



So you are thinking about growing shellfish?

Things to consider....

Leslie N. Sturmer

University of Florida / IFAS

Shellfish Aquaculture Extension Program

Cedar Key, Florida



Why?

Attributes

- Supports small business entrepreneurship
- Many farms are individual or family operated
- Size of commercial-scale farm relatively small, from 2 to 10 acres
- Relatively inexpensive start-up and operating costs in growout operation
 - Lease lands, do not purchase
 - No feed, aeration or pumping costs
- Provides independent lifestyle on the water
- Over 880 shellfish farms in U.S. with sales value of \$442M (USDA 2018)



What shellfish to grow?

Species Selection

- Dependent on geographic area
- Supports existing culture operations
- Life history / biology well known
- Hardiness / tolerance to a wide variety of environmental conditions
- Established culture technology
- Reliable seed production / collection methods
- Minimal susceptibility to diseases
- Established markets and existing demand
- Marketable product at early life history stage
- Moderate to high unit sale price

Oysters



From left to right:

Pacific oyster

Crassostrea gigas

Kumamoto oyster

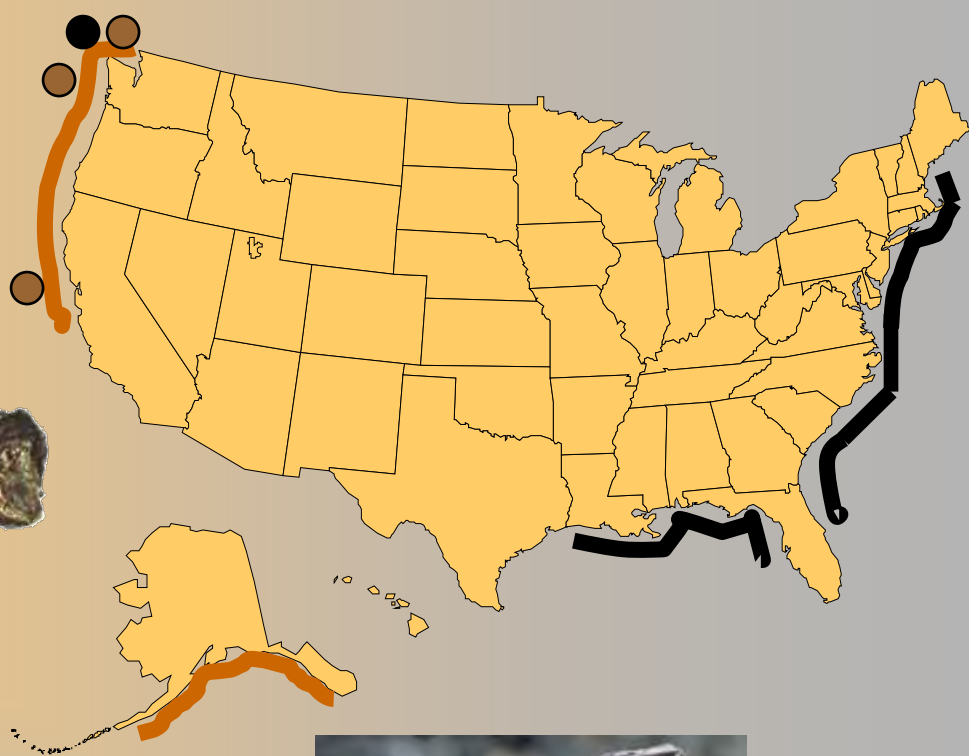
Crassostrea sikamea

European flat oyster

Ostrea edulis

Olympia oyster

Ostrea lurida



Eastern oyster

Crassostrea virginica

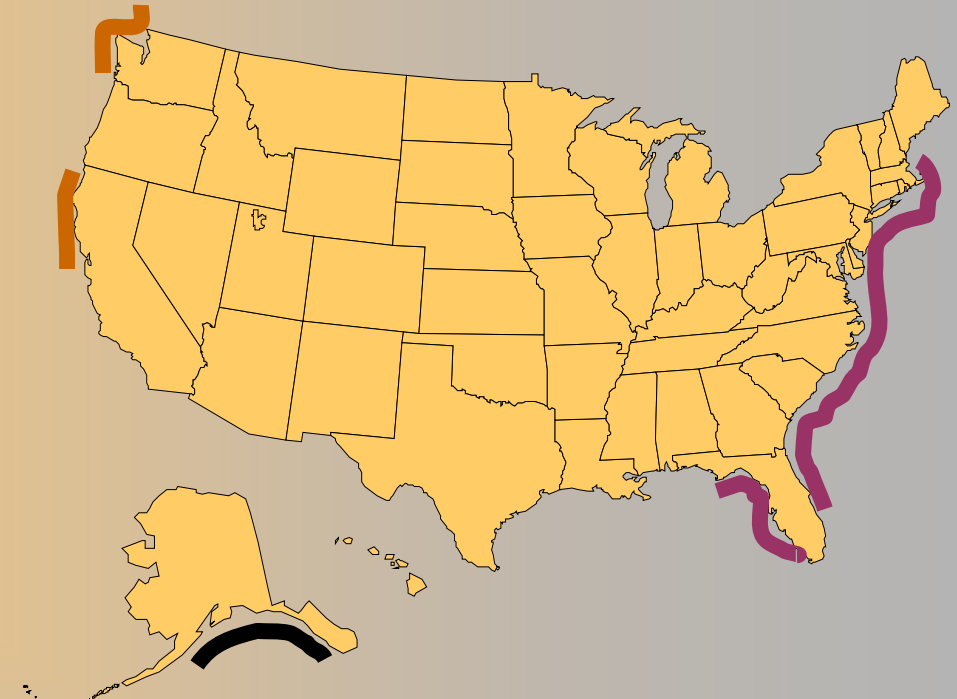
Clams



Manila clam
Tapes philippinarum



Pacific littleneck clam
Protothaca staminea



Hard clam, northern quahog
Mercenaria mercenaria

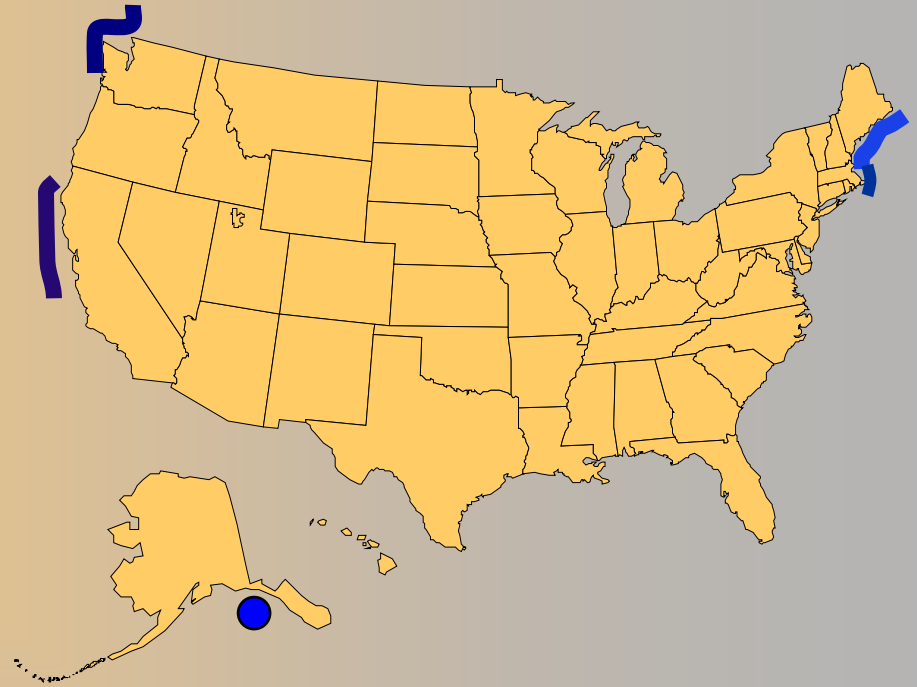
Mussels



Mussels:

**Mediterranean,
*Mytilus galloprovincialis***

**California,
*M. californianus***



**Blue mussel
Mytilus edulis
*M. trossulus***

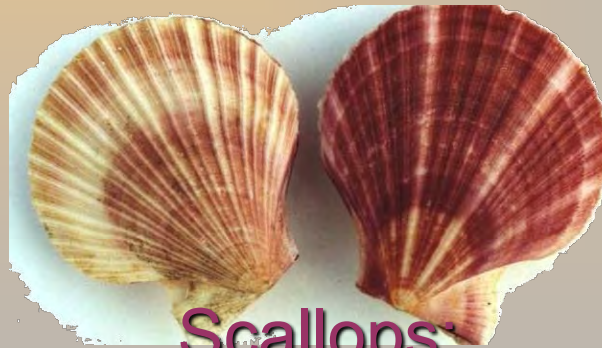
Other species



Geoduck clams
Panopea abrupta

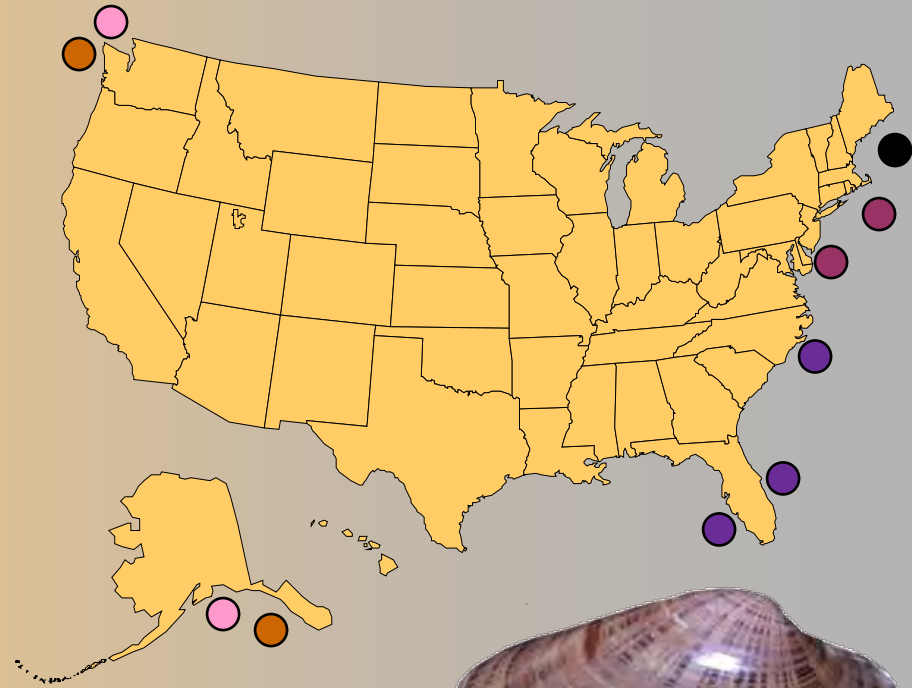


Soft-shelled clam
Mya arenaria



Scallops:

Bay, *Argopectin irradians*
Pink and Spiny, *Chlamys* spp.
Rock, *Crassadoma gigantea*



Sunray Venus
Macrocallista nimbosa



Where to locate your farm?

