The Sam Mitchell Aquaculture Demonstration Farm in Blountstown is one of several facilities that were closed due to severe budget reductions imposed on UF/IFAS in the wake of Florida’s budget deficit. Budget callbacks for the current fiscal year and large cuts anticipated for next year have resulted in immediate closure or consolidation of both on- and off-campus IFAS units. In conjunction with the closure and reduction in these facilities, many of the associated staff have been laid off to meet the budget restrictions. The aquaculture facility, part of UF/IFAS’ Department of Fisheries and Aquatic Sciences (FAS), was opened in 1988 to provide commercial fish farmers with the latest technology and management practices in foodfish and baitfish aquaculture. Through the years, work at the 40-acre farm has included applied production research and demonstration on species such as sturgeon, golden shiners, Gulf killifish, hybrid striped bass, and fancy goldfish. The official closing date for the Sam Mitchell Aquaculture Demonstration Farm was February 28.

Equipment and supplies at the facility have been moved to the Department’s core facility in Gainesville and to its Tropical Aquaculture Lab in Ruskin for use in ongoing programs. Disposition of the property has yet to be determined.

 Though all staff positions associated with the Blountstown facility were eliminated, FAS is using temporary grant funding to retain Debbie Britt Pouder as a Senior Biological Scientist assisting with aquaculture extension and applied research programs in the Florida Panhandle. For general aquaculture information, Debbie can be reached on Monday’s at the Bay County Extension Office in Panama City at 850/784-6105.
The following UF/IFAS faculty and staff are available to answer questions or provide technical support for aquaculture, fisheries and aquatic sciences, and pond management.

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**Student Involvement at UF**

Undergraduate and graduate students are an important part of the teaching, research, and extension programs at the University of Florida. Student involvement is highlighted in each issue of *WaterWorks.*

Ed Sullivan received a bachelor of science degree in Marine Biology from the University of West Florida in May of 1999. That fall, he began his graduate studies at the University of Florida under Dr. Debra Murie. Ed was interested in studying new management techniques for marine fisheries and proposed the idea of studying hatchery-reared red drum in the wild. Dr. Murie and co-investigator Dr. Daryl Parkyn were able to secure funding for a small project involving the cooperation of Florida Power and Light's (FP&L) Mariculture Center and the USGS Chassahowitzka National Wildlife Refuge.

In the refuge, they released approximately 20,000 juvenile red drum into two creeks in June of 2000. Subsequent to the release (within the first week) they observed a high rate of disappearance from the release creeks. Based on recapture locations and ultra-sonic tracking of tagged fish, fish that survived the release rapidly emigrated out of the tidal creeks.

The project demonstrated that both the location of the release site and the seasons are important considerations when releasing hatchery-reared red drum into the wild and tracking their progress into a red drum fishery.

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“Original plan was to release two-inch fingerling redfish into the refuge in the autumn,” said Sherwood. “This would have been an in-season release. However, due to a variety of hatchery constraints, we released 2.5-inch fingerlings during June of 2000. This made it an out-of-season release, and allowed us to evaluate it against in-season releases.”

Our results provide a basic insight into the use of supplemental stocking as a management strategy for red drum.

“We expected the fish to move from the creeks, but were surprised at just how quickly they moved. We assume that the majority of fish left the creeks (rather than died) because we ultrasonically tracked similar sized red drum during the post-release period and most of these fish moved toward the mouth of the creeks before disappearing.”

In June of 2001, Ed began work at the Florida Marine Research Institute (FMRI) as a researcher in the Fisheries Independent Monitoring Program (FIM). FIM tracks the relative abundance of a variety of marine fish and select invertebrates within the Tampa Bay estuary and monitors the release of hatchery-reared red drum into the Alafia River. The goal of the study is to increase recreational catches of red drum in Tampa Bay by 25 percent. Ed was drawn to the project, as it pertained to his graduate work.

