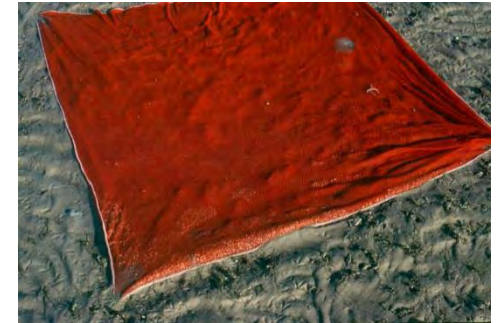
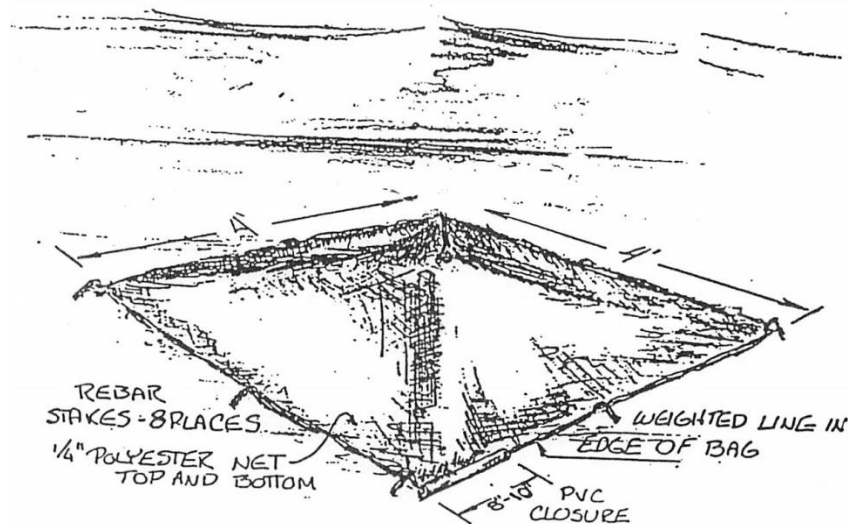


Clam Culture Gear in Cedar Key, FL

Leslie Sturmer

Shellfish Aquaculture Extension

UF UNIVERSITY of
FLORIDA
IFAS



Development of Soft Bag - 1990s

- Developed by FL east coast industry
- New aquaculture leases prohibit use of mechanical harvesting, Chapter 253, F.S.
- Leases in IRL subtidal, limited tidal exchange
- Technology transferred in training programs for fishermen on FL west coast



Harvesting

- Bottom bag contains the clams
- Harvest by hand, boom and roller rig on boat





Photo by Pat Bonish



From single bag to belting bags together...

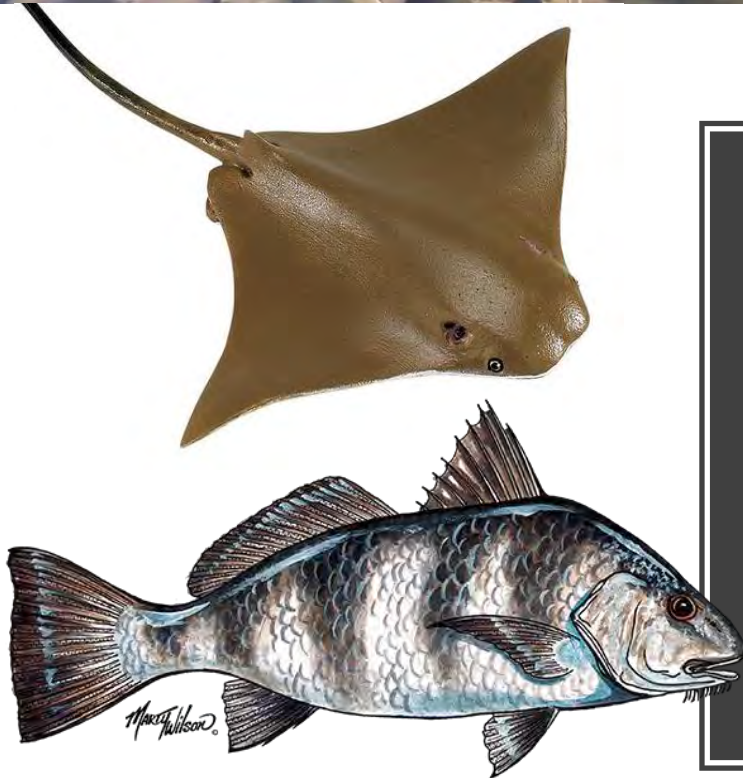
Able to lay out rows efficiently on leases,
cost-effective system for growing clams in
Cedar Key



