WaterWorks

A Newsletter Highlighting Aquaculture and Pond Management Programs of the University of Flori

University of Florida Cooperative Extension Service / Institute of Food and Agricultural Sciences Volume 2 Number 4 1998

Calendar of Events

See page 7 for more in-depth information concerning these workshops, courses and seminars.

November 14
Tilapia Workshop
Tropical Aquaculture Laboratory / Ruskin, FL
Debbie Britt 850/674-3184

November 18
Technical Advisory Committee Meeting
St. Johns River W MD Office/ Orlando, FL
Frank Leteux 850/414-0200

December 15 - 16
Fish Health Management Workshop
Fisheries and Aquatic Sciences / Gainesville, FL
Dr. Ruth Francis-Floyd 352/392-9617 ext 229

December 5
Florida Farmed Fish Festival
Harbor Branch Oceanographic Institution / Ft. Pierce, FL
Dr. Kevan Main 561/465-2400

February 1999
Annual Hard Clam Meeting
Date, time and location to be announced
Leslie Sturmer 352/543-5057

May 17-28, 1999
Diseases of Warm Water Fish
Tropical Aquaculture Laboratory / Ruskin, FL
Dr. Ruth Francis-Floyd 352/392-9617 ext 229

May 17-20, 1999
Aquatic Weed Control & Revegetation Short Course
Ft. Lauderdale Marriot North / Ft Lauderdale, FL
Dr. Vernon Vandiver, Jr. 954/475-8990

1998-1999 Research Needs for Florida Aquaculture

On October 16, the Aqua culture review Council (ARC), an advisory council to the Commissioner of Agriculture Bob Crawford, drafted a list of recommendations for funding priorities for Florida aquaculture.

Now that the list is complete, "it's up to the various aquaculture commodity groups to find funding sources for their research priorities in this next Legislative session—by incorporating the proposed costs into the annual budgets of state universities, the Department of Agriculture and Consumer Services and other agencies," says Joanne McNeely, Bureau Chief of Seafood and Aquaculture/Florida Department of Agriculture and Consumer Services (DACS).

"Because so much of the funding is dependent on legislative action, it's very important that aquaculturists communicate and work with their legislators." Joanne also noted that while funds totaling $250,000 were made available in 1996, there were no funds appropriated in the 1997 legislative session.

The following is an inventory of the proposed research priorities for 1998-1999, listed alphabetically by commodity groups and ranked according to priority. The same list has already been sent to the Governor's office and the Legislature.

Alligator
1) Identifying factors contributing to hide and leather quality problems, to improve the international competitiveness of American alligator skins.
2) Maintaining egg quality on public lakes that are used by alligator farmers for egg collection.
3) Identification of disease outbreaks on Florida alligator farms.
4) Marketing and promotion to develop new markets.

Aquatic Plant
1) Research to increase the number of pesticides labeled for use in controlling pests.
2) Research to determine the nutritional needs of aquatic plants.
3) Research to determine production methods of new plants not presently being cultivated.

Commercial Fishing
1) Classification of as many, or all, of the unclassified state waters.
2) Reduction of restrictions on shellfish harvest to cooler time which is currently causing Florida shellfish to have a poor shelf life.

Continued on page 6

UNIVERSITY OF FLORIDA
Institute of Food and Agricultural Sciences
Department of Fisheries and Aquatic Sciences

design team

The Cooperative Extension Service uses State Major Programs to provide guidance and direction to extension efforts in Florida. Each major program has a design team responsible for establishing priorities, implementing extension programs, and evaluating impacts. Aquaculture and Pond Management is a State Major Program, with the following design team members:

DEPARTMENT OF FISHERIES AND AQUATIC SCIENCES

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COUNTY EXTENSION FACULTY

Leslie Sturmer
Multi-county shellfish aquaculture
352/543-5057

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jsbn@gnv.ifas.ufl.edu

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MITCHELL AQUACULTURE FARM (BLOUNTSTOWN)

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Roy Yanong
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rpy@gnv.ifas.ufl.edu

There are many other faculty who assist with extension and research in aquaculture and pond management and we will be periodically focusing on their efforts. We encourage you to become familiar with the design team, its role in our programs, and how the faculty can collectively or individually assist you.