During his short time with FMRI, Ed was offered a position as a Marine Research Assoc. in November of 2001. He is now working on several projects including a gear comparison study; the Project Tampa Bay study; an examination of the distribution and abundance of red drum in three Florida estuaries; and the development of a temporal and spatial model of red drum within Tampa Bay.

“I enjoy my work very much,” says Ed. “I’m in the field two or three days a week and have used a variety of gear to capture and study estuarine fish. I’ve gained a tremendous amount of field experience and am starting to get more involved with data analysis. My long-term goals are to be involved with annual stock assessments and management decisions of Florida’s marine fisheries. I think I can accomplish these goals here at FMRI.” Ed is currently writing his Master’s thesis and hopes to defend it this Spring.

Dr. Debra Murie
352/392-9617 x 245
Curbing Cormorants

The U.S. Fish and Wildlife Service recently released a draft Environmental Impact Statement (EIS) for public review that will guide development of a nationwide management strategy for double-crested cormorants.

The EIS analyzes various options for managing rapidly growing cormorant populations—to reduce conflicts with recreational anglers, commercial aquaculture companies, and other human activities.

“The double-crested cormorant was given Federal protection during serious population declines in the 1970’s. Today, we face a different problem as we seek to achieve sustainable populations and reduce conflicts with human activities,” said Tom Melius, the Service’s assistant director for Migratory Birds and State Programs.

Cormorants have been federally protected by the Migratory Bird Treaty Act since 1972, when they were given protection after their populations dropped precipitously due to the pesticide DDT, killings by humans, and the overall declining health of many ecosystems, especially the Great Lakes. Today, the population is at historic highs, due in large part to the presence of ample food in their summer and winter ranges, federal and state protection, and reduced contaminant levels.

Between 1970 and 1991, in the Great Lakes region of the U.S. and Canada, the number of double-crested cormorant nests increased from 89 to 38,000, with an average annual increase of 29 percent. By 1997, the Great Lakes population reached approximately 98,000 pairs. The total population of double-crested cormorants in the U.S. and Canada has most recently been estimated at some 2 million birds.

The population resurgence of double-crested cormorants has led to increasing concern about the bird’s impact on commercial and recreational fisheries. The effect of cormorants on fish populations in open waters is less clear than at aquaculture facilities. In some cases, research suggests that cormorants appear to be capable of taking numbers of sport fish significant enough to have a negative impact on catch rates.

The Service believes that at this time, there is no sufficient scientific evidence to justify controlling cormorants on a national level to benefit open water commercial fisheries. Where site-specific problems are significant, the Service’s practice is, and will continue to be, to issue depredation permits to alleviate conflicts outside the authority of the depredation orders.

The Service’s proposed action would establish a new Depredation Order authorizing state, tribal and federal land management agencies to implement a double-crested cormorant management program while maintaining Federal oversight of populations via reporting and monitoring requirements to ensure sustainable populations.

Control activities carried out under this new depredation order would take place on public and private lands and waters where these cormorant populations are demonstrably having a negative impact on public resources.

Under this action, the 1998 Aquaculture Depredation Order would continue to allow cormorants to be taken at commercial freshwater aquaculture facilities and state-owned fish hatcheries in 13 states and conditions such as those found at fish farms, hatcheries, and sites where hatchery-reared fish are released. The Service has previously taken action to protect fish in these situations.

In 1998, the Service issued a Depredation Order authorizing commercial freshwater aquaculture producers in 13 states including Florida, to take this species of cormorant without a federal permit, when the birds were found committing or about to commit depredations to aquaculture stocks.

The Depredation Order states that double-crested cormorants may be taken by shooting only during daylight hours, and only when necessary to protect freshwater commercial aquaculture and state-operated hatchery stocks and that such actions must be carried out in conjunction with a non-lethal harassment program.

The 1998 Order does not address impacts on commercial and recreational fisheries. The effect of cormorants on fish populations in open waters is less clear than at aquaculture facilities. In some cases, research suggests that cormorants appear to be capable of taking numbers of sport fish significant enough to have a negative impact on catch rates.

