

# Shellfish Aquaculture Gear Management

Charlie Culpepper, Asst. Director, FDACS - Division of Aquaculture  
North Carolina Aquaculture Gear Management and Storm Preparedness Workshop  
April 8, 2021



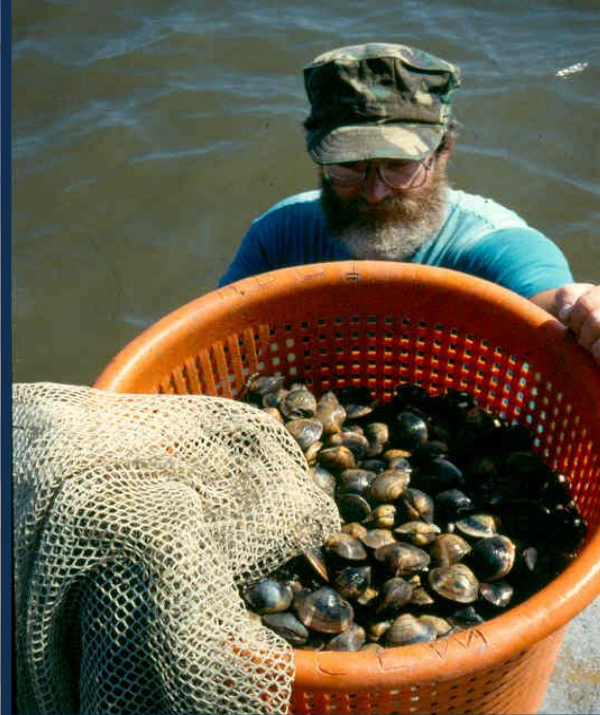


# Aquaculture on Sovereignty Submerged Land Leases

- Division oversees the application, execution and compliance of submerged land leases for aquaculture use.
  - **Assess proposed sites** and identify new areas for culture.
  - **Lease permitting** and annual farm certification.
  - Enforces **Aquaculture Best Management Practices**.
  - Conducts **inspections and audits** to ensure regulatory compliance.
- To date: Florida has **784 active leases covering 2,795 acres**.



# Farm Types – Clams



# Farm Types – Oysters



# Primary Concerns for Shellfish Aquaculture Debris



# Routine Gear Loss



# Primary Concerns for Shellfish Aquaculture Debris

## Hurricanes



Photo: NOAA



# Primary Concerns for Shellfish Aquaculture Debris

## Clam Cover Netting



# Proactive Management





# Shellfish Gear - Regulations

- 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.*



# Shellfish Gear - Regulations

- 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.



# Shellfish Gear - Regulations

- 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.
- 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.



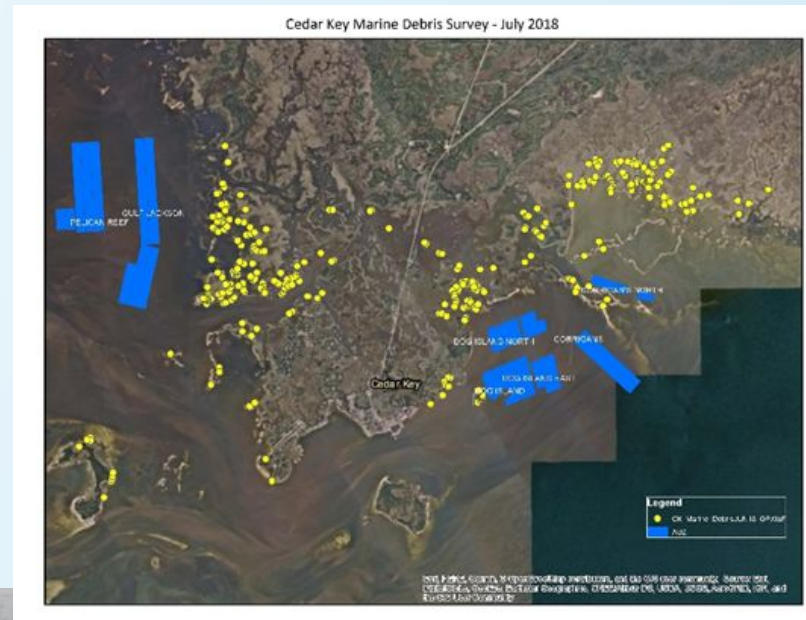
# Shellfish Gear - Regulations

- The leaseholder's identification information shall be attached to all floating or off-bottom culturing structures.
- *In the events that floating or off-bottom culturing structures become dislodged from the lease site, **it is the leaseholder's responsibility to retrieve the structures** form 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.*