🐚 Open-water farming

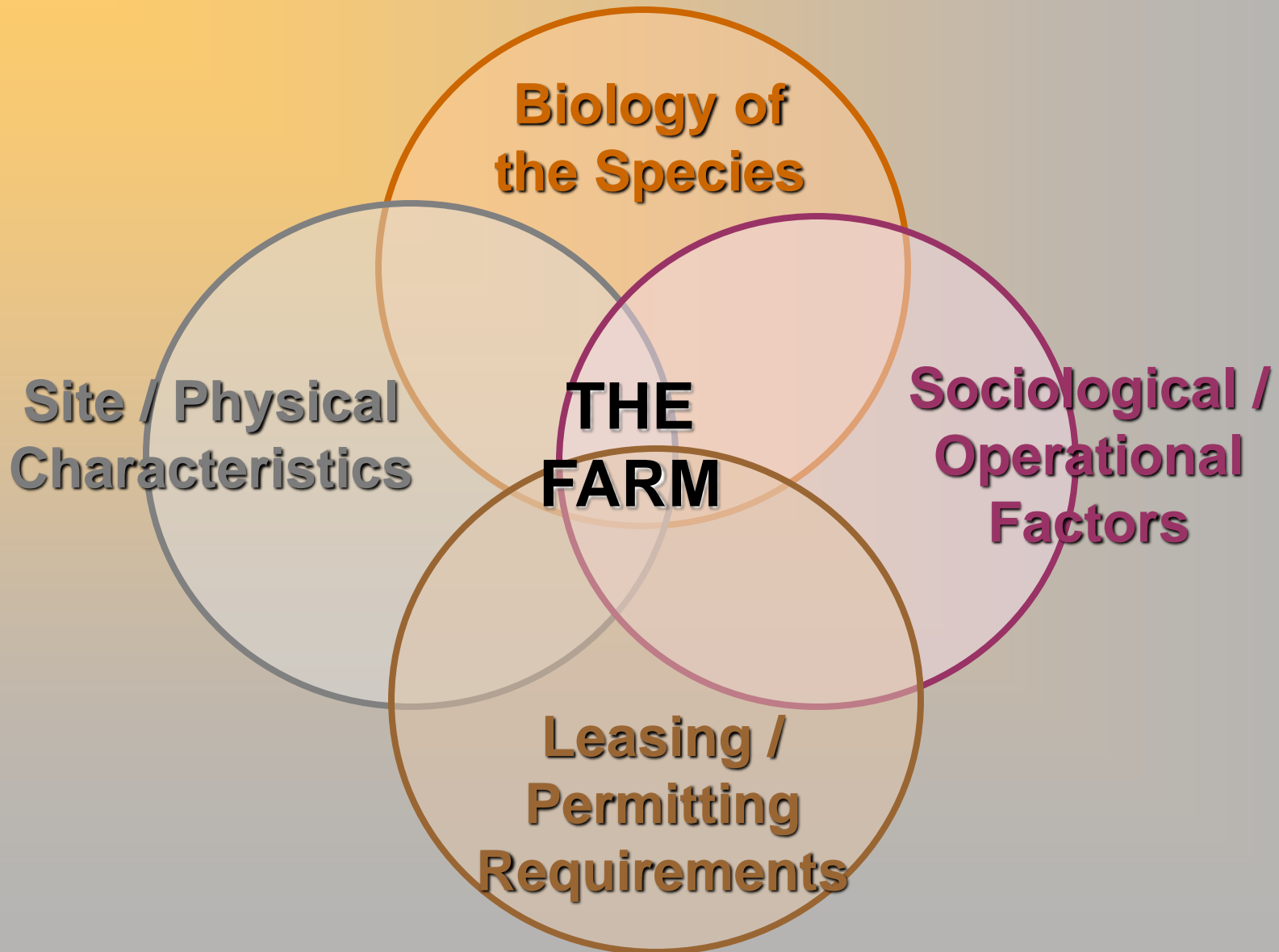
- Estuaries, bays, sounds, offshore

🐚 Conducted on

- State-owned (sovereign) leases
- Grants / deeds
- Privately-owned submerged lands

“Location, location, location...the most critical step!”

Where to site your shellfish farm?

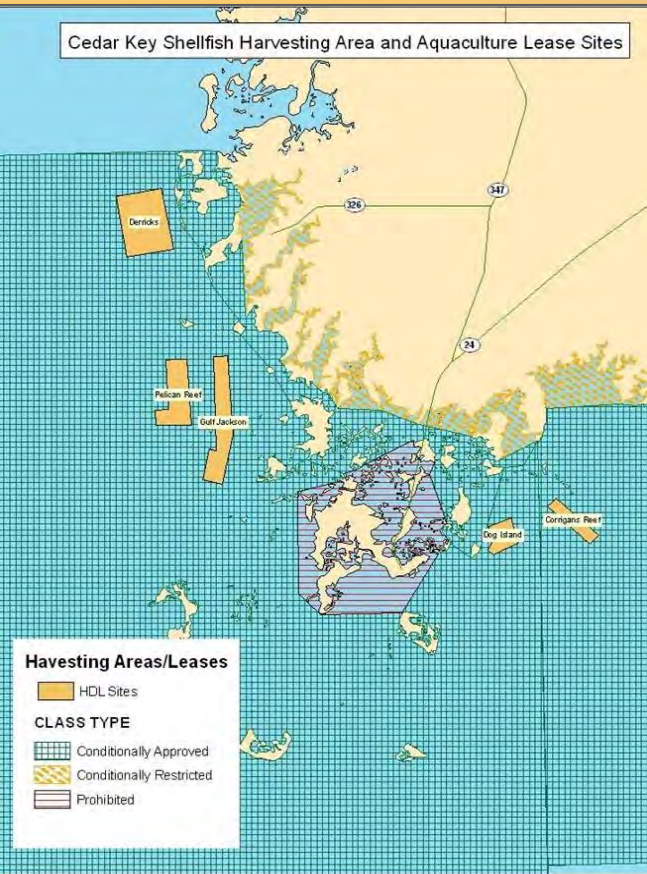


Biological considerations

- Growth
 - Old shell / Live shell
 - Test plots
- Food (primary productivity)
 - Density - how much?
 - Diversity - what kind?
- Predators
 - Effect on survival
 - Abundance / species
- Fouling
 - Effect on flow, cleaning, equipment, product
- Prevalence of diseases – MSX, Dermo, QPX
- Prevalence of harmful algae blooms - red tide, PSP



