

# GEAR MANAGEMENT

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*Safeguarding the public and supporting Florida's agricultural economy.*

*This publication was produced from information gathered at a shellfish aquaculture gear management workshop held in Cedar Key in September 2018.*

## Impacts of Marine Debris

### ◆ Hazard to Navigation

*Marine debris is difficult to see and can result in damage to vessels and motors.*

### ◆ Entanglement & Ghostfishing

*Marine life can get caught and killed in lost or abandoned nets and traps.*

### ◆ Habitat Damage

*Large marine debris, such as nets, can entangle and suffocate critical habitats such as submerged reefs and seagrasses.*

### ◆ Ingestion

*Numerous marine animals consume plastic and other debris by mistake, often resulting in illness or death.*

### ◆ Economic Cost

*Cleaning up marine debris costs coastal communities time and money, and may also reduce the economic benefits of recreation and tourism.*

Information provided by  
NOAA Marine Debris  
Program.



## Lease Stewardship and Public Perception

From plastic straws and bottles to large derelict vessels, marine debris is a growing problem worldwide. Up to 165 million tons of plastic debris is currently predicted to exist in the world's oceans, with an additional 4 to 13 million tons destined to end up in the oceans annually. In addition to being an aesthetic nuisance, marine debris can complicate navigation, entangle and kill marine life, harbor communities of pathogenic bacteria and leach harmful chemicals into the environment.

Shellfish aquaculture is nationally renowned for its sustainability and environmental benefits. Maintaining the industry's public image as a steward of the nation's coastal ecosystems requires diligent management of gear. Not only can lost aquaculture gear cause fish, bird, sea turtle and marine mammal deaths, mismanagement of gear and the accumulation of unsightly debris in coastal areas could result in negative public perception and economic damage to the industry as a whole.

Environmental stewardship at its core requires planning, action and investment to reduce, reuse, recycle and recover the gear and equipment used everyday. An unhealthy aquatic environment cannot support a healthy shellfish crop. Careless farming practices are unsustainable for current and future generations of farmers and processors that depend on shellfish aquaculture products to make a living. While the reader may consider themselves a diligent and conscientious steward of their local environment, it is important to



*Florida's pristine and highly productive coastal waters provide excellent conditions for shellfish aquaculture.*

remember that the industry will be viewed as a whole by consumers. Encouraging all farmers to practice proper gear management and disposal can be an effective tool to ensure that shellfish gear is accounted for and the environment is not impacted.

While the greatest contributor of plastic debris to the marine environment is trash from land-based sources, shellfish aquaculture activities are highly visible to the public. Maintaining a positive image as stewards of public waters must be a key consideration for Florida's shellfish farmers. Consumer and coastal stakeholder perception will play a significant role in the longevity and growth of aquaculture farms and market demand for farmed shellfish products throughout the nation.



## Ocean Conservancy® International Coastal Cleanup Day

Beginning in Texas in 1986, the [Ocean Conservancy](https://oceanconservancy.org/) has organized coastal cleanup events throughout the world to remove marine debris from beaches and inland waterways. Some 17 million volunteers have removed more than 350 million pounds of debris throughout the years. This global effort now takes place in hundreds of countries. During the September 2022 cleanup, nearly 500,000 volunteers participated, collecting more than 8 million pounds of trash from nearly 15,000 miles of coastline.

Each year, a cleanup event in Cedar Key is organized by the University of Florida Institute of Food and Agriculture Sciences (IFAS). Hundreds of local farmers, residents and visitors in the Cedar Key area participate in the annual cleanup event, and collect items ranging from bottles to nets to beach chairs. The Cedar Key Aquaculture Association supports a two-week long effort to collect lost aquaculture gear during September, coastal cleanup month. The Cedar Key Aquaculture Association also funds the dumpsters for farmers to dispose of derelict clam nets in permanent locations year round.

To organize or participate in a coastal cleanup event in your area, visit:

[OceanConservancy.org/](https://oceanconservancy.org/)

# Best Management Practices for Shellfish Aquaculture Gear

In order to establish a streamlined regulatory process, replace the need for numerous permits from other agencies and ensure environmental protection, the Florida Department of Agriculture and Consumer Services, Division of Aquaculture enforces the [Aquaculture Best Management Practices](#) (BMPs). The Florida Aquaculture BMPs include rules and regulations for all aquaculture commodity types and activities. **BMPs are required to be followed by all certified commercial aquaculturists, are enforceable by law and do not supersede other applicable local, state or federal regulations, unless explicitly authorized in statute.**

Lease management requirements are also reiterated in the sovereignty submerged land lease agreement. Noncompliance may result in cancellation of the lease agreement and/or the prohibition from acquiring or subletting any new sovereignty submerged land leases.

Division staff conduct periodic, unannounced inspections of each certified aquaculture facility, including submerged land leases, to ensure compliance with BMPs and the lease agreement (if applicable).