Student Involvement at UF

Undergradate and graduate students are an important part of the teaching, research, and extension programs at the University of Florida. Involvement of individual students in these programs will be highlighted in each issue of **WaterWorks.**

Philip Fowler was born in Bethesda, Maryland and grew up in Auburn, Alabama and Key West, Florida. He attended the United States Merchant Marine Academy, Florida Keys Community College, and Tennessee Technological University. In 1978 he received a Bachelor of Science degree in Agricultural Engineering from the University of Florida.

Upon graduation, he returned to Key West and ran an owner/operator charter boat and dive business and also worked as a boat/finish carpenter — building boats and remodeling houses in a self run carpentry business.

In 1990, Phil returned to the University of Florida to pursue a Master of Engineering in the Agricultural and Biological Engineering Department. He developed the software package "An Expert System in Urban Forestry" under the supervision of Dr. Howard Beck.

After this, he went on to pursue a Doctor of Philosophy in the Agricultural and Biological Engineering Department under the supervision of Dr. Ray Bucklin.

Phil's dissertation, **A Methodology for the Design of Complex Computer Systems in Agriculture and Aqua culture**, integrates complex biological systems and computer control systems.

A microcontrolled aquacultural system was developed to test and demonstrate the methodology.

This recirculating aquacultural system was designed, built, and tested in the Structures and Environment Lab of the Agricultural and Biological Engineering Department. The system consisted of four 10-gallon tanks, filters, pumps, heaters, sensors, feeders, lights and microcontrollers (for system control) and was designed to run a complete aquacultural grow-out cycle of tilapia.

Photo by David Blanenship

Phil Fowler with a microcontroller —a complete computer on a chip— that was used to control an aquacultural recirculating system for the grow-out of tilapia. Phil has proven microcontrolled systems to be a practical option for control of reicrculating aquacultural systems.

Aquaculture was chosen because of its dynamic parameters and harsh environment for electronic sensors and mechanical equipment. Also, the fish's environment requires constant monitoring and control to maintain quality.

The control system consisted of three microcontroller units linked to a PC for operator interaction. The microcontrollers controlled water flowrate, air pumps and heaters and operated a waste removal settling filter.

A microcontroller is a complete computer on a chip —with its own CPU, memo ry, input/output — and operates the system independently of the PC. The PC was used only as an operator interface to change operating parameters and monitor system operation. This interfacing PC was linked to the internet, enabling the system to be monitored by PCs also linked to the internet.

The microcontrollers had the capacity to sound alarms or use a modem to call an operator if system components did not operate properly. The system was run under varying conditions for approximately four months and tested for failure modes.It responded properly to component failures and showed excellent ability to adjust to the dynamic environmental changes.

Phil's work demonstrates the practicality of using microcontrolled systems to grow fish. Previous computer controls have been expensive and have not operated reliably when used in the damp and electrically noisy environments used for aquaculture production.

Today micro-controllers are used in many applications such as automobiles, home appliances, auto-focus cameras, and environmental control in homes and businesses.

The cost of microcontrollers has dropped rapidly during the 1990s and is expected to continue to drop, making microcontrolled systems a practical option for control of recirculating aquacultural systems.

Phil successfully defended his PhD dissertation this summer and has accepted a position with Dynamac Corp, a NASA subcontractor at the Kennedy Space Center. He will work in the Life Support Division of the Space Shuttle and Space Station Projects.

—Dr. Ray Bucklin
352/392-7728

Regulatory and Financial Assistance for Florida Aquaculturists

Florida's Department of Agriculture and Consumer Sercies (DACS) is now the primary agency responsible for regulating aquaculture in the state. However, there are other agencies involved in the process. The following is a list of the agencies involved in various aspects of aquaculture permitting, as well as those that provide financial guidance/assistance.

Regulatory Assistance

Bureau of Seafood and Aquaculture

The Bureau is the first agency you should contact if you're interested in participating in any kind of aquaculture activities as it is now the primary agency for all environmental permit applications. The bureau has assumed environmental assistance responsibilities and is in the process of developing a series of Best Management Practices to replace environmental permitting.

All aquaculturists must contact the bureau to obtain an Aquaculture Certificate of Registration.

Florida Department of Agriculture and Consumer Services
2051 East Dirac Drive
Tallahassee, Florida 32310-3760
Telephone: 850/488-0163
Fax: 850/922-3671
E-mail: seafood@doacs.state.fl.us
Web Site: http://www.fl-aquaculture.com
Contact: Ms. Joanne McNeely, Chief

Bureau of Food and Meat Inspection

Regulates food processing, storage and sale including HACCP. All food processors and handlers are required to possess a Food Permit from this department unless the operation is under continuous state or federal inspection.