Shellfish water classifications

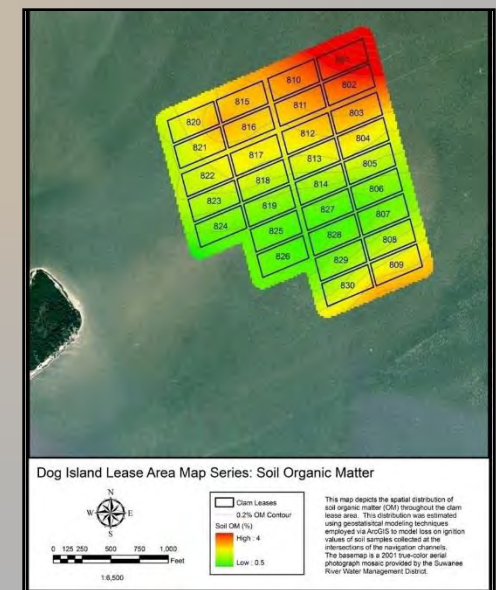
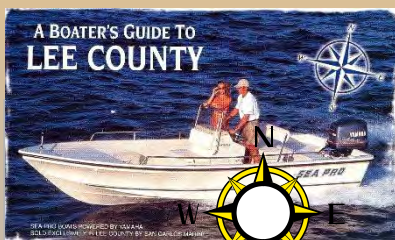


Cedar Key Shellfish Harvesting Area, Classification Map

- Mollusks require sanitary control
 - Filter feeders / Consumed raw
- Federal guidelines provided by ISSC National Shellfish Sanitation Program
- Established bacteriological standards
- Shellfish harvesting classifications
 - Approved / Conditionally approved
- SHA maps obtained from state shellfish regulatory authority
- Management plan of SHA
 - Rainfall, river stage, HABs, biotoxins
 - Number of annual closure days

Environmental (physical) factors

- Salinity
 - Flow / circulation
- Water depth and contour
- Substrate characteristics
- Sedimentation rate
- Turbidity
- Currents
- Tidal action
 - Flow / height / exposure
- Wind and wave direction
- Exposure
- Storm damage frequency



Other considerations

Sociological Factors

- Riparian and adjacent land owners
- Alternative usages
 - Fisheries / Recreational
- Pollution sources
- Future development

Operational Factors

- Upland access
 - Boat launching
 - Nurseries, sieving
 - Wholesalers, harvesting
 - Equipment storage
- Access to markets
- Security / surveillance
- Proximity to other farms
- Production expandability
- Manpower availability



Permitting requirements

–Other state agency permits

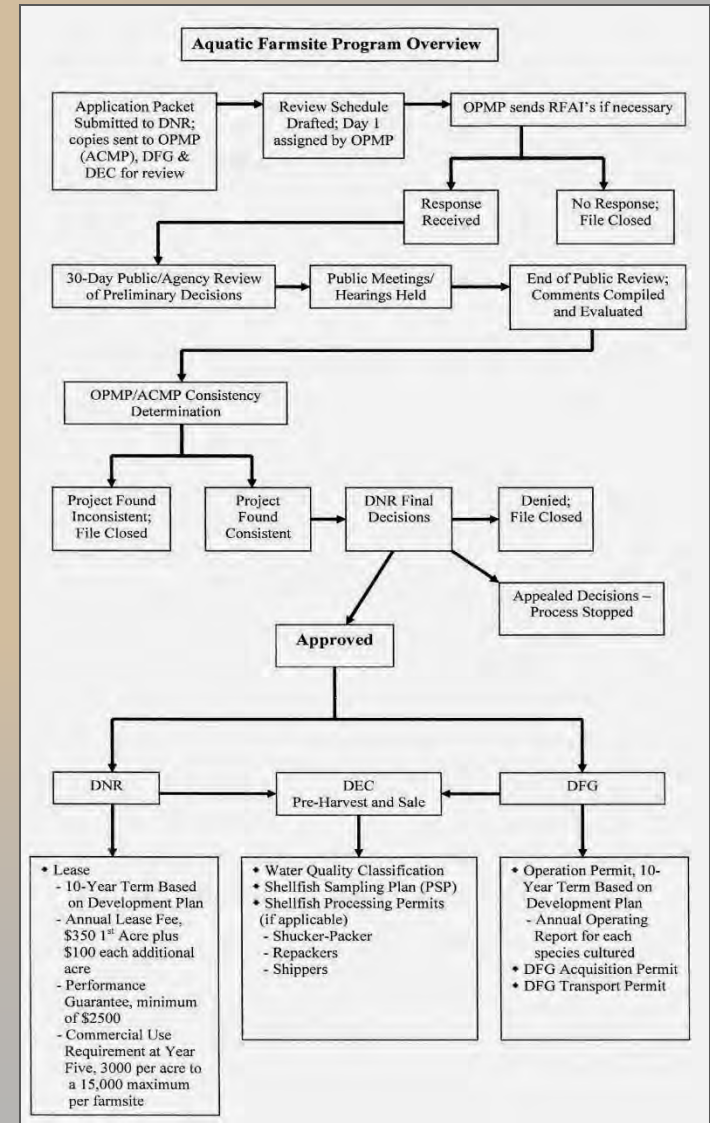
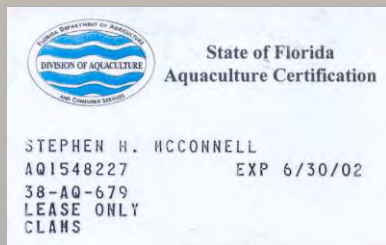
- Leasing
- Upland operations

–Federal agency permits / notifications

- Army Corps of Engineers
- U.S. Coast Guard

–Licensing

- Harvesting
- Shellfish wholesaler
- Local occupational





How to grow your shellfish?

- 🐚 Culture methodology
 - Extensive versus intensive
 - Intertidal, subtidal, or water column use
- 🐚 Culture equipment / gear

“Start off small, allow time to move up the learning curve!”

