

Aquaculture Leasing Process



Where do I find shellfish harvest area information and maps?

Visit the Division's SHA webpage: [FDACS.gov/Business-Services/Aquaculture/Shellfish-Harvesting-Area-Classification](https://fdacs.gov/Business-Services/Aquaculture/Shellfish-Harvesting-Area-Classification)



The screenshot shows the website for the Florida Department of Agriculture and Consumer Services (FDACS). The page title is "Shellfish Harvesting Area Classification". The navigation menu includes "Home", "Pay/Register Online", "About", "Divisions & Offices", "Forms", "Cannabis", "News & Events", and "Contact Us". The breadcrumb trail reads: "You are here: Home > Business Services > Aquaculture > Shellfish Harvesting Area Classification". There is a search bar and a language selection dropdown.

Florida Department of Agriculture and Consumer Services

Home Pay/Register Online About Divisions & Offices Forms Cannabis News & Events Contact Us

You are here: Home > Business Services > Aquaculture > Shellfish Harvesting Area Classification

Select Language

Shellfish Harvesting Area Classification

[Shellfish Processing Facility Certification](#)

[Area Information](#)

[Shellfish Harvesting Area Maps](#)

[Harvesting Management](#)

[Daily Status](#)

[Return to Aquaculture](#)



FDACS staff routinely collect water samples from harvesting areas.

Shellfish Harvesting Area Classification

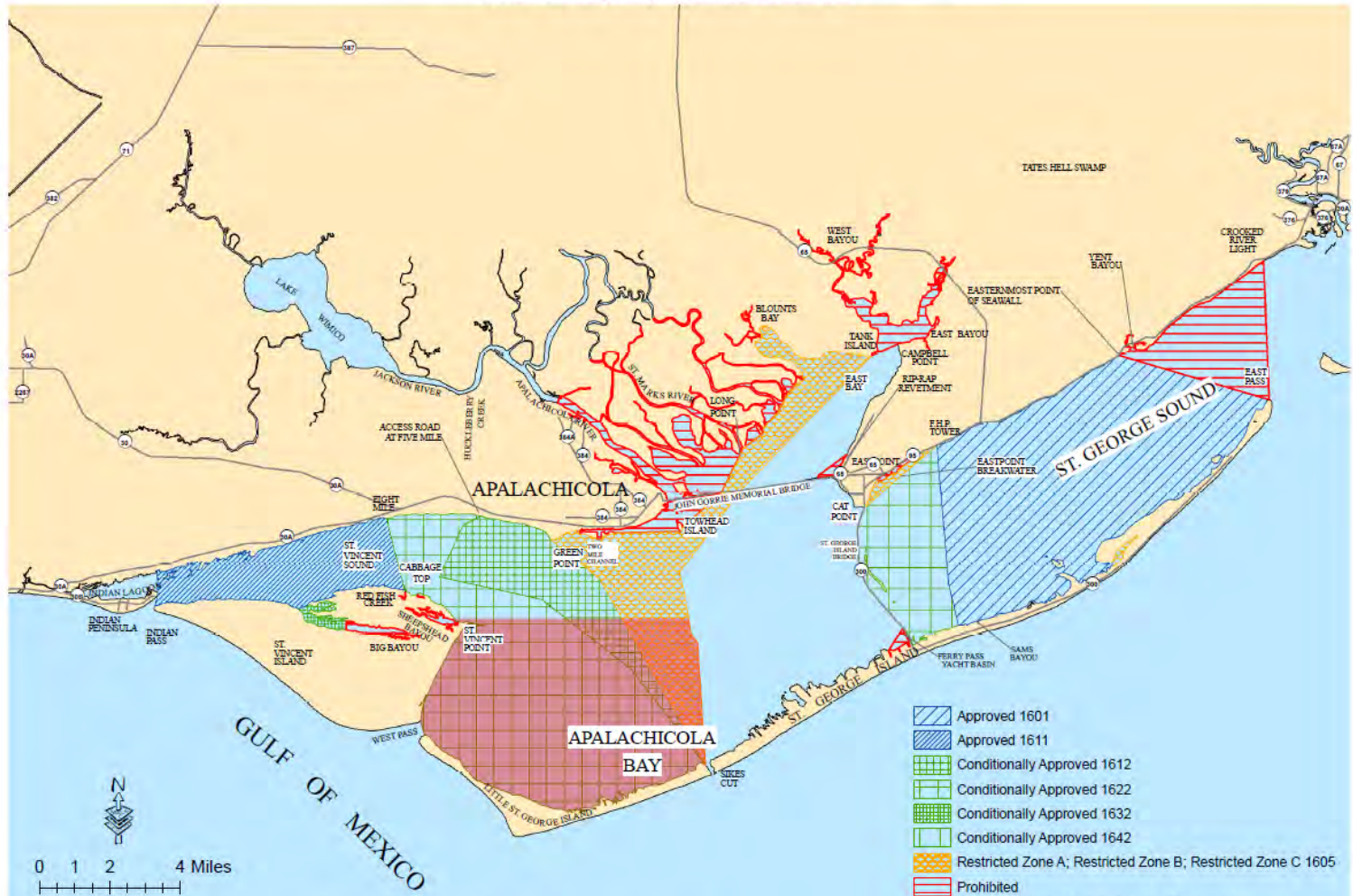
Shellfish are nutritious, delicious food, but contaminated shellfish can make people sick. To minimize the risk of shellfish-borne illness, the Florida Department of Agriculture and Consumer Services (FDACS) continually monitors and evaluates shellfish harvesting areas and classifies them accordingly. It also ensures the proper handling of shellfish sold to the public.

Program Resources

- [Boating Basics](#) [ 1.36 MB]
- [Florida Marine Research Institute \(FWRI Red Tide Site\)](#)



SHELLFISH HARVESTING AREA CLASSIFICATION MAP #16A
 Apalachicola Bay System (#16) Shellfish Harvesting Area in Franklin County
 Winter: January - May, September - December



This product, produced by Florida Department of Agriculture and Consumer Services, Division of Aquaculture, is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Date: 8/31/2016



Where do I find shellfish harvest area information and maps?

OR you can also call a Division regional field office:

Region	Office Location	Phone #
Western Gulf Coast	Panama City	850-236-2200
Central Gulf Coast	Apalachicola Bay	850-653-8317
Big Bend	Cedar Key	352-543-5181
Southern Gulf Coast	Port Charlotte	941-613-0954
Atlantic Coast	Melbourne	321-984-4890

We also strongly recommend that you join the Division's **SHA notification listserv**. By joining, you will automatically be notified of changes in SHA status (open/closed).

To be added, contact Jill Fleiger at:
Jillian.Fleiger@FDACS.gov



Survey and Marking

Water column leases must obtain U.S. Coast Guard Private Aid to Navigation Permit and install/maintain prescribed warning signs and lights.

Two prints of a survey, which shall constitute the field survey, shall be submitted subsequent to final approval of the application but prior to issuance of the lease.



Lease Rental Fees

Water Column leases-\$33.46/acre or fraction thereof.

Plus \$10.00/acre or fraction thereof surcharge.

Paid annually-due prior to lease execution and January 1 thereafter.

Total annual rent for a 1.5-acre water column lease is \$86.92.



Aquaculture Certificate of Registration



- Aquaculturists, their farms, and products recognized as an agricultural commodity through Aquaculture Certificate of Registration
- Required to sell aquaculture products
- Complete Shellfish Harvester Education Training annually
- Annual certification, expires on June 30th of each year, \$100 fee
- Match the lease title.



Annual Audits

- Annual Audits due in March.
- Audits must document effective cultivation.
- Audits request basic information including:
 - amount of seed/stock purchased and planted
 - copies of seed/stock receipts
 - amount harvested



Best Management Practices

- Only native species can be stocked.
- Prohibited to stock oysters from Atlantic Coast in Florida Gulf Coast waters.
- An Official Certificate of Veterinary Inspection and diagnostic results must be sent to the division prior to out of state shellfish entering Florida.
- Oyster seed from out of state source must use Florida broodstock in genetic selection program.
- Out of State Source -Tripliod seed derived from a tetraploid crossed with a diploid oyster require the use of broodstock from the Gulf of Mexico.



Lease Agreement Terms and Conditions

- Lease cannot be assigned, transferred or subleased for five years. Must be approved by Board of Trustees.
- Perform effective cultivation.
- Maintain lease markers and marine lanterns.
- Maintain an Aquaculture Certificate of Registration.
- Pay lease rental fees annually. Due January 1st
- Maintain current address and contact information.



Docks

- If over state owned submerged lands, must have authorization to conduct commercial aquaculture.
- Letter of Consent- for docks under 2,000 square feet.
- Lease- Docks over 2,000 square feet.

253.74 Penalties.—(1) A person who conducts aquaculture activities in excess of those authorized by the board or who conducts such activities on state-owned submerged lands without having previously obtained an authorization from the board commits a misdemeanor of the second degree, punishable as provided in s. [775.082](#), is subject to a civil fine in the Class I category pursuant to s. [570.971](#), or both. In addition to such fine and imprisonment, all works, improvements, and animal and plant life involved in the project may be forfeited to the state.

(2) Any person who is found by the department to have violated the provisions of chapter 403 or chapter 597 shall be subject to having his or her lease of state-owned submerged lands canceled.





NICOLE "NIKKI" FRIED
COMMISSIONER

**APPLICATION FOR A STATE-OWNED
SOVEREIGNTY SUBMERGED LAND
AQUACULTURE LEASE**

Section 253.06, Florida Statutes – Rule 18-21.021, F.A.C.

Application No. _____ (Official Use Only)

Please Type or Print Legibly

PART I - Applicant Information

Name: _____

Company Name: _____

Lease Title: _____

Aquaculture Certificate of Registration Number: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone Number: _____ Fax Number: _____

E-Mail Address: _____

I certify that I am 18 years old or older (please initial): _____

Describe your capability to conduct your proposed aquaculture activities (including training, experience and education that you have obtained or will obtain).

PART II- Parcel/Site Information

Bottom Lease (use of up to 6 inches off the bottom)

Water Column Lease (use of the full water column) Please contact the division to determine if the parcel can be issued for full water column usage.

A. Existing/Approved Parcels

County _____

Aquaculture Use Zone _____

Parcel # _____ Alternate Parcel # _____

You may enter an alternate parcel in case your first choice is already taken.

Lease Title: A lease can be issued to persons or to a company or LLC. Please use the full legal name for a lease to be issue in a personal name. If entering a company or LLC name, please provide incorporation or registration documentation as proof that the business entity is registered and that you are authorized to conduct business on behalf of the entity.

Remit payment of application fee of \$200.00 by check or money order to:
Florida Department of Agriculture & Consumer Services
P. O. Box 6700
Tallahassee, FL 32314-6700

Org. Code: 42150300000
EO A2
Object Code: 001237 \$200.00

Lease Title

Must be 18 to apply

Complete entire page



Briefly describe your reasons for selecting the proposed site (i.e., substrate type, location, water quality, etc.). The proposed area selected should have minimum environmental, social and use impacts (e.g., seagrasses, natural shellfish resources, navigation, recreation and commercial uses, etc.).

List any recreational and commercial uses of the proposed area (e.g., fishing, tourism, etc.).

Describe the potential impacts of the proposed use on the ecology of the area (including fish habitat, threatened and endangered species and other natural resources).

Provide a statement explaining why the lease is in the public interest or is not contrary to the public interest.

For dock applications, describe any aquaculture-related structures proposed (a detailed and dimensioned site plan is required pursuant to subsection 18-21.021(1) (d) (3), Florida Administrative Code).

PART III- Lease Development Plan (complete this section for all applications)

Proposed aquaculture activities are (check only one):

- Commercial Experimental

Product(s) to be cultivated:

(Please check all that apply)

- Hard Clam (*Mercenaria spp.*)
 Sunray Venus Clam (*Macrocallista nimbosa*)
 Eastern Oyster (*Crassostrea virginica*)
 Live Rock
 Other



Describe gear to be deployed.

Cultivation must be at least 70,000 oysters planted per acre per year.

Shellfish must be sold to a certified shellfish processor.

Provide a description of your proposed gear. You will also be required to submit a picture of the gear.



Describe the aquaculture activities to be conducted including planting and harvesting activities.

[Redacted area for aquaculture activities description]

Effective cultivation is required to be performed on all aquaculture leases. Minimum effective cultivation is the planting of 100,000 seed clams or 70,000 seed oysters per acre per year. Provide below a detailed business development plan including the amount of product to be planted and harvested each year throughout the term of the lease (Year 1-Year 10).

Year 1	
Year 2	
Year 3	
Year 4	
Year 5	
Year 6	
Year 7	
Year 8	
Year 9	
Year 10	

Describe the supply source of seed stock or rock products.

[Redacted area for supply source description]

Describe the distribution of the product after harvest.

[Redacted area for distribution description]

PART IV- Proposed Gear (complete this section for all applications)

Describe the maximum dimension (length x width x height) and characteristics of the gear to be used (material type, wire gauge, brand, etc.).

[Redacted area for gear description]

A cross section diagram of the proposed area is required to be included in this application package. See Attachment 2 for guidance and at a minimum include the following items in the diagram:

- Legend with applicant name, county, water body and date.
- Label the dimensions of the proposed area with GPS coordinates in Decimal Degrees.
- Water depth at Mean High Water and Mean Low Water.
- Location and number of proposed gear and support poles.

Images or sketches of proposed structures for aquaculture production are required to be included in this application package. This includes all cages, bags, anchors etc. See Attachment 3 for guidance.

The leaseholder is responsible and liable for equipment and gear placed on the lease. All off bottom gear must be permanently and individually marked with the name of the leaseholder. Additionally all gear must be properly disposed of following use or displacement off the lease. Please provide a description of marking methods for off bottom gear and a gear recovery plan to meet these requirements.

Additional Information

- I understand prior to signing the lease agreement, it is my responsibility to read and comply with all terms and conditions of the lease agreement.
- I understand that upon final approval of a new lease area, I will be responsible to provide two prints of a survey of the parcel pursuant to section 18-21.021(1)(i)&(j), Florida Administrative Code.
- I understand that I will be responsible to install and maintain lease markers pursuant to an approved U.S. Coast Guard Private Aids to Navigation permit.
- For existing parcels, an application fee of \$200.00 is required to be submitted with the lease application.
- For new site nominations, do not include the application fee at this time. However, upon review and approval of an application for a newly proposed area, the division will contact you for the required \$200 application fee.

For questions regarding this form or the application process, please call the
Division of Aquaculture at (850) 617-7600.

Applicant's Signature:

Date:

Please detail how you plan to mark your gear.

Please check the first 4 boxes and sign and date the application.