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Requests for copies of the draft Environmental Impact Statement should be mailed to:

Chief/Division of Migratory Bird Mgmt.
U.S. Fish and Wildlife Service
4401 N. Fairfax Drive, Room 634
Arlington, VA 22203

Copies can also be downloaded from the Division of Migratory Bird Management web site at:

http://migratorybirds.fws.gov/issues/cormorant/cormorant.html
Shellfish Aquaculture

Cedar Key

Clam farmers (and anyone else for that matter) can now go on-line to check current water quality and weather data conditions at a select number of offshore clam leases off Florida’s Gulf Coast.

“Real-time” equipment, installed by UF/IFAS’ Dept. of Fisheries and Aquatic Sciences and the Dept. of Agriculture and Consumer Services’ (DACS)/Division of Aquaculture, is transmitting data to the Division’s web site: www.FloridaAquaculture.com

So far, three of four sets of scientific equipment have been installed near commercial clam culture leases. One is located on the Gulf Jackson lease, another on the Horseshoe Lease. Both are high density leases located near Cedar Key. A third unit is in the Aquaculture Use Zone near Sebastian and a fourth unit is scheduled for the Charlotte Harbor area. Installation of the equipment is an integral component of CLAMMRS (Clam Leasing Assessment, Management and Modeling using Remote Sensing).

CLAMMRS is a four-year study by UF/IFAS’ Dept. of Fisheries and Aquatic Sciences and the Dept. of Environmental Engineering, with the goal of developing a production model that identifies optimum clam farming practices and monitors changes in their natural food abundance and quality. The model, along with an improved understanding of hard clam nutrition and physiological requirements, will help identify optimum sites for leases. The data can also be used by farmers to document crop losses, should they occur, for financial assistance.

Workshops will be held this Spring, by UF/IFAS’ Shellfish Aquaculture Extension Program and DACS’ Division of Aquaculture, to describe the value and practical interpretation of this information. Also, the Division is seeking commercial clam farmer’s comments on how best to present the information on their web site.

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Exotic Fish Removed from UF Campus Pond

A reproducing population of exotic convict cichlids Cichlasoma nigrofasciatum was recently eradicated from Green Pond, near the J. Wayne Reitz Union, on the University of Florida (UF) main campus.

The cichlids are small tropical fish (< 5 inch), native to Central America, that have managed to survive Gainesville’s winter temperatures due to the constant inflow of warm water from the Reitz Union’s heating and cooling system.

The Florida Fish and Wildlife Conservation Commission (FWC) requested that Green Pond be renovated to remove the convict cichlids — the only reproducing population in Florida. Personnel from UF/IFAS’ Dept. of Fisheries and Aquatic Sciences, under the direction of Dr. Chuck Cichra, conducted the effort, with assistance from the FWC and Florida Museum of Natural History. The pond will be restocked with native fishes.

Over 1,000 convict cichlids were removed along with two other exotic fish species, two black pacu Colossoma macropomum and a single oscar Astronotus ocellatus. It’s unknown exactly how these exotic fish ended up in the pond, but all are popular aquarium fish. (It’s illegal to release any non-native fish into open waters of Florida.) Regardless of how they got there, it is the legal responsibility of the landowner to keep these fish out of the water. In this case, UF had the honors. The FWC, which has regulatory and enforcement authority over exotic fishes, worked closely with UF to remove the fish.

Florida has several species of exotic fishes that have established reproducing populations. Most of them are undesirable and represent potential problems for native species. Green Pond is being used as an example, for the University community and the public, of the legal, environmental, and ethical issues involved in fish introductions. Extension materials, and a series of popular and scientific articles are currently under development. Signs discouraging fish releases will also placed near UF ponds. Look for more information in the next issue of WaterWorks.

Jeff Hill
352/392-9617 x 236
Despite early morning rain and chilly conditions, a crowd of 455 anglers converged on the ponds at the UF/IFAS Department of Fisheries and Aquatic Sciences, for the fourth annual Fishing For Success (FFS) Law Enforcement Appreciation Day. The February 16 event was the first of many FFS Family Fishing Days scheduled for the coming months, and the fishing was fast and furious throughout the morning.