Extensive versus Intensive Culture

- Seed collected from wild
- Usually little equipment involved
- Lower farm costs
- Lower labor input
- Lower production per acre
- High acreage required



Oyster cultch lease, Apalachicola, FL

- Hatchery-produced seed
- Equipment required for predator protection
- Higher capital costs
- Higher operating costs
- Higher labor input
- Higher production per acre
- Less acreage required



Oyster bags, Southern Cross Seafarms, FL

Intertidal culture



Water column culture



Subtidal culture

Oyster culture



Cultch and seed plant, LA



Floating chub,
NC



Flexible belt, FL

Oyster culture



Bag and stacked rack, FL



Bag and rack, MA



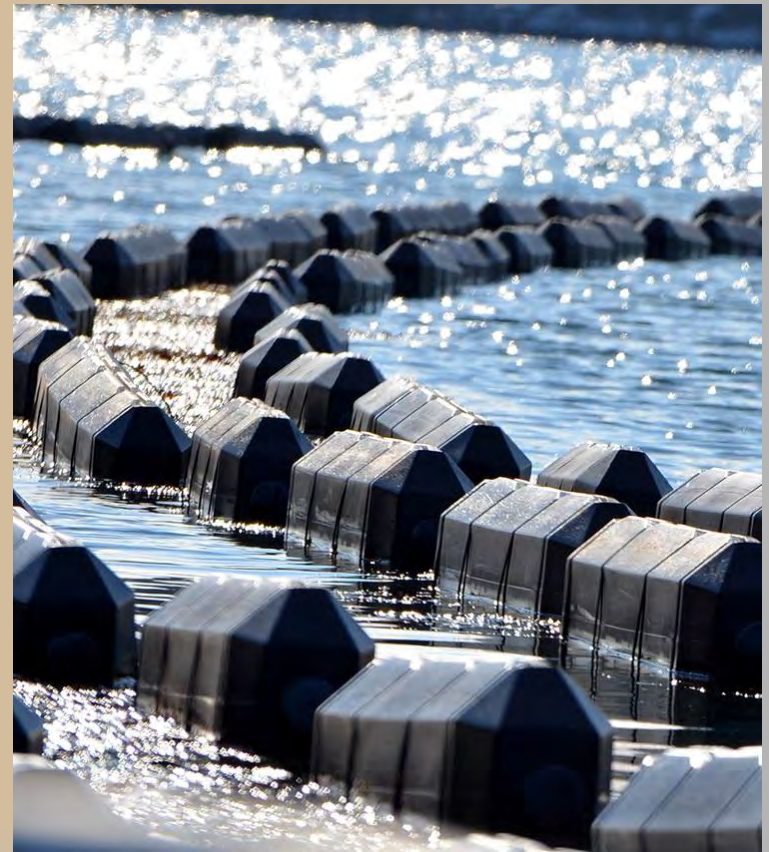
Oyster culture

*Tray and lantern nets,
MA, WA, AK and BC*



Oyster culture

*Floating Bags and Cages
Atlantic & Gulf of Mexico States*



Suspended Oyster Culture

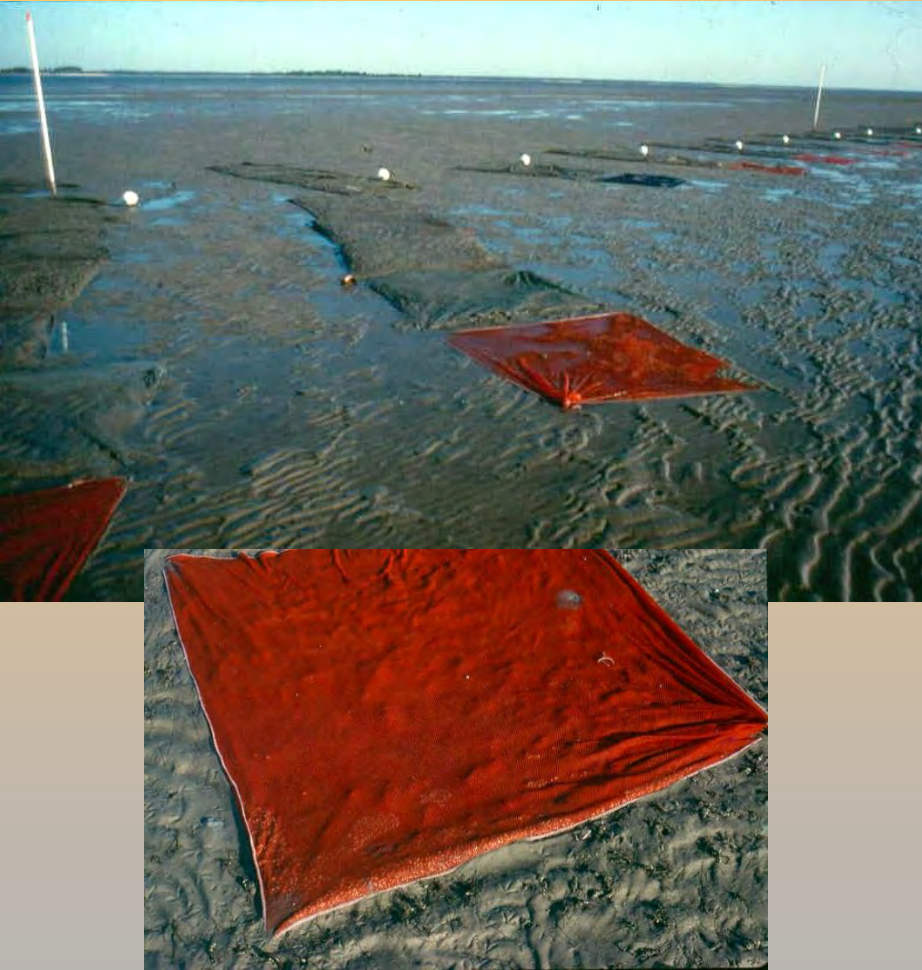
Flip Bags
Pacific NW Coast



Adjustable Long Lines
Atlantic & Gulf of Mexico States



Clam culture



Soft bottom bag, NC, SC, GA, FL



Bottom tray, FL

Clam culture

*Bottom exclusion nets,
NC to ME*



Mussel culture



*Filling socks,
ME*



Hanging ropes, ME

Long lines, BC





Where to get your seed?