# Monitoring Shellfish Lease Areas

- FDACS conducts routine and post-storm surveys in high density lease areas.
- Survey maps used to guide future cleanup efforts and identify hot spots.



100  
Left

10  
Right

## Monitoring Shellfish Lease Areas

10.1ft

0.5mph

72.7°F



- Recently started conducting bottom surveys of lease areas for submerged derelict gear.
- We use a Hummingbird Helix 10 side scan sonar.
  - Quickly cover large areas.
  - Water clarity no longer an issue.
  - Also great for new lease site assessments.

# Shellfish Harvester Annual Training

- All commercial shellfish harvesters required to take an annual training course. *Required by ISSC.*
- Cooperative program by FDACS and FWC.
- Marine debris information and gear management practices now included.



## Gear Loss Prevention



Plastic debris from derelict gear

Clam cover net litter

## Preventing Gear Loss



Properly collected gear ready for disposal

Aquaculture gear disposal point

# Gear Management Workshops

- FDACS, NOAA MDP, UF/IFAS and industry associations hosted workshop in 2018.
- Similar UF/IFAS and FDACS workshop in 2019 in different part of state.
  - Gear tags given away as incentive for attending.

## Shellfish Aquaculture Gear Management Workshop



Date  
Wednesday, September 12th, 2018 1-5pm

Location  
FWC Senator Kirkpatrick Marine Lab,  
11350 SW 153rd Court,  
Cedar Key, FL 32625

In partnership with the National Marine Sanctuary Foundation and NOAA's Marine Debris Program, the FDACS Division of Aquaculture is hosting a workshop to discuss shellfish aquaculture gear management techniques and strategies to prevent gear loss.

Guest speakers Charles Grubb, of NOAA's Marine Debris Program, and Bob Rheault, Executive Director of the East Coast Shellfish Growers Association, will discuss the importance of marine debris prevention as the shellfish aquaculture industry increases in size and begins utilizing new production methods and gear.

Informal group discussions of oyster and clam gear management techniques will be led by Dr. Bill Walton, MSAL Sea Grant and Leslie Sturmer, UF/IFAS. Each session will feature a panel of farmers that will discuss their personal experiences working with shellfish gear.

The workshop will conclude with an overview of a recent aquaculture pump event on

View Live Broadcast Online!

Follow this link to view the workshop live via ZOOM Cloud Meetings:  
[ufl.zoom.us/j/436539248](http://ufl.zoom.us/j/436539248)

When you click the link, it will download the free Zoom software. You may also pre-download Zoom onto your computer at [zoom.us](http://zoom.us) or on a tablet or phone by searching for zoom cloud meetings in an app store.

For more information about attending the live webinar, contact Natalie Simon  
Phone: (352) 543-1008  
Email: [nmsimon@ufl.edu](mailto:nmsimon@ufl.edu)

**UF/IFAS Extension**  
University of Florida

**Hurricane Preparation and Recovery for Oyster Growers**

**Meeting Agenda**

Lessons learned by Alabama oyster growers  
*Bill Walton and Rusty Grice, Auburn University Shellfish Lab*  
FDACS Division of Aquaculture's best management practices  
*Charlie Culpepper, FDACS Division of Aquaculture*  
Informal break-out sessions on hurricane preparation, oyster gear management and recovery, Hurricane Michael impacts  
*Led by Bill Walton AU, Charlie Culpepper FDACS, Leslie Sturmer and Erik Lovstrand, UF/IFAS Florida Sea Grant Extension*  
Commercially available, durable markers to tag and identify oyster gear will be introduced. Florida Sea Grant will be funding gear tags for growers in Bay, Gulf, Franklin and Wakulla Counties. Tag options will be available to choose from and will be ordered following workshop attendance.

