WATERWORKS

UF UNIVERSITY of FLORIDA IFAS

SFRC school of forest resources & conservation

June 2012

Newsletter of the SFRC-Fisheries and Aquatic Sciences Program

Inside this issue:

WaterWorks is a semi-annual publication of the Fisheries and Aquatic Sciences Program in the School of Forest Resources and Conservation at the University of Florida/IFAS. The purpose of the newsletter is to provide information to prospective students, alumni, stakeholders, and partners. This issue was edited by Nancy Montes, Bob Swett, and Roy Yanong. To contribute an article or information for a future issue contact Tom Frazer (frazer@ufl.edu).

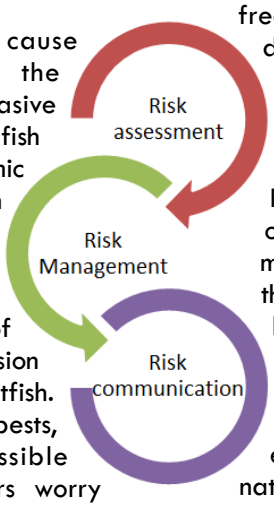
NON-NATIVE FISHES: WHAT ARE THE RISKS?

African jewel cichlid

By Jeffrey E. Hill, Ph.D., Assistant Professor and Extension Specialist in Fisheries and Aquatic Sciences at the UF Tropical Aquaculture Laboratory, jeffhill@ufl.edu

A warm climate and abundant waterways make Florida an attractive travel destination and home for people from all over the world. Non-native fishes also find Florida to their liking. In fact, Florida has more established exotic fishes, those from other countries, than any other state in the USA. In Florida south of the Suwannee River, there are at least 34 species with reproducing populations.

Some non-native species cause problems for humans or the environment: these are invasive species. For example, some fish farmers in Florida suffer economic losses due to walking catfish crawling into their ponds and eating their fish. Homeowners in some south Florida subdivisions experience loss of property due to increased erosion from burrowing armored catfish. Other species are potential pests, causing concern over possible negative impacts. Bass anglers worry that snakeheads will eat the largemouth bass they so enjoy catching. National Park Service and National Wildlife Refuge staff are concerned over swamp eels and snakeheads entering their parks.



On the other hand, many non-native species benefit Floridians. Some, like oscars and Mayan cichlids, are sought by recreational anglers. Butterfly peacock bass were intentionally stocked by the state to benefit anglers in southeast Florida. Tilapia and brown hoplos are caught in commercial fisheries. Non-native fishes support most of Florida's large aquaculture industry.

Although some non-native species are invasive, most seem to have little negative effect on our economy or on native species. Resources for managing non-native fishes are scarce so it makes sense to use those resources where they will do the most good, that is, trying to prevent the introduction of invasive species or managing populations that are truly pests. Benefits of non-native species and personal freedom also factor into management. How do we distinguish the relatively few problem species from the majority of non-native species? The answer is risk analysis.

Risk analysis is a way for scientists, agencies, and stakeholders to assess and manage risks. Risk is a function of something happening (in this case, the establishment of a non-native fish) and the consequences if the event happens (the negative effects of the fish). Risk assessment identifies the risk factors, estimates the likelihood that the non-native species will establish, and predicts the severity of impacts. Risk management attempts to reduce risks to acceptable levels.

A series of steps must occur for a non-native species to establish a self-sustaining population. First, the species must be introduced into the environment. The main pathway in Florida is the release of aquarium fish by hobbyists, though some species are introduced from other pathways such as aquaculture, the live food fish trade, and even ceremonial release. Individual fish must survive the introduction event, find food, escape predators, and reproduce. Enough offspring must survive to adulthood and reproduce themselves.

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Non-Native Fishes continued from page 1

The climate and habitat must be conducive to long-term survival as well. Climate is a major limiting factor in Florida because so many of our introduced fishes are tropical. Florida has a warm climate but periodic cold winters such as in 2009-2010 can eliminate populations of non-native fish or reduce their range in Florida.

Once established, non-native fishes may prey on native species, compete with them for food or other resources, change the habitat, or introduce disease. The actual impact that a non-native species will have on Florida's aquatic environments is difficult to predict because the environment is very complex.

