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COMMISSIONER OF AGRICULTURE

FLORIDA AQUACULTURE

Issue Number 46
January, 2006

New Rule Updates *Aquaculture Best Management Practices Manual*

The third edition of the *Aquaculture Best Management Practices Manual* has been adopted into rule and incorporated into the Florida Administrative Code.

During the year-long rule development, the Division of Aquaculture conducted a series of five public workshops on aquatic animal health; the Aquaculture Interagency Coordinating Council reviewed the proposed BMPs for state agency input; Cabinet Aides were consulted for review, comment, and suggested changes to the aquaculture dock section; Division staff met individually with the Florida Fish and Wildlife Conservation Commission and Department of Environmental Protection staffs for specific comment; and, BMP development workshops were held in Bartow, Cedar Key, and Tallahassee to gather comments and suggestions for changes to the entire Manual. Major changes include:

Table of Contents – Chapters have been reordered and some renamed to clarify and reorganize the Manual.

Water Resources – Reorganized by moving existing BMP language from other sections. New language addresses production poundage and feeding limits for pit ponds with direct connection to a Class I drinking water aquifer.

Construction – A new chapter created from existing BMP language to address wetlands identification and protection, site selection, pond construction, erosion control, and storm water management.

Three new subsections were added: 1) new operations must submit construction plans, and construction and production timelines, 2) farmers can reclaim old production ponds, and 3) aquaculture docks are limited to 2,000 square feet with no more than four aquaculture related boats moored at any time.

Non-native and Restricted Non-native Species – Added a requirement that producers must apply and receive authorization from the Division to culture transgenic species.

Shellfish Culture – This chapter has been expanded and rewritten. A new submerged lands grow out section repeats many of the requirements of the sovereign submerged lands lease agreement. These conditions have been added to clarify the Environmental Resource Permit (ERP) exemption provided to Certified Aquaculturists.

Live Rock Culture – Two new requirements involve: 1) producers must obtain a lithographic description of the substrate to be planted from a geologist, retain that description until time of sale, and make that description available for Division inspection, and 2) producers culturing non-native marine life species on non-native substrate must be located in closed upland systems or effluents must be sterilized.

Health Management - Deleted the animal health plan requirement.

Preventing Wildlife Depredation – The July addendum on Wildlife Depredation has been added.

Aquatic Animal Welfare – A new chapter requiring humane animal practices.

The January 2005 Aquaculture Best Management Practices Manual is available on the Division's website, http://www.floridaaquaculture.com/publications/BMP%20Rule-Manual112805.pdf.

Hard copies are available upon request. Please contact Kal Knickerbocker, 850-488-4033, or Portia Gotwalt, 863-519-8459.

Special points of interest

- Eagle Scout installs educational kiosk.
- Division publishes on invasive and endangered species.
- Frequently asked questions about red tide.
- 2005 Hurricane Damages at $8 million.

Eagle Scout Candidate Directs Aquaculture/Aquatic Preserve Kiosk Construction

Article and photos by Anthony Dretzka, BSA Troop 734

My name is Anthony Dretzka and I am a Life Scout member with Troop 734 of Palm Bay, Florida. The next step for me is obtaining my Eagle rank. An assistant scoutmaster in my troop Mr. Chris Combs (Brevard County Sea Grant Agent) explained that he had an Eagle Project opportunity that seemed very interesting. He explained to me that I would be working with the Florida Division of Aquaculture.

The project would be constructing an informational kiosk at John Jorgensen's boat launch in Grant, Florida. I had to get authorization from the Brevard County Parks and Recreation. So I met with Mrs. Marsha Cantrell and Mr. Charles Nelson with the county's park system for approval of my project. I thought that an addition to the kiosk by adding a bench to the backside would be nice. So I consulted with a family friend, Dan Faubel, who helped design the bench.

Now that I had the plans and the approval I needed help building the kiosk and needed to raise money for the supplies for the bench. So I received donations from family and friends. I also set aside a weekend for the building process by asking for volunteer hours of the scouts and adults of my troop. On October 8th and 9th the kiosk was finished.

When Hurricane Wilma slammed the southwestern part of Florida the kiosk withstood high winds and the flooding of the Indian River. After Wilma, we further strengthened the kiosk with the construction of the bench.

I am thankful for this learning experience and the opportunity to work with the Florida Division of Aquaculture, Brevard County Parks and Recreation, scouts, scoutmasters, friends, family and being able to further my path in scouting.

Editor Note: Funding for this project was provided in part by the Florida Coastal Management Program, Florida Department of Environmental Protection, by the Coastal Zone Management Act of 1972, as amended, Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

Division of Aquaculture Publishes Key Papers

A chance conversation two years ago in a hallway led to a collaboration by Juan Gutierrez, Florida State University, Department of Mathematics, and Dr. John Teem, Division of Aquaculture, to write a mathematical model that examines the feasibility of inducing extinction of an invasive fish population through manipulating male to female ratio.

In a steady state (no non-fish related mortality factors), the model predicted the fish population would become extinct in several decades when feminized male fish are added at a proportion of 3.2 percent of the population every couple of months.

The authors noted that using a feminized male as a biological control agent would not harm native fish and the technology is available to produce feminized males.

The peer-reviewed paper has been accepted for publication by *The Journal of Theoretical Biology*. For additional information contact John Teem at 850-488-4033 or teemj@doacs.state.fl.us.