- 🐚 Natural recruitment
- 🐚 Collection from wild sources
 - Cultch, spat collectors, relay
- 🐚 Hatchery production
- 🐚 Land-based nursery options

*“Start off small...you can learn as much by killing
10,000 seed as with a million seed!”*

Hatchery production



Spawning



Algal production



Larval rearing



Post-set nursing



Where to buy seed?



National suppliers
guide

Regional suppliers list

RUTGERS
New Jersey Agricultural Experiment Station
Cooperative Extension

Cooperative Extension of Ocean County
Extension Center
1522 Whitesville Road
Toms River, NJ 08753-1199
ocean@njaes.rutgers.edu

ryles@njaes.rutgers.edu
552-548-1127, A-14
732-246-1246, Agriculture
732-505-3671, Environmental Resource Management
732-246-1147, F&F
732-246-1122, Fisheries/Aquaculture
732-246-1245, Rutgers Master Gardener
732-905-8944, Fax

2019 East Coast Shellfish Hatchery and Nursery Directory

Douglas Zemeckis, Ph.D.
County Agent III (Assistant Professor)
Rutgers Cooperative Extension

This directory is designed to identify shellfish hatcheries and nurseries from along the east coast of the United States, and to serve as a tool to provide a better link between shellfish seed suppliers and shellfish farmers. The directory includes contact information for each business, as well as some additional information indicating the type of operation and what products they expect to have available in 2019. Also included is the contact information for shellfish aquaculture extension agents in each state who can serve as additional resources to the industry.

Multiple people from along the east coast have reviewed content included in a draft of this directory. If there is an omission, then it certainly has not been intentional. If there are any suppliers who wish to and have not been included, they should contact the author for inclusion in the next publication. Also, this is not a complete list of all suppliers on the east coast given that some opted to not be included for 2019 or may not have been known to our team.

If someone is using this directory and cannot reach a business because the contact information has changed or is incorrect, then please contact Dr. Douglas Zemeckis, Rutgers Cooperative Extension (contact information below). If a new operation gets started, please encourage them to contact us to be added to this directory. This directory is updated annually, so please help to keep the information current for maximum benefit to all parties.

Finally, this information by no means suggests a recommendation about the quality of the products or services that these seed suppliers produce, and should by no means be construed as an advertisement for any of these companies by either the author or Rutgers Cooperative Extension.

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For corrections, more information, or to add a new operation, please contact:

Douglas Zemeckis

Douglas Zemeckis, Ph.D. - County Agent III (Assistant Professor)
Marine Extension Agent for Ocean, Atlantic, and Monmouth Counties

Cooperative Extension of Ocean County
Department of Agriculture and Natural Resources
New Jersey Agricultural Experiment Station
Rutgers, The State University of New Jersey
1522 Whitesville Road, Toms River, NJ 08755 USA
dzemeckis@njaes.rutgers.edu | 732-349-1152 (Office)

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2020 Florida Shellfish Seed Suppliers

These hatchery and nursery operations are supplying molluscan shellfish seed to Florida growers this year. Contact suppliers for information on species, seed sizes, price, color variation and availability.

Apalachicola Oyster Company - H 456 Hwy 98 Apalachicola, FL 32320 Contact: Tammy Reese (850) 653-7426 tammy@apalachicolaoyster.com Species: OY	Great Florida Shellfish Company - H, N 72 Azalea Circle Tequesta, FL 33469 Contact: Tom McCrudden (561) 702-8159 tom@greatfloridashellfish.com Species: HC, OY, SRV, BS, PA	Seaventures Clam Co. - H 5600 US-1 Fort Pierce, FL 34946 Contact: Carolina Panoff (833) 732-8368 carolina@seaventuresgroup.com Species: HC
Bay Shellfish Co. - H, N P.O. Box 289 Terra Ceia, FL 34250 Contact: Curt Hennel (727) 309-1269 curt@bayshellfish.com Website: bayshellfish.com Species: HC, OY, SRV, BS, PA	Orchid Island Shellfish Co. - N 633 Old Dixie Highway Sebastian, FL 32958 Contact: Ed Mangano (772) 913-0053 or 589-5080 (Fax) southerncrossdams@gmail.com Website: www.orchidisland.com Species: HC, OY	Southern Cross Seafarms - H, N 12170 State Road 24 Cedar Key, FL 32623 Contact: Shawn Stephenson or Jon Gill (352) 543-5980 or 543-5981 (Fax) southerncrossdams@gmail.com Website: www.southerncross.com Species: HC, OY
Clamatic - H, N P.O. Box 664 Cedar Key, FL 32625 Contact: Chris Topping or Anthony Hinkle (352) 213-5999 or 949-2233 clamatic2000@yahoo.com Species: HC	Pensacola Bay Oyster Hatchery - H, N 11 W. Garden St. Pensacola, FL 32502 Contact: Josh Neese (850) 512-0024 josh@pensacolabayoyster.com Species: OY	Two Docks Shellfish, LLC - H, N PO Box 9499 Bradenton, FL 34206 Contact: Brendyn Mettlinger 443-624-2948 twodockshellfish@gmail.com Species: HC
Ewan Leighton - H, N 270 Sea Dunes Drive Melbourne Beach, FL 32951 Contact: Ewan Leighton (321) 288-8201 ewan191@gmail.com Species: HC	Premium Seafood - H, N 7579 Al A South Cocoa Beach, FL 32909 Contact: Mike Sullivan (386) 847-3202 (cell) premiumseafoodinc@gmail.com Species: HC	H - Hatchery N - Nursery Shellfish HC - Hard Clam OY - Oyster SRV - Sunray Venus BS - Bay Scallop BA - Blood Arks PA - Ponderous Ark

This list is provided as a service of the UFRAS Shellfish Aquaculture Extension Program. We do not sponsor or endorse any of these suppliers over any others. To obtain a list of East Coast shellfish seed suppliers, contact Doug Zemeckis with Rutgers Cooperative Extension, (732) 349-1152, dzemeckis@njaes.rutgers.edu, or go to www.ecaps.org. Shellfish seed obtained from east-coast suppliers must meet best management practices pertaining to both genetic and disease prevention. For more information, contact the FL Department of Agriculture and Consumer Services, Division of Aquaculture at (850) 617-7600, or visit their website, click on Best Management Practices, Chapter 5L-3.