Risk assessors rely on knowledge of Florida's waters and native species, the history of invasiveness of species elsewhere, certain characteristics of concern common to invasive fishes, data from previously established non-native fishes in Florida, and scientific theory to aid in their predictions. For example, large predators such as flathead catfish, a fish that can grow to over 100 lbs., reduces the abundance of redbreast sunfish and some native catfish in the Apalachicola River. Therefore, risk assessors would rate this species and large predators in general as having added risk. Unfortunately, little is known about the impacts of many non-native fishes in Florida, though most evidence suggests that impacts are localized with a few exceptions.

Programs at the Tropical Aquaculture Laboratory develop data to better assess risks of non-native fishes. Research on the ability of native predators to reduce the success of non-natives informs risk assessors about establishment potential (see "Alien Vs. Predator" p 4). Limiting habitat and climate factors (e.g., salinity tolerance) give information on habitat needs, spread, and potential range in Florida. Field and laboratory studies of diet and prey help evaluate competition. Development of new methods for risk assessment (see article below), including rapid screening tools, reduces costs and improves accuracy. These programs are collaborative with the Florida Fish and Wildlife Conservation Commission, Florida Department of Agriculture and Consumer Services, U.S. Department of Agriculture, U.S. Fish and Wildlife Service, and U.S. Geological Survey as well as the Centre for Environment, Fisheries & Aquaculture Science in the United Kingdom.

Jeff Hill holding a barramundi, an Australian species considered for aquaculture in Florida.

A Risk Screening Tool for Non-Native Fishes in Florida

By Larry Lawson, Jr., M.S. student in Fisheries and Aquatic Sciences (Jeff Hill, Advisor)

A risk assessment for non-native aquatic species involves defining the risks of a non-native species becoming invasive, first by estimating the probability of introduction and establishment of a self-sustaining population in the wild and second by estimating the potential consequences of establishment. In recent years, several risk assessment strategies have been developed for non-native species with some success, yet current research focuses on developing a methodology that is more objective, transparent, and cost-effective.

Walking catfish (*Clarias batrachus*)

Screening tools can be used at the initial stages of the risk analysis process to assist resource managers in determining which species are at higher risk to become invasive. By distinguishing quickly and accurately between high and low risk species, these tools can save resource managers (and taxpayers) time and resources. The Fish Invasiveness Scoring Kit (FISK) is a semi-quantitative risk screening tool that was developed to assess non-native freshwater fishes in the United Kingdom. The FISK was adapted from the Australian Weed Risk Assessment (WRA), an early version of non-native risk identification tools developed for screening non-native terrestrial plants. Both of these risk screening tools have been incorporated into legislation concerning the management of non-native species within the regions for which they were developed. Similar to the WRA, the FISK is a computer program that consists of 49 species-specific questions within two main sections (Biogeography/History and Biology/Ecology), which are comprised of eight categories (Domestication/Cultivation; Climate and Distribution; Invasive elsewhere, Undesirable traits; Feeding guild; Reproduction; Dispersal mechanisms; Persistence attributes). Each of the questions is assigned a numerical value (generally -1 to 1) based upon the response.

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Risk screening tool continued from page 2

The question scores are summed to produce a total score that can range from -11 to 54 and is used to place the species into one of three levels of potential risk of becoming invasive: low risk (score < 1); medium risk (score = 1 – 18); high risk (score ≥ 19).

My research focuses on evaluating the FISK for use as a risk screening tool of non-native freshwater fishes in peninsular Florida. Florida has a well documented history of dealing with non-native fishes, which provides a unique opportunity to test the ability of FISK to predict whether or not an introduced species will become invasive. To date, we have already modified several components of the FISK tool to better accommodate the ecological conditions in Florida and to improve the user-friendliness of the computer program. We are currently assessing 98 non-native freshwater fishes that have been introduced into peninsular Florida using the FISK screening tool. By assessing species that have already been introduced we are able to compare how the FISK tool assessed each species (i.e., low risk, medium risk, or high risk) to the actual status of that species in Florida (i.e., invasive or non-invasive).