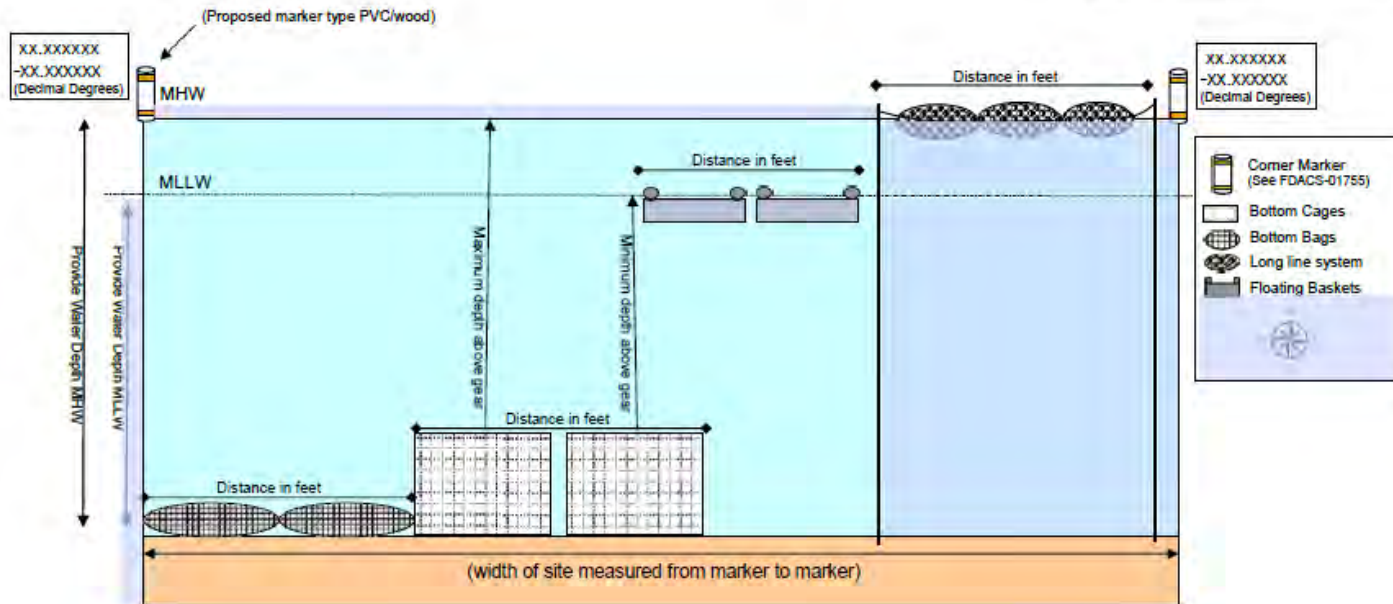


Please detail how you plan to deploy gear on the lease site.

Attachment 2: Cross section diagram (may be hand drawn or computer generated)

Include this information on all documents submitted with your application.

Name: Jane Doe
County, State: Your County, FL
Water body: Your Water body
Date: 07/06/2016



Please provide a picture or sketch of the gear you plan to deploy on the lease site.

Attachment 3: Proposed Gear (may be hand drawn or computer generated)

- 3-D Sketch and/or photos of in-water equipment

Please include:

- Dimensions (l x w x h)
- Quantity
- Configuration within lease area



Application Window

- FDACS will accept lease applications from March 6, 2020 through March 20, 2020. Do not send the lease application fee at this time.
- Applications received outside of the application window will be returned.
- A person may apply as an individual or as business entity but not as both. Only one application per person or per business entity will be accepted.



Preferences

Preference will be given to:

- Applicants that are Franklin County residents.
- Applicants that have attended a pre-application meeting (which will be held in Franklin County to provide an overview of the aquaculture leasing process and requirements).
- Applicants that have not previously held a 10-year renewable submerged land aquaculture lease.
- Applicants that have held a Saltwater Products License (SPL) for at least three of the last five years.
- Applicants that have held an Apalachicola Bay Oyster Harvesting License (ABOHL) for at least three of the last 10 years.



Parcel Selection

- After March 20, 2020, FDACS will develop a ranked list of applicants using a random selection number and preferences.
- The 38 highest ranked applicants will be notified and allowed 15 days to provide the \$200 application fee.
- Failure to timely submit the application fee will result in disqualification from the process. The next highest ranked applicant will be notified and allowed 15 days to furnish the application fee.
- Upon receipt of the application fees for all 38 parcels, FDACS will conduct an open meeting where the applicants, in rank order, will select lease parcels. You must be present at the meeting to select your parcel.



For more information contact:
Portia Sapp
Division of Aquaculture
(850) 617-7622
Portia.Sapp@FDACS.gov





Shellfish Aquaculture Lease Management

Charlie Culpepper, Asst. Director, FDACS - Division of Aquaculture



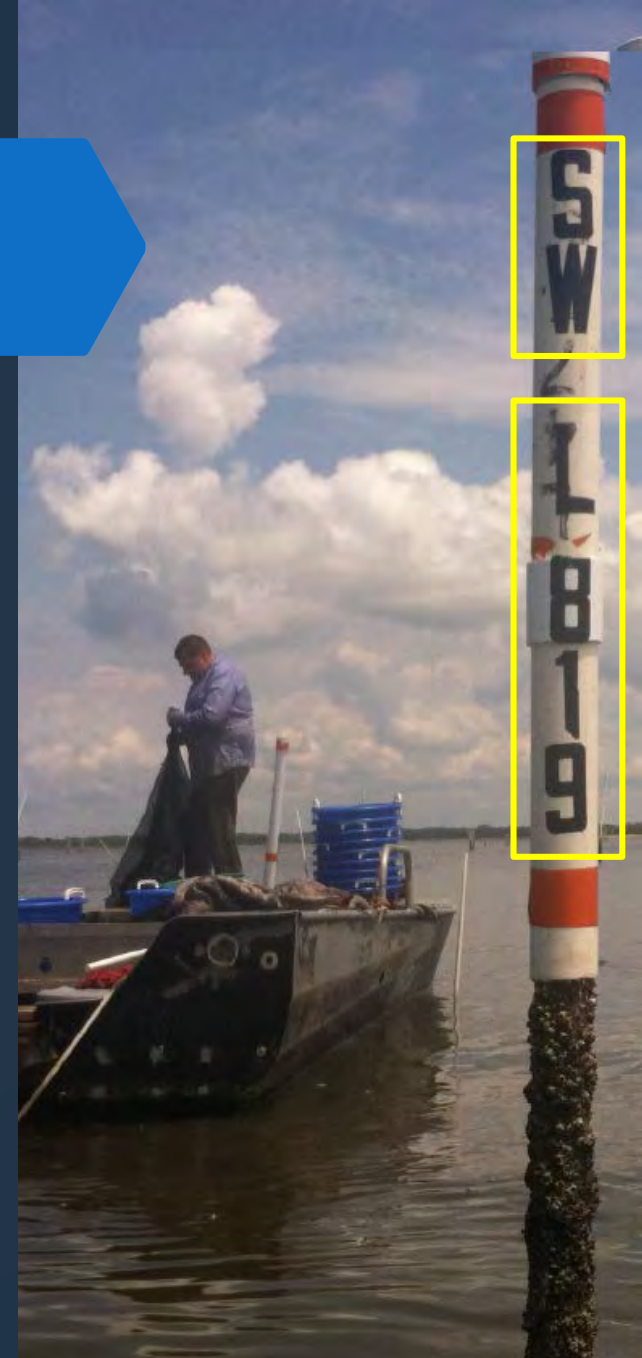
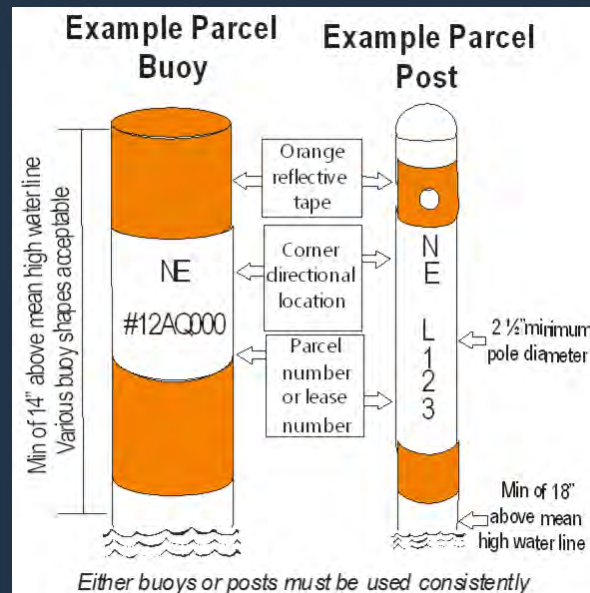
Lease Marking – Corner Markers

- ▶ Corner markers required by U.S. Coast Guard PATON permit.
- ▶ All AUZ or individual parcel corners must be designated with:
 - ▶ Yellow, 3 x 3 ft. sign on min. of 6" pole
 - ▶ Corner direction and lease number
 - ▶ Marine lantern

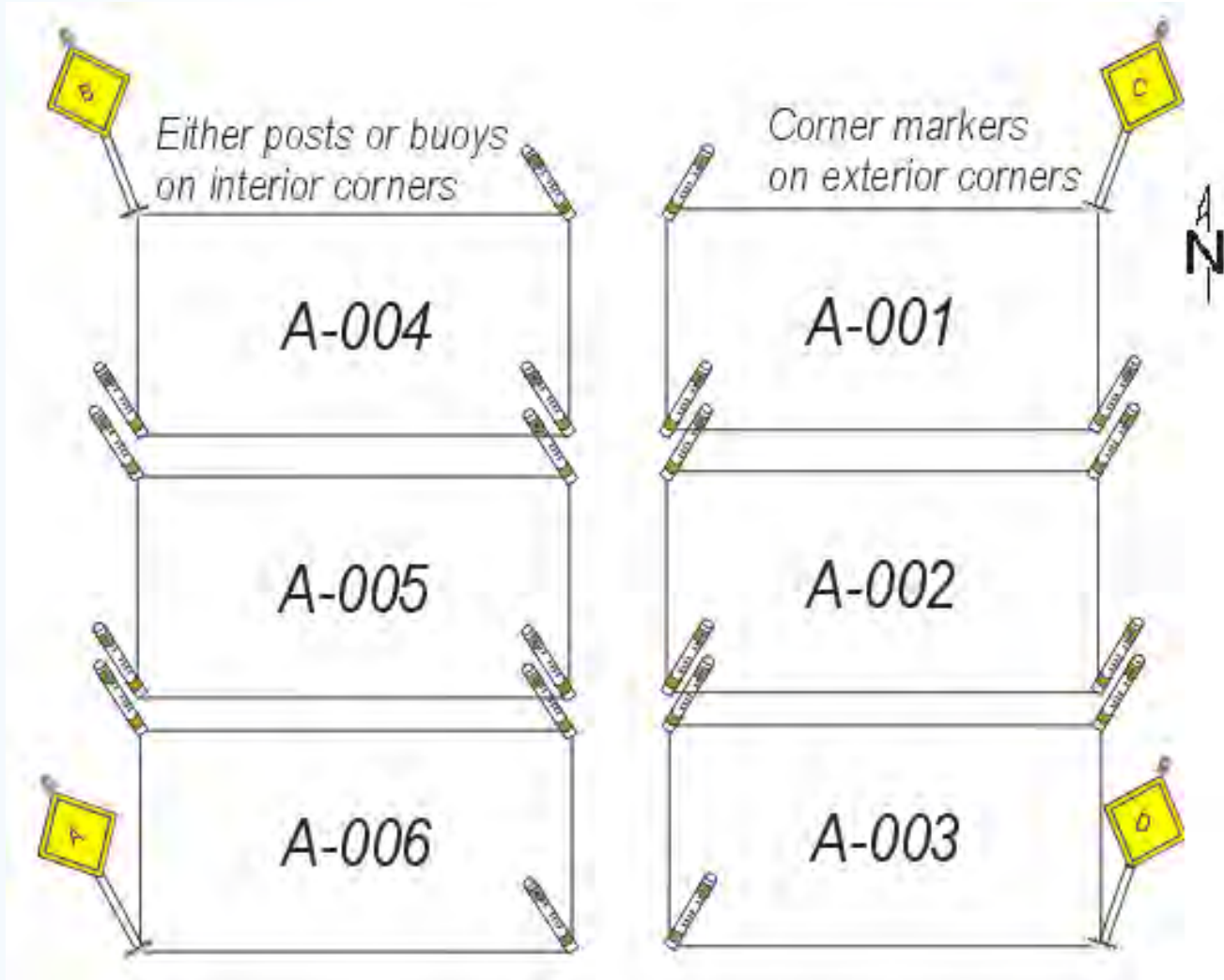


Lease Marking – Posts/Buoys

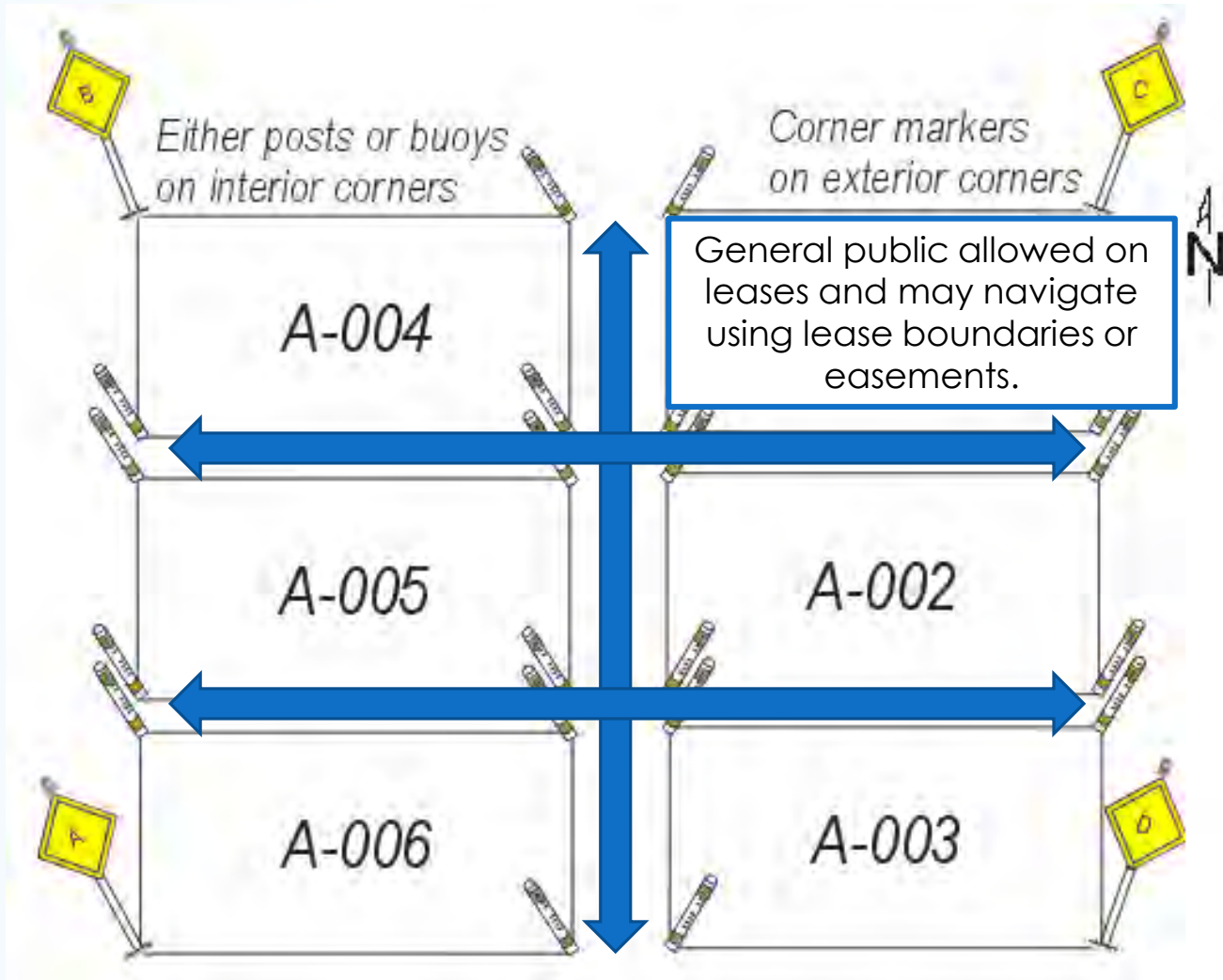
- ▶ All parcel corners must be marked with:
 - ▶ Post (2" PVC) or floating buoy
 - ▶ Corner direction
 - ▶ Lease (L123) or AQ number (12-AQ-123)