January 2020

UF FLORIDA
IFAS Extension

State suppliers list

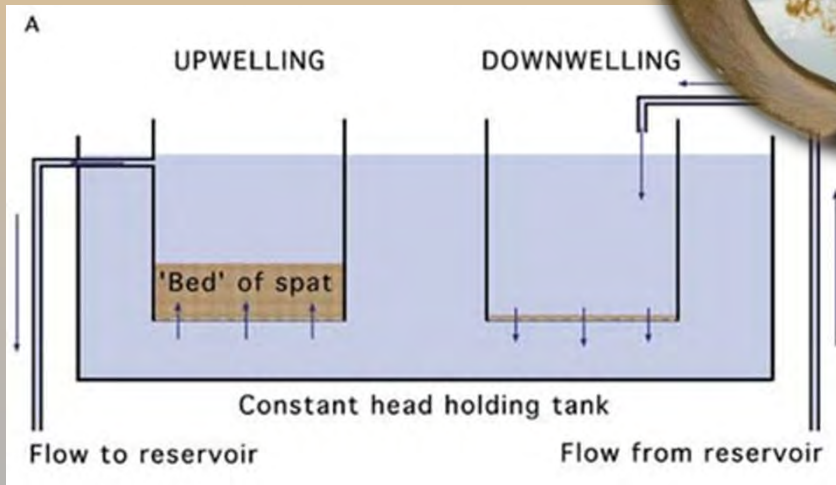
What is a land-based nursery?

- Intermediate step
- Seed from hatchery is nursed to a field plantable size
- Simple in design and operation
- Consist of wellers and raceways
- Requires minimum maintenance
- Lowers initial seed costs
- Increases seed availability



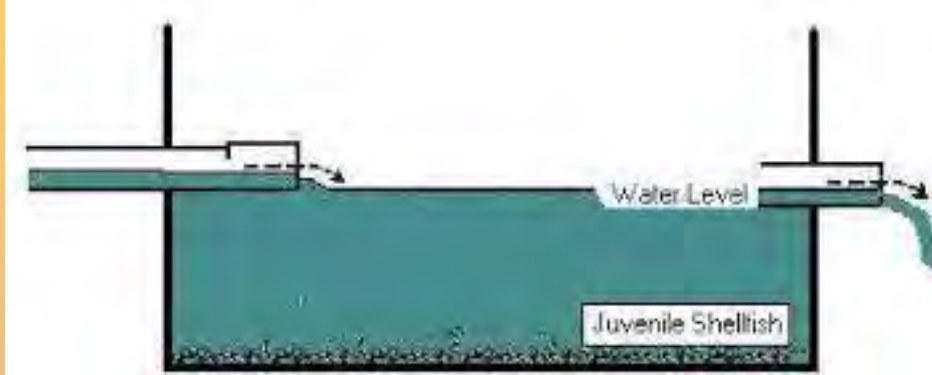
Land-based nursery options

Upwellers



FLUPSY

Land-based nursery options



Raceways



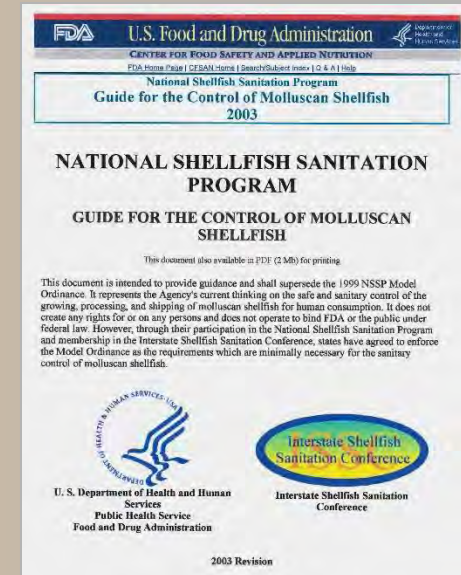
How to sell your product?

- 🐚 Sell to a shellfish wholesaler
- 🐚 Become a shellfish wholesaler
 - How to become a wholesaler?
- 🐚 Processing / Product forms
- 🐚 Market channels / Distribution

“You don’t make money growing shellfish, you make money selling ’em...if you get a good enough price.”

Shellfish wholesaler requirements

- Harvesting, processing and shipping of mollusks highly regulated
- Accountability from point of harvest to consumer
- Federal oversight – ISSC National Shellfish Sanitation Program Guide



- State permitting / certification
- Plant inspections
- Approved plans
 - Facility
 - HACCP
 - Sanitation

Shellfish product forms



Shucked meats



Live shellstock



Shellstock processing



Culling



Washing/tumbling



Grading



Tagging / Packaging



Transporting in refrigerated trucks

Shellstock market channels





What else?

- ☛ Develop a business plan
- ☛ Obtain adequate financing
 - Capital (it takes money, to make money)
 - Operating (for at least 2-3 years of operation)
- ☛ Gain practical experience
 - Initially grow a small plot of shellfish
 - Work with other shellfish farmers

“Approached in a well logical, well-informed manner, shellfish farming has the potential for returning a profit on your efforts. Likewise, done without adequate planning it is guaranteed to lose you money!”