Predation

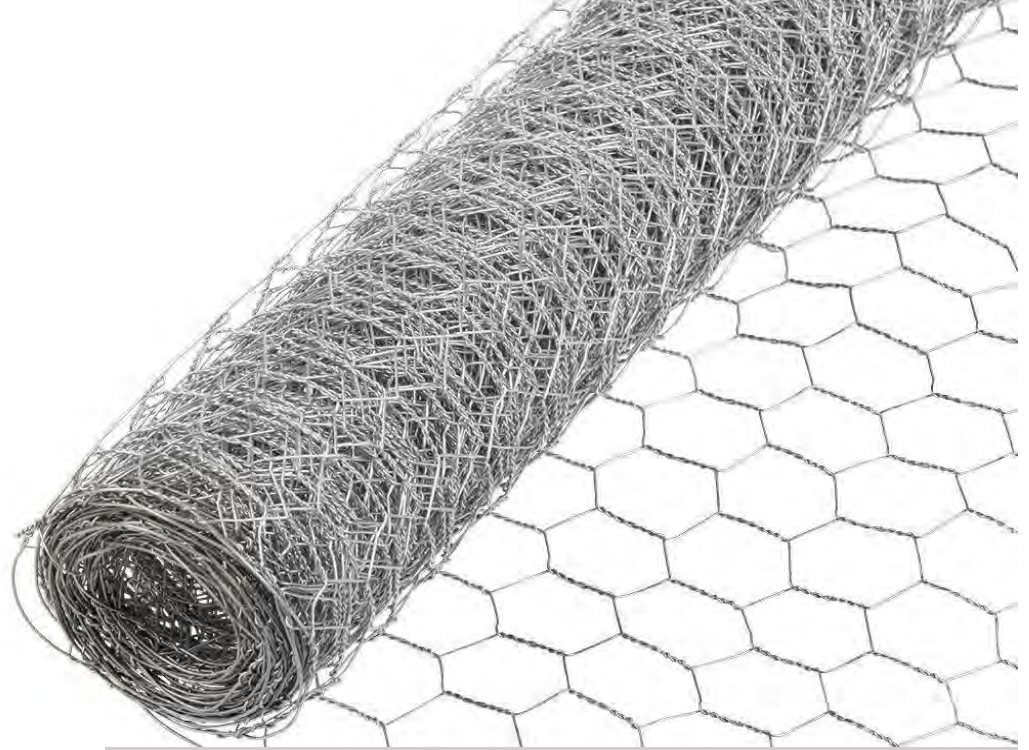
- One of biggest contributors to clam mortality
- Clam bag designed to minimize predation
- Threats dependent on clam size and season