Of the 64 introduced fish species that have been assessed to date, the FISK has shown considerable accuracy in identifying both low and high risk species. The FISK successfully identified 80% of invasive fishes as high risk while simultaneously identifying 85% of non-invasive fishes as low risk. With FISK assessments taking on average less than two hours, this tool provides fisheries managers an efficient means of assessing risk. Furthermore, the consistent accuracy of the FISK indicates that it can be used to inform managers to make decisions with reasonable confidence.

M.S. students Larry Lawson and Emily Haug holding bullseye snakeheads

It should be noted, that the usefulness of the FISK depends upon its appropriate application as a decision support tool. FISK scores and outcomes will be dependent upon the assessor, the available information, and the region of concern and should thus be interpreted with caution. Our research is seeking to define and reduce the variability in FISK. Screening tools do not provide management decisions in themselves, but instead should be used to help inform those who make management decisions.

Fancy guppies (*Poecilia reticulata*), non-native aquarium fish

"Alien vs. Predator": Non-Native fish interactions with native fish predators

By Emily Haug, M.S. student in Fisheries and Aquatic Sciences (Jeff Hill, Advisor)

Many established non-native aquarium fish in Florida are relatively large-bodied (over 6 inches or so as adults). The one major exception is the African jewel cichlid, which grows to ~4 inches in total length and can be found across the state. Why does this fish succeed while no other exotics of its size seem to persist?

Behavior is an important determinant in whether species will become established when introduced into a novel environment. My research focuses on predator/prey interactions between native and non-native fish species, specifically how small-bodied, ornamental fish react to the presence of native largemouth bass and eastern mosquitofish. Does anti-predator behavior play a role in whether small, non-native, ornamental fish are likely to become established when introduced into a new environment?

Prior work in Dr. Hill's lab has established that largemouth bass and mosquitofish are effective predators of small fishes and may interact to have a greater effect than either predator alone. Interestingly, largemouth bass also eat mosquitofish, so there is intraguild predation, meaning that two species eat the same prey but one predator also eats the other. So, sometimes largemouth bass actually interfere with the effect of mosquitofish as predators. The effect of the two predators on each other and on their shared prey has a lot to do with the habitat as well as the behavior of the prey. My study uses video recordings of several ornamental species taken under different predator regimes to examine anti-predator behavior. These take place in a series of tanks that contain various combinations of largemouth bass, eastern mosquitofish and small ornamental fish. Over the course of several days, I periodically record their behavior and count the remaining (uneaten) fish, scoring any damage to their caudal fins due to harassment by mosquitofish. The purpose of this is to explore the possibility that predation might explain the lack of small-bodied, non-native fish found in peninsular Florida.

Marine Ornamentals: Rising Tide Conservation Hits The UF-Tropical Aquaculture Laboratory

By Eric J. Cassiano, M.S. 2009 (FAS), Biologist/Ph.D. candidate (on left) and Matthew L. Wittenrich, Ph.D., Senior Biological Scientist (on right), both based at the UF-Tropical Aquaculture Laboratory

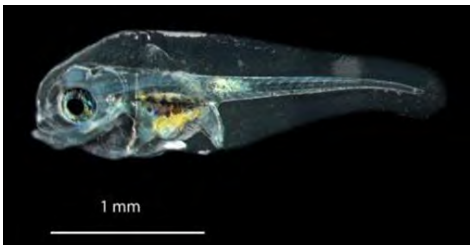
The trade in marine ornamental fishes relies almost exclusively on wild-caught specimens to supply both public displays and private aquariums. Commercial production techniques for marine ornamental fishes are available for fewer than 80 of the 1,300 species traded in the world aquarium industry. Success with many important, but primarily pelagic spawning species, has been limited.

Researchers at the University of Florida's Tropical Aquaculture Laboratory (TAL) have recently developed a program focused on developing commercial production protocols for marine ornamental fishes. TAL is a participant of the Rising Tide Conservation Initiative (Rising Tide), spearheaded by Dr. Judy St. Leger, Director of Pathology and Research for Sea World Parks and Entertainment, and supported by the SeaWorld and Busch Gardens Conservation Fund, PETCO, Instant Ocean, and Shedd Aquarium. The Rising Tide is a collaboration between research facilities, industry partners, including production facilities, and AZA (Association of Zoos and Aquariums) institutions pooling their expertise to generate focused research on developing captive breeding programs for marine ornamental fish species. Rising Tide's main goal is to establish commercial production of targeted species to enhance the sustainability of the hobby and public aquarium exhibits. Targeted species include Banggai cardinalfish, Bartletts' anthias, emperor angelfish, Pacific blue tang, and yellow tang. Rising Tide is based on an open forum of information exchange utilizing the broad range of expertise available at Universities, private industry, public aquaria, and other research institutions.