**WEDNESDAY JULY 31, 2019**

**2-4:30 pm**  
**FSU Coastal and Marine Lab**  
3618 Coastal Hwy 98  
St. Teresa, FL 32358

**6-8:30 pm**  
**Wakulla County Extension Office**  
84 Cedar Avenue  
Crawfordville, FL 32327

For more information, contact  
**Leslie Sturmer at 352.543.5057 or [Lnst@ufl.edu](mailto:Lnst@ufl.edu)**

**Sea Grant**  
Florida

**Florida Shellfish Aquaculture Association**

**IFAS Extension**  
UNIVERSITY OF FLORIDA

**Sea Grant**  
Manatee County

Agriculture and Consumer Services  
Putnam, Commissioner

All Equal Opportunity Institutions. UF/IFAS Extension, University of Florida, Institute of Food and Agricultural Sciences, and UF/IFAS Extension, Single copies of UF/IFAS Extension publications, including 4-H and youth publications, are available free to Florida residents from county UF/IFAS Extension offices.

[shellfish.ifas.ufl.edu](http://shellfish.ifas.ufl.edu)





# Publications: Shellfish Aquaculture Gear Management

## Lease Stewardship



**Division of Aquaculture**

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*Shellfish Aquaculture*

# GEAR MANAGEMENT

FDACS-P-01914 Technical Bulletin #10 - January 2019

*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. For a video copy of the entire workshop and presentations given, visit the Shellfish Gear Management Workshop webpage, or contact the division for a DVD copy.*

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**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**  
*Clearing 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.



**Overview:**

*Marine Debris Facts*

*Lease Stewardship and Public Perception*

*Best Management Practices for Shellfish Gear*

*Reduce, Reuse, Recover and Recycle*

*Shellfish Gear Management Strategies*

*Preparing for Severe Weather*

*Important Resources*

## 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 thought 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 on or off the farm. 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



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

diligent and contentious steward of their local environment, it is important to remember that the industry will be viewed as a whole by consumers. Encouraging negligent 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 the 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.


Florida Department of Agriculture and Consumer Services

FDACS-P-01914 Rev. 01/2019

# Publications: UF/IFAS Oysters Farm Management Series

- Planning Guide
- Workboats
- Land-based
- Long-line
- Floating Cages
- Floating Baskets

## Hurricane Prep



# Oyster AQUACULTURE

Leslie Sturmer  
Bill Walton  
Erik Lovstrand  
Natalie Simon  
Rusty Grice  
Brian Callam

Tropical Storm and Hurricane Preparedness for  
Off-bottom Oyster Aquaculture in the Gulf of Mexico  
**Introductory Planning Guide**

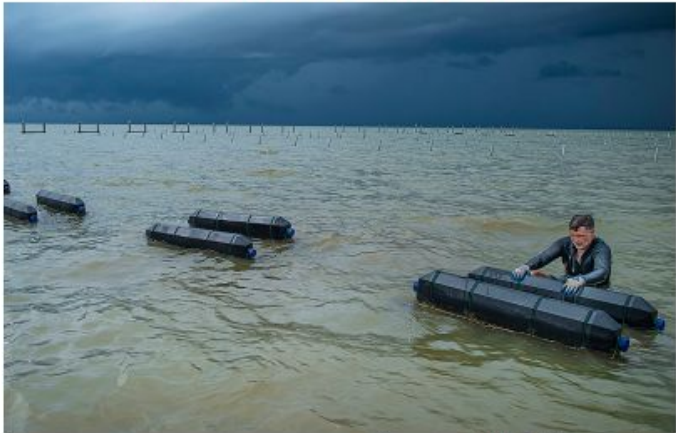



Photo courtesy of USDA Risk Management Agency

These fact sheets for the off-bottom oyster aquaculture industry in the Gulf of Mexico provide guidelines and suggested safety procedures in preparing for tropical storms and hurricanes:


- Introductory Planning Guide
- Adjustable Long-Line Farms
- Floating Bag Farms
- Floating Cage Farms
- Land-based Operations
- Workboats

To access all of the fact sheets in this series, visit the National Sea Grant Library at [nsgl.gsurl.edu](http://nsgl.gsurl.edu). Using the "search the catalog" function, search "Oyster Aquaculture Hurricane Preparedness Series."