Florida Department of Agriculture and Consumer Services
3125 Conner Boulevard Room 289
Tallahassee, Florida 32399-1650
Telephone: 850/488-3951
Fax: 850/488-7806
Contact: Dr. John Fruin, Chief

Alligator Management Program

The Alligator Management Section of the Bureau of Wildlife Resources is the source for alligator regulatory, processing, farming, and husbandry information; application procedures for participating in alligator hunts; and in alligator egg and hatchling collections on public and private lands.

Division of Wildlife/ GFC
620 South Meridian Street
Tallahassee, FL 32399-1600
Telephone: 850/488-3831
Contact: Mr. Harry Dutton

Bureau of Marine Resources and Regulation

This is the application point for submerged land leases to culture shellfish and live rock. The Bureau also regulates the processing and handling of clams and oysters and classification of shellfish harvesting areas.

Florida Department of Environmental Protection
3900 Commonwealth Boulevard, Mail Stop 205
Tallahassee, Florida 32399
Telephone: 850/488-5471
Fax: 850/922-6398
Contact: Mr. David Heil, Chief

Photo by Joe Richard

Financial Assistance

There are no state or federal loan programs structured specifically to assist aquaculturists. However, there are programs to assist agri-business or small businesses through loans or loan guarantees with existing financial institutions.

Unfortunately, programs and funding levels change frequently and we are listing sources of information and not program descriptions. You may also wish to contact regional planning councils, chambers of commerce and small business development centers (usually associated with community colleges) to find out if there are programs available within your region.

Enterprise Florida

390 North Orange Avenue, Suite 1300
Orlando, Florida 32801
Telephone: 407/316-4631
Contact: Ms. Michele Miller

Farm Credit of Central Florida

PO Box 8009
Lakeland, FL 33802-8009
Telephone: 800/533-2773
Contact: Mr. Ron O'Connor

Florida State Farm Service Agency/ USDA

PO Box 141030
Gainesville, FL 32614-1030
Telephone: 352/379-4500
Fax: 352/379-4580
Contact: Mr. Kevin Kelley

National Marine Fisheries Service

Fisheries Obligation Guarantee Program
9721 Executive Center Drive, North
St. Petersburg, FL 33702-2449
Telephone: 813/570-5377
Contact: Mr. Brett Brunne

Rural Development Administration

PO Box 147010
Gainesville, Florida 32614-7010
Telephone: 352/338-3482
Contact: Mr. Joe Mueller

Small Business Adminstration

Jacksonville District
7825 Baymeadows Way, Suite 100-B
Jacksonville, Florida 32256-7504
Telephone: 904/443-1922
Contact: Mr. Paul Thomas

South Florida District
1320 South Dixie Highway, Suite 301
Coral Gables, FL 33146-2911
Telephone: 305/536-5521 ext. 108
Fax: 305/536-5058
Contact: Mr. Robert Clairmont, Sr.

Many thanks to Paul Zajicek with the Bureau of Seafood and Aquaculture/ FL Dept of Agriculture and Consumer Services for compiling such a listing and allowing us to borrow from it. For more information, see the DACS web site at:
http://www.fl-seafood.com/newpages/index.htm

UF/IFAS Aquaculture and Pond Management Update

Department of Fisheries and Aquatic Sciences
Gainesville

UF/IFAS Department of Fisheries and Aquatic Sciences recently hosted the fifth meeting of the The Sturgeon Production Working Group.

Representatives were present from the aquaculture industry, US Geological Survey / Biological Resources Division; the National Marine Fisheries Service, the Sierra Club, as well as Congressional offices of Representatives Stearn, Boyd and Thurman. Senators George Kirkpatrick and John Laurent, were also in attendance. The following information was presented:

♦ A letter from David S. Whaley was read, expressing his interest in the commercialization of sturgeon in Florida. David serves on the congressional Subcommittee on Fisheries Conservation, Wildlife and Oceans.

♦ Mark Berrigan, with the Florida Department of Environmental Protection (DEP) presented a draft of the "Plan and Implementation for the Culture of Florida Sturgeon" for review and discussion.

♦ UF/IFAS fisheries biologist Doug Colle reported on the sampling procedures and broodstock collection that occurred this spring on the Suwannee River.