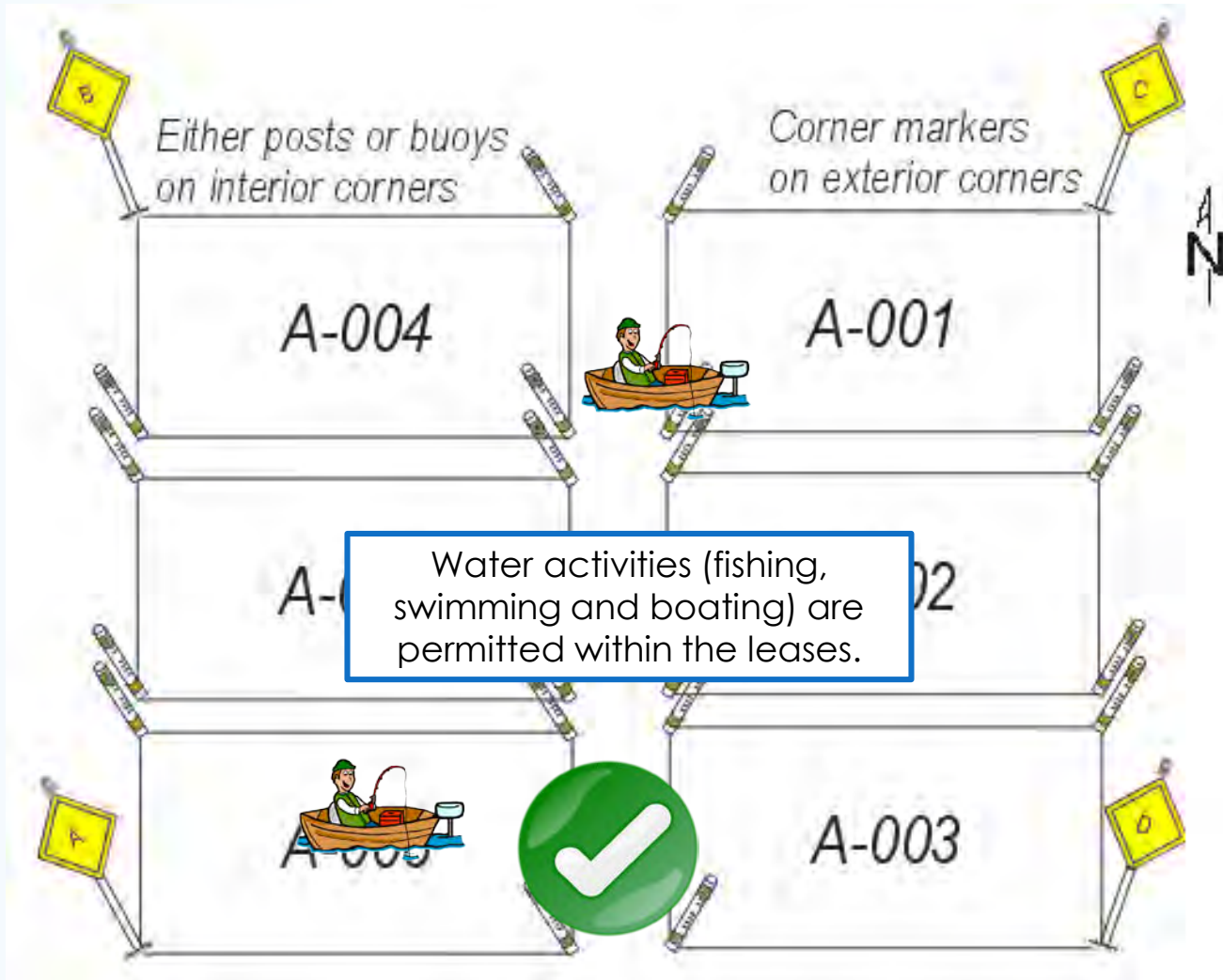
Lease Marker Requirements



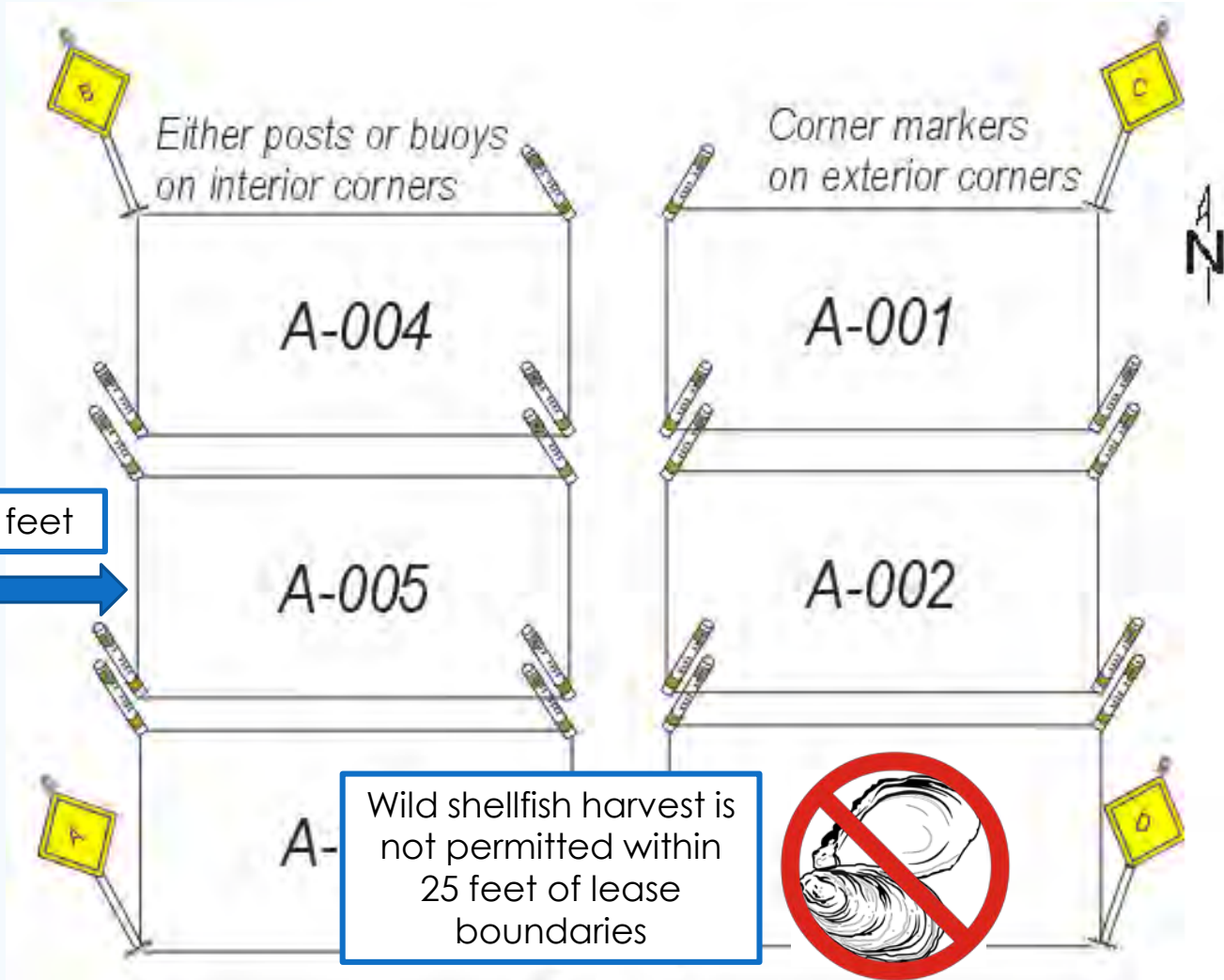
Public Access



Public Access



Public Access



Lease Activities

- ▶ Leases can only be operated on from sunrise to sunset only.
- ▶ The use of the bottom is prohibited for these leases.
- ▶ Dredges or mechanical harvest devices are prohibited.
- ▶ No vessels or platforms can be moored for greater than 24 hours.



Lease Activities

- ▶ No wild shellfish can be harvested from or relayed to a lease.
- ▶ Culling and sorting of oysters must be done on the lease site.
- ▶ Shellfish products must be sold directly to a certified shellfish processing facility.
- ▶ Direct to retail sales prohibited.
- ▶ Farmed oyster may not be sold using an Saltwater Products License (SPL).



Resubmergence

- ▶ Oysters >3/4 inch that are removed from the water for more than 4 hours, during April through October, must be resubmerged for a minimum of 14 days before they can be harvested.
 - ▶ Includes desiccation practices / flipping cages.
 - ▶ Must be segregated from other stocks.
- ▶ Aquaculturists must maintain a replant log of all replant/resubmergence activities.





Allowable Gear Types



Lease Gear

- ▶ Must be securely anchored.
- ▶ All gear must be removed from the water during all mechanical cleaning.
 - ▶ Mechanical or hydraulic devices can't be used below the water for the cleaning.
 - ▶ Only hand tools can be used.
- ▶ During harvest, gear must be rinsed/cleaned over the grow-out area.



Lease Gear

- ▶ All materials must be clean and free of pollutants.
- ▶ Petroleum based products such as tars, oils and greases, or other pollutants are prohibited.
- ▶ Compounds used as preservatives must be used in accordance with the product label.



Gear Marking and Retrieval

- ▶ The leaseholder's identification information must be attached to all floating or off-bottom culturing structures.



Gear Disposal and Collection

- ▶ Leaseholder is responsible for the collection and proper disposal of all gear.
 - ▶ Including when dislodged during a storm event.
- ▶ The leaseholder must remove all structures and gear within 60 days following the date of expiration or termination of the lease.





Questions?

Charlie.Culpepper@FDACS.gov



Florida Department of Agriculture and Consumer Services

Shellfish Harvesting & Processing Requirements For Aquacultured Product



Shellfish Harvester Education Training Program



- No Aquaculture Certificate of Registration will be issued without proof of annual training.
- Resets April 1st each year
- Links on web pages:
<https://www.fdacs.gov/Divisions-Offices/Aquaculture>
&
<http://myfwc.com/Shellfish>.



Certified Processors

All Shellfish Must be Delivered Directly to a Certified Processor

Rule 5L-1, F.A.C.

Aquacultured shellfish may NOT be sold
directly to
Restaurants or Retail Markets



Vibrio spp. Illness

- *Vibrio spp.* are **naturally abundant** in warm Gulf of Mexico waters.
- **Open wound** (*most common*).
- **Consumption** of raw shellfish.

Symptoms include:

- ✓ Fever
- ✓ Diarrhea
- ✓ Nausea
- ✓ Vomiting
- ✓ Change in mental status
- ✓ Septic shock
- ✓ Hypotension (low blood pressure)
- ✓ Distinctive bulbous skin lesions
- ✓ Amputation
- ✓ **Death in @ 50% of cases**



Vibrio Control Management (VCM)

Strict time-temperature guidelines calculated to minimize high temperature exposure



- Aquaculturists must adhere to time-temperature guidelines in Vibrio Control Management Plan (VCM)
- Oysters must be in the cooler of Certified Processor by:
 - 11:00 am during summer **VCM** months
 - 1:00 pm during **VCM** months of April & October
 - 5:00 pm during **non-VCM** months November to March

Month	Oysters (Times are when oysters must be placed in cooler at a certified shellfish processing facility)				Clams Delivery from time of harvest
	Traditional Cooling ¹ (≤55°F in 8 hours)	Rapid Cooling ² (≤55°F in 2 hours)	On-board Cooling ³ (≤55°F at time of delivery)	Restricted Use Only ⁴ (Green Tag)	
November	10:00 p.m.	Non-Vibrio Control Month	Non-Vibrio Control Month	Non-Vibrio Control Month	10:00 p.m.
December	10:00 p.m.	Non-Vibrio Control Month	Non-Vibrio Control Month	Non-Vibrio Control Month	10:00 p.m.
January	10:00 p.m.	Non-Vibrio Control Month	Non-Vibrio Control Month	Non-Vibrio Control Month	10:00 p.m.
February	10:00 p.m.	Non-Vibrio Control Month	Non-Vibrio Control Month	Non-Vibrio Control Month	10:00 p.m.
March	10:00 p.m.	Non-Vibrio Control Month	Non-Vibrio Control Month	Non-Vibrio Control Month	10:00 p.m.
April	4:00 p.m.	4:00 p.m.	3:00 p.m.	4:00 p.m.	12 Hours
May	11:00 a.m.	2:00 p.m.	3:00 p.m.	4:00 p.m.	12 Hours
June	Not permitted	11:00 a.m.	3:00 p.m.	4:00 p.m.	10 Hours
July	Not permitted	11:00 a.m.	3:00 p.m.	4:00 p.m.	10 Hours
August	Not permitted	11:00 a.m.	3:00 p.m.	4:00 p.m.	10 Hours
September	Not permitted	11:00 a.m.	3:00 p.m.	4:00 p.m.	10 Hours
October	1:00 p.m.	3:00 p.m.	3:00 p.m.	4:00 p.m.	12 Hours

Refer to FWC regulations for current bag limits and resource protection seasonal closures.

1 - **Traditional Cooling** - Oysters must be in the cooler of a certified facility by time specified the day of harvest and at or below 55°F in 8 hours.

2 - **Rapid Cooling** - Oysters must be in the cooler of a certified facility by time specified the day of harvest and at or below 55°F in 2 hours.

3 - **On-board Cooling** - Oysters cooled on boat and stored under mechanical refrigeration or in a cooler surrounded by ice. Oysters must be in the cooler of a certified facility no later than 3:00pm.

4 - **Restricted Use (green tag)** - Shellfish that do not meet the Rapid Cool or On-Board Cooling requirements must be tagged for slacking only by a certified dealer or for Post Harvest Processing (PHP) only.



Vibrio Control Management (VCM)

Shellfish Tagging:

- A critical part of Florida's Vibrio Control Management Plan is product labeling.
- Ensures product has been properly harvested and handled.
- Establishes a chain of custody.
- Allows product trace backs if illnesses occurs.



Aquaculture Shellfish Tags

Know your AQ Numbers!



There are 3 important numbers associated with an Aquaculture Lease

- Aquaculture Certificate Number -(begins with “AQ”) **AQ1234567**
- Aquaculture Lease Number - (“AQ” is in the middle) **12-AQ-1234**
- Parcel Number - (begins with letter) **W1234**



Aquaculture Tags :

- Complete Tag Information:
 - Harvester AQ #
 - Harvest date & harvest area
 - Specific Lease or Parcel #
 - Species
 - Quantity
 - Product Consigned To (bulk tag)

****Note - No SPL Numbers**



AQ HARVESTER TAG

HARVESTER AQ # **AQ1234567**

DATE OF HARVEST _____ TIME OF HARVEST _____

TIME OF REFRIGERATION (if applicable) _____

LEGAL HARVEST AREA # _____ (4 digit code)

SPECIFIC LEASE OR PARCEL # **12-AQ-1234** **or** **W1234**

TYPE OF SHELLFISH _____ QUANTITY OF SHELLFISH _____

Cooling option (circle one): Traditional Rapid Cool On-Board Cool

THIS TAG IS REQUIRED TO BE ATTACHED UNTIL CONTAINER IS EMPTY
OR IS RETAGGED AND THEREAFTER KEPT ON FILE FOR 90 DAYS

BULK AQUACULTURE TAG

HARVESTER AQ # **AQ1234567**

DATE OF HARVEST _____ TIME OF HARVEST _____

TIME OF REFRIGERATION (if applicable) _____ COOLING OPTION: Traditional/ Harvest / Rapid Cool

LEGAL HARVEST AREA # _____ (4 digit code)

SPECIFIC LEASE or Parcel # **12-AQ-1234** **or** **W1234**

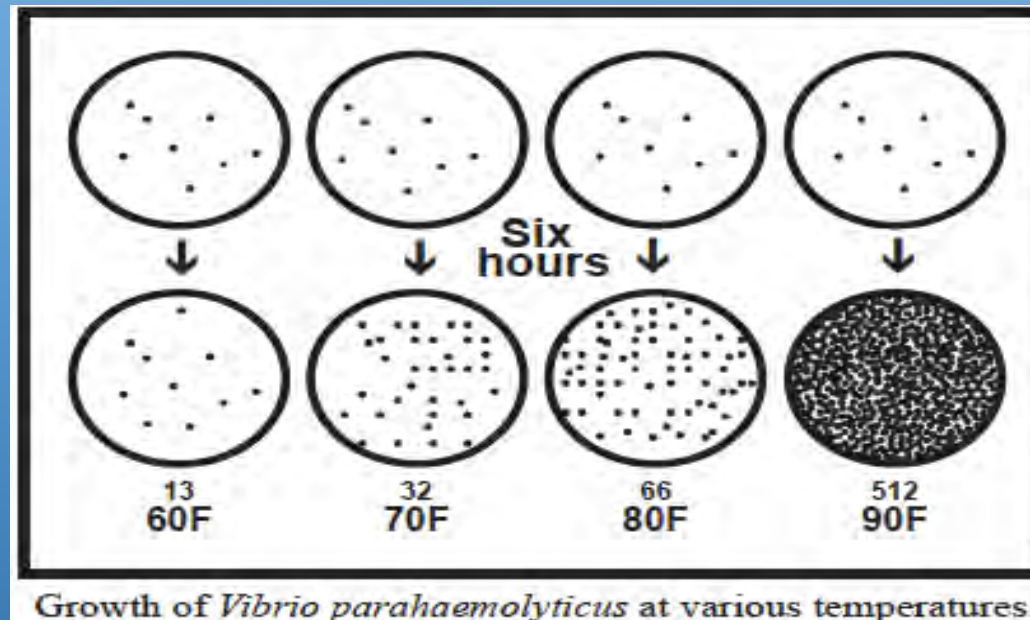
TYPE OF SHELLFISH _____ QUANTITY OF SHELLFISH _____

CONSIGNED TO: **Certified Processor #**

THIS TAG IS REQUIRED TO BE ATTACHED UNTIL CONTAINER IS EMPTY
OR IS RETAGGED AND THEREAFTER KEPT ON FILE FOR 90 DAYS

Vibrio Growth

- Any temperature abuse of shellfish can cause low numbers of Vibrio present at time of harvest to multiply to infectious levels.