Funding from the Sea World and Busch Gardens Conservation Fund has been used, in part, to construct a new greenhouse and systems dedicated to marine aquarium fishes. Like other programs at TAL, this project will focus on practical, commercially viable opportunities, and extend that information directly to collaborative industry partners.

Semicircle angelfish (*Pomacanthus semicirculatus*)

One project is underway to collect eggs produced in AZA institution display aquariums containing the targeted species mentioned above and others. This work was funded by the AZA Conservation Endowment Fund, and collected eggs are shipped to TAL for evaluation and preliminary rearing trials. Although numerous marine ornamental fish species are kept on display at public aquaria, some or all of the expertise needed to take advantage of this resource for culture of these species is not available on site. Therefore, the Columbus Zoo and Aquarium, the Florida Aquarium, the Georgia Aquarium, Henry Doorly Zoo, SeaWorld (Orlando, San Antonio, and San Diego), the Shedd Aquarium, the California Academy of Sciences, and the Virginia Aquarium have all agreed to deploy egg collectors in tanks with mature reef fish. Floating egg collectors, tiles, and other egg collecting techniques are employed focusing on both pelagic spawners (fish species that release eggs directly into the water) and demersal spawners (fish that deposit eggs onto substrate). The eggs are collected and sent to TAL where various rearing techniques are tested.



9 days-post-hatch regal blue tangs (*Paracanthurus hepatus*):

Many of the eggs come from reef exhibits, so it could be months before a positive species ID can be made. Strategies utilizing DNA identification are currently being developed and should speed up the identification process. Shipments received so far have included green chromis, sea bream, pajama cardinalfish, sergeant majors, a *Rhinopias* sp., hairy blenny, multiple tang spp., multiple species of grunts, butterflyfish, angelfish, and some currently unknown larvae. Receiving quality shipments can be challenging, but optimizing packing and shipping methods of collected marine fish eggs is one of the goals of the project. Eleven species have been reared to date and include some remarkable species with tremendous commercial potential. Semicircle angelfish, orbic batfish, spadefish, porkfish, ternate damselfish, blue-lined grunts, and red scooter blennies are a few of the species with market potential. Juveniles, grown at TAL, were recently returned to SeaWorld Orlando, the Florida Aquarium, and the Columbus Zoo and Aquarium where they have been, or will be added to exhibits, demonstrating the potential for sustainability within the public aquarium community.

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New Major: Marine Sciences

In a state with over 1,000 miles of coastline and an economy largely dependent on the marine environment (international trade, tourism, fishing, and aquaculture), students have been puzzled by the lack of a marine-related major at the University of Florida. Although they could earn a minor in Fisheries and Aquatic Sciences, there was no undergraduate major in marine science.

A New Degree in Marine Sciences

Now that has changed! Beginning this summer, undergraduates at UF can earn an Interdisciplinary Studies degree in Marine Sciences. This major is a collaboration between the College of Agricultural and Life Sciences (CALS) and the College of Liberal Arts and Sciences (CLAS) and draws on faculty expertise across the campus and the state. Both tracks are nearly identical in their required foundation courses. In the upper division core courses and electives, however, the CALS and CLAS tracks differ. Marine Sciences students in the CLAS track will concentrate on Marine Biology or Marine Geosciences, while students in the CALS track will concentrate on Marine Conservation and Management.

The CALS Marine Sciences Track

Drawing on the expertise of faculty in the School of Forest Resources and Conservation, the CALS track is truly interdisciplinary, offering a strong foundation in all marine organisms (fish, invertebrates, algae), quantitative skills in statistics and sampling, and economics and policy. While the CALS track concentrates on applied aspects of marine conservation and management, students can further focus on topics such as Ecology and Organismal biology, Economics and Human Dimensions, or Quantitative Skills. There are also plans to provide practicum or internship experiences as part of the major.