This publication was supported by Florida Sea Grant, the Mississippi-Alabama Sea Grant Consortium, and Louisiana Sea Grant.  
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Florida • Louisiana  
Mississippi-Alabama



NOAA  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
U.S. DEPARTMENT OF COMMERCE

### INTRODUCTION

Off-bottom oyster aquaculture is relatively new in the Gulf of Mexico region. Since 2010, over 200 farms have become established in Alabama, Florida, Louisiana, and Mississippi. Oyster aquaculture, like any agriculture operation, has inherent risks with perils beyond growers' control. However, coastal waters present challenges for oyster farmers, beyond the traditional farm setting, in the form of tropical storms and hurricanes. Extreme conditions associated with these events can result in severe impacts to oyster farms. Damages related to wind, storm surge, and decreased salinity due to flooding include oyster mortality, loss of gear and equipment, and increased labor costs.

The Gulf of Mexico region has a long history of storms that have devastated many coastal communities. The official hurricane season is from June 1 through November 30. As the season progresses, the threat of major hurricanes increases from west to east across the region. As such, Texas and Louisiana are the prime targets for early season hurricanes, while the west coast of Florida is more likely to be impacted in mid-September to October. According to the National Oceanic and Atmospheric Administration (NOAA) National Hurricane Center, the four oyster-producing states (AL, FL, LA, MS) have experienced five hurricanes and seven tropical storms from

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# Publications: Guide to Aquaculture Net Coatings

## Alternatives to Plastic



**Division of Aquaculture**

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*Information and Regulations for Clam Aquaculture*

# NET COATINGS

FDACS-P-00089 Technical Bulletin #05 - Revised January 2019

**Overview**

*Net Uses for Clam Aquaculture*  
*Net and Net Coating Regulations*  
*How to Apply, Handle and Cure Net Coatings*  
*Requesting Approval for a New Net Coating*  
*List of Approved Net Coatings*  
*New Production Techniques*

**Net Coating Uses for Clam Aquaculture**

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

**Best Management Practices**

Shellfish farmers must abide by provisions of their lease agreement and **Aquaculture Best Management Practices (BMPs)** that are established by state law.

- The use of petroleum or tar derived coatings on clam bags, cover nets, markers and any other associated aquaculture equipment placed in state waters is prohibited.
- The discharge of pollutants (including oil of any kind or in any form, gasoline, pesticides, ammonia, chlorine and derivatives thereof) into or upon any coastal waters, estuaries, tidal flats, beaches, and lands adjoining the coastline of the state is prohibited.
- All leaseholders are responsible for 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.

As clams are grown to market size in waters of the state, **clam aquaculturists must ensure that all production gear is free of adulterants or pollutants that may harm the marine environment.** Farm-raised hard clams are typically stocked in polyester mesh bags that are secured to the bottom, allowing clams to dig down into the sediment for protection. To feed, clams push their siphon up through the mesh to filter phytoplankton, dissolved organic matter and organic particles from the water column.

Clams may be predated upon by a wide variety of fish (cow-nose or eagle rays, black drum, and sheephead) or crustaceans (horseshoe, blue, and stone crabs).