While the BMPs cover a wide range of topics, **the following rules are specific to shellfish aquaculture gear management and must be followed by all shellfish aquaculture farmers in the state.**

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- ⇒ **The aquaculturist is responsible for the collection and proper disposal of all bags, cover netting or other materials** used in the culture of shellfish on submerged lands or when such materials are removed during maintenance or harvesting or become dislodged during storm events.
  - ⇒ **Non-natural materials placed in the water or on submerged lands shall be anchored to the bottom.** This includes any protective netting used to cover clam bags.
  - ⇒ **All culture materials, cover nets, bags or other designated markers placed on or in the water shall be clean and free of pollutants** including petroleum based products such as creosote, oils and greases or other pollutants.
    - ⇒ Compounds used as preservatives must be used in accordance with the product label.
    - ⇒ For more information on approved gear coatings, see [Tech Bulletin #03 Net Coatings](#).
  - ⇒ **Bags, cover nets and/or trays used in the culture operation shall be removed from the water during all mechanical cleaning, maintenance and repair operations.**
    - ⇒ During harvest, culture bags and cover nets shall be rinsed/cleaned over the grow-out area to allow sediments to remain in the lease area.
    - ⇒ Mechanical or hydraulic devices shall not be used below the water for the cleaning of submerged structures.
    - ⇒ Use hand tools for cleaning shellfish, bags and other structures underwater.
  - ⇒ **The aquaculturist must remove all works, equipment, structures and improvements from sovereign submerged lands within 60 days following the date of expiration or termination of the lease.**
  - ⇒ **The leaseholder's identification information shall be attached to all floating or off-bottom culture structures.**
    - ⇒ In the event that floating or off-bottom culture structures become dislodged from the lease site, **it is the leaseholder's responsibility to retrieve the structures** from the shoreline, seagrass beds or submerged bottom with minimal damage to the resources affected.
    - ⇒ The structures shall be removed and properly disposed of or returned to the lease site.

## Reduce, Reuse, Recover and Recycle

In recent years, plastics have replaced wood, cotton, steel, iron and copper for fishing and aquaculture gear such as nets, lines, bags, buoys, baskets and cages. Plastic alternatives to traditional materials are effective, durable, flexible, light, adaptable and generally low-cost. As plastic products do not breakdown or decompose, they have a long working life, are typically easier to maintain and use and are ultimately far more cost effective than other materials such as metal or wood. However, if plastic materials are lost or littered into the environment, they remain there for thousands of years and can cause significant environmental damage to the marine ecosystems which aquaculturists depend upon to efficiently produce sustainable and safe shellfish products.

**Reduce:** Consider the function and utility of each component of your aquaculture gear. Single-use plastic equipment, such as zip-ties, can often be replaced with a biodegradable alternative without adding costs, such as cotton twine or rope.

**Reuse:** Examine whether single-use products are appropriate economically and environmentally over the long term. Choose products that can be used more than once with proper care or consider natural alternative materials.

**Recover and Recycle:** When equipment wears out or is no longer needed, recover it and dispose of it properly. Many plastic items can be recycled instead of being dumped into a local landfill where it can decrease the lifespan and functional decomposition of landfill. Some shellfish aquaculture communities, such as Cedar Key, have conveniently placed dumpsters for proper disposal of aquaculture gear.

*Contact your local waste management authority, Chamber of Commerce or aquaculture association to find appropriate options for disposing of derelict materials.*

## Shellfish Aquaculture Gear Management

From an economic and ecological perspective, it is important for shellfish farmers to properly utilize, maintain and secure culture gear. Due to the nature of operating in coastal waters with ever-changing conditions, erosive forces and severe weather events, it is not possible to eliminate gear loss. However, diligently managing farm gear and following key management considerations can greatly reduce the likelihood of gear becoming dislodged and lost to the natural environment. Regardless of the shellfish species you produce or the type of gear you prefer to use, the following practices can prevent the loss of production gear and reduce the need for time consuming retrieval efforts.

### Key Management Considerations

- ⇒ **Appropriate anchoring**  
Step one in preventing gear loss is ensuring that anchoring systems are secure, properly sized and in good condition. Whether you use steel auger anchors for floating gear or one-inch diameter PVC stakes for bottom bags, anchors and attachment points wear out over time and may become loose or broken. Make anchor inspections a routine part of your farm maintenance.
- ⇒ **Reduce gear chafing**  
Tide, wave and wind action in coastal waters means that gear is in constant motion. Given enough time and movement, gear made from any material will wear thin and break if it is rubbing on a harder surface. Rope, plastic and even thinner metals will chafe and break if rubbing or in a bind against wood or metal stakes, poles or anchors. Make sure gear is laid out and secured in a way that reduces contact points and rubbing.
- ⇒ **Knot and attachment point inspections**  
Knots, lines and attachment points should be inspected routinely to make sure they are secure, in good condition and functioning properly. PVC stakes on clam bag belts and predator protection wire or nets should be secured to the outer edge or through several mesh openings to increase durability. Oyster gear line knots at anchor pilings should be checked regularly, as this is a high tension attachment point prone to failure.
- ⇒ **Gear overloading**  
No matter how robust an anchoring and line system is, if gear is loaded beyond design specifications it will not perform as intended. While it may be tempting to put 5 percent more product in a cage, it will not pay off if an overloaded line breaks and 100 percent of your valuable product is lost. Do not overstock baskets or cages, and follow manufacturer specifications.