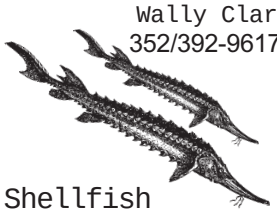
♦ A Market Assessment for Florida Sturgeon was presented by Mr. Paul Zajicek, with the Bureau of Seafood and Aquaculture/Florida Department of Agriculture and Consumer Services (DACS). The report was prepared cooperatively by Mr. Zajicek, and Deborah Britt and Dr. Andrew Lazur, UF/IFAS Mitchell Aquaculture Demonstration Farm in Blountstown.

This report made it clear that Florida is an ideal market for the introduction of new products such as cultured sturgeon and that sturgeon caviar is "truly international in its production and consumption. The volume and value of imported product exhibits a strong growth trend."

♦ A second marketing presentation was given by Mr. Mats Engstrom, President of California Sunshine Fine Foods—one of the top suppliers of caviar on the international market and producers of Tsar Nicoulai Caviar, a California-grown aquaculture product.

Before the meeting was adjourned, Mark Berrigan, Environmental Administrator with the DEP, was charged with preparation of the final report in response to comments by the Working Group, other state and federal agencies and meeting attendees. The plan will come under review once more at the next meeting, December 4.

Wally Clark
352/392-9617



Shellfish Aquaculture
Cedar Key

The Florida Clam Industry Summit held in Cedar Key this fall resulted in about 100 farmers and wholesalers from eight counties coming together for an exchange of information on the following topics:

1 Marketing- Industry input was solicited by Joanne McNeely, Bureau Chief with the Bureau of Seafood and Aquaculture regarding marketing strategies for Florida farm-raised clams; DACS recently received legislative-funding for a state-wide aquaculture marketing campaign, including Florida farm-raised clams. Foodservice awareness, consumer education and retail sales were outlined. For more information, contact Joanne at 850/488-0163.

2 Interstate Shellfish Sanitation Conference (ISSC) Issues David Heil presented public health issues that had been discussed at this year's ISSC meeting in July. Heil is Bureau Chief for the Bureau of Marine Resources Regulation and Development/Florida DEP.

The ISSC is a federal/state/industry cooperative program that addresses public health issues to insure molluscan shellfish are safe for human consumption.

Florida's shellfish industry was most interested in the interim certification guidelines that shucker/packer processors must now conform to during plant inspection.

3 Shelf Life One of the issues submitted jointly —by industry, DACS, DEP, and UF/IFAS— and presented to the ISSC at their annual meeting was a dry tempering process to extend shelf life of clams; the state regulatory agency (DEP) has the authority to evaluate and approve measures proposed by industry to provide controls equivalent to the existing time/temperature requirements during harvesting and processing.

Dr. Steve Otwell with the UF/IFAS Aquatic Food Products Lab reported that the ISSC took no action on this issue.

Discussion was initiated at the summit on how industry can take the necessary steps toward preventing (instead of reacting to) potential problems with molluscan shellfish safety. Everyone agreed that it is important to ensure a safe, marketable clam. A committee was then selected to represent industry and to advance the tempering issue forward on a state level.

In addition, the concept of a quality assurance program, including the production level, was presented as an option for the clam culture industry to consider—a logical step following the recent mandatory implementation of HACCP at the processing level.

A quality assurance program is a way in which industry can build consumer confidence through reinforced and uniform industry practices (quality and safety controls), as well as education (marketing) about their products.

These types of programs are already in place for cultured catfish, cultured trout, and other foods. The shellfish industry, both from a national and global perspective, is also beginning to recognize the value of these types of programs. For example, the Pacific Coast Oyster Growers Association is developing a best management program — whereas Canadian shellfish growers are implementing what they refer to as "codes of practice."

The timing may be right to initiate such a program in Florida. Plans are being made to include this topic in our next Annual Hard Clam Meeting, hosted by the UF/IFAS Aquatic Food Products Lab. The meeting is scheduled for February (1999). Date, time, and location to be announced.

Leslie Sturmer
352/543-5057

Miami-Dade County Cooperative Extension Service
Homestead

Aquaculture in Miami-Dade County primarily consists of freshwater ornamental fish for the home aquarium. Most of the fish produced belong to the Cichlid family and come from Africa's Malawi and Tanganyika lakes.

These fish were brought to the Miami aquaculture industry some years ago. Fish are grown-out in both ponds and above-ground tanks and are fed commercial diets or on farm mixtures.