Careers in Marine Sciences

Undergraduate students earning the new Marine Sciences Interdisciplinary Studies degree will be poised to pursue many types of careers. They will be prepared for further studies in graduate school or jobs with federal or state agencies (e.g., Water Management Agencies, Florida Fish and Wildlife Conservation Commission, Florida Department of Environmental Protection), non-profit conservation groups, private firms (e.g., consulting), and educational institutions.

Excited students. While the new Marine Sciences Interdisciplinary Studies major does not officially begin until Summer B, 2012, many current UF students have already indicated their intent to switch majors. As high school students, transfer students, and more UF students learn of the new major, we expect the major to gain even more momentum. This is an exciting time to be in marine sciences at the University of Florida!

More information. For more information about the Marine Sciences major, contact Dr. Shirley Baker, sbaker25@ufl.edu.

Online Master of Fisheries and Aquatic Sciences

Starting in the Fall of 2012, a new online Master of Fisheries and Aquatic Sciences (MFAS) will be offered by the Fisheries and Aquatic Sciences Program in the School of Forest Resources and Conservation. This program is designed for working professionals in the fields of fisheries, aquatic sciences, environmental sciences, and natural resources who are interested in advancing their careers by earning a graduate degree. The ability to take this degree program entirely online means that students do not have to sacrifice their commitments to career and family in order to earn an advanced degree.

Students entering this program come from a variety of backgrounds, including state and federal fisheries agencies and NGOs, as well as journalism, public education and relations, resource interpretation, environmental law and other non-science disciplines. Requirements for the degree are met by completing a schedule of online courses and writing a technical paper in an appropriate professional area approved by their Supervisory Committee; a research thesis is not required for the MFAS.

For more information, please visit our website at: www.sfrc.ufl.edu/distance_ed/MFAS, or contact Dr. Debra Murie, Online MFAS Coordinator at dmurie@ufl.edu or (352)-273-3601.

NOAA/NMFS Training Program Finds a New Home in FAS

By Micheal Allen, Ph.D.

The NOAA/National Marine Fisheries Service recently selected UF's Fisheries and Aquatic Sciences Program to house the NOAA Recruiting, Training, and Research Center (RTR). The program is funded by NOAA's Southeast Fisheries Science Center, and was designed to address a noted lack of trained professionals in the discipline of fisheries stock assessment. The RTR is intended to attract and train top undergraduate and graduate students to work in this field.

Dr. Jim Berkson (on left) is the director of the RTR, and he joined the faculty as a courtesy associate professor in January 2012. Dr. Jim Berkson will teach courses at UF in population modeling and simulation, and will also mentor graduate students. Mendy Willis was recently hired as the administrative assistant to help with all facets of the program.

The RTR activities will include graduate research assistantships for MS and PhD students, and a week-long undergraduate workshop to introduce students with strong skills in mathematics and statistics to the field of quantitative fisheries science. A summer program will also allow students to further interact with faculty and personnel from NOAA's Southeastern laboratories.

The first undergraduate workshop was held at Mote Marine Laboratory in Summerland Key. It was attended by 15 top undergraduates from around the country, who are all highly skilled in math and statistics. The workshop was a huge success, and at least one of the participants is coming to UF this summer to work as an intern and potential future graduate student.

The first two RTR graduate students are Shannon Sully and Bryan Matthias. Shannon received a BS from the Florida Institute of Technology and will work with Dr. Jim Berkson as her major advisor toward a MS degree. Bryan Matthias, received his BS at University of Wisconsin Stevens-Point and his MS in the UF–FAS program. Bryan will be starting a PhD with Rob Ahrens in the fall.

The RTR program has a set of offices on the ground floor of McCarty Hall B. Please stop by and welcome Jim, Mendy, and the students to FAS!

Workshop students learn about commercial fisheries from NMFS port sampler

Smithsonian Festival Showcases UF Water Programs

By Mickie Anderson

A group of University of Florida scientists will travel to the nation's capital this summer to educate Smithsonian Folklife Festival-goers about the importance of water.

