

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:

<i>Coatings must be fully cured</i>	2
<i>How to request approval for coatings</i>	2
<i>Apply, handle and cure coatings safely</i>	3
<i>Coatings may work under certain circumstances</i>	3
<i>Food safety and shellfish farming</i>	4
<i>Clam farming equipment constantly evolves</i>	4

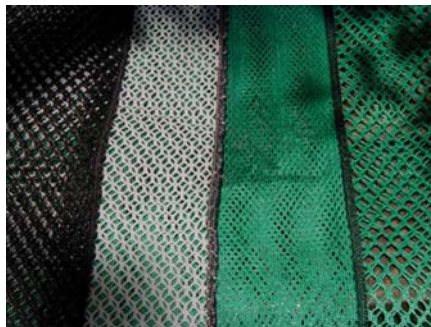
Netting is Critical to Clam Farming

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 or at sea causing the loss of months of work and investment.



Different mesh sizes are used to protect clams during production.

Aquaculture BMPs Regulate Nets and Net Coatings

The State of Florida leases sovereignty submerged lands, typically found in coastal estuaries, for shellfish culture and has declared that it is in the state's interest to promote aquacultural production while protecting Florida's environment.

Shellfish farmers must abide by provisions of their state lease agreement and Aquaculture Best Management Practices (BMPs) that are established by state law. BMPs specific to nets and net coatings require that all culture materials, cover nets and bags placed in the wa-

ter shall be clean and free of pollutants, including petroleum based products such as creosote, oils, and greases, or other pollutants. Net coatings must be used in accordance with the product label.

(continued on page two)

Coatings Must be Fully Cured

Coatings that release pollutants, especially oil-based products of any kind or in any form, are prohibited by state law. Examples include, but are not limited to, oil, asphalt-based tars, other tars, and creosote.



Coatings may be tinted using various colors (black, green, red, maroon, etc.) for a variety of reasons that may include: to identify net ownership, to camouflage net

bags for additional predator protection, or to hide planted clams from clam thieves. Colorants or any other additives that leach pollutants are prohibited by state law.

Coatings that do not release pollutants when fully cured are acceptable. Examples of materials that are acceptable when properly handled, dried, and cured include acrylic, latex, polyester, epoxy or alkyd resins. Cured coatings must not release oil-based residuals when placed in Florida coastal waters, estuaries, tidal flats, beaches or submerged coastal lands.

Coating manufacturers must provide information that clearly states fully cured coatings do not release pollutants. This information must include handling, drying or curing instructions for the use of the coating in the production of farm-raised

shellfish. Coating manufacturers are encouraged to include this information with coatings sold to Florida clam farmers.

Clam farmers can contact the Division or the University of Florida's Shellfish Aquaculture Extension Office in Cedar Key (telephone number 352-543-5057 or visit <http://shellfish.ifas.ufl.edu>) for a list of approved coatings and the appropriate handling, drying or curing methods.

The Florida Department of Agriculture and Consumer Services provides coating manufacturer information as a public service and does not endorse a manufacturer and/or imply satisfactory product performance.

Aquaculture BMPs Regulate Nets and Net Coatings

(Continued from page one)

Aquaculturists are also required to implement a BMP for the collection and proper disposal of all bags, cover netting, or other materials used in shellfish culture on submerged lands or when such materials are removed during harvesting or become dislodged during storm events.



Any innovative materials or equipment, other than the standard industry practices (soft bags, hard bags, cover netting, chicken wire, or crab traps), must be approved by the Department.

A third BMP concerns the use of new predator exclusion devices.

Shellfish farmers that intend to coat their protective netting must inform

the Department in writing, identify the products being used, and retain product labels and handling and application instructions for Department inspection.

For a copy of Florida's Aquaculture Best Management Practices, contact Kal Knickerbocker at 850-488-4033 or visit <http://www.FloridaAquaculture.com>.

How to Request Coating Approval

To receive approval to use coatings on shellfish production equipment or to use treated equipment purchased from a supplier, a written request must be submitted to the Division that describes or includes:

1. Equipment to be coated.
2. Functional purpose for the coating.
3. Coating product label.
4. Manufacturer handling, application, and curing instructions.

5. Manufacturer statement that properly applied and fully cured coatings do not release pollutants to state waters.

The Division will review the written request and materials and respond back to the person or persons requesting approval. Once a material has been approved by the Division and has been placed on an "approved product list," then a farmer does not

have to request approval to use the material in the same way as has been previously approved. However, when a farmer wants to use new products, or approved products in a new way, then they must request the Division's approval.

To submit an approval request or request a list of approved coatings, please contact Mark Berrigan at 850-488-4033 or ber-rigm@doacs.state.fl.us.

Apply, Handle, and Cure Coatings Safely

Individuals that intend to add a protective coating to clam farming equipment must implement and adhere to all coating manufacturer instructions concerning handling, application, drying or curing, including the recommended materials to thin the coating.

Coatings that when cured release pollutants, especially oil of any kind or in any form, are prohibited.

In general, coating application practices should include the following. Nets should be cleaned, washed and dried thoroughly prior to treatment, especially if the nets are fouled from prior use in grow out.

High pressure



Recapturing drip loss and preventing spills protects the environment and saves money.

cleaning of bio-fouled equipment may not occur over sovereign submerged lands.

Coatings should be handled and stored to prevent spillage and in containers with lids or tops that can be secured when the material is not in use.