Currently, there are approximately 20 individuals producing ornamental fish on 5-acre parcels with an estimated farm gate value of $3 million.

In an effort to address the growing needs of the Miami-Dade County aquaculture community, the Miami-Dade Aquaculture Advisory Council was established this summer. The purpose of the council is to help define and prioritize the community's needs as it relates to aquaculture production with the hope that these needs can be addressed through extension programming.

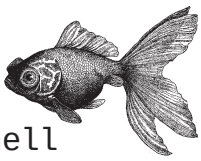
The council's first meeting, was held on August 19 at the Miami-Dade County Coop-

erative Extension Service office in Homestead. Participants defined the issues they see as a priority — labor, marketing, water quality (effluents), disease, and nutrition. As a result, a water quality monitoring program was initiated in October to compare source water versus the effluent.

Representatives from all sectors of the aquaculture arena were present at the council meeting. I would like to thank the following volunteers for participating:
Mr. Buck Albert,
Mr. Rick Biro,
Mr. Laif DeMason,
Mr. Arie DeZwart,
Mr. Bobby Gornto,
Mr. Michael Mulvihill, and
Mr. Paul Radice.

A marketing seminar is planned for early next year. Stay tuned for updates.

Molly Sandfoss
305/248-3311 ext 230



Mitchell Aquaculture Demonstration Farm

Blountstown

Interest in sturgeon culture in Florida is steadily building due to its high value for both meat and caviar. Florida has three native species/subspecies — the Gulf of Mexico, shortnose, and Atlantic — with most of the recent research focusing on life history and induced spawning techniques for Gulf of Mexico and shortnose sturgeon. Within the past several years research efforts have expanded into investigating culture techniques and evaluating fish performance.

A Gulf of Mexico sturgeon culture research project was initiated this July and is investigating the production and economic feasibility of two commercial scale production systems.

One of the treatments utilizes flow-through well water at three exchanges per day and the other treatment utilizes recirculated pond water. The recirculating pond water system is designed to reduce water requirements, take advantage of the pond's natural plankton biofiltration, and allow for zero discharge. Both treatments consist of three 20-foot diameter fiberglass tanks supplied with airlifts and airstone aeration.

Oxygen will be supplemented later in the 16-month study when fish biomass and feeding rates exceed airstone oxygen transfer capabilities. Each tank was stocked with 400 three month old fingerlings (6.5g) which are expected to reach 8 - 10 lbs by the end of the study.

Fish growth, water quality, facility infrastructure and operating costs are being monitored and a comparison between the two systems completed. In addition, monthly effluent analysis is being conducted from the flow-through tanks.

Data from July to September in the above study have shown slower fish growth in the pond water recirculating treatment where water temperatures have been averaging 10 degrees F — higher than the well water flow-through system. In order to more clearly evaluate the effect of water temperature on Gulf of Mexico sturgeon growth, another project will begin in October.

In this study, six month old fingerlings will be cultured for 10 weeks in four water temperatures ranging from 70 to 85 degrees F.

For more information on the current sturgeon research projects at the farm, call Andy Lazur or Debbie Britt.

Debbie Britt
850/674-3184

Food and Resource Economics

Gainesville

The second harvest season for the Florida Sea Grant funded bay scallop (*Argopecten irradians*) culture project is drawing to a close. The final harvest occured October 30 from the lease site located several miles into the Gulf of Mexico from the mouth of the Crystal River. Seed scallops grown at the University of South Florida were transplanted from the St. Petersburg hatchery to the lease site in early summer.

The scallops were then grown out to market size (40-45 mm shell height) in cages located at the lease site. Growout requires about six months. Market-sized scallops were then delivered to select area restaurants for market testing in whole form.

This year, as well as during 1997, market-sized cultured bay scallops were provided at no cost to a very select group of white-table cloth restaurants in Inglis, Cedar Key, and Gainesville.

Chefs were asked to prepare the product in any manner they wished, as long as the product was cooked and presented to the patron in whole form. Patrons who ordered the appetizer, entree, or side dish were then asked to complete a brief questionnaire that solicited opinions about this non-traditional seafood product.

With few exceptions, most surveys indicated a high degree of satisfaction and a willingness to purchase the product again, although a number of respondents expressed initial trepidation at the thought of eating a whole scallop. This suggests that a latent market for whole bay scallops exists in north central Florida.