This first FFS event of the year held a new exciting attraction. Watson Construction and other local businesses recently combined efforts to construct a new half-acre pond for FFS, to complement its many quarter-acre ponds.

The new pond was built to replace the one-acre pond on USGS property, which had previously been used for fishing events, but is now off-limits to the public, due to the events of Sept. 11.

In preparation for this year’s events, the new pond was stocked with hundreds of large catfish (up to 30 pounds), nearly 1,000 sunshine bass, and thousands of bluegills.

The Florida Fish and Wildlife Conservation Commission (FWC) donated sunshine bass, and the catfish and bluegills were moved from the old USGS pond to their new home. FFS staff are hoping to raise the necessary funds to build a handicap-access dock adjacent to the new pond in the near future.

On Feb. 16, scores of kids hurried out to the new pond and the result was continuous fishing action punctuated by the screaming of overloaded reels and excited children. Several big fish were hooked briefly, but no one landed any of the 25-30 pound catfish.

Little Nikki Bennett, age 4, captured the “most fish” trophy by reeling in 68 bluegills and sunshine bass in three hours, with only minimal help from her father Greg.

Fishing for Success Coordinator Tom Glancy stocks the new fishing pond at UF’s Dept. of Fisheries and Aquatic Sciences.

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In addition to its Family Fishing Days, FFS also hosts many educational field trips for area schools and church groups. Last year, more than 9,800 people participated in FFS programs, and attendance is expected to increase again this year.

The new, bigger fish pond will certainly help absorb some of the fishing pressure. Somewhere in that new pond lurks “General Sherman,” a monster 30-pound catfish. With the standing FFS policy of catch and release, “The General” will surely give more than a few youngsters the fight of a lifetime in the coming years.

Tom Glancy
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Sean Phinney, age 11, won the trophy for Biggest Fish with a 16.1-pound channel catfish, which he managed to land in spite of a separated shoulder. WaterWorks editor Joe Richard wrestles with the brute.

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Crappie Recruitment Varies Widely

Florida lake fishermen have often wondered why the black crappie, a popular panfish, is abundant one year and not the next. Do overall crappie populations change that much? It would seem so.

Recent studies conducted by UF/IFAS fisheries researchers indicate that Florida’s black crappie fishery fluctuates considerably due to a highly variable recruitment each year. (“Recruitment” refers to the production and survival of young fish.) This variation contributes to a “boom and bust” fishery later when crappie grow large enough to be caught by anglers.

Dr. Mike Allen and his team of graduate students at UF’s Department of Fisheries and Aquatic Sciences have been investigating black crappie recruitment for the last five years in Florida, with the following findings:

**Winter severity may influence black crappie recruitment.**

For example, in Lake Wauberg in north central Florida, graduate student Bill Pine found that early-hatched black crappie that were subjected to cold water temperatures (e.g., resulting from a late-season cold front), experienced slower growth and higher mortality, compared with late-hatched fish in the same lake.

Black crappie growth is dependent on their density in some lakes.

Graduate student Kevin Dockendorf found that high densities (number of fish per acre) of young black crappie in Lakes Lochloosa and Wauberg led to slower fish growth, causing these fish to take much longer, three to four years, to grow big enough to be caught.

Conversely, in the years 2000-2001, young black crappie in Lake Tarpon had low densities and the fish grew quickly, requiring only two years to grow to harvestable sizes. These observations have important implications for the black crappie fishery. In lakes with high densities, fishery managers may be able to ease harvest regulations by increasing bag limits. That way, anglers can help reduce fish numbers and hopefully increase fish growth. Lakes with low-density populations could be managed with stricter bag limits that will, in turn, help preserve the low numbers of fast-growing fish, eventually building a quality fishery.

On the subject of crappie, a long-term cooperative study is now being conducted with the Florida Fish and Wildlife Conservation Commission and the UF/IFAS Florida LAKEWATCH program.