**To enhance predator protection and reduce wear and tear on clam bags, some farmers treat nursery and grow out bags with various coatings to stiffen the fabric.**

*Photos: LP/IFAS*

**Low tide briefly exposes an array of planted clam bags.**

Net coatings stiffen the bag mesh, and reduce the ability of fish or crabs to access and consume valuable clam crops. Coated polyester bags may be protected from damaging ultraviolet sunlight and retains its strength longer, resulting in decreased gear costs. Coated bags may also replace the need for cover netting, eliminating the cost of those materials and the labor required to handle, install and dispose of cover netting. Properly applied coatings maintain an open mesh to facilitate current flow that carries the food and oxygen necessary for healthy clam growth. However, the coatings may also offer an improved attachment site for bio-fouling organisms and impede current flow. Farmers report that dark colored coated bags may not be noticed by visually oriented predators, and they are also not as visible by passing boaters.

*Photos: LP/IFAS*

**Different mesh sizes are used to protect clams during different stages of production.**

Florida Department of Agriculture and Consumer Services

FDACS-P-00089 Rev. 01/2019

# Industry Cleanup Events

- ❑ Cedar Key Aquaculture Association hosts annual cleanup event for 10+ yrs.
  - ❑ 90,000 lbs. removed in 2018 cleanups.
- ❑ Informal groups formed for cleanups in other areas.
- ❑ Post-hurricane cleanups
  - ❑ Hurricane Michael devastated the panhandle oyster farms.