A final component of the study will be an assessment of the economic feasibility of the cultured process on a small, commercial scale. The analysis will consider several growout techniques and utilize information from existing markets in the northeast US, as well as Virginia where similar research has been conducted.

Culturing bay scallops for the meat alone would likely not be economically feasible given the large volumes of imported scallop meats. Although the technology required to produce seed scallops is fairly standard (i.e. very similar to that utilized for hard clams), the most appropriate growout technology is under development.

The market potential for a shell-stock, cultured bay scallop to be consumed whole is not fully understood.

Currently, commercial harvest and sale of wild, bay scallops is not allowed in Florida. However, similar regulations in the northeast US have been modified to allow the sale of cultured bay scallops. Bay scallop culture may eventually provide a means by which existing hard clam growers in Florida can diversify.

Chuck Adams
352/392-1826 ext 223

Tropical Aquaculture Laboratory

Ruskin

The Tropical Aquaculture Laboratory was proud to have recently hosted two vitally important meetings, related to aquaculture:

♦ On October 16, the Aquaculture Review Council (ARC) met to finalize a list of research priorities that was presented to the Legislature for funding. The Tropical Aquaculture commodity group cited the following research needs for 1998-99:

1 Special local needs permit for Dylox for use in commercial tropical fish production ponds;
2 FDA approval of oxy tetra cycline for use in ornamental fish;
3 FDA approval of metronidazole for use in ornamental fish;
4 New species production such as clown loach and fancy guppies;
5 Water quality management and conservation to include research on recirculating aquaculture systems;
6 Marketing and education to expand awareness and popularity of ornamental fish among children.

♦ That same afternoon, the second meeting of the Technical Advisory Committee was held to begin drafting Best Management Practices (BMPs) to be used by aquaculturists—as part of the newly adopted aquaculture certification process.

Craig Watson
813/671-5230

Sales Tax Exemption for Fish Farmers

Along with making changes to the aquaculture permitting process, the last Legislative session also passed into law a bill that provides sales tax exemption status for fish farmers (Senate Bill 1692).

The legislation amended Chapter 212 of the Florida Statutes and provides fish farmers the same sales tax exemption status as other farmers including exemptions on :

- ♦ agriculture commodities (horticultural, aquacultural, poultry and farm products, livestock and livestock products);
- ♦ livestock, which now includes fish raised for commercial purposes;
- ♦ self-propelled farm equipment ;
- ♦ power-drawn farm equipment; and
- ♦ power-driven farm equipment.

These legislative changes took effect on July 1 and should resolve sales tax issues that have plagued the fish farming industry. However, it may take some time before the various revenue field offices are aware of the new law. If a farmer encounters a problem, he/she should contact the Florida Aquaculture Association (FAA) office to obtain a copy of the new legislation. For more information contact:
David Boozer 941/293-5710

Interim Measures for Aquaculture Permitting

As reported in the previous issue of WaterWorks, the last legislative session transferred most aquaculture permitting and regulatory responsibilities to the Florida Department of Agriculture and Consumer Services(DACS). As a result, newly created Aquaculture Certificates will:

- ♦ replace General Fish Farm Permits which have, until now, been required from the Florida Department of Environmental Protection;
- ♦ replace the Resident Fish Dealer's License from the Florida Game and Fresh Water Fish Commission (GFC); and
- ♦ address the Environmental Resource Permit from the water management districts.

Instead of permitting based on the traditional regulatory rule, Best Management Practices (BMPs), which are in the process of being developed, will address the concerns of all the agencies. If a farm can demonstrate that they are employing the appropriate BMPs, they will be certified by DACS.

However, the development of BMPs is going to take a while. It has been suggested that during the interim, farms operating under a current General Fish Farm Permit adopt their existing permit rules as BMPs—a relatively easy way to become certified. However, there are many other forms of aquaculture that do not have existing general fish farm permit rules to work under. To accomodate these situations, DACS has:

1 Formed a Technical Advisory Committees (TAC) for the various commodity groups to assist in the development of BMPs, including representatives from industry, research, and other agencies involved;

2 Proposed legislation which will allow for farms operating within existing rules and authorizations to be certified until BMPs are developed.

A Technical Advisory Committee meeting , the second so far, was held at the Tropical Aquaculture Laboratory on October 16 and demonstrated a cooperative atmosphere. A third meeting is scheduled for November 18. (See Calendar of Events on page 7 for details.)