Risks of Exposed Oysters



No more than 4 hours out of the water
or
oysters must be put back down for 14 days



Shellfish Illness Investigations

Illnesses associated with shellfish consumption:

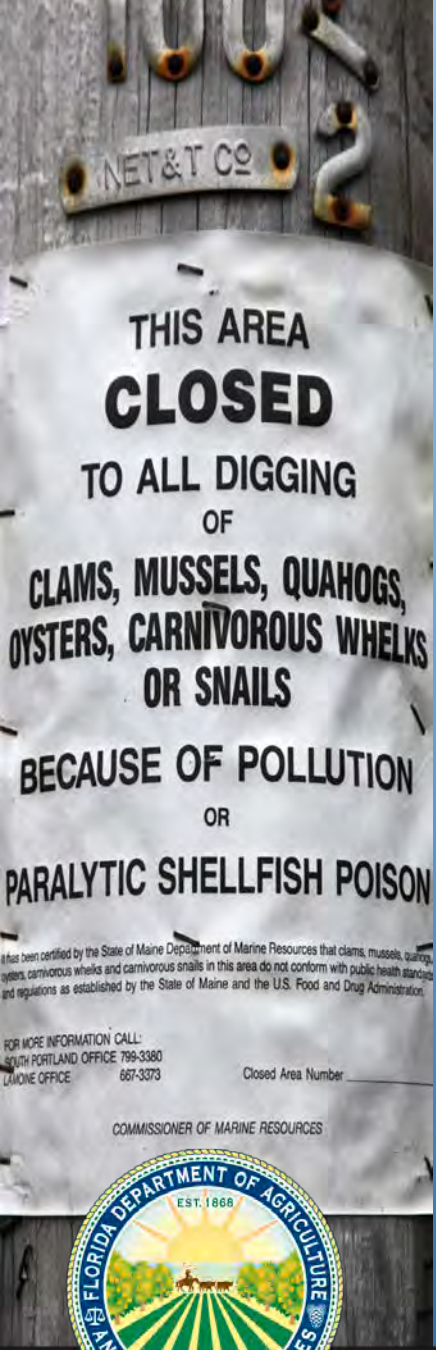
- Information is reported to the **Center for Disease Control (CDC)**
 - Cholera and Other Vibrio Surveillance System (**COVIS**)
- Investigations are coordinated by several agencies.
- Restaurants or seafood markets are investigated
- Harvest tags & Invoices trace the implicated product to:
 - Product source (harvest area and lease number).
 - Harvesters, aquaculturists, and dealers.
- Harvest areas, aquaculturists, and dealers are then further investigated for health or safety issues.

A detailed form titled "CHOLERA AND OTHER VIBRIO ILLNESS SURVEILLANCE REPORT" from the CDC. The form includes sections for "DEMOGRAPHIC AND ISOLATE INFORMATION", "CLINICAL HISTORY", "DIAGNOSTIC TESTS", and "EXPOSURE HISTORY". It contains various checkboxes and fields for recording patient information, symptoms, and potential exposures to shellfish.

Shellfish Illness Outbreak

“two or more persons not from the same household”

- Outbreaks may result in corrective actions for:
 - Facilities
 - Aquaculturists
 - Harvesters
- Corrective actions may include:
 - Product Recalls
 - Facility Sanctions
 - Facility Closures
 - Harvest Area Closures (*may be permanent*)
- Harvest area closures can be economically devastating



Shellfish Illness Outbreak: (cont.)

Foodborne Illness Outbreak Database

This database provides summaries of significant food and water related outbreaks occurring since 1984 caused by E. coli, Salmonella, Hepatitis A, Campylobacter and other pathogens. [READ MORE »](#)

[Return to Search Results »](#)

Apalachicola Bay, Area 1642, Oysters 2011

Consumption of raw or steamed oysters harvested from Area 1642 in Apalachicola Bay, Florida, was linked to an outbreak of *Vibrio cholerae* O75. The ill resided in four states, but had consumed the oysters while in Florida. Area 1642 is a zone that stretches from north to south in Apalachicola Bay just on the east side of the bridge that goes from Eastpoint, Florida, to St. George Island, Florida. The zone is approximately two miles wide from east to west. The traceback implicated oysters harvested between March 21 and April 6.

Tags: [cholera](#)



Norovirus



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State oyster recall underway on Pacific Northwest coast over Norovirus

BY NEWS DESK | APRIL 14, 2017

Due to multiple reports of oyster-associated Norovirus-like illnesses, Washington State is conducting a recall for all shellfish harvested from 3/15/17 to 4/11/17 from the implicated portion of the Hammersley Inlet growing area. The area of the recall has been closed.

At this time the following companies are identified in this recall include: Calm Cove Shellfish Company, Clearwater Shellfish, Gomez Shellfish, Goodro Shellfish, National Fish and Oyster Company, Navy Yard Oyster Company, Padden Seafood, Rivera's Shellfish, Russ Shellfish, S and B Shellfish Company, Salazar Shellfish, Schreiber Shellfish, and Sea Fresh Farms.



State officials believe that the implicated shellfish companies are in the process of contacting their customers. The state will provide additional information and details of distribution as it becomes available. Local health jurisdictions are aware of the recall, but are not being asked to participate in formal recall verification activities at this time.

Following reports of norovirus-like illnesses in people who report eating raw oysters from several areas in Washington and elsewhere, public health officials at the Washington

State Department of Health have tracked down areas where some of the illness-linked oysters were harvested.

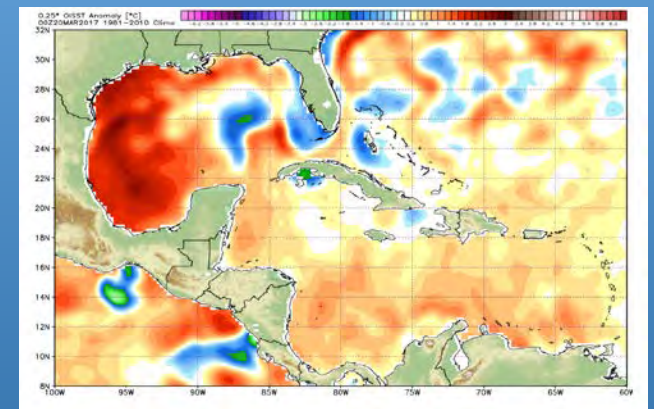
Over the past several weeks, small harvest closures and recalls have been ordered, the largest of which is in Hammersley Inlet in Mason County, where a recall has been issued for any shellfish harvested there since March

“Other” *Vibrio* sp. Illnesses



2017 Distribution of *Grimontia Hollisae* shellfish related illness cases

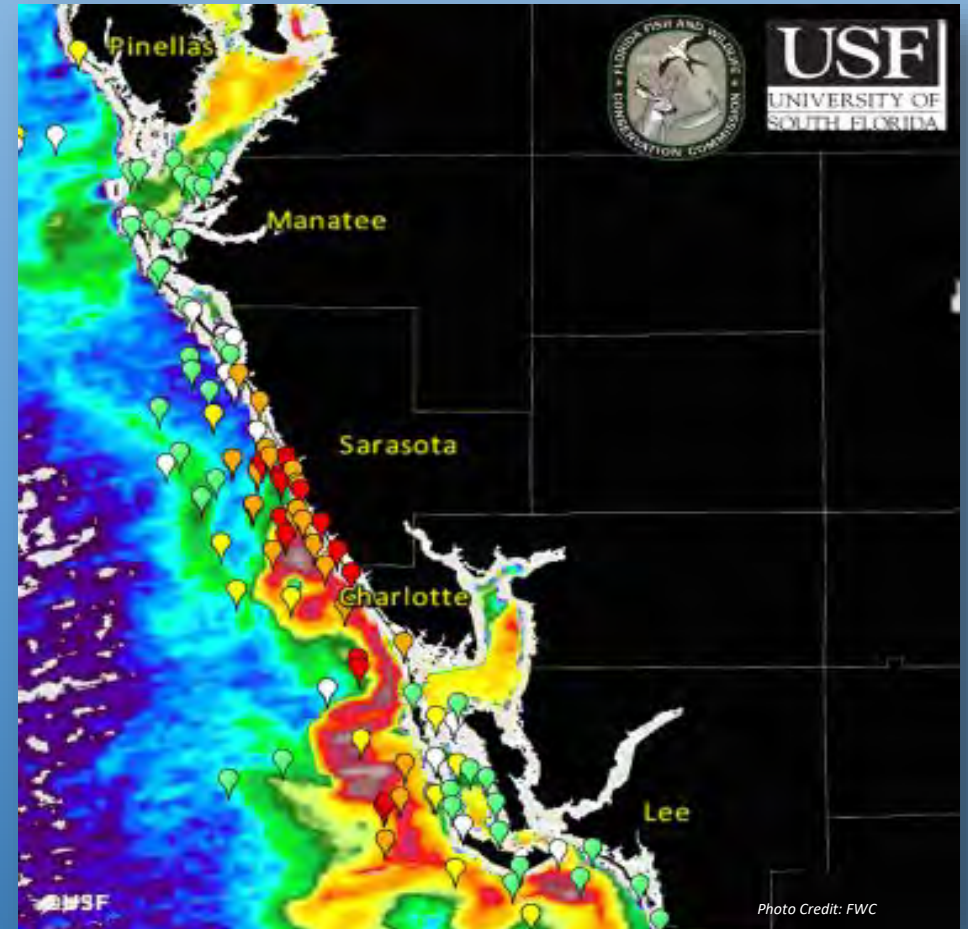
- In 2017 the Gulf average sea surface temperature never fell below 73 degrees over the winter for the first time on record
- Water temperatures at the surface of the Gulf of Mexico have spurred historically warm winters from Houston to Miami.



Rising Trends - HABs

Water temperatures at the surface of the Gulf of Mexico have stayed warm and not decreasing as in previous years.

- Increases in extent and duration of red tide.
- New harmful algae species.
 - *Pseudo-nitzschia* spp.
 - *Pyrodinium bahamense*





Harvest Vessel Condition

Must meet the Rule 5L-1 requirements

- Clearly displayed registration numbers
- Coast Guard approved:
 - Flotation device for each person
 - Marine use fire extinguisher,
 - A sound producing device (i.e. whistle)
 - 3 day time/night time signals
- Portable toilet or other sanitation devise



Transportation:

Must meet the Rule 5L-1 requirements

- **No animals**
-dogs, fish, etc.
- **No trash-**
-cans, food, old tires, car battery, etc.
- **No hazardous chemicals**
-Gas/oil cans, bleach, grease, fertilizer, paint
- **Protected from potential contaminants**
- Don't cover with plastic tarp
- **Ice product if possible**



Summary - Wild vs. Aquaculture

Both wild and Aq shellfish must **adhere to the same harvesting regulations and time/temp requirements**

Both Must deliver to a certified processor

	Wild	Aquacultured
Regulations	5L-1, F.A.C.	5L-1, F.A.C. and FDACS Best Management Practices, 5L-3, F.A.C.
Vessel	Must meet Rule 5L-1, F.A.C.	Must meet Rule 5L-1, F.A.C.
Harvest Time	Vibrio Management Plan	Vibrio Management Plan
Delivery	Directly to certified dealer (no Remote Buying)	Directly to certified dealer (No Remote Buying)
Harvest Season	FWC open/closed seasons	All year
Harvest Size	3 inches	All sizes
Replant/Resubmerge	Not applicable	-14 days if exposed >4 hours during VCM Segregate from other shellfish Maintain replant records.



Safe harvest!



Questions?

Contact the Division:

Tallahassee Office (Main)	(850) 617-7600
Atlantic Coast Office	(321) 984-4890
Apalachicola Office	(850) 653-8317
Panama City Office	(850) 236-2200
Cedar Key Office	(352) 543-5181
Port Charlotte Office	(941) 316-0954



Off-bottom Oyster Culture in Florida

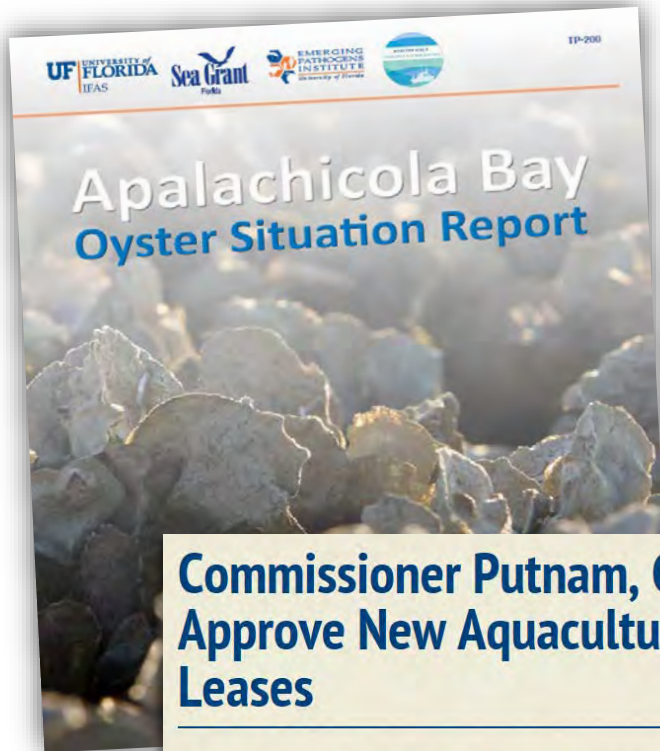


UF | IFAS
UNIVERSITY of FLORIDA

Leslie Sturmer
University of Florida / IFAS
Shellfish Aquaculture Extension
Cedar Key, Florida

Sea Grant
Florida

The impetus, 2012 to 2014...



- Oyster landings plummeted
- Fishery failure declared for Apalachicola Bay
- Water column leases approved
- Community college institute developed oyster aquaculture certification program

Commissioner Putnam, Cabinet Approve New Aquaculture Leases

Expansion of Water Column Leases Brings Opportunity to Apalachicola Bay, Other Areas of the State

Oct 10, 2013

Tallahassee, FL – Commissioner of Agriculture Adam H. Putnam and the Florida Cabinet today voted unanimously to approve additional aquaculture leases in several parts of the state, primarily in Apalachicola Bay.