The festival, which runs from late June through early July, draws thousands to the National Mall in Washington, D.C. This year, much of the festival's focus is on public land-grant universities, such as UF, which will host a large, hands-on display to pique visitors' interest about water and show them ways UF is working to find solutions for global challenges such as ensuring water quality, quantity and access.

The festival program commemorates the 150th anniversary of the founding of land-grant universities as well as the USDA.

Leslie Sturmer, a UF/IFAS Extension agent in Levy County, is among those who will engage with festival goers about clam farming – an industry that has helped Cedar Key become a leading producer of farm-raised clams.

The industry produces 175 million clams a year, is responsible for more than 500 jobs and has a $45 million economic impact.

Harvesting hard clams in Florida

Notes & News

Faculty/Staff

Mark Hoyer's photograph of Grasshopper Lake (Lake County) was chosen for the cover of the March issue of *Lake and Reservoir Management*. This issue also contains three papers by **R.W. Bachmann, D.L. Bigham, M.V. Hoyer,** and **D.E. Canfield, Jr.** on numeric nutrient criteria in Florida lakes.

Faculty and staff at the Tropical Aquaculture Laboratory received an appreciation plaque for overall assistance with infrastructure development in the Stars to Starfish program, "A Space, Earth, and Sea Interactive Demonstration School" at Sarasota's Riverview High School. **Carlos Martinez** provided significant support with construction of the aquaculture section of the program.

Chuck Cichra was awarded the "Faculty of the Year Award" for 2012 by Students United in Research of Fisheries (SURF), the UF fisheries graduate student organization.

Students

2012 Florida Chapter, American Fisheries Society Meeting:
Chelsey Campbell (MS student—Daryl Parkyn, Advisor) won both the best student poster and Roger Rottmann Scholarship (MS) at the 2012 AFS Florida Chapter Meeting; **Geoff Smith,** (PhD student—Deb Murie, Advisor) won the Roger Rottmann Scholarship (PhD). **Andrew Barbour** (PhD student—Don Behringer, Advisor) received the Jack Dequine best student paper award. **Janice Kerns** (PhD student—Mike Allen, Advisor) was elected president of the Student Chapter of the Florida AFS. Former Fisheries graduate student **Travis Tuten** (now with FWC) was made vice-president elect of the Florida Chapter of the AFS.

Andrew Barbour (PhD student—Don Behringer and Kai Lorenzen, Advisors) in 2011 was awarded the Jimmy G. Cheek graduate student medal of excellence, UF Fisheries and Aquatic Sciences' Outstanding Masters Student award, and an NSF international travel award supporting travel to the World Recreational Fisheries Conference in Berlin, Germany. Andrew also developed and became lead instructor for a new graduate course, "Scientific Writing and Critical Evaluation: an introduction to the peer-review process," and founded and became lead writer for 'The Life Aquatic' science column in *The Drake* fly-fishing magazine.

Dana Bigham (PhD student—Dan Canfield, Advisor) received the UF College of Agricultural and Life Sciences' Jack L. Fry Graduate Student Teaching Award, the UF Agricultural Women's Club Vam York Scholarship, and the SFRC Teaching Assistant of the Year Award, 2012.

Melissa Broderick (MS student—Shirley Baker, Advisor) received the Gordon Gunter Award for best student poster at the 2012 National Shellfisheries Association.

Felipe Carvalho (PhD student—Deb Murie, Advisor) received the Guy Harvey Ocean Foundation award to help defray the costs of holding a workshop on tagging and analyzing satellite tag data from large pelagic fishes. The workshop will be held in Cape Town South Africa, this summer.

Amanda Croteau (PhD student—Chuck Cichra, Advisor) received a 2012 Longboat Key Garden Club Scholarship to assist her with her dissertation research on the response of the aquatic community to the restoration of the Robinson Preserve, Bradenton, Florida.

Michael Dickson (MS student—Don Behringer, Advisor) received a 2011 Florida Sea Grant Aylesworth Scholarship.

Matt DiMaggio (PhD student—Cortney Ohs, Advisor) received the 2012 FAS Graduate Student of the Year Award – PhD Level.