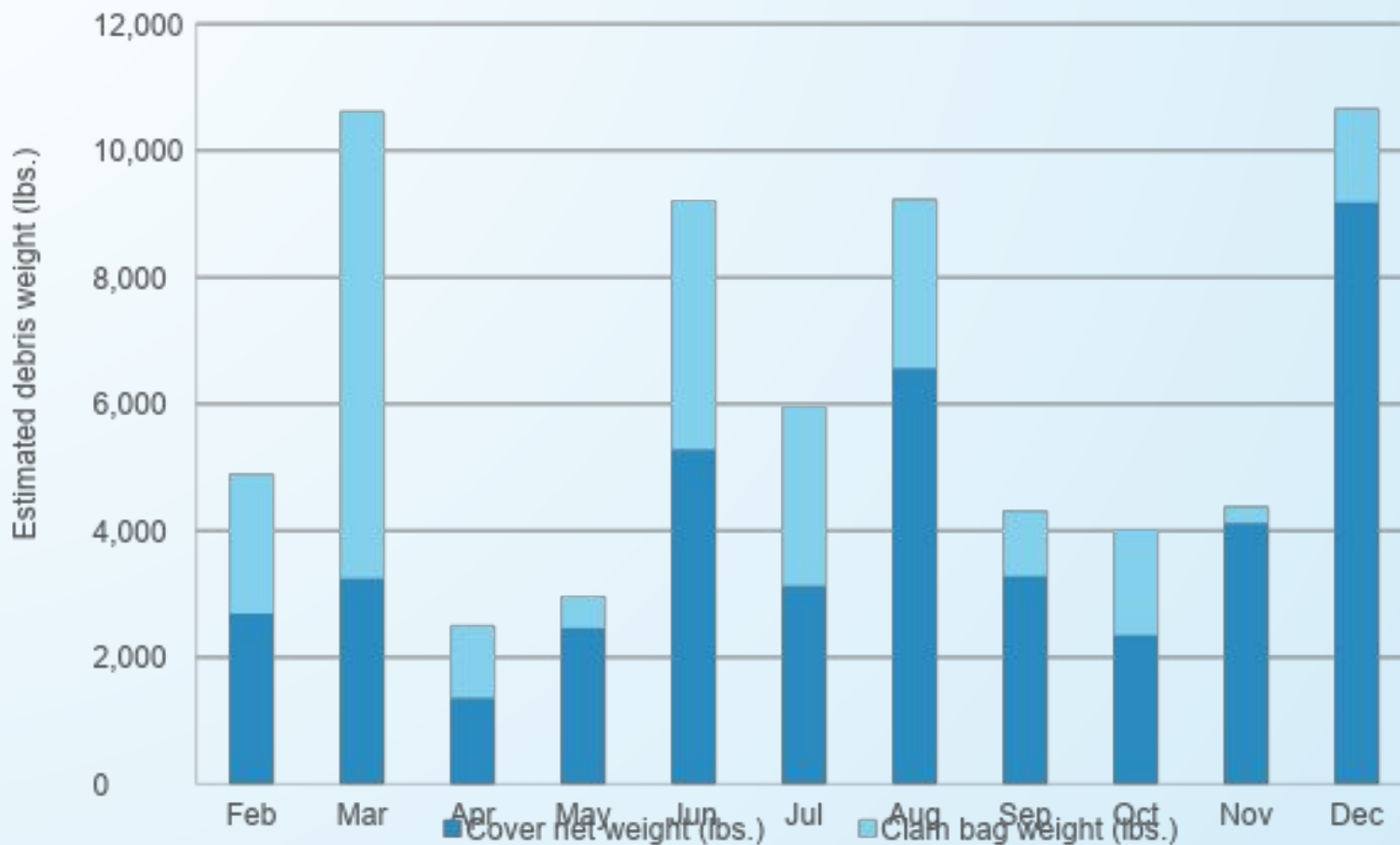


# Disposal dumpsters are very effective!

- ❑ Funded via NOAA Marine Debris Program Hurricane Relief funds or industry associations.
- ❑ Industry partners volunteer to host dumpsters.
  - ❑ Locate partners near high use areas, such as processors or hatcheries and near primary boat ramps.
- ❑ Information signs also critical to prevent use by others and to help educate general public.

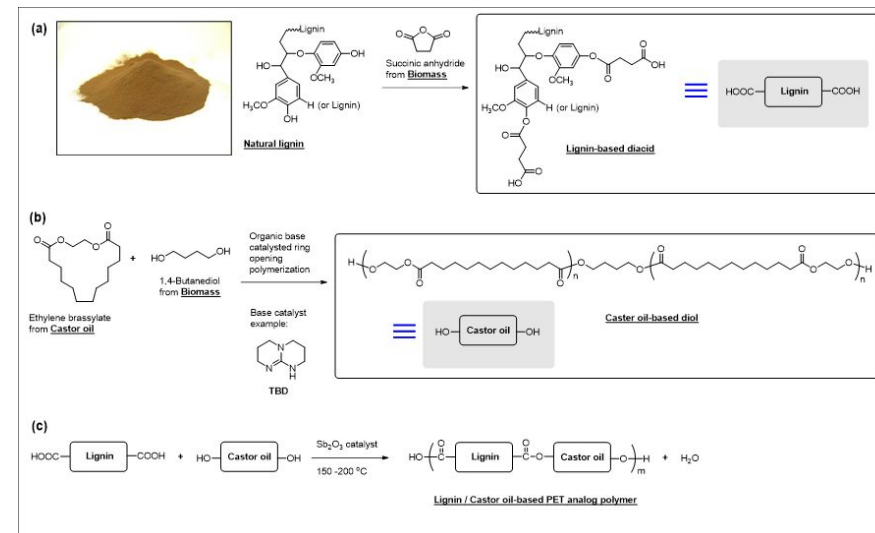
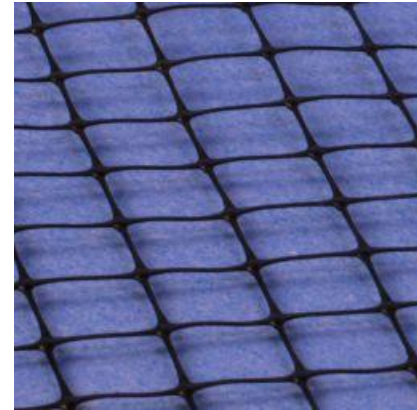