LAKEWATCH volunteers monitor water quality on the lake they live on, and send in samples to the University each month. Participating volunteers will harvest crappie from 15 Florida lakes each autumn. The goal is to document trends in the number of young fish as the years go by. Combined with water sampling, it’s hoped this study will provide an indication of how changes in water levels and aquatic plant growth may also be influencing this fishery in Florida.

Dr. Mike Allen
352/392-9617 x 252

Black crappie (*Pomoxis nigromaculatus*)

UF/IFAS grad students Kevin Dockendorf and Kristin Henry examine a black crappie caught in their trawl on Lake Wauberg.
Dear Editor,

Below is a photo I took of a plecostomus from Lake Marian at Kenansville, Florida last year...while stopped there, I noticed several fish belly-up and others dying in the small pockets of water in the almost dry canal. I walked over and found not a few, but hundreds of these fish dying. (It was a few days after the coldest weather last year in Florida).

We then traveled a mile or two to Lake Jackson. While there, we found hundreds of dead or dying plecostomus. This caused me to wonder about other areas, as it was obvious that Kissimmee and its canals are infested with them. Two days later we took a trip to the Peace River at Zolfo Springs. It was also down very low, and we found many dead and dying plecostomus there. We then traveled to Arcadia, and it was the same there.

I raised two of these fish in a 110-gallon aquarium to adult size. When my cichlids laid eggs in the aquarium, the plecostomus would eat the eggs if possible. Since the pleco has natural armor and a taste for fish eggs, is it possible the deterioration of fish populations in Florida lakes is related to these voracious catfish?

Frank Hamill

Dear Frank,

Your observations of numerous dead and dying pleco catfish over the winter match those reported by fisheries biologists and the public. These fishes are tropical in origin and cold winter temperatures will cause partial or total kills.

Florida has several established exotic (i.e., foreign) fishes, including pleco catfish. Plecos belong to the South American fish family Loricariidae, the armored suckermouth catfish. Members of this family are often called plecos in the aquarium fish trade. Florida has members of at least two genera, Hypostomus, armored suckermouth catfish, and Pterygoplichthys, saillfin catfish. The saillfin catfish are more widespread and occur in much of peninsular Florida, including the upper St. Johns River and west coast streams north of Tampa Bay, southward to the canals of southeast Miami-Dade County. The range of plecos has increased in Florida in recent years and, as you have seen, they may reach high densities.

As a group, plecos feed mainly on algae and detritus (organic material) from the bottom. Some species are more carnivorous than others, but the species established in Florida mainly eat this typical pleco diet. I have maintained plecos of various species in aquaria and also observed them feeding on shrimp pellets, other fish food pellets, dead fish, and fish eggs. In most cases, cichlid fishes are able to successfully raise young in the presence of plecos, but an occasional individual pleco may develop a habit of eating undefended or exposed fish eggs. This behavior is also found in many types of fishes (e.g., native sunfish Lepomis spp.). Moreover, food items of captive fish are not necessarily reliable indicators of diets in natural habitats. For example, nearly any fish large enough will eat the small eastern mosquitofish Gambusia holbrooki in an aquarium, regardless of normal fish selection in the field.

Like you, I have often wondered about the role of plecos as nest predators of exotic cichlids and native sunfishes in Florida. Nevertheless, based on a fair amount of aquarium observations and limited field observations, I suspect that plecos may not be a significant limiting factor to nesting success of these fishes. Even in confined aquaria, cichlids in particular seem quite capable of nest defense against plecos. I have even had plecos injured or killed by nesting cichlid parents. On the other hand, nighttime nest predation could occur. The fact is that no one has researched this topic, an undertaking that would require carefully controlled laboratory and field experiments.