The wild oyster industry in the Apalachicola Bay has declined substantially in recent years. Spring Creek Oyster Company recently began cultivating oyster cages in the full water column. This places the oysters in the most nutrient-rich part of the water, which reduces predators, shortens the grow-out time and improves survival rates.

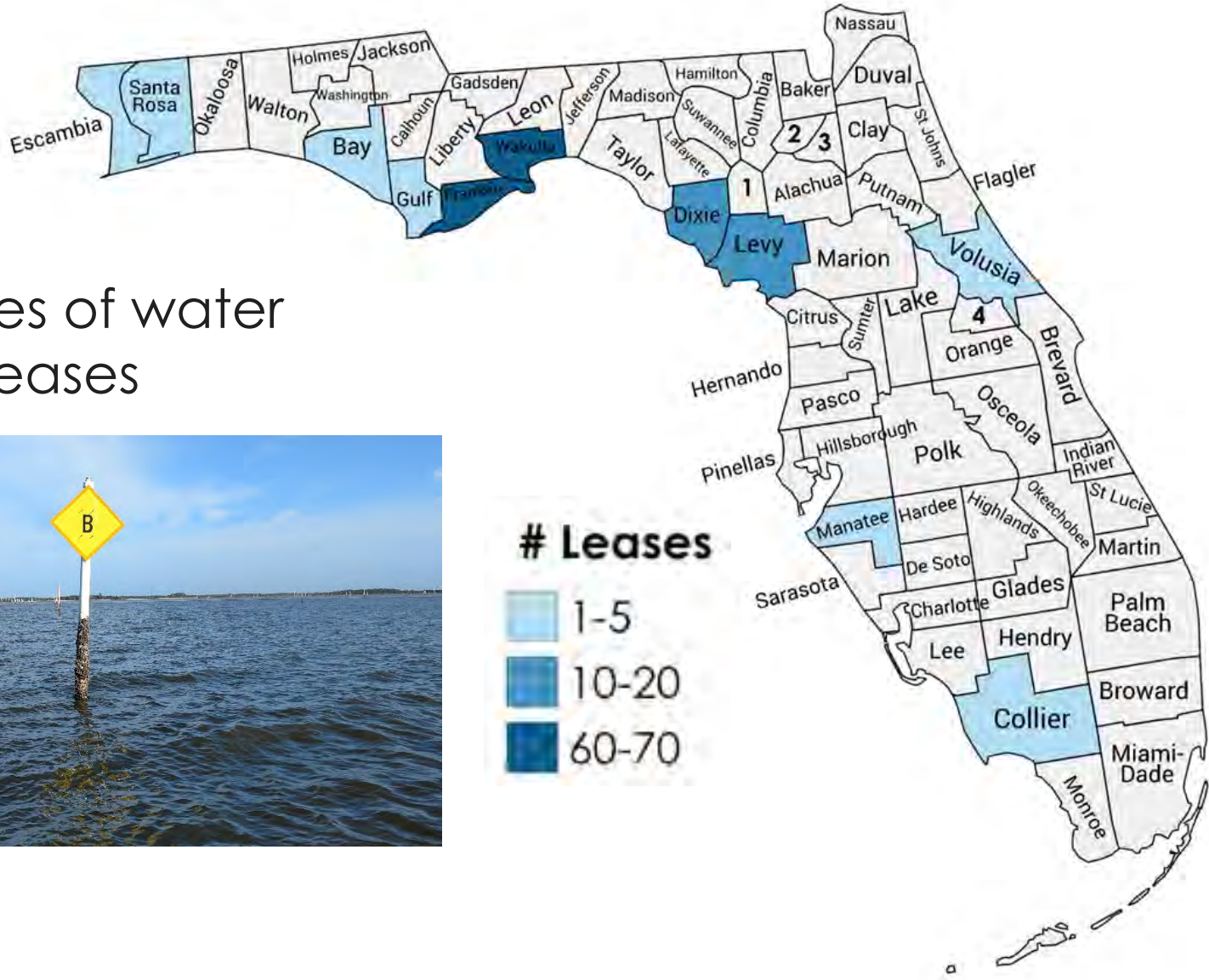


EDUCATION | CONSERVATION | RECREATION
Training Tomorrow's Environmental Workforce



Oyster culture takes off...

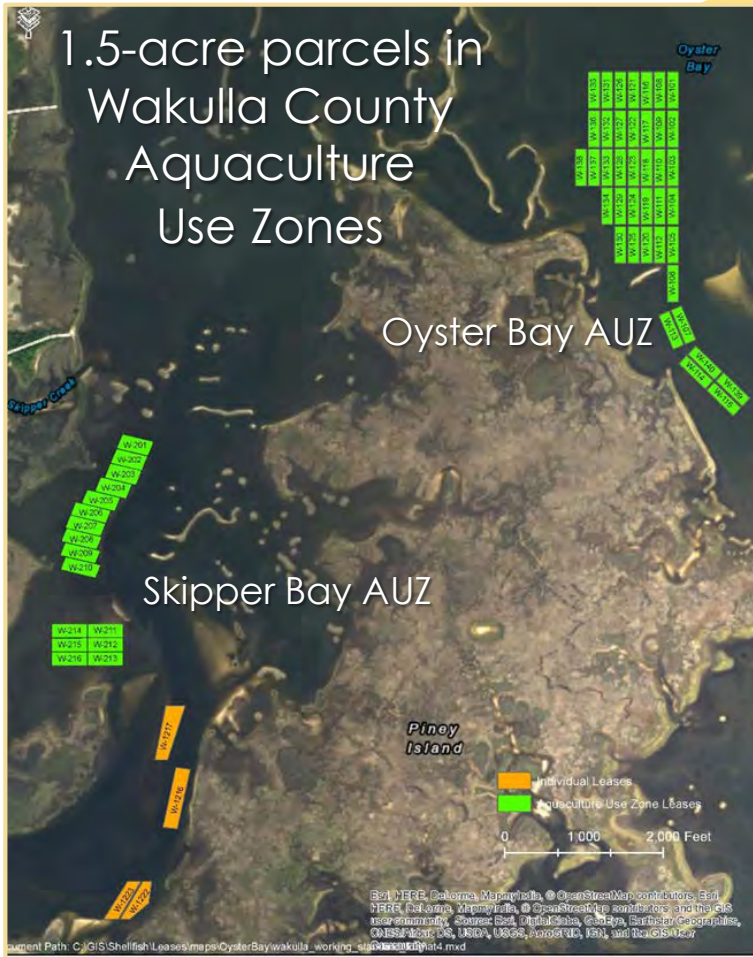
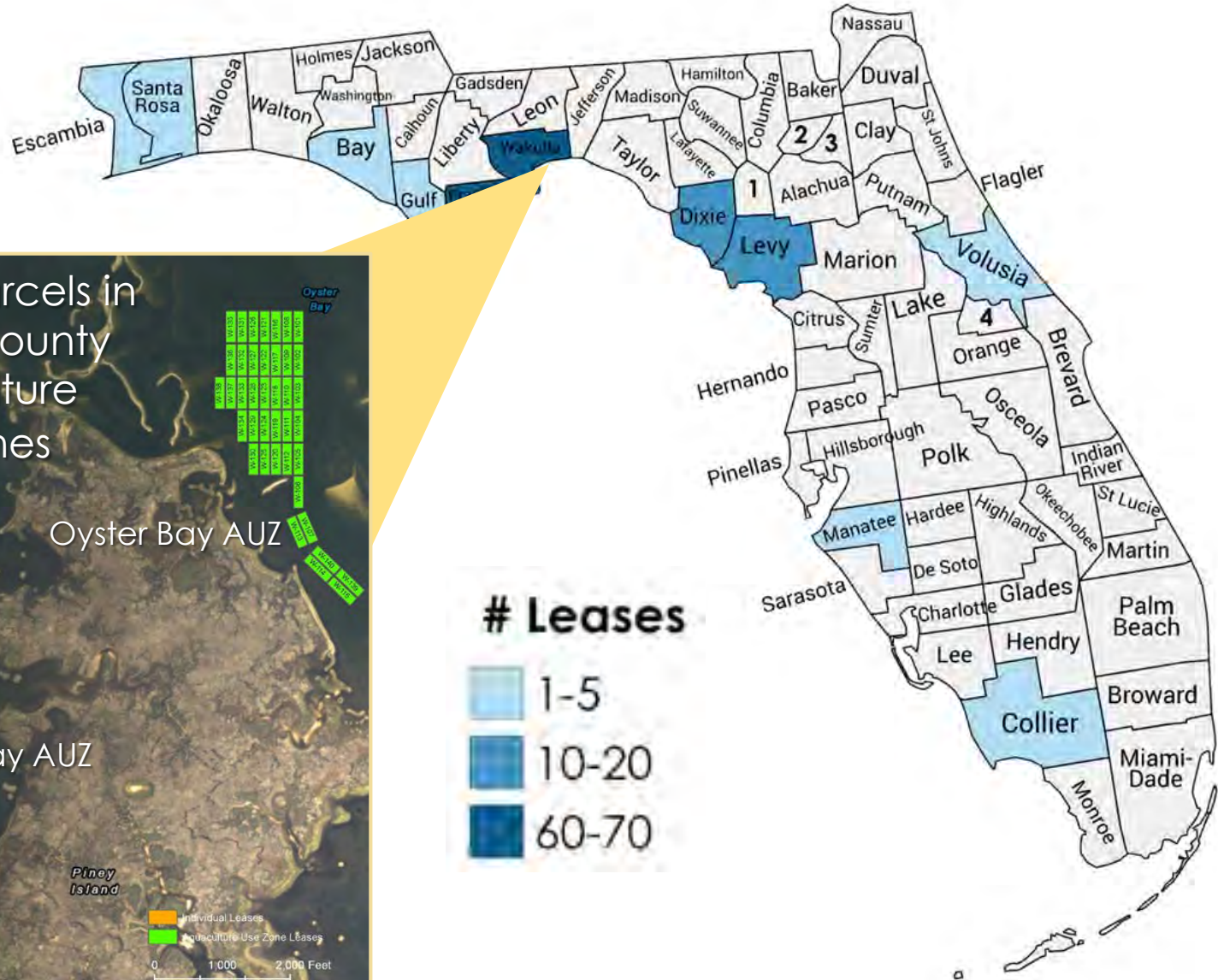
>350 acres of water column leases



Oyster culture takes off...



Oyster culture takes off...



Oyster seed availability...

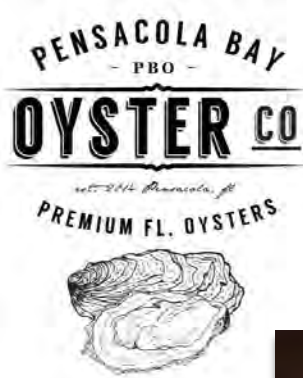


- Three clam hatcheries are also producing oyster seed
- Two new oyster hatcheries in Panhandle
- State rules allow out-of-state seed but with restrictions pertaining to disease prevention and genetic protection



Oyster culture gear...

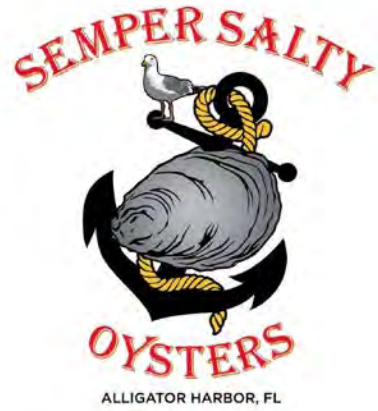




Saucy Lady



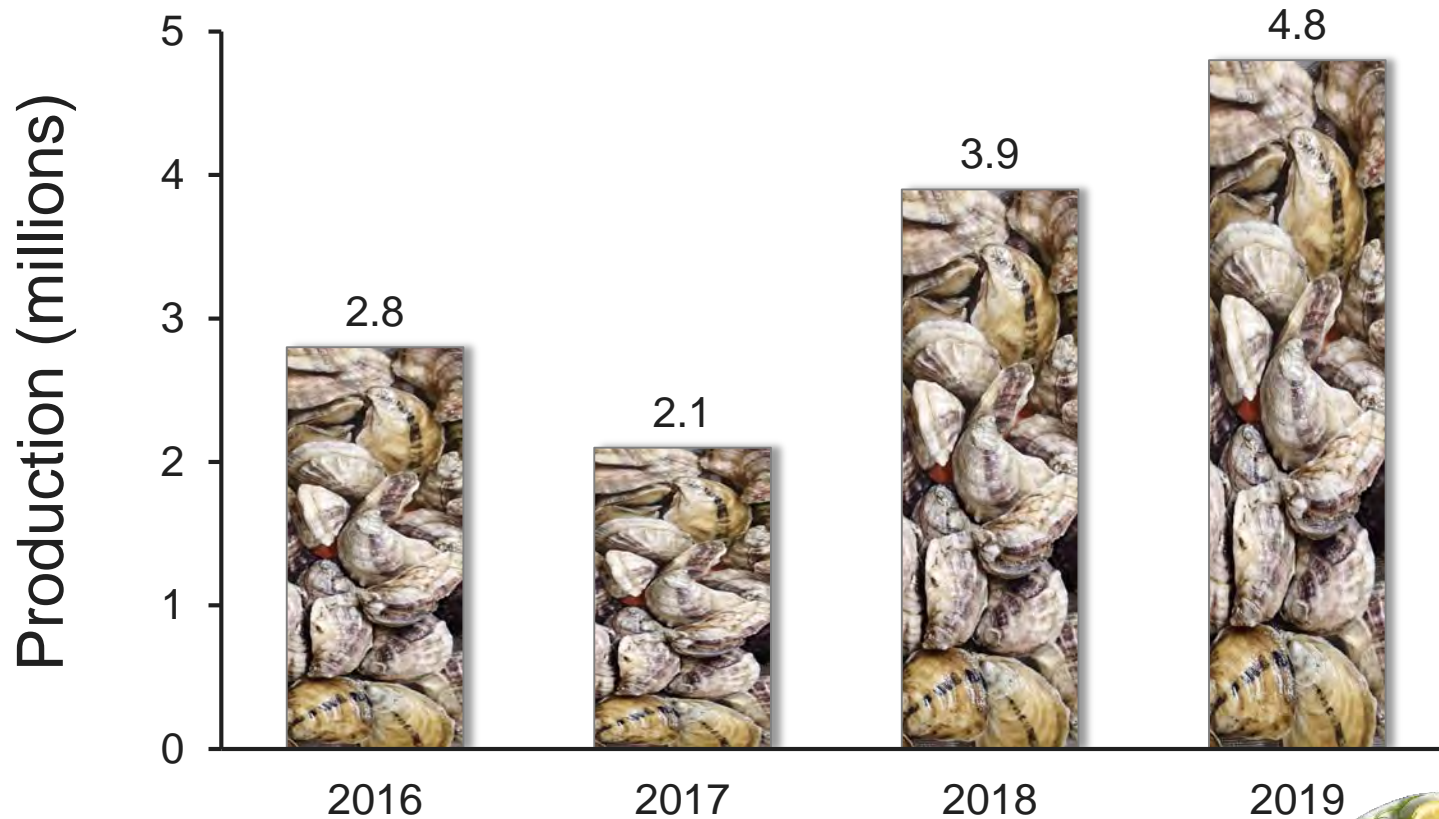
Oyster Company



>25 Shellfish Wholesale Dealers



Florida off-bottom oyster culture today...



- ▶ 125 certified oyster growers
- ▶ 4.8 million oysters sold in 2019

FDACS internal data



Challenges of a new industry...