Pat Gardner (MS student—Tom Frazer, Advisor) received a 2012 International Women's Fishing Association Scholarship.

Larry Lawson (MS student—Jeff Hill, Advisor) received the 2012 FAS Graduate Student of the Year Award – MS Level.

Geoff Smith (PhD student—Deb Murie, Advisor) was awarded a scholarship from the Longboat Key Garden Club to assist funding his research on the interrelationship of snook and pike killifish in South Florida. Geoff also received the MS Thesis of the Year Award, 2012.

Sarah Stephens (MS student—Rob Ahrens, Advisor) received a 2012 Guy Harvey Scholarship.

Kyle Wilson (MS student—Mike Allen, Advisor) was recently named the Outstanding Graduate Student Leader for 2011-2012 by the UF Graduate Student Council. This University-level award recognizes the graduate student who best demonstrated outstanding leadership qualities to benefit the University's student population and greater community. Kyle presently serves as the President of SURF and, in addition to his studies in Mike Allen's Lab, he helped educate and mentor middle school and undergraduate students, assisted with Fishing for Success and LAKEWATCH, and created a new discussion series that initiated dialogue between faculty and graduate students on science and management.

Upcoming Events

June 18-21, 2012. ***The Florida Lake Management Society (FLMS) 23rd Annual Conference.*** The theme is "Lake Management in a Time of Budget Cuts". It will be held at the Paramount Plaza Hotel, Gainesville, Florida. One day and student registrations are available. See the FLMS website (http://flms.net) for registration, program, etc.

October 17, 2012. ***Florida Sea Grant 1st Biennial Coastal Science Summit.*** On the UF campus, with presentations by researchers and extension agents / specialists, student posters, and a panel discussion on a topic affecting Florida coastal ecosystems and economies. Details will be posted on our Facebook page (www.facebook.com/flseagrant), on Twitter (@floridaseagrant) and on our web site (www.flseagrant.org) sometime in early summer.

January 17 - 18, 2013. ***UF Marine Biology Symposium.*** Dr. Steven Gaines from UC Santa Barbara will deliver the Keynote address. Contact: Rob Ahrens (rahrens@ufl.edu; 352-273-3630) or Don Behringer (behringer@ufl.edu; 352-273-3634).

Fisheries and Aquatic Sciences Publications in 2011-2012

2011 SFR-FAS Publications

Abd-Elrahman, A., Croxton, M., Pande-Chettri, R., Toor, G., Smith, S., and Hill, J. (2011). In situ estimation of water quality parameters in freshwater aquaculture ponds using hyperspectral imaging system. Isprs Journal of Photogrammetry and Remote Sensing 66, 463 -472.

Afonso, A. S., Hazin, F. H. V., Carvalho, F., Pacheco, J. C., Hazin, H., Kertstetter, D. W., Murie, D. J., and Burgess, G. H. (2011). Fishing gear modifications to reduce elasmobranch mortality in pelagic and bottom longline fisheries off Northeast Brazil. Fisheries Research 108, 336-343.

Ahrens, R., and Christensen, V. (2011). Modeling future fisheries catch scenarios., Fisheries Centre, University of British Columbia.

Ahrens, R., and Devlin, R. (2011). Standing genetic variation and compensatory evolution in transgenic organisms: a growth-enhanced salmon simulation. Transgenic Research 20, 583-597.

Allen, M. S., Rogers, M. W., Catalano, M. J., Gwinn, D. C., and Walsh, S. J. (2011). Evaluating the potential for stock size to limit recruitment in largemouth bass. Transactions of the American Fisheries Society 140, 1093-1100.

Almeida, O., Lorenzen, K., McGrath, D. G., and Rivero, S. (2011). Impacts of the comanagement of subsistence and commercial fishing on Amazon fisheries. In The Amazon Varzea (Pinedo-Vasquez, M., Ruffino, M. L., Padoch, C., and Brondizio, E. S., eds.), pp. 107-117. Springer, New York.

Baker, P., Fajans, J. S., and Baker, S. M. (2011). Habitat dominance of a nonindigenous tropical bivalve, Perna viridis (Linnaeus, 1758), in a subtropical estuary in the Gulf of Mexico. Journal of Molluscan Studies 78, 28-33.