Coatings should be applied with adequate ventilation and the means to capture or clean up drip loss.

Coatings may not be applied in locations that are over sovereign submerged lands.

The handling and application of coatings may require safe handling practices and worker safety equipment. Follow manufacturer recommendations.

Aquaculturists using protective coatings must retain and store product labels and handling and application instructions for review by Department personnel.

Manufacturer recommended drying or curing times between coatings or prior to use must be followed.

Coated equipment must be fully dried or cured such that coatings do not release pollutants. Improperly applied or cured coatings may release pollutants into the water.

Follow all coating manufacturer instructions regarding cleanup and waste disposal.

Certified aquaculturists interested in applying a coating to clam farming

equipment or installing coated equipment on sovereign submerged lands must contact the Division for permission to do so.



Coated equipment must be fully cured to an inert condition.

Individuals interested in supplying

coatings or coated equipment to Florida clam farmers are encouraged to apply and demonstrate to the Division that fully cured coatings will not release pollutants to Florida waters. Please submit a request to Mark Berrigan, 850-488-4033 or berrigm@doacs.state.fl.us.



Follow manufacturer recommendations for adequate ventilation and protective gear.

Coatings May Work Under Specific Circumstances

The Division does not recommend using net coatings and suggests the use of coatings only as a last resort to deter predators. We do recognize that adding a protective coating to clam bags may yield certain benefits. First and foremost is predator deterrence. Clams are eaten by a wide variety of fish (cownose or eagle rays, black drum, and sheepshead) or crustaceans (horseshoe, blue, and stone crabs). The coating

stiffens mesh to prevent fish or crab access to the growing clams.

Coated bags may not require cover netting which eliminates the cost of those materials and their handling and installation.

Properly applied coatings maintain an open mesh to facilitate current flow that carries the phytoplankton and oxygen necessary for healthy clam growth.

However, the coatings may also offer an improved attachment site for biofouling organisms and impede current flow.

Farmers report that dark colored coated bags may not be noticed by visually oriented predators and that these bags are not as visible by passing boaters.

Coated polyester is protected from damaging ultraviolet wavelengths in sunlight and retains its strength longer.

Coated nets that last longer with improved predator prevention may reduce production costs.

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*Safeguarding the public, protecting
the environment, and supporting
Florida's aquacultural economy.*



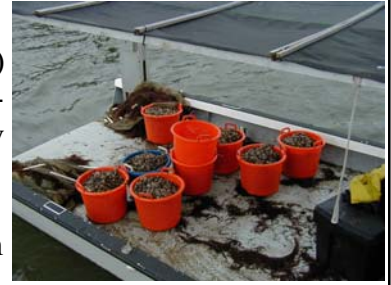
Our thanks to Leslie Sturmer, Florida Sea Grant Program, and the Cedar Key Aquaculture Association for providing information and images.

Visit

**<http://www.FloridaAquaculture.com>
for Florida aquaculture information.**

Food Safety and Shellfish Farming

The National Shellfish Sanitation Program (NSSP) is the federal/state cooperative program recognized by the U.S. Food and Drug Administration and the Interstate Shellfish Sanitation Conference (ISSC) for the sanitary control of shellfish produced and sold for human consumption. The purpose of the NSSP is to promote and improve the sanitation of shellfish (oysters, clams, mussels and scallops) moving in interstate commerce through federal/state cooperation and uniformity of the State shellfish programs. Florida adheres to the NSSP and is a member of the ISSC.



Shellfish have the ability to concentrate poisonous and deleterious substances such as metals, pesticides, hydrocarbons, etc. to potentially unsafe levels. To ensure the safety of shellfish, each State must supervise the growing, harvesting, relaying, and transportation of shellfish.

Clam Farming Equipment Constantly Evolves

Florida clam farming began in the 1970s with experimentation by Dr. Winston Menzel of Florida State University. Dr. Menzel planted his clams in wire cages or surrounded his clam crop with six foot high, plastic coated wire fencing. Current state law and cost prohibit such equipment today.

Early clam farmers during the 1980s in the Indian River used plywood trays. The cumbersome and very heavy wooden trays were quickly replaced with polyester mesh bags. A common sight at Florida clam operations was newly cleaned and drying clam bags.



As the number of clam farmers grew in the mid-1990s so did encounters with clam eating fish and crabs.

Clam farmers noticed that fish and crabs could cut through or gather and crush growing clams when planted in the soft, polyester mesh bags.

To deter predators, polyester mesh netting, chicken wire, or plastic "bird" netting was

rolled out over the clam bags as cover netting to increase protection. Purchasing, handling, installing, and removing cover netting increased production costs. To reduce cost and effort, farmers attached grow out bags to chicken wire and rolled out cover netting and grow out bags in one step. However, the quality of chicken wire has declined and cost increased.



Some farmers coat the side of a clam bag exposed to predators.

Farmer recognition that the soft mesh may be the problem led to experimentation with coatings to stiffen the mesh. In some applications, these coatings were successful in deterring predators and eliminating the need for cover netting. However, hardening the mesh increased

biofouling by oysters, sea squirts, and seaweeds at some lease locations. And the stiffer nets may not be suitable over certain bottom types like hard sand or shell hash.

Today a mix of predator deterrence equipment and methods are available for use depending upon location, season, and sediment type. Only hard won experience will prove what works.