*Sand anchors used to hold down gear.*



*Clam cover nets.*



*Photo: MS-AL Sea Grant*

*Oyster farmers working lease.*

## Helpful Resource Links

### Division of Aquaculture

- ◆ [Best Management Practices Manual](#)
- ◆ [Preparation and Recovery from Hurricanes](#)
- ◆ [Information and Regulations for Clam Aquaculture: Net Coatings](#)

### University of Florida/IFAS

- ◆ [Shellfish Aquaculture Gear Management Workshop Videos and Presentations](#)
- ◆ [Resources Guide for Florida Shellfish Aquaculture](#)

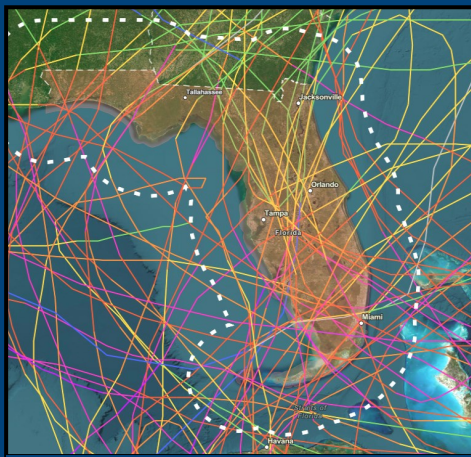
### NOAA Marine Debris Program

- ◆ [Florida Marine Debris Reduction Guidance Plan](#)
- ◆ [Florida Marine Debris Emergency Response Guide](#)
- ◆ [Marine Debris Fact Sheets](#)

### East Coast Shellfish Growers Association

- ◆ [Best Management Practices Guide](#)
- ◆ [Grower Resources](#)

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Paths of major hurricanes (Category 3 or higher) over Florida from 1851-2024 Image: NOAA

## Preparing for Severe Storms

**Regardless of where your shellfish farm is located in Florida, it will be impacted by severe weather events.** Florida leads the nation in direct hurricane landfalls, with 40 percent of all U.S. hurricanes impacting Florida. It is not a matter of if but when, and preparing for severe weather can mitigate economic damage to your gear and product. Not only will routinely inspecting, adjusting and replacing farm gear prevent typical annual losses, it will reduce the labor and time required to prepare your farm for a severe storm in the critical days prior to impact. Consider the following methods when developing a storm plan for your farm.

### Components of a Storm Plan

- ⇒ **Prepare a written plan.** A few days before a major hurricane impact is not the time to determine how to prepare your gear and farm, it is the time to take planned action. Before a hurricane, most people are worried about family and personal property, not their business needs. Knowing how to prepare and when to make critical decisions will save precious time and resources when they matter most.
- ⇒ **Determine how to prepare** all of the farm gear, facilities and equipment.
- ⇒ **Evaluate risks.** What is typical wind direction and storm surge in your area? Are there gear weaknesses? At what storm intensity does the decision to sink, reinforce or move gear need to be made?
- ⇒ **Conduct a storm drill** with staff in order to be familiar with preparation methods and to estimate how long it will take to prepare all lease sites and upland facilities prior to impact.
- ⇒ **Determine when to prepare** based off the practice drill. How many days ahead of impact does the decision to sink cages or anchor bags need to be made?
- ⇒ **Provide a copy of the storm plan to all staff** and include pertinent contact information.
- ⇒ **Have a recovery plan.** There will be many immediate priorities following a severe storm. Make sure you and your staff know how to recover gear and get product back to working order.
- ⇒ **Be prepared to cleanup and retrieve lost gear and product.**

### Key Considerations for Different Gear Types

#### Floating Gear:

- ⇒ Lines should be inspected for wear on cages and anchor attachment points.
- ⇒ Check knots to make sure they are secure and in good condition.
- ⇒ If wave and tidal surge are predicted to be high, provide extra slack in anchor lines.
- ⇒ Make sure floats and float caps are in good condition and sealable.
- ⇒ If cages are sunk, sink them so that the floats rest on the bottom. This will prevent product from becoming buried and suffocated.
- ⇒ After sinking gear, secure the caps to prevent floats from filling with sand.

#### Suspended Gear:

- ⇒ Lines and clips should be checked at the pilings for wear and make sure they are secure.
- ⇒ Set lines to the lowest clip position on the pilings.
- ⇒ Basket doors should be checked to be certain they are firmly closed.
- ⇒ Baskets should not be overstocked. Split overly dense baskets if possible.
- ⇒ Be sure that the baskets are correctly clipped to the lines.

#### Bottom Gear:

- ⇒ Inspect bag and net anchors to make sure they are secure and in good condition.
- ⇒ Newly planted bags are the most vulnerable to being dislodged. Consider placing additional stakes on these bags.
- ⇒ In hurricane conditions, add an additional crisscrossed anchor line over your bags and nets.