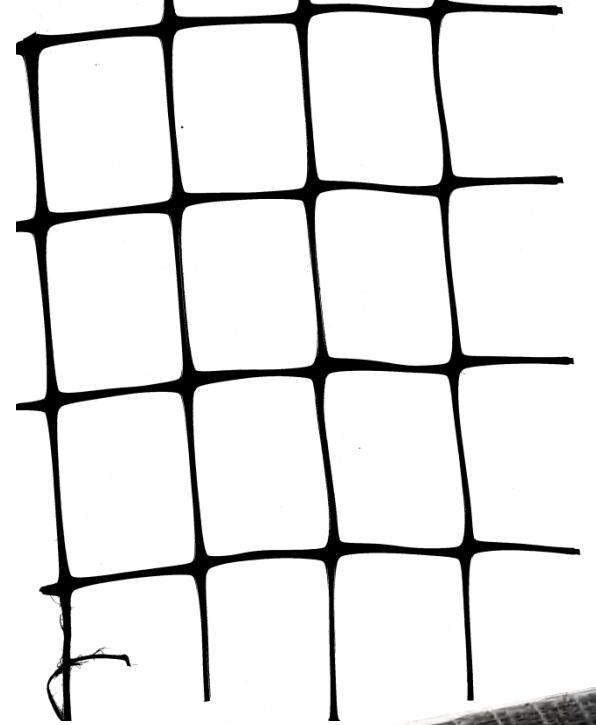
As number of clams planted
on leases increased, so did
predation...

Large schools of cownose rays
and black drum



Chicken Wire

- Additional layer of inflexible netting to minimize predation
- Protects clams until they bury
- Helps with keeping bags and clams spread when planting
- Biodegradable, rusts over time



HDPE Netting

- Additional layer of netting to minimize predation
- Does not degrade in environment
- Reusable





Staking Material – fence post wire



Staking Material – plastic hangers?



Staking Material

PVC pipe





Net Coatings

- Stiffens polyester mesh to minimize predation
- Several coatings used
- Lasts several crop cycles



Shellfish Nets and Net Coatings

Technical Bulletin Number 4

April 28, 2005

Regulatory Facts

- 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 seacoast of the state is prohibited.
- The use of petroleum derived coatings on clam bags, cover nets, markers and any other associated equipment placed on sovereign submerged lands is prohibited.
- New shellfish production equipment must be approved by the Department.

Inside this bulletin:

- Coatings must be fully cured 2
- How to request approval for coatings 2
- Apply, handle and cure coatings safely 3
- Coatings may work under certain circumstances 3

Netting is Critical to Clam Farming

Hard clam farmers use submerged state lands to plant their crops and take advantage of Florida's coastal waters that are rich in phytoplankton. These microscopic plants are a natural and abundant food source for clams, oysters, mussels and scallops. Farm-raised hard clams are usually enclosed in polyester mesh bags that are secured to the bottom. The bags conveniently containerize the clams for ease of handling and protect them from a variety of predators. Sediments naturally filter through the mesh and the clams dig down into the bottom for protection. To feed, clams push their siphon up through the mesh to filter out phytoplankton, dissolved organic matter, and organic particles.



Low tide briefly exposes an array of planted clam bags.

To enhance predator protection and reduce wear and tear, some farmers treat the clam nursery and grow out bags with various colored (i.e., black or green) or clear coatings to stiffen the fabric. Skates, rays, black drum, and blue crab are efficient clam predators that can cut through untreated, exposed netting or crush clams inside the bags and consume the soft meats. Untreated polyester mesh is also weakened through physical scouring by wave and current-driven sediments. Holes appear or the weakened netting tears during harvest that results in the spilling of a valuable crop on board harvest vessels in months of work and investment.



Different mesh sizes are used to protect clams during production.

Aquaculture BMPs Regulate Nets and

The State of Florida leases sovereignty submerged lands, typically found in shellfish farmers must abide by provisions of their state lease agreement and

- Requires DACS approval
- See DACS Technical Bulletin #4: *Shellfish Nets and Net Coatings*