- ▶ Limited seed availability, need for Florida-specific tetraploids
- ▶ Recent unexplained mortalities in spring and summer
- ▶ Almost year-round need for biofouling and oyster overset control
- ▶ Risks (hurricanes, mortalities, etc.) and economic feasibility being assessed by emergent industry

Oyster culture workshops

A series of workshops (2013-19) held by UF and FDACS providing information on culture gear, methods, marketing, and hurricane preparation



An Introduction to Intensive Oyster Culture

Thursday
September 26, 2013
FSU Coastal and Marine Laboratory
3618 Coastal Hwy 98
St. Teresa, FL

Friday
September 27, 2013
FWC Senator George Kirkpatrick Marine Lab
11350 SW 153rd Ct
Cedar Key, FL

Both workshops are from 2:00 to 5:00 PM.

Workshops are FREE.

To ensure there are enough handouts available, please confirm your attendance with:

Portia Sapp, FDACS Division of Aquaculture, (850) 488-5471, Portia.Sapp@FreshFromFlorida.com or
Leslie Sturmer, UF IFAS Shellfish Aquaculture Extension Program, (352) 543-5057, LNST@ufl.edu

TOPICS TO BE INTRODUCED:

- Overview of U.S. intensive oyster culture
- Rules of the Red water column rule permits, BMPs and regulations for oyster culture
- Development of the northern Gulf of Mexico oyster culture

SPEAKERS INCLUDE:

- Leslie Sturmer, Shellfish Aquaculture Extension Specialist
- Chris Brooks, Florida Department of Agriculture and Consumer Services
- William (Bill) Walton, Auburn University Shellfish Laboratory and Alabama Cooperative Extension Service

SUPPORTED BY:

An Introduction to Oyster Culture Gear & Suppliers

Wednesday
December 4, 2013
1:00-4:00 pm
FSU Coastal and Marine Laboratory
3618 Coastal Hwy 98
St. Teresa, FL

Thursday
December 5, 2013
1:00-3:00 pm
FWC Senator Kirkpatrick Marine Laboratory
11350 SW 153rd Ct
Cedar Key, FL

The workshops are FREE.

To ensure there are enough handouts available, please confirm your attendance with:

Portia Sapp, FDACS Division of Aquaculture (850) 488-5471
or
Leslie Sturmer, UF IFAS Shellfish Aquaculture Extension Program (352) 543-5057
LNST@ufl.edu

TOPICS TO BE COVERED:

- Hands-on discussion of oyster culture gear types—advantages, disadvantages, costs, and considerations for siting, deployment, and operational management
- Where to buy culture gear? Information on equipment suppliers
- Where to buy oyster seed? Information on seed suppliers
- Overview of oyster aquaculture activities in Louisiana (only at the December 4th workshop)

SPEAKERS INCLUDE:

- William (Bill) Walton, Ph.D., Auburn University Shellfish Laboratory and Alabama Cooperative Extension Service
- John Supan, Ph.D., Louisiana State University and Sea Grant (only at the December 4th workshop)
- Time will be allotted for equipment and seed suppliers to present their products and services

SUPPORTED BY:

An introduction to the Oyster Culture Industry in the Northeastern U.S.

Thursday
April 3, 2014

TOPICS TO BE PRESENTED:

- Introduction to on-bottom oyster culture systems and methods used in small farming operations in the Northeastern U.S.
- Start-up of a private oyster culture initiative in Martha's Vineyard—from training and seed development to marketing and promotion
- Development of best management practices for the east coast shellfish aquaculture industry

SPEAKERS INCLUDE:

- Dale Leavitt, Ph.D., Associate Professor and Aquaculture Extension Specialist, Roger Williams University, Bristol, Rhode Island. Dale teaches a course on practical shellfish farming and conducts applied research for the advancement of shellfish aquaculture
- Rick Kamey, Director and Shellfish Biologist, Martha's Vineyard Shellfish Group, Oakes Bluff, Massachusetts. For over 30 years, Rick and his shellfish group have sought to expand their island's shellfisheries through innovative aquaculture technologies
- Sandy MacFarlane, Coastal Resources Specialist, Massachusetts Sandy, a renowned Cape Cod author, has three decades of experience in coastal resource management, shellfish aquaculture and restoration

SUPPORTED BY:

Introduction to Harvesting and Marketing Cultured Oysters

Over 290 oysters. What are your favorites?

TOPICS TO BE PRESENTED:

- Niche marketing cultured oysters for the raw bar—what top chefs demand and how to ensure you get paid for your hard work
- Learn to differentiate your product on qualities other than price in the marketplace and adapt your marketing pitch
- Marketing strategies to target key buyers and get maximum return
- Rules of the Road: Harvesting and processing requirements for oysters during summer months

SPEAKERS INCLUDE:

- Bob Rheault, Ph.D., Executive Director, East Coast Shellfish Growers Association (ECSGA). Bob started Moonstone Oysters™ in 1986. He likes to joke that the only reason he survived was because he was a good salesman and landed the highest priced passionate advocate for the industry.
- Martin May, Bureau Chief, Florida Department of Agriculture and Consumer Services, Bureau of Seafood and Aquaculture Marketing
- Kim Nargren, Environmental Administrator, Florida Department of Agriculture and Consumer Services, Division of Aquaculture

SUPPORTED BY:

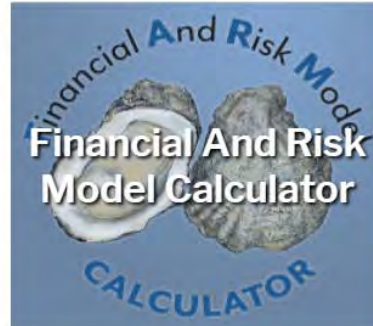
Online Resource Guide for Florida Shellfish Aquaculture

The screenshot shows the homepage of the 'Online Resource Guide for Florida Shellfish Aquaculture' website. At the top, the UF IFAS University of Florida logo is on the left, and the title 'Online Resource Guide for Florida Shellfish Aquaculture' is centered. A search bar and social media icons are on the right. Below the title is a navigation menu with links for HOME, ABOUT THE INDUSTRY, GETTING STARTED, RESOURCES, SUPPLIERS, EXTENSION, NEWS, ABOUT US, and TOPICS. The main banner features the title 'Florida Hard Clam Aquaculture' and three key messages: 'Providing JOBS in rural coastal communities', 'ENVIRONMENTALLY BENEFICIAL ecosystem services', and 'HEALTHY, NUTRITIOUS and LOCALLY PRODUCED seafood'. A central image shows clam farming in a bay, with the text 'A SUSTAINABLE INDUSTRY' below it. Below the banner is a welcome message: 'Welcome to the new and improved Online Resource Guide for Florida Shellfish Aquaculture. This site provides, through the University of Florida IFAS Shellfish Aquaculture Extension Program, information about shellfish farming and related activities for the general public, growers, and others involved in the shellfish industry. A "news blog" is featured which provides current information on a timely basis and replaces The Bivalve Bulletin newsletter. This site also includes updates on research and extension projects, presentations from industry workshops, suppliers' lists, and pertinent publications. Read More'. The page is divided into two main sections: 'NEWS & EVENTS' on the left and 'SHELLFISH' on the right. The 'NEWS & EVENTS' section lists three items: 'Monthly Inventory Reports for USDA Farm Service Agency's NAP Program' (October 3, 2019), 'Financial Assistance Programs: Workshop Presentations, Handouts, and Video Recordings' (August 16, 2019), and 'Hurricane Workshop Presentations and Marker Tag Program' (August 2, 2019). The 'SHELLFISH' section features a grid of images for 'Hard Clams', 'Oysters', and 'Sunray Venus'. Below this is a 'TOPICS' section with a grid of images for 'Water Quality', 'Environmental Benefits', 'Clam Workshops', 'Dr. Yang's Lab', and 'Big Bend SHELLFISH TRAIL'. A mouse cursor is pointing at the 'Oysters' image.

<http://shellfish.ifas.ufl.edu>



Oyster Culture



Oyster Culture Topic Page



Oyster Culture

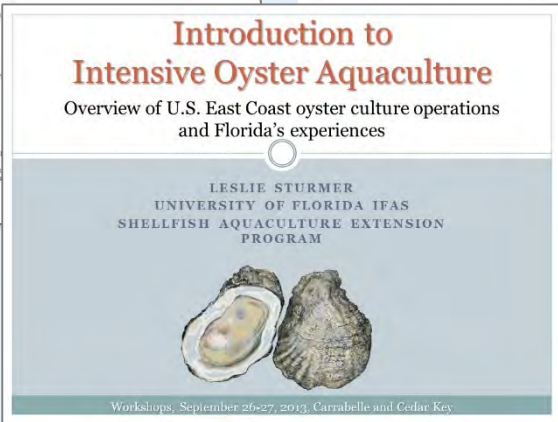
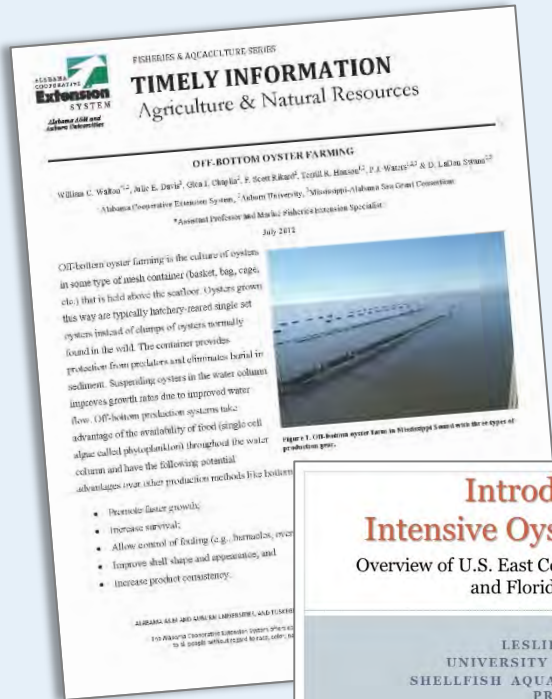
A large decline in oyster landings was reported in 2012 and has continued through 2014 for Apalachicola Bay and other areas along the west coast of Florida where the state's oyster fishery is based. Efforts conducted through the University of Florida's Oyster Recovery Team, described conditions prior to and after the historic collapse of the oyster fishery. Their report reviews possible causes and outlines a plan for future monitoring, research, and fishery management. In August 2013, the U.S. Secretary of Commerce declared a commercial fishery failure for the Florida oyster fishery.

Shellfish farming was introduced on the west coast of Florida during the 1990s as part of retraining opportunities for seafood workers affected by increasing regulations. Although these programs demonstrated that oysters could be grown using on-bottom methods, they were not successful. Unlike cultivating hard clams, oysters proved too labor-intensive and costly to grow. Today, there is renewed interest in oyster culture. With decreased supplies from the fisheries and higher dockside prices, the economics may be more favorable. Further, the success of Florida's clam culture industry provides a model for the oyster industry in their recovery efforts.

Florida Governor and Cabinet approved modification of hard clam permit only six inches above the bottom substrate for culture activities, to permit (Franklin County) full use of the water column for culturing oysters. Since then, lease modifications for oyster cultivation have been approved.



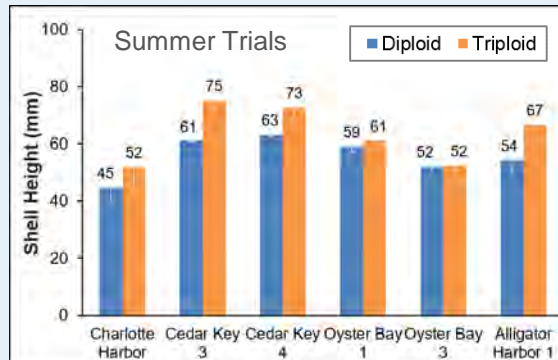
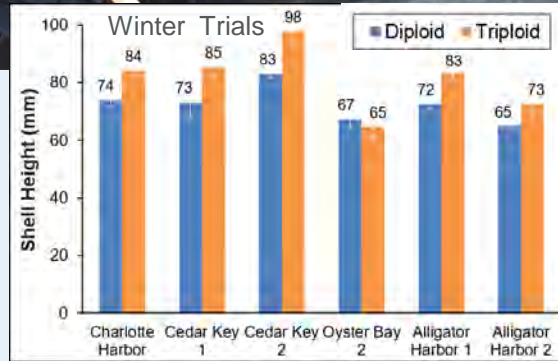
- Oyster Culture
- Introduction
- Culture Gear & Supplies
- Northeast U.S. Industry
- Lease Modification
- Marketing



- Workshop handouts
- Presentation files
- Presenter information
- Gear suppliers lists



- Documented seasonal growth, survival, and health of diploid and triploid oysters at commercial farms
- Evaluated gear and management practices in replicated field trials



UF IFAS
FLORIDA STATE UNIVERSITY

Online Resource Guide for
Florida Shellfish Aquaculture

Home | About the Industry | Getting Started | Resources | Suppliers | Extension | News | About Us | Topics

Home - Oyster Farming Demonstration Project

Oyster Farming Demonstration Project
Application of Triploidy to the Emergent Florida West Coast Industry

The project allowed for large-scale demonstration and evaluation of an oyster breeding process to local conditions on Florida's west coast by oyster growers. The objectives were two-fold:

1. Document production performance, assess health, and evaluate the quality (sensory characteristics) of diploid (2N) and triploid (3N) oysters under commercial conditions; and
2. Quantify the effects of different culture methods, salinity regimes, and seasonal harvests.

SOON'S GR WORK: Oysters from two ploidy types (triploids – 3N and diploids – 2N) and two seasonal openings (spring and fall) were provided to certified growers, who obtained approval from DACS to culture oysters on their shellfish aquaculture leases. Ten growers in the west coast counties (Charlotte, Franklin, Lee, Levy, and Volusia) used a variety of culture systems (floating bags, floating cages, bottom cages, and adjustable line lines), which allowed for evaluation of site and gear interaction on ploidy type, maturity,

FOLLOW THE PROJECT BY VIEWING THE NEWS ARTICLES BELOW:

Sea Grant



Seed Provided to Growers in July
July 27, 2016

Single-seed triploid oyster seed were produced by crossing Cedar Key stocks with apertm from tetraploid stocks maintained at Louisiana Sea Grant's oyster hatchery. [Read more](#)



UF Plants Seed in August
September 14, 2016

Triploid and diploid oyster stocks were also planted by UF at their experimental lease located within the Dog Island Lease Area off Cedar Key on August 4. [Read more](#)



Hurricanes Impact Oyster Trials
October 7, 2016

After mauling around the Gulf of Mexico as a tropical depression, Hurricane Hermine gathered steam and headed straight for the Big Bend coast on September 2. [Read more](#)



UF Oyster Growout Study Initiated
November 4, 2016

This article summarizes the growth of diploid (2N) and triploid (3N) oysters cultured at the UF experimental lease within the Dog Island Lease Area near Cedar Key. [Read more](#)



Financial Characteristics and Risks
January 2017

Another component of the Oyster Culture Demonstration Project is to document economic costs and benefits associated with diploid versus triploid oyster production along the west coast of Florida. [Read more](#)



Sampling UF Field Trials
February 2017

A similar number of oysters provided to project participants were also cultured at the UF experimental lease off Cedar Key so that growth and survival could be documented site-to-site during growout. [Read more](#)





Other Projects
2018-present

Other Oyster Culture Projects

During 2017 - 19, applied field trials were conducted by University of Florida/IFAS to continue 1) evaluating various gear types and management practices and 2) documenting annual and seasonal oyster production on an experimental lease off Cedar Key. In collaboration with Sea Grant agents and industry partners from the Southeast US and Gulf of Mexico, effects of biofouling control methods for floating cages, such as flipping regimes and biocide-free, antifouling coatings, were evaluated. Oyster performance and biofouling control using floating cages and floating bags were also compared. In another replicated study, survival and growth of oysters stocked from 175 to 250 per floating bag were documented.