Barbour, A. B., Adams, A., and Behringer, D. C. (2011). "PIT tag antennae arrays as fishery monitoring tools in tropical environments." Paper presented at the Proceedings of the Gulf and Caribbean Fisheries Institute.

Barbour, A. B., Allen, M. S., Frazer, T. K., and Sherman, K. D. (2011). Evaluating the potential efficacy of invasive lionfish (Pterois volitans) removals. PLoS ONE 6, e19666.

Behringer, D. C., Butler, M. J., Shields IV, J. D., and Moss, J. (2011). Review of Panulirus argus Virus 1 (PaV1) – a decade after its discovery. Diseases of Aquatic Organisms 94, 153-160.

Biesinger, Z., Bolker, B. M., and Lindberg, W. J. (2011). Predicting local population distributions around a central shelter based on a predation risk-growth trade-off. Ecological Modelling 222, 1448-1455.

Black, K., Yilmaz, M., and Phlips, E. J. (2011). Growth and toxin production by Microcystis aeruginosa PCC 7806 (Kutzing) Lemmerman at elevated salt concentrations. Journal Environmental Protection 2, 669-674.

Bonevechio, T. F., Allen, M. S., Gwinn, D. C., and Mitchell, J. S. (2011). Impacts of electrofishing removals on the introduced flathead catfish population in the Satilla River, Georgia. In Conservation, Ecology, and Management of Catfish: The Second International Symposium (Michaletz, P. H., and Travnichek, V. H., eds.), pp. 395-407. American Fisheries Society, Bethesda, Maryland.

Brodziak, J., Ianelli, J., Lorenzen, K., and Methot, R. D., eds. (2011). Estimating Natural Mortality in Stock Assessment Applications. NOAA, Silver Spring, MD.

Camp, E. V., Gwinn, D. C., Lauretta, M. V., Pine, W. E., and Frazer, T. K. (2011). Use of recovery probabilities can improve sampling efficiency for throw traps in vegetated habitats. Transactions of the American Fisheries Society 140, 164-169.

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A major bottleneck to the expansion of the marine ornamental aquaculture sector has been the first feeding stage, when larvae switch from relying on their own yolk reserves to feeding on live organisms or artificial diets in the water column. Advances in marine aquaculture technologies, especially within the area of larval feeding and production of live feeds, present a unique opportunity for expanding the species list in marine ornamental production. Rotifers (*Brachionus* spp.) and brine shrimp (*Artemia* spp.) are the typical live feeds utilized during the larviculture phase of most marine fish species. However, they are not the preferred prey item of most marine fish larvae and success with them has been limited to a few species and groups. For years, we have known that copepods and other marine plankton usually yield better results during experimental trials. A major challenge is producing sufficient numbers of these marine plankton for commercial facilities to be lucrative. Furthermore, the collection of wild zooplankton can be inconsistent and problematic for the hatchery environment. The approach at TAL is to identify the preferred prey item of marine fish larvae and then determine if that food item, or a similar substitute, can be grown in sufficient quantities to make larviculture feasible looking beyond the readily available live feeds and exploring the numerous phytoplankton and zooplankton available. Currently at TAL, copepod and algae production systems are producing sufficient quantities of nauplii. However, the plan is to move beyond currently cultured species and explore new species of copepods and other plankton to determine the optimal prey item for each marine fish species examined. In addition to live feeds, providing the appropriate larviculture environment is equally important with many of these candidate species. Often the correct live feed will be available at the appropriate time, but the larvae will not consume the prey item because the culture environment is inadequate. Identifying optimal environmental parameters is critical for determining the correct live feed for successful larval rearing. Researchers at TAL are excited about exploring all aspects of marine ornamental fish production in order to expand the species list of commercially available captive breed species. For more information contact Craig Watson at cawatson@ufl.edu or go to these two websites:

http://www.risingtideconservation.blogspot.com and
http://www.risingtideconservation.org.

18 day-post-hatch and 23 day-post-hatch orbit batfish (*Platax orbicularis*)

Faculty, staff, and graduate students attending the15th Annual FAS Graduate Student Symposium at Prairie Creek Lodge. Graduate students presented their research and/or proposed research projects this past March.