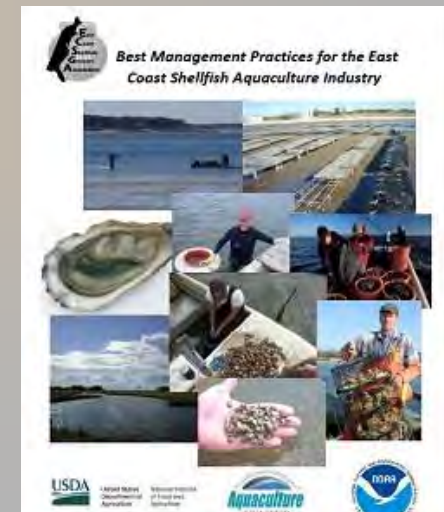
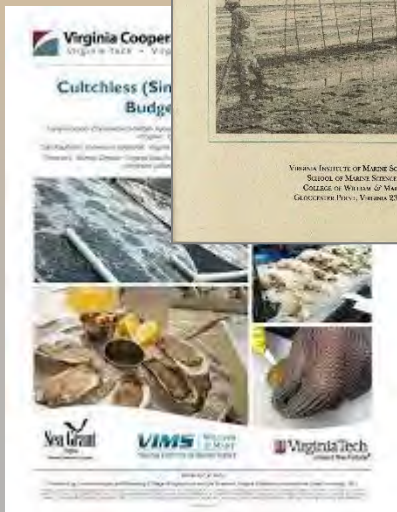
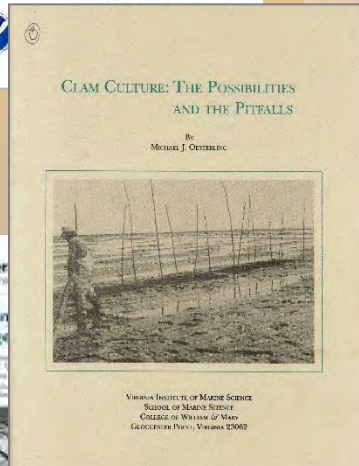
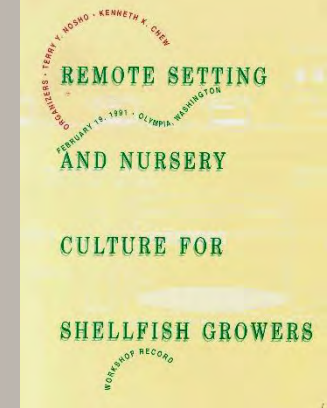
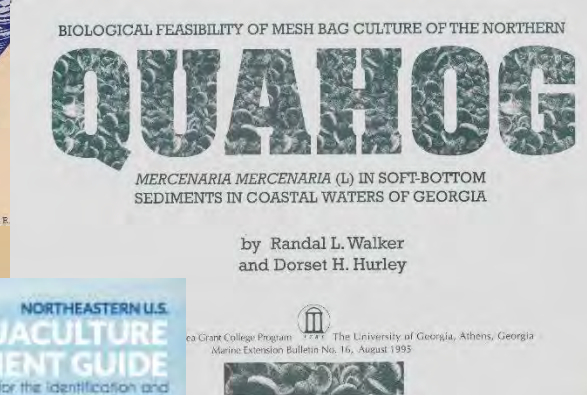
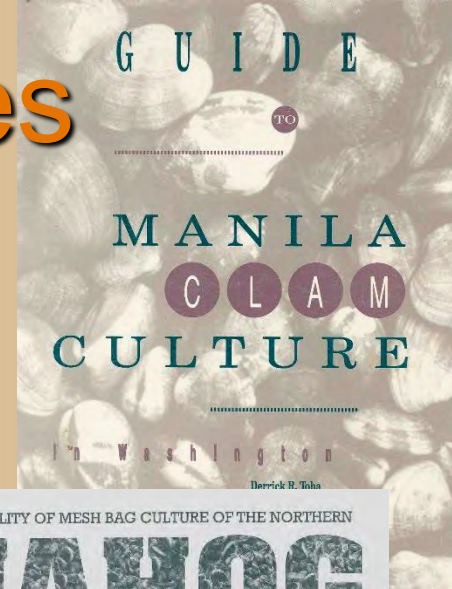
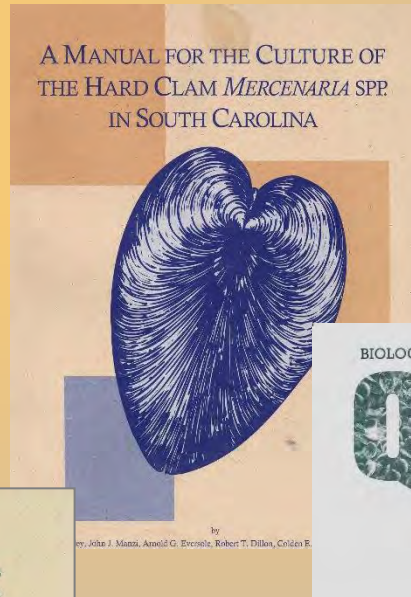
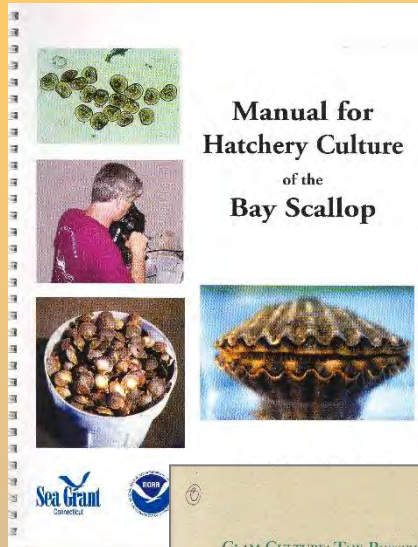


How to get information?

- Aquaculture extension agents or Sea Grant marine agents
- USDA Regional aquaculture centers (NRAC, SRAC, WRAC)
- Internet / Industry, suppliers and association web sites
- Shellfish farmers

“It spite of available information, it will still be your time, money and dedication that will be required for a successful shellfish farm.”

Information sources



Shellfish farming... ...a way of life