Stephen Fernandez worked as a part time employee to draft a petition to delist captive held shortnose sturgeon for commercial production. His work led him to publish a paper entitled, *A Market Approach to Sturgeon Conservation Under the U.S. Endangered Species Act*, that appeared in the December issue of *Fisheries*.

Stephen argues that a means exist in the Act to allow commercial culture which would not negatively effect wild populations.

For copies contact Paul Zajicek at 850-488-4033 or visit http://www.fisheries.org.

Frequently Asked Red Tide Questions

What is red tide?

Florida red tides are unique, natural events which have existed long before Florida was settled. The term 'red tide' refers to blooms of *Karenia brevis*, other *Karenia* species, and over 100 other types of toxic microalgae, each with its own unique nutrient preferences, toxins, and ecosystem effects.

Does pollution cause red tide?

There is no evidence of a direct link between Florida red tides and nutrient pollution. Red tides in Florida occurred long before settlement and severe red tides have been observed in each decade since *Karenia brevis*, the red tide dinoflagellate, was identified in 1948.

Why is it difficult to determine what nutrients feed red tide?

Nutrient concentrations within and surrounding red tides are very low, often too low to be detected. Scientists have used a variety of methods to try to 'source' the nutrients supporting a bloom, including examining nutrient concentrations immediately prior to a red tide, stable nitrogen isotope signatures, and nutrient 'budgets' of the amount of nutrient a red tide requires compared to the amount of nutrients provided by coastal inputs. All methods indicate that coastal nutrient pollution does not cause a red tide, and while it may contribute to maintaining a red tide in coastal waters, it cannot solely account for red tide persistence and spread. Scientists have concluded that many different nutrient sources contribute to a red tide, including nutrients from: bottom sediments, microalgae able to fix nitrogen gas and excrete it into seawater as dissolved organic nitrogen or as ammonium, atmospheric nutrient inputs, rivers and surface runoff, decaying fish, and excretion by small crustaceans that feed upon phytoplankton.

What can be done to control red tide?

Controlling red tide blooms is not a simple issue. Before any methods are used several points need to be considered.

First, it is easy to kill red tide cells. But red tide cells do not cause the harmful effects—it is the toxin contained within the cells that harms sea life, kills fish, and causes respiratory irritation in humans. Killing red tide cells releases these toxins directly into seawater, making a red tide more toxic. Mitigation strategies must not only kill or remove red tide cells, but also destroy the toxins in the water.

Second, control strategies or treatments must not create additional harm to the environment. In the 1950s, it was discovered that adding copper to an aquarium of red tide killed the cells. Tons of copper sulfate were added to a large bloom in 1953 and 1955. It killed the red tide cells but did not affect the toxins within the cells, which were released directly into the water. The copper treatment did not eliminate the bloom and the copper probably had a significant negative impact on sealife not affected by red tide.

Spreading fine clay particles on the sea surface is another method to control red tides. Red tide cells stick to the heavy clay particles and sink o the bottom. Although this removes red tide cells from the water column, it moves them and their toxins to the bottom where they either kill creatures on the bottom (e.g. crabs) or they are later resurrected by turbulent upwelling. Clay also adds a smothering layer to the bottom, resulting in less oxygen availability.

Another control method currently being tested is ozone. Ozone is toxic to red tide but in seawater it combines with bromide to form new toxic compounds that must be investigated to make sure that there is no harm to other marine organisms.

Scientists have also been interested in the possibility of using biological control. Like other organisms, red tide cells can be terminated by viruses or bacteria. By understanding the potential pathogens associated with red tide cells there may be a possibility to use biological methods to control blooms.

A third point is that mitigation must be practical. Red tides vary greatly in size and can be huge, up to 10,000 square miles, and present from surface to bottom. It is simply not practical to 'control' something that big.

Information provided by the Florida Fish and Wildlife Commission, Fish and Wildlife Research Laboratory. Visit http://www.floridamarine.org/ for red tide status reports.

2005 Hurricanes Cause $8 Million in Damages to South Florida Aquaculture

As the 2005 hurricane season comes to an end, aquaculturists in South Florida are rebuilding after suffering extensive damage from three Category 5 hurricanes: Katrina, Rita and Wilma. The short time frame between storms left producers little time to recover from the structural damage caused by Katrina and the flooding caused in many areas by Rita before being pounded by the extreme winds of Wilma.

Many producers in South Florida experienced significant losses. Greenhouses were subjected to severe winds that twisted structures out of shape, destroyed shade cloth and mangled electrical and plumbing systems. Widespread power outages lasting up to 15 days led to decreased water quality and fatally low dissolved oxygen levels that killed and stressed fish at many facilities. The cost and availability of fuel to run generators only compounded the problem. As a result, numerous farmers lost large numbers of production fish and many lost valuable brood stock that will be difficult to replace and are vital to business.

Aquaculturists attempted to salvage their fish and equipment to the best of their ability and have already begun the long, arduous process of rebuilding their facilities. Facilities more fortuitously located are back to running near normal with only minor repairs still pending, while others are simply trying to rebuild lost inventories and brood stock for the 2006 season. Very preliminary Hurricane Wilma damage estimates approach $8 million. When combining Wilma damages with the damage caused by Hurricanes Katrina and Rita, it is easily understood that it will take a considerable amount of time, effort, and funds to fully mend.

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DACS-P-00082

Benefiting commercial aquaculture,
Conserving natural resources

2005 South Florida Aquaculture Hurricane Damage Estimated at $8 Million

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