All aquaculturists are encouraged to participate by communicating ideas and concerns to their industry representatives. For more information contact:

Frank Leteux at 850/414-0200 or
Rich McLean 850/ 488-6249.

continued from page 1

Food Fish

1) The Florida catalog of aquaculture development potential.
2) Use of digital computer technology to optimize feeding rates, growth and survival in aquacultured crops.
3) Development of non-chemical treatments to control diseases and maintain health in aquacultured fish and crustaceans.
4) Florida tilapia production and recirculation in ponds: a demonstration of the economic viability of developing an industry to compete with foreign imported tilapia.
5) Integration of aquaculture with water management; a demonstration project to replace tax revenues lost from public works projects with new economic activity.
6) Development of aquaculture techniques for sustainable fingerling production of the Southern flounder, *Paralicthys lethostigma.*
7) Develop culture techniques for sturgeon as a food fish.

Industry at-Large

1) Identify markets and marketing strategies for shellfish.
2) Nutritional studies to develop a high quality, economical food source for *penaeid* shrimp.

Shellfish

1) Research the biology of harmful algae blooms.
2) Develop systems for the cultivation of *penaeid* shrimp in freshwater in Florida.
3) Extending shelf life of farmed shellfish.
4) Disease detection/treatment of shellfish.
5) Develop a microencapsulated diet for shellfish.
6) Develop an information transfer system, including Internet and CD-ROM-based aquaculture research content for farm use.

Tropical Fish

1) Special local needs permit in FL for Dylox.
2) FDA drug approval of oxytetracycline.
3) FDA drug approval of metronidazole.
4) New species production such as clown loach and fancy guppies.
5) Water quality management and conservation to include research on recirculating aquaculture systems.
6) Marketing and education to expand awareness and popularity among children.

Dates for the 1998-1999 Legislative session are as follows.*

November	**16-17**	**New member orientation**
November	**18-20**	**Committee Meetings**
December	**1-3**	**Committee Meetings**
December	**5**	**Senate Inauguration**
January	**4-7**	**Committee Meetings**
January	**19-22**	**Committee Meetings**

Additional information can be obtained by visiting the Legislative web site at:
"http://www.leg.state.fl.us".

Calendar of Events

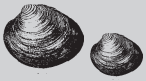
November 14
Tilapia Workshop
Tropical Aquaculture Laboratory / Ruskin, FL
This workshop will focus on low cost, low tech outdoor culture. Topics include biology, infrastructure requirements, pond and cage systems, production technology, nutrition and feeding, water quality, fish health, marketing, economics, regulations, information resources and supply resources. Lunch and refreshments provided. Cost: $20. 8:30 am - 4:30 pm
Debbie Britt 850/674-3184

November 18
Technical Advisory Committee Meeting
St. Johns River WMD Office/ Orlando, FL
This is the third meeting for the TAC. Drafted Best Management Practice rules from the last meeting will be reviewed for approval, along with discussion and consideration of new material. The meeting is open to the public. Call for copies of the minutes or an agenda.
Frank Leteux 850/414-0200

December 5
Florida Farmed Fish Festival
Harbor Branch Oceanographic Institution / Ft. Pierce, FL
An opportunity to market your aquaculture products to area consumers.Noon - 5 pm.
Dr. Kevan Main 561/465-2400

December 15 - 16
Fish Health Management Workshop
Fisheries and Aquatic Sciences / Gainesville, FL
The curriculum includes an introduction to water quality as it pertains to fish health management, important infectious diseases, and treatment and management options. Workshop fee is $50. For more info contact:
Dr. Ruth Francis-Floyd 392-9617 ext 229

February 1999
Annual Hard Clam Meeting



This meeting will be sponsored by UF/IFAS Aquatic Food Products Laboratory in Gainesville. Topics will include discussion of Best Management Practices for hard clam culture, proposed quality assurance program, etc. Date, time, and location will be announced in the next newsletter.
Leslie Sturmer 352/543-5047

May 17-20, 1999
Aquatic Weed Control, Aquatic Plant Culture and Revegetation Short Course
UF/IFAS Research and Education Center
Ft Lauderdale Marriot North/Ft Lauderdale, FL
This short course will provide participants with training and advanced research updates in aquatic plant culture and new techniques for aquatic plant propagation; revegetation; aquatic weed and aquatic plant identification and biology; biological weed control techniques, herbicide application technology; herbicide characteristics and regulatory information.
The course also offers aquatic plant managers and technicians new information on aquatic weed and plant identification and biology, as well as a control techniques including biological control, herbicide characteristics, herbicide application and regulatory information.
Approximately 20 Continuing Education Units (CEUs) may be earned in such categories as aquatic pest control, right of way, CORE, ornamental and turf. A representative from DACS will be available to answer questions regarding CEUs and licensing.
Dr. Vernon Vandiver, Jr. 954/475-8990