Biofouling Control



Gear Comparison

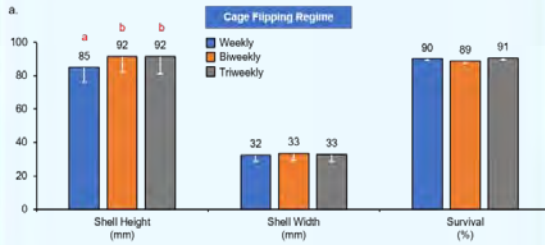
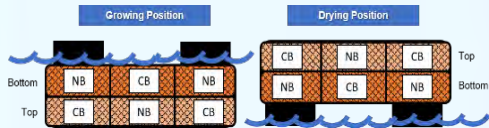


Stocking Density

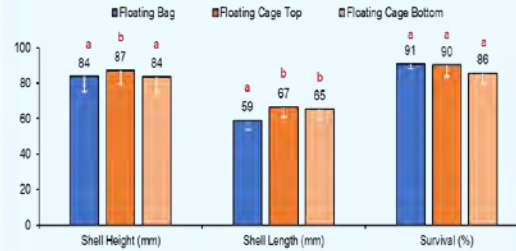
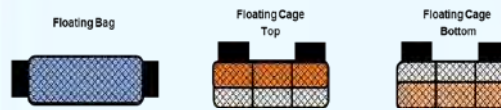
Other Oyster Culture Projects



Biofouling Control

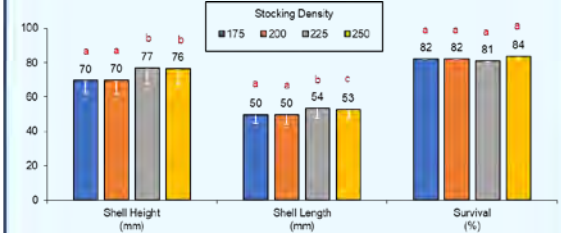


Gear Comparison



Stocking Density

Ploidy Type	# Oysters per Bag	# Bags
Triploid (3N)	175	4
Triploid (3N)	200	4
Triploid (3N)	225	4
Triploid (3N)	250	4





Oyster Culture Videos

Oyster Resources

Hatchery

- Oyster Hatchery Manual: Protocols for North Carolina Oyster Hatchery Operations (Car)
- Oyster Hatchery Techniques (SRAC 4302)
- Hatchery Culture of Bivalves: A Practical Manual (FAO Fisheries TP 471)
- Installation and Operation of a Modular Bivalve Hatchery (FAO Fisheries TP 492)
- A Regional Shellfish Hatchery for the Wider Caribbean (FAO Fisheries & Aquaculture Pr
- Eastern US Interstate Shellfish Seed Transport Workshop Abstracts (SCSG)
- Lipid Enrichment of Oyster Broodstock Using Commercially Available Emulsions (NRAC
- Evaluation of Eastern Oyster Spat Collectors for Whitehouse Seafood (UGMES Vol. 13, 2
- Wild Eastern Oyster Spat Collection for Commercial Grow-out in Georgia (UGMES Vol. 2

Nursery

- Nursery Growout Methods for Aquacultured Shellfish (NRAC 00-002)
- Shellfish Upweller Silo Construction: 101 (NRAC 212-2010)
- Producing Oyster Seed by Remote Setting (NRAC 220)
- A Low Cost Floating Upweller Shellfish Nursery System Construction and Operat
- Construction and Operations Manual for a Tidal Powered Upwelling Nursery System
- Shellfish Upweller Nurseries (Roger Williams University)
- High-Density Rearing of Oyster Larvae in Flow-Through Systems (SRAC 4311)

Algae Culture

- Growing Microalgae to Feed Bivalve Larvae (NRAC 160)
- Phytoplankton Culture for Aquaculture Feed (SRAC 5004)
- Plankton Culture Manual (Florida Aqua Farms order information)
- Use of Microalgae Concentrates for Rearing Oyster Larvae (MASG-12-048)

Oyster Production

- The Cultivation of the American Oyster (SRAC 0432)
- Extensive Culture of *Crassostrea virginica* in the Gulf of Mexico Region (SRAC 4300)
- Off-Bottom Culture of Oysters in the Gulf of Mexico (SRAC 4308)
- Off-bottom Oyster Farming (ACES)
- Off-bottom Oyster Culture Gear Types (MASGP 12-013-04)
- Reference Manuals for Oyster Aquaculturists (New Brunswick University Pub)
- Non-Commercial Oyster Culture or Oyster Gardening (SRAC 4307)



Introduction to Harvesting and Marketing Cultured Oysters

May 2015

Robert Rheault, ECSGA; Martin May and Kim Norgren, DACS



An Introduction to Intensive Oyster Culture Workshop

September 2013

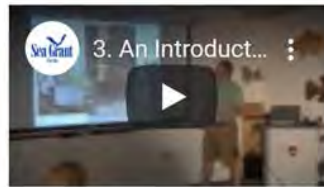
Leslie Sturmer, UF; Portia Sapp and Kim Norgren, DACS; Bill Walton, AU



An Introduction to Oyster Culture Gear and Suppliers Workshop

December 2013

John Supan, LSU; Bill Walton, AU; Rheel Savoie, OysterGro; Kent Ferguson, Go Deep International; Tom Rossi, 4Cs Breeding Company



An Introduction to Oyster Culture in the Northeastern United States



Application of Triploidy to Oyster Culture on Florida's West Coast



Gear Management Workshop

September 2018



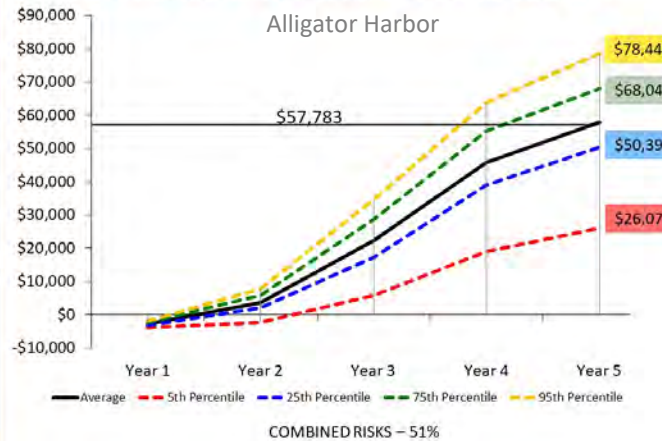
Financial And Risk Model



CALCULATOR

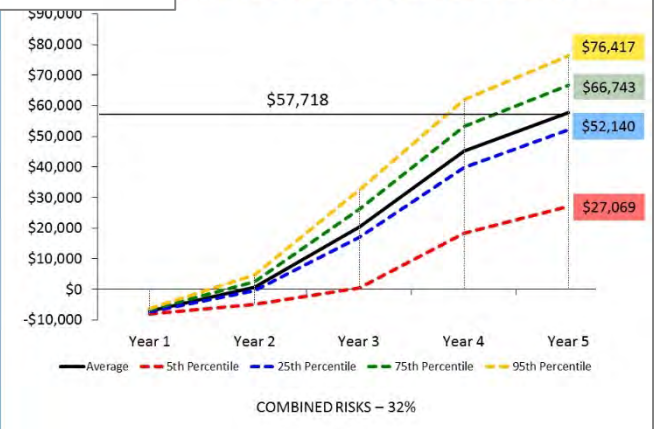


NET INCOME RESULTS: FRANKLIN COUNTY



- Determined net income for a hypothetical small-scale oyster farm over 5-years based on combined risks

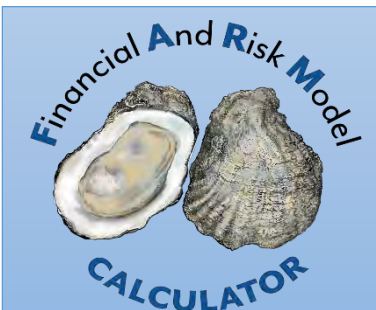
NET INCOME RESULTS: WAKULLA COUNTY



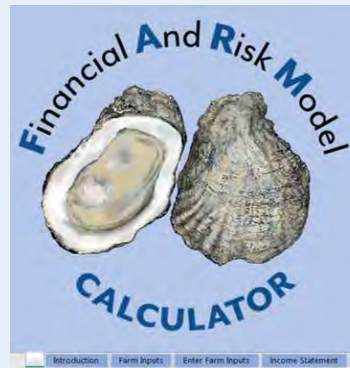
Environmental Risk	County	Probability
--------------------	--------	-------------

Major Storms	Escambia	11%
	Franklin - AH	19%
	Levy	19%
	Wakulla	16%
High Salinity Event (>30 ppt for 2 months)	Escambia	0%
	Franklin – AH	30%
	Franklin - AB	2%
	Levy	0%
	Wakulla	0%
Low Salinity Event (<10 ppt for 2 months)	Escambia	50%
	Franklin - AH	0%
	Franklin - AB	18%
	Levy	0%
	Wakulla	11%

- Identified environmental and economic risks to oyster culture in four counties
- Assessed risk probabilities based on long term data sets



- Developed tool for growers to input their own costs and culture methods to generate their farm's income statement and financial risk situation



- Introduction
- Farm Inputs
- Income Statement
- Risk Outputs
- Risk Fan Graph
- Risk StopLight Chart
- About the Calculator
- Credits and References

Enter Your Farm Inputs					
	Year 1	Year 2	Year 3	Year 4	Year 5
Where is your lease located?	Lewy County - West				
What are your annual certification and lease rental fees?	\$ 156.00	\$ 156.00	\$ 156.00	\$ 156.00	\$ 156.00
How many oysters are you planting each year?	50,000	100,000	200,000	350,000	500,000
What is the cost per 1,000 oyster seed?	\$ 15.00	\$ 20.00	\$ 20.00	\$ 20.00	\$ 20.00
What is your average market price per oyster?	\$ 0.40	\$ 0.45	\$ 0.45	\$ 0.50	\$ 0.50
What percentage of oysters brought to market are able to be sold?	90%	90%	85%	85%	85%
What culture method do you use?	Floating Bags				
What mesh size bag/baskets do you use each year?					

Farm Income Statement					
	Year 1	Year 2	Year 3	Year 4	Year 5
Total Fixed and Variable Costs	\$ 14,456.00	\$ 22,046.00	\$ 28,876.00	\$ 39,156.00	\$ 57,856.00
Additional Costs Due to All Risks					
Labor Wages	\$ 9.66	\$ 11.23	\$ 10.28	\$ 11.00	\$ 11.81
Capital Costs	\$ 8.68	\$ 50.77	\$ 43.19	\$ 11.29	\$ 8.79
Total Additional Costs Due to All Risks	\$ 18.34	\$ 62.00	\$ 53.47	\$ 22.29	\$ 20.60
Total Farm Costs	\$ 14,474.34	\$ 22,108.00	\$ 28,929.47	\$ 39,178.29	\$ 57,876.60
Oyster Plantings and Mortalities					
Number of Oysters Planted	50,000	100,000	200,000	350,000	500,000
Normal Mortality	20%	20%	20%	20%	20%
Mortality from Major Storms	1%	1%	1%	1%	1%
Mortality from an Extended Low Salinity Event	0%	0%	0%	0%	0%
Mortality from an Extended High Salinity Event	0%	0%	0%	0%	0%
Marketable Oysters	35,644	71,131	134,503	235,493	334,908
Farm Revenues					
Market Price per Oyster	\$ 0.40	\$ 0.45	\$ 0.45	\$ 0.50	\$ 0.50
Total Farm Revenue	\$ 14,257	\$ 32,009	\$ 60,526	\$ 117,747	\$ 167,454
Profitability (Pre-tax Net Income)	\$ (216.86)	\$ 9,901.08	\$ 31,596.85	\$ 78,568.30	\$ 109,577.37

Shellfish Aquaculture in Florida

A SUSTAINABLE INDUSTRY

UF IFAS
UNIVERSITY of FLORIDA



Providing

JOBS in rural coastal communities



ENVIRONMENTALLY BENEFICIAL ecosystem services



HEALTHY, NUTRITIOUS and **LOCALLY PRODUCED** seafood



visit shellfish.ifas.ufl.edu

OYSTER FARM GEAR AND MANAGEMENT

Bill Walton

Auburn university shellfish lab





SITE SELECTION

- Location, location, location
...
- Site comes first! Choose gear second.
- Factors to consider
 - Biological
 - Physical
 - Economic & Regulatory
 - Social





BIOLOGICAL FACTORS

- You are raising a filter feeding bivalve that requires phytoplankton to grow
 - Your site will need good food quality
 - Not all 'green' is edible
- What is oyster growth and survival at site?





BIOLOGICAL FACTORS

- Predators
 - Crabs, drills, fish, etc.
- Fouling Community
- Disease
 - Dermo or *Perkinsus marinus*
 - www.oystersentinel.org
- Frequency of harmful algal blooms





PHYSICAL FACTORS

- Salinity
 - What is the range?
 - Oysters do best above 10 PPT
 - Don't survive below 5 PPT, especially at higher temperatures
 - What is the duration and timing of low salinity events?
 - High salinity is actually fine for oysters but can promote disease & fouling
- Temperature
 - High temperatures cause stress, especially during air drying
 - Low temperatures cause stress especially when oysters are exposed at low tide





PHYSICAL FACTORS

- Dissolved oxygen
- Water Depth
- Water Current
 - The more flow, the better generally
- Wave Exposure & Storm Protection
- Bottom Type
- Size of Area





ECONOMIC AND REGULATORY FACTORS

- Required Permits
- Terms of Lease
- Water Quality Classification
 - Frequency and duration of closures?



ECONOMIC AND REGULATORY FACTORS

- Logistics
 - What are the time/temperature requirements and can you meet them at your site?
 - Boat only access?
 - Duration of trip to farm?
- Security
 - Shared area
 - Cameras
- Marketability of Site



SOCIAL FACTORS

Viewshed Concerns

Conflicts with Other Stakeholders

- Navigation
- Recreational use
- Fishing

Marine Debris

Be a Good Neighbor!

- Adapt ECSGA BMP if there is a desire



CULTURE GEAR OPTIONS

- On-Bottom Culture
 - No gear
- Off-Bottom Culture
 - Suspended gear
 - Floating gear
- Other Gear to Consider
 - Boat/work barge
 - Nursery equipment
 - Truck/trailer
 - Sorter/Grader
 - Etc.





NEED A (COST-EFFECTIVE) PLAN TO CONTROL BIO-FOULING!

- Routine air-drying
- Power washing
- Brine dipping
- Other?