You have also identified a perceived problem, namely reduced harvest of fish from Florida lakes, and suggested a mechanism to explain it — egg predation by plecos reducing fish recruitment. In science, we call this a hypothesis, a testable possible explanation for an observed phenomenon. First, we would need to clarify if the problem is real or just apparent by reviewing historic fish and fishery data and conducting research to assess current fish populations. If the problem is real, we move to the next step. According to the scientific method, we would make predictions based on this explanation and devise tests to attempt to disprove this hypothesis. That is right, attempt to disprove it. We do not prove hypotheses in science, but gain confidence in an explanation based on numerous failed attempts to demonstrate that it is false.

What else may be a cause of the decline of a fishery?

Numerous possibilities come to mind - drought, muck build up, excessive aquatic plants, summer fish kills due to low dissolved oxygen, lack of food for larval or juvenile fishes, overharvest, etc. You see, there are many possible explanations that would require study, not just plecos eating fish eggs.

Although exotic fishes have been prominent in the state since the 1950s, relatively few researchers have studied them. The Florida Fish and Wildlife Conservation Commission (FWC) has regulatory and enforcement authority over exotic fishes in open waters and has for many years maintained a monitoring and research program in south Florida. Recently, UF's Department of Fisheries and Aquatic Sciences of the University of Florida, the U.S. Geological Survey, Florida International University, and individual researchers in other institutions are directing effort towards exotic fishes in Florida.

The release of non-native fishes into open waters in Florida is illegal, and the FWC attempts to eradicate new introductions if possible. Once an exotic fish becomes established, however, it is generally not feasible to attempt eradication. It is clear that pleco catfish are firmly established in Florida and beyond eradication.

Many people assume that exotic fishes have caused widespread harm to Florida's native fishes. Contrary to this opinion, there is almost no scientific documentation that exotic fishes have caused such harm. It is an unfortunate fact that little research has been conducted concerning interactions between native and exotic fishes in Florida. On the other hand, there has been an accumulation of large amounts of qualitative fishery data and some quantitative data that is useful for assessing the overall status of native fish populations in areas affected by exotic fishes.

The conclusion from these data is that widespread catastrophic effects have not occurred. This is not to say that exotic fish are "good," nor are they inherently "bad." Nearly everyone agrees that exotic fishes are generally undesirable and that much research is needed to determine the effects that exotic fishes may have in Florida's aquatic systems.

Jeff Hill
UF/IFAS Graduate Fellow

[Image]
A Beginner’s Guide to Water Management — The ABCs (Circular 101)

In a continuing effort to bridge the information gap between the scientific community and Florida’s citizenry, UF/IFAS’ Florida LAKEWATCH program has assembled a series of information circulars designed to provide an introduction to the terminology and concepts used in water management.

A Beginner’s Guide to Water Management — Nutrients (Circular 102)

Nutrients are substances required by all organisms for growth, and they’re found in every aquatic system. They are also the object of much discussion by lake managers and the general public, who are concerned about the influence nutrients sometimes have on the growth of algae and/or aquatic plants. Written for a lay audience, this information circular is an ideal reference booklet for students and/or professionals interested in water management. It’s thirty-two pages in length, with many supporting graphs and photos.

Now available on the UF/IFAS EDIS website: http://edis.ifas.ufl.edu/fa079

A Beginner’s Guide to Water Management — Water Clarity (Circular 103)

Water clarity is one of the most noticeable attributes of a waterbody. In Florida, a wide range of water clarity occurs naturally in lakes and waterbodies. This booklet is 33 pages in length and includes numerous photographs and figures. Topics include: measuring water clarity and what affects it; the relationship between water clarity and biological productivity; and techniques used for managing clarity in lakes. Mathematical models are also introduced as a way of predicting water clarity in lakes.

Now available on the UF/IFAS EDIS website: http://edis.ifas.ufl.edu/fa080

Printed copies are available by contacting your local UF/IFAS Cooperative Extension Service or from the LAKEWATCH program itself. (Quantities may be ordered at cost.) They may also be downloaded for free by visiting the UF/IFAS EDIS website addresses provided here or from the Florida LAKEWATCH website listed below:

http://lakewatch.ifas.ufl.edu/LWcirc.html

Florida LAKEWATCH
1-800-LAKEWATCH (525-3928)
352/392-4817

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