated Pest Management Center. Davis, CA.

Flimlin, G., S. Macfarlane, E. Rhodes, and K. Rhodes. 2010. Best Management Practices for the East Coast Shellfish Aquaculture Industry. East Coast Shellfish Growers Association. Toms River, NJ.

Florida Department of Agriculture and Consumer Services. 2016. Aquaculture Best Management Practices Manual, FDACS-02034. Florida Department of Agriculture and Consumer Services, Division of Aquaculture, Tallahassee, FL.

Getchis, T.L., Editor. 2014. Northeastern U.S. Aquaculture Management Guide: A Manual for the Identification and Management of Aquaculture Production Hazards. Northeastern Regional Aquaculture Center. College Park, MD.

Leavitt, D.F., Editor. 2004. Best Management Practices for the Shellfish Culture Industry in Southeastern Massachusetts. Massachusetts Shellfish Growers. Boston, MA.