GEAR OPTIONS: SUSPENDED



GEAR OPTIONS: SUSPENDED

- WWW.EKONEOYSTER.CO
M



GEAR OPTIONS: SUSPENDED

Pros

- Easy handling and inventory control
- Tumbling (esp. in-line arrangement) can shape/clean oysters
- Fouling control accomplished by setting tidal height
- Automated grading and loading equipment available
- Tropical storm strategy

Cons

- Limited to narrow tidal range (3'-5.5' or so)
- Needs firm bottom
- Visually obvious
- Labor-intensive gear installation





GEAR OPTIONS: FLOATING



GEAR OPTIONS: FLOATING

Pros

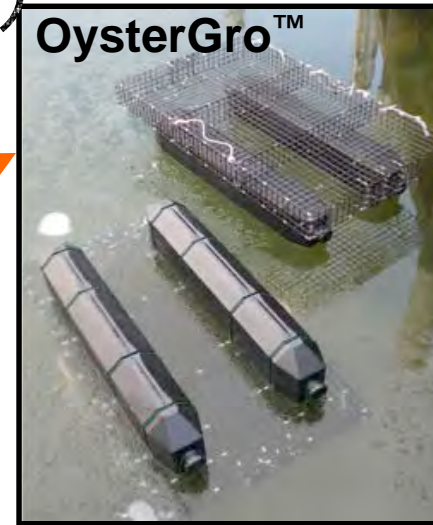
- Easy handling and inventory control
- Can adapt to variety of water depths
- Tumbling (esp. when flipped or in rough water) can shape/clean oysters
- Fouling control accomplished by flipping
- Gear can be moved around farm easily
- Tropical storm strategy

Cons

- Cages get heavy to flip; may require additional labor
- Relatively space-inefficient due to flotation
- Need to be sure of anchors and reduce chafing

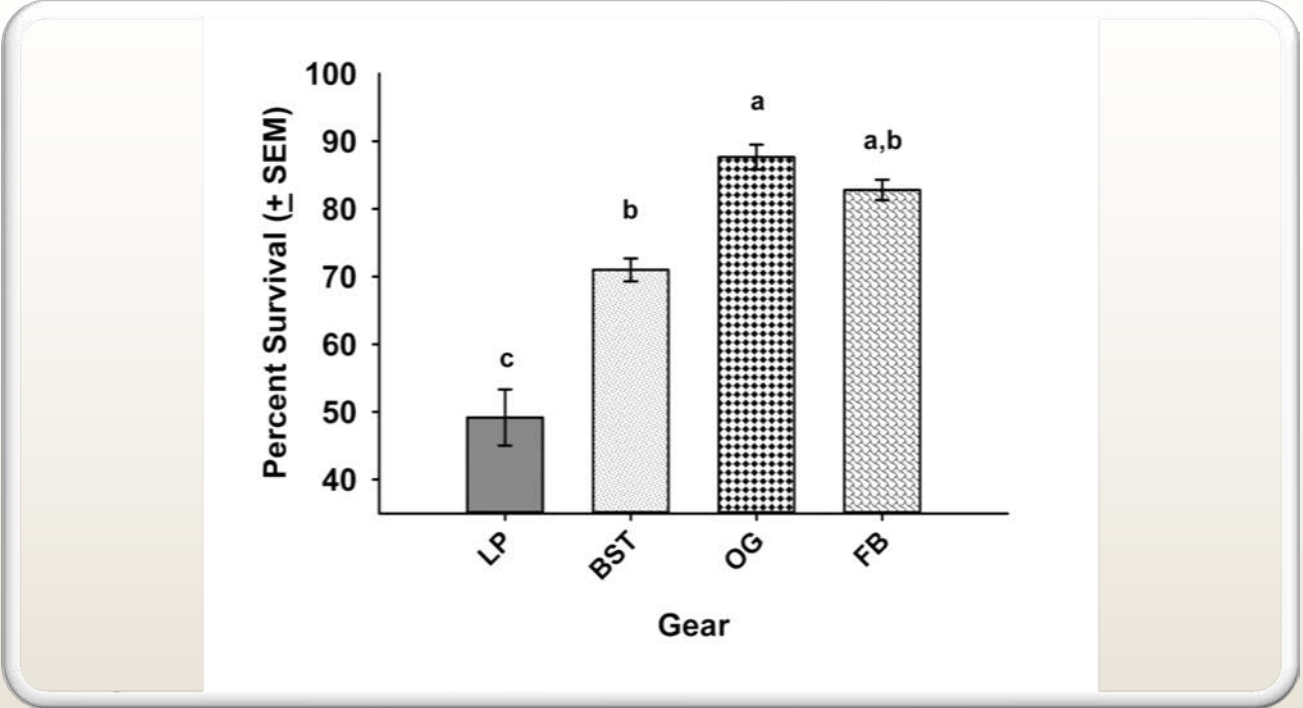


COMPARISON OF GROW-OUT GEAR (CODDINGTON, 2011)



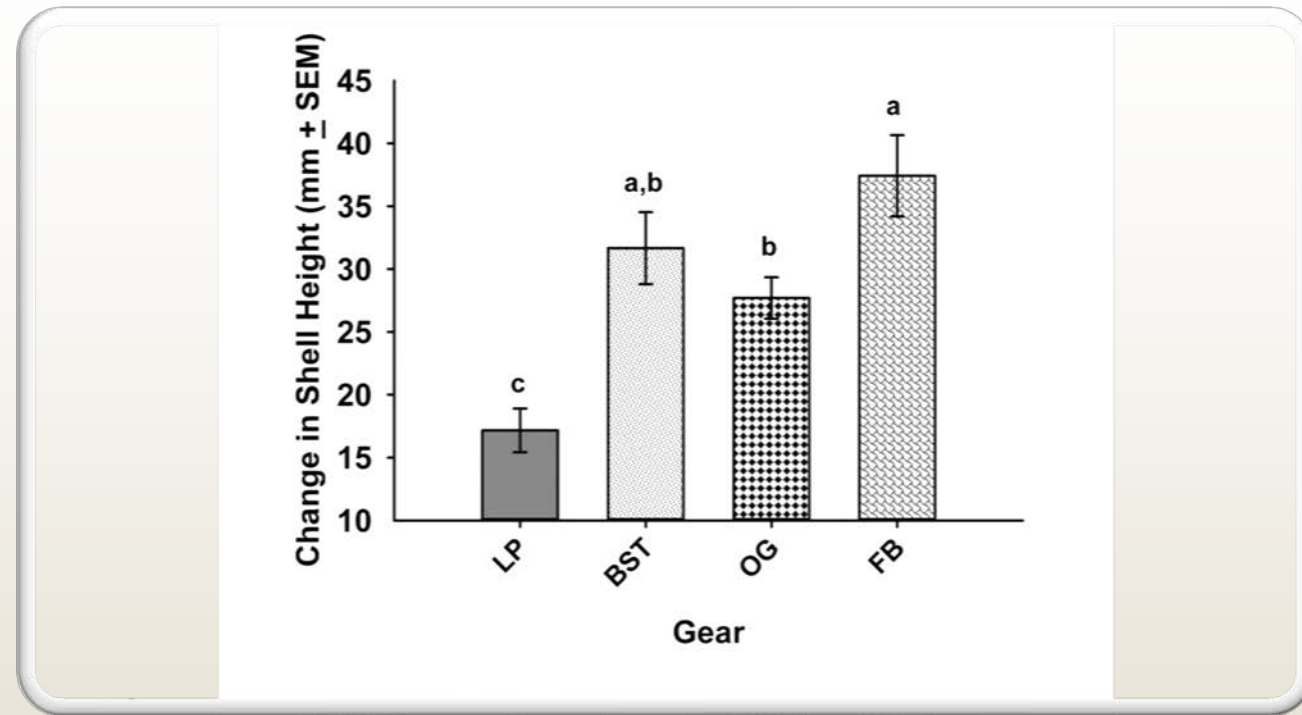
Photos: Bill Walton, Courtney
Coddington, & Julie Davis





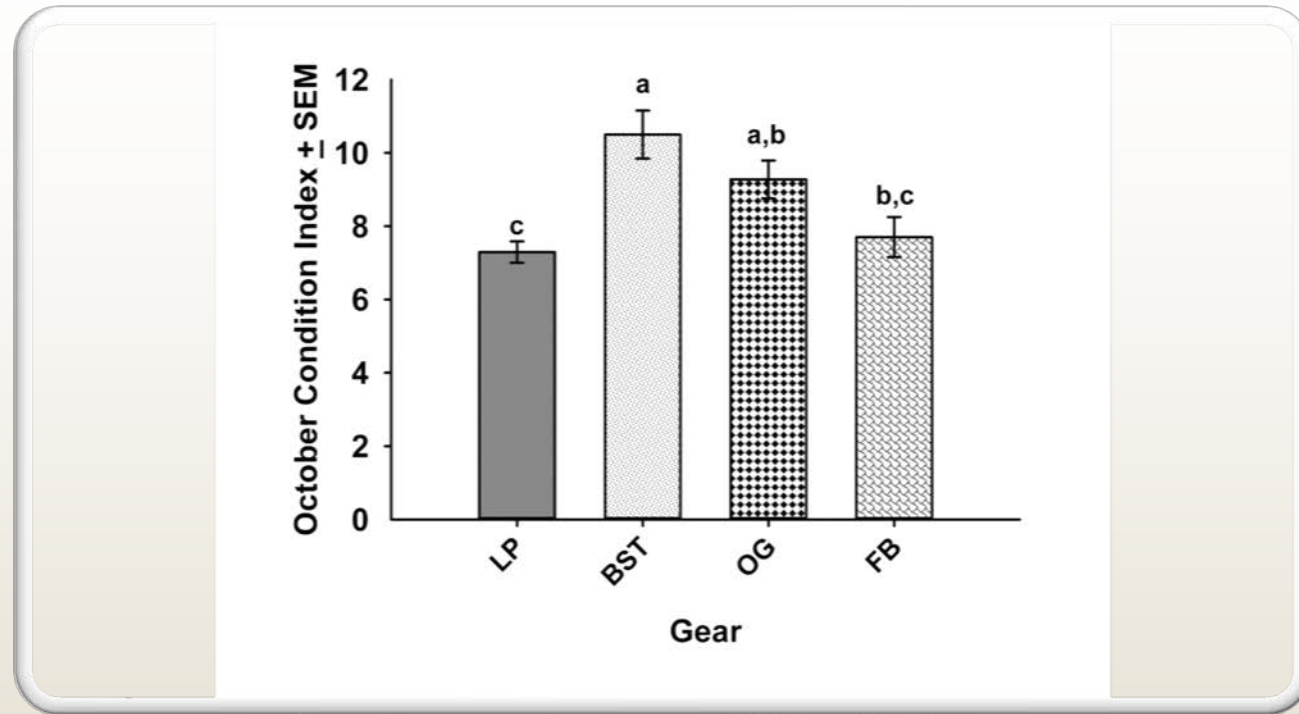
EFFECT OF GEAR ON SURVIVAL






EFFECT OF GEAR ON CHANGE IN SHELL HEIGHT





EFFECT OF GEAR ON OCTOBER CONDITION INDEX



A man wearing a blue hoodie with "MICHIGAN EST. 1817" and a tan cap is leaning over the side of a boat, handling a fishing net. The background is a body of water.

ADDITIONAL CONSIDERATIONS

- Cost of Gear/Production Costs
- Ease of Use
- Durability
- Ability to Replace/Restock Gear
- Customer Support





**GEAR
ARRANGEMENT,
INSTALLATION &
ASSEMBLY**





ARRANGEMENT

- Consider
 - Wave action
 - Exposure to storms
 - Water flow
 - Getting in and out





INSTALLATION

- Don't skimp on infrastructure
- Consider professional help
- Pilings or no?
 - Jetted in or vibrated in
- Diver or other tools for anchors
- Neatness counts



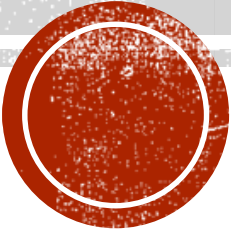


AVOID COMMON MISTAKES

- Buying too much seed for too little gear, too little labor
 - Sometimes get better survival by buying fewer seed
- Waiting for a problem to appear before doing something
 - Much, much harder to control established biofouling
- Grow what your customer wants, not what you think they want
 - Find out what your final customer wants



Questions?





Apalachicola Bay Oyster Aquaculture Economics

Andrew Ropicki
IFAS/Florida Sea Grant
University of Florida

UF|IFAS
UNIVERSITY of FLORIDA

**Food and
Resource
Economics**



Overview

- Estimated startup costs and income assuming min. required planting density
- Floating bags and floating cages
- Lots of assumptions – Take numbers with a grain of salt!!!



Assumptions

- Plant 70,000 seed per acre (105,000 total) evenly over 6 months
 - Triploid seed, 8-11 mm shell height (\$25.67 per thousand)
- Owner/operator (limited outside labor used and **no owner/operator salary** included in costs)
- **Not included** in startup costs:
 - Boat, motor, trailer, truck
 - Tumbler/pressure washer
 - Lease survey/marketing costs
- 10 months from plant to harvest
- 80% survival and 90% of final oysters are marketable
 - ~72% of what you plant you sell
- Receive \$0.41 per oyster
- Startup costs are self-financed (no loans)
- 10% of capital equipment has to be replaced each year
- Risks not included (hurricanes, red tides, etc.)



Floating Bag Start Up Cost Estimates

	<u>1.5 Acre Lease Site</u>	
	# of Units	Seed Planted Per Year: 105,000
Site Set-Up/Regulatory Costs		
FL Aquaculture Cert.	1	\$ 100.00
Lease Rental Fees	1	\$ 65.19
Total Site Set-Up/Regulatory Costs		\$ 165.19
Seed and Bag Costs		
8-11mm triploid seed	105 (sold by the thousand)	\$ 2,695.00
4, 9, and 14 mm bags	363	\$ 2,087.25
Total Seed and Bag Costs		\$ 4,782.25
Total Float and Tie Costs	(floats, zip ties, id tags, hog rings, pucks and clips, baskets and gloves)	\$ 9,205.72
Total Longline Costs	(rope, screw anchors, buoys, #10 neobraid)	\$ 1,058.00
Total Other 1st Year Costs	(hired labor, fuel, capital replacement, administrative costs)	\$ 2,351.00
<u>TOTAL INITIAL START UP COSTS</u>		<u>\$ 17,562.16</u>

Floating Cage Start Up Cost Estimates

	<u>1.5 Acre Lease Site</u>	
	# of Units	Seed Planted Per Year: 105,000
Site Set-Up/Regulatory Costs		
FL Aquaculture Cert.	1	\$ 100.00
Lease Rental Fees	1	\$ 65.19
Total Site Set-Up/Regulatory Costs		\$ 165.19
Seed and Bag/Cage Costs		
8-11mm triploid seed	105 (sold by the thousand)	\$ 2,695.00
4, 9, and 14 mm bags	363	\$ 2,087.25
Floating Cages	54	\$ 11,880.00
Total Seed and Bag Costs		\$ 16,662.25
Total Float and Tie Costs	(zip ties, id tags, hog rings, baskets and gloves)	\$ 571.20
Total Longline Costs	(rope, screw anchors, buoys)	\$ 650.00
Total Other 1st Year Costs	(hired labor, fuel, capital replacement, administrative costs)	\$ 3,529.00
<u>TOTAL INITIAL START UP COSTS</u>		<u>\$ 21,577.64</u>

Floating Cage Income Statement Estimates

<u>YEAR 1</u>			
<u>Revenue</u>	Oysters Sold	Price/Oyster	Total
Sales Revenue	12,600	\$0.41	\$5,166
<u>Expenses</u>			
Certificate and Lease Rental Fees			\$165
Oyster Seed			\$2,695
Zip Ties			\$100
Hired Labor			\$1,400
Fuel			\$470
Capital Replacement			\$1,509
Administrative			\$150
<u>Total Expenses</u>			\$6,324
<u>Net Income before Taxes</u>			-\$1,158
INCOME PER ACRE:			-\$772
INCOME PER OYSTER:			-\$0.09

<u>YEAR 2</u>			
<u>Revenue</u>	Oysters Sold	Price/Oyster	Total
Sales	75,600	\$0.41	\$30,996
<u>Expenses</u>			
Certificate and Lease Rental Fees			\$165
Oyster Seed			\$2,695
Zip Ties			\$447
Hired Labor			\$2,400
Fuel			\$470
Capital Replacement			\$1,509
Administrative			\$150
<u>Total Expenses</u>			\$7,324
<u>Net Income before Taxes</u>			\$23,672
INCOME PER ACRE:			\$15,781
INCOME PER OYSTER:			\$0.31

Key Takeaways

- You need at least \$17,000 to \$22,000 to get started (even if you have a boat and a truck)
- You are most likely going to lose money in the first year while you wait for your oysters to grow to market size (~10 months)
- At the minimum production level (70,000 planted per acre), profitability depends on effort
 - If it takes 20 hours per week the pay rate is \$22-24/hour
 - If it takes 40 hours per week the pay rate is \$11-12/hour
- Income per oyster looks good (\$0.31-0.33/oyster) but as you increase production you have to hire more labor which will lower these numbers



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**Food and
Resource
Economics**