- Products approved by DACS
 - Latex (water-based), alkyd
 - Acrylic polymer

Division of Aquaculture Approves our Net Dip

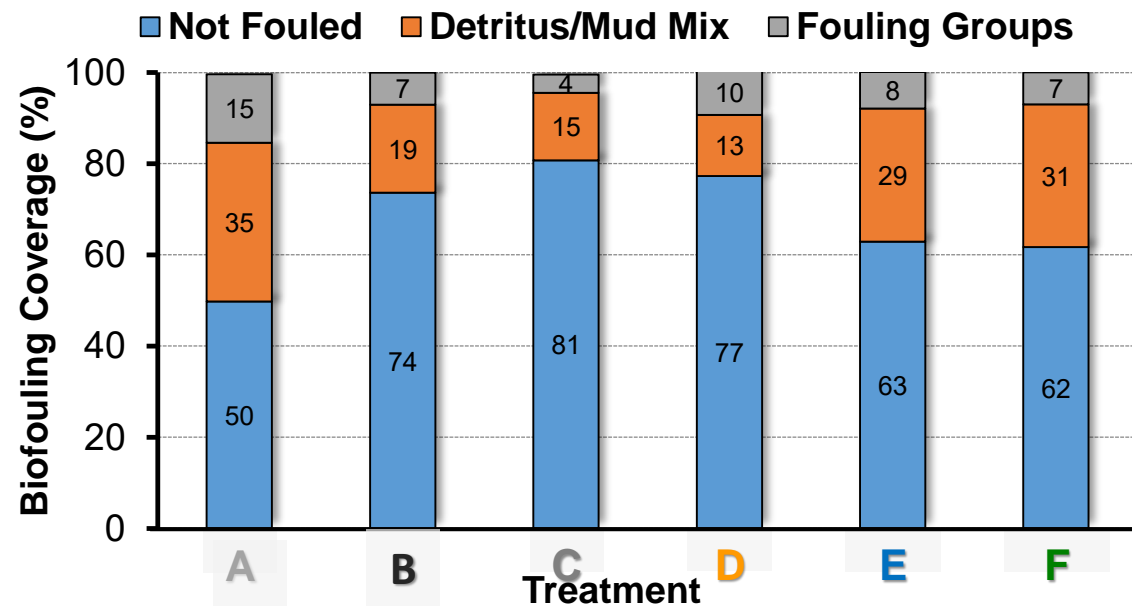
CALL NOW FOR A FREE SAMPLE.
Ask for Kurt or Karen

- ✓ Made of GRAS ingredients approved by FDA as safe for incidental contact with food intended for human consumption
- ✓ We have already gotten State approval, all you do is use according to instructions, and keep our Certification letter on file.
- ✓ Comes in Green or Black
- ✓ Get more information when you call for your sample.

Delta Laboratories, Inc.
3710 NW County Highway 326
Ocala FL
800-741-3582 FAX 352-629-1268

Biocide-free Antifouling Coatings

- Several commercially available coatings tested by UF, 2012, 2014-15
- May be effective in reducing biofouling organisms on bag surface
- Only one coating tested may be cost-effective (\$1.75/bag)
- No improvements in clam production



Considerations

- Effectiveness in minimizing predation
- Bag and seed sizes
- Prevalent fouling organisms
- Lease site characteristics (e.g., bottom substrate)
- Durability
- Reusability
- Preference
- Costs



Hurricane/Storm Preparation

- Recently planted clam bags most vulnerable
- Secure with additional stakes to minimize being dislodged or relocate
- After event, re-stake flagging bags
- Shifting of sediments can result in buryment of bags, may be able to use a pump to remove accumulated sediments
- Have GPS coordinates of lease corners / place monuments at each corner
- Keep inventory records, document losses



Hurricane Hermine, 9/1/2017



Panel Discussion:

- What type of predator protection do you use?
- Why? How does it work on your leases?
- How do you secure bags and netting?
- How do you dispose of netting or other gear debris?
- Have you had problems with storms, hurricanes?
- Do you have a storm / hurricane plan?
- Anything else?

Panel Members:

- Joe Cannon, Cedar Key Aquaculture Association
- Chad O'Steen, Cedar Key Aquaculture Farms
- Craig Parks, B&E Seafood
- Bobby Witt, Scale Key Clams