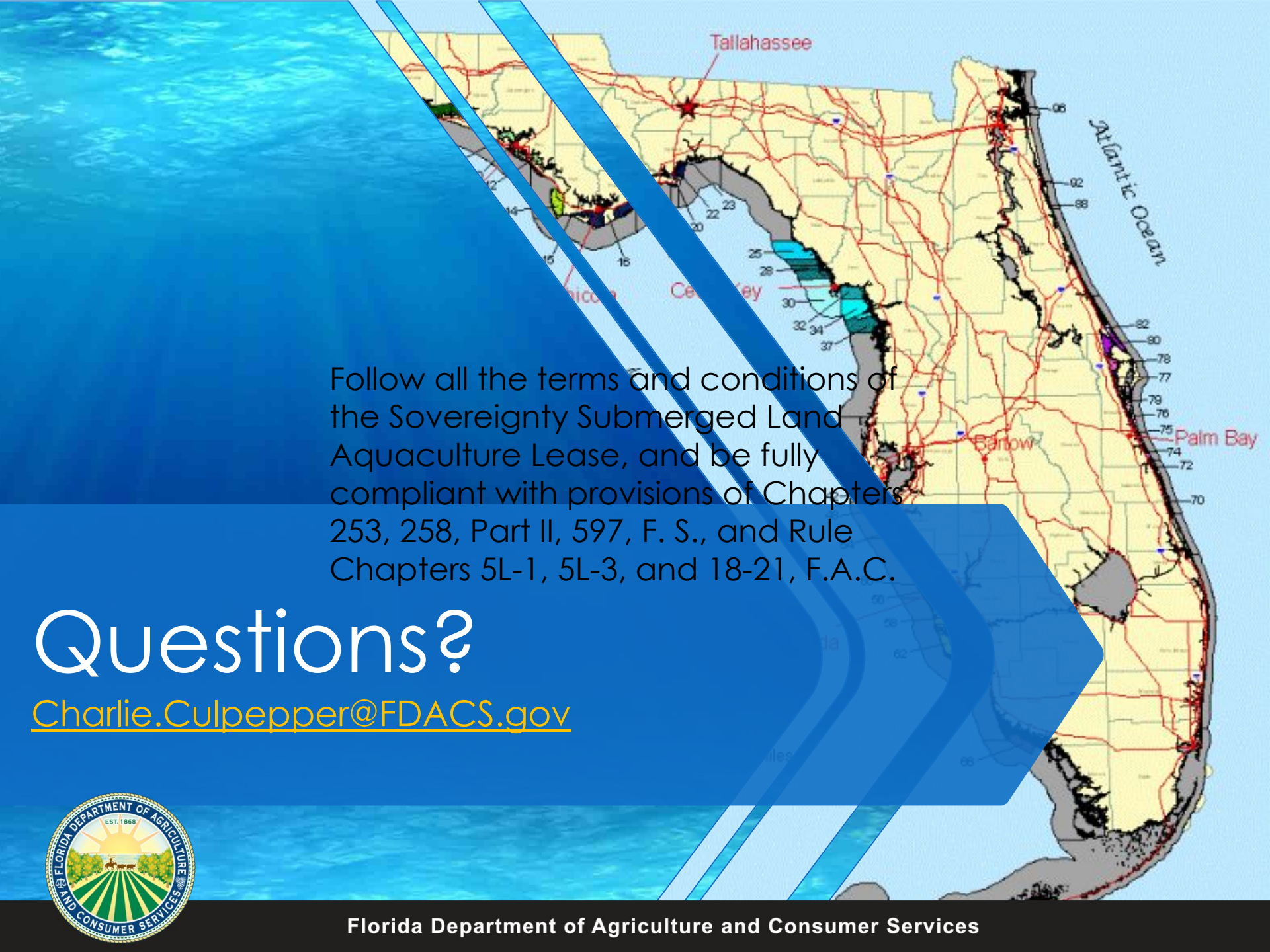
## 2020 Cedar Key Aquaculture Dumpster Use



# Biodegradable Cover Net Research

- USDA NIFA funded project to produce effective and affordable alternative to plastic cover nets.
- Biopolymer engineer at Florida State University currently synthesizing the novel material.
  - Base material is lignin (tree pulp waster product).
  - Can be mass produced w/o new machinery.
- Field trials will be conducted soon in Cedar Key.





Follow all the terms and conditions of the Sovereignty Submerged Land Aquaculture Lease, and be fully compliant with provisions of Chapters 253, 258, Part II, 597, F. S., and Rule Chapters 5L-1, 5L-3, and 18-21, F.A.C.

# Questions?

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