May 17 - 28, 1999
Diseases of Warm Water Fish
Tropical Aquaculture Laboratory / Ruskin, FL
Whitney Marine Laboratory/St. Augustine, FL
A short course to provide instruction in the diagnosis and treatment of parasitic, bacterial, fungal, viral, nutritional and environmental diseases of warmwater food fish and aquarium species.
Recommended for veterinarians, professional biologists, aquarists and aquaculturists, the class is internationally attended and generally fills quickly.
Dr. Ruth Francis-Floyd 352/392-9617 ext 229

Fee Fishing in Florida

Photo by Joe Richard

With fishing pressure increasing on publlic waters, many anglers are looking for alternative places to fish. Fee fishing can provide just that— particularly for anglers seeking particular species such as largemouth bass or trophy bluegill. Fee fishing is attractive to youth, tourists, anglers who don't own a boat, or individuals that fish infrequently as no license is required to fish in most fee-fishing ponds.

Fee Fishing in Florida, Extension Circular 809, provides a comprehensive guide to the different types of fee fishing operations in Florida, the economics of fee fishing operations, as well as step-by-step instructions on how to set up a fee fishing operation. The UF/IFAS Cooperative Extension service offers a large selection of educational publications and videos on aquaculture and pond management. To obtain a free copy of **Fee Fishing In Florida** or other publications,* contact your nearest county Extension office.

* SRAC publications 479, 480, 481 and 482 are also available on the subject of fee fishing.

Sturgeon Research — A National Initiative

Recent efforts by California and Florida Sea Grant programs to develop a national initiative for funding sturgeon research in the United States is proving to be timely, according to reports from the Volga River in Russia.

In an issue of Newsweek,* published earlier this year, writer Owen Matthews reports a growing concern, internationally, for the shrinking availability of Russian sturgeon roe (caviar). For years Russia has been the main source of caviar to the international market.

Matthews reports, "Caviar is big business — but a dwindling one. So many sturgeon are being poached out of the Volga and the Caspian Sea that next year could be the last caviar-production season for up to a decade. Sturgeon take nine to 15 years to mature and the stocks of adult fish have dwindled to almost nothing. Though Russian government-funded fish farms release 50 million baby sturgeon into the Caspian every year, most are caught before they grow up and spawn. Catches have fallen by 90 percent during the past decade to just over 60 tons of caviar per year."

With seven indigenous species of sturgeon in U.S. waters, such news has added a sense of urgency to U.S. scientists' search for sturgeon research funding. Workshops designed to raise awareness about these ancient fish, as well as encourage a national research initiative, were organized this year. Interested state Sea Grant programs were asked to sponsor scientists, from their funding jurisdiction, to participate in these workshops.

Photos by Joe Richard

Researcher Dr. Andy Lazur studies Gulf of Mexico sturgeon finglerlings at the UF/IFAS Mitchell Aquaculture Farm in Blountstown. The fingerlings were cultured this Spring at UF/IFAS' hatchery facility in Gainesville.

One such workshop was held here at UF in March. A total of 36 scientists representing 14 states and the District of Columbia participated.

The first day of the workshop consisted of four presentations and general discussion including the following speakers:

♦ Donald Campton, US Fish and Wildlife, presented an overview of our present understanding of evolution and systematics of North American sturgeon;

♦ Dr. John Boreman, National Marine Fish eries Service, discussed mechanisms for pro tection and restoration of impacted fish popu lations in the U.S.;

♦ Dr. Serge Doroshov, University of Califor nia at Davis, presented a paper discussing the biological characteristics of sturgeon; and

♦ Dr. Charles Adams, University of Florida, discussed the husbandry and economics of sturgeon.

On the second day, participants were divided into three groups representing the following areas of study: systematics, evolution and population genetics; experimental cuture and aquaculture; protection and restoration. Each group was charged with the development of a list of research needs.

A written research initiative is now being drafted jointly by UF/IFAS and University of California at Davis Sea Grant programs and will be available by the new year.

* Bye, Beluga. Later, Sevruga. *Newsweek,* June 22, 1998.

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