the Shellcracker

FLORIDA CHAPTER OF THE AMERICAN FISHERIES SOCIETY

http://www.sdafs.org/flafs

July, 2007

President's Message:

About a year and a half ago, I was interviewed for an article illustrating the habitat and fisheries comeback of Orange Lake (Alachua County) relative to the poor lake conditions during the drought of 1999-2001, when the lake shrank from 4800 ha to 730 ha. During that period, the Florida Fish and Wildlife Conservation Commission took advantage of the drought and removed approximately 420,000 m^3 of unconsolidated sediments from 69 ha to expose hard bottom sand in portions of the lake. Two years later, the hurricanes during the summer of 2004 refilled the lake to its normal high water level and by 2006, the littoral habitat and fisheries flourished, filling the lake with anglers and providing business to fish camps as it had in the past.

The interviewer remarked how natural climatic events can be devastating to the fisheries during the drought and destructive to the habitat during the hurricanes, and applauded the habitat restoration work we accomplished as the primary reason the lake's fisheries rebounded. I responded that those natural events were important components of the lake ecology that were necessary for the lake to "reshuffle the deck" and play a different hand. Furthermore, while the work we completed was a step in retarding the lake succession in certain portions of the lake, the responses in the habitat and fisheries were more likely due to those climatic events. I then took a step forward that I couldn't back peddle from that we all encounter at some time in our careers during an interview. I was quoted saying:
"Sometimes I think that what I do is useless," Nagid said of his job monitoring area lakes and wildlife. "I say that because, as you can see, nature really can take care of itself."

There was obviously more to the statement and it was spun to make it more appealing to the readers, but that's the way it was printed. You can imagine the calls I got from colleagues getting their digs in, and from others in Tallahassee jokingly advising me that publicly stating that my responsibilities are useless is not a good career move.

The point I was trying to make is that we are stewards of fisheries and their habitats in the big scheme of things, despite political, social and in this instance, environmental influences. Natural events provide the right functions on regular periodicity but occasionally need some assistance as the landscape and hydrology are altered. The same tools we use today for habitat rejuvenation are the same processes that occur naturally when the time is right: drawdowns, flooding, and fire. Never once did I think that what I do is useless, and we as environmental scientists should never feel that what we do is unimportant. The roles we serve, both through research and applied management, are essential to the best interest and sustainability of the resources that we study and conserve. We work in this field because we have a genuine care for this resource, fervor for science and the goal of making a difference during our careers. If I fail to recognize that on occasion in my day to day job, it is widely apparent at the Chapter meetings each year. Feel proud of what you do and make it visible. Champion your work through journal submissions, conferences, educational materials, and the occasional interview…just don't use the word useless.

Eric Nagid, President FL AFS

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Upcoming Events

Jul 7-11--Jul 11-16—Joint Meeting of Ichthyologists and Herpetologists, St. Louis, Missouri.

Jul 16-18—Grants 101: Professional Grant Proposal Writing Workshop, Missoula, Montana.

Jul 17-21—First International Sclerochronology Conference, St. Petersburg, FL. See

Jul 23-26—2007 National Forum on Contaminants in Fish, Portland, Maine.

Jul 23-26—Waterpower XV: Advancing Technology for Sustainable Energy, Chattanooga, Tennessee.

Jul 24-26—Hydro Basics Course, Chattanooga, Tennessee.

Jul-27—National Marine Educators Association Conference, Portland, ME.

Jul 31-Aug 1—13th Annual Aquaculture Drug Approval Coordination Workshop, Bozeman, MT.

Jul 31-Aug 2—Backpack Electrofishing and Fish Handling Techniques—Effective Methods for Maximizing Fish Capture and Survival, Grand Junction, Colorado.

Aug 5-10—2007 Joint Annual Meeting of the Ecological Society of America and the Society for the Ecological Restoration, San Jose, California.

Aug 12-18—30th Congress of the International Association of Theoretical and Applied
Limnology: Redefining Theoretical and Applied Limnology in the 21st Century, Montreal, Canada.

AFS Sep 2-6—American Fisheries Society 137th Annual Meeting, San Francisco. CA.

Sep 15— Ocean Conservancy 22nd Annual International Coastal Cleanup.

Sep 16-21—Association of Fish and Wildlife Agencies 2007 Annual Meeting, Louisville,
Kentucky.

Check out our Parent Society's calendar at http://www.fisheries.org/Calendar.shtml for other events not listed here!

Feature Article

Water distribution, minimum flows, and fish resources: Separating process from purpose

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In Florida, freshwater resources appear to be everywhere as Florida is home to over 7000 lakes, 10,500 miles of rivers and streams, the largest concentration of first-magnitude springs in the world, and Florida receives some of the highest annual rainfall levels in the US. While the idea of water as a scarce resource is at first counterintuitive in a state where water has historically been plentiful, in 21st century Florida meeting water demands of our booming populous will certainly be the biggest challenge for every resource agency and citizen of the state. Cynthia Barnett in her book *Mirage: Florida and the Vanishing Water of the Eastern U.S.* chronicles the transition of Florida from a state where water was too plentiful to a State where water is scarce. A recurring theme in her book is our ever growing human population and the challenges that this increasing population brings. The numbers simply cannot be avoided; Florida has a net influx of about 1,060 people *per day* from the following sources: 1,890 move in, 945 move out, births exceed deaths by 115. To meet this population growth, water managers in Florida have to find an additional 200,000 gallons of water daily. However, these freshwater resources are becoming threatened due to rapidly increasing demands to meet both human consumption and agricultural needs- particularly in south Florida where the majority of the state's citizens live, but where freshwater resources are relatively scarce.

Traditionally Florida has relied on groundwater pumping for the majority of its water supply. Yet in many areas of the state groundwater pumping has far exceeded the recharge rate of the aquifer leading to mandatory water conservation restrictions and water shortages. As groundwater resources have declined, surface waters including lakes, streams, and rivers have received increasing attention as sources of meeting local – and potentially even intrastate demand. In 1997 the Florida Legislator expedited the development of minimum flows and levels (MFLs) for water bodies within the state. These guidelines were designed to protect water resources from significant harm resulting from permitted water withdrawals. But what defines significant harm and how is this assessed?

Understanding how aquatic organisms respond to water withdrawals and changes in flow are questions needing substantial research. While intuitively "leaving a little water in the river for the fish" is appealing, in reality changes in riverine flows can have large changes in the types of fish habitat that are available in the river, alter the access to historic spawning sites, increase the risk of predation, or magnify the likelihood of an invasive species becoming established. As is commonly the case in the US, the state entity mandated with managing the water (the Water Management Districts) and the agencies responsible for managing the resources that rely on the water (primarily the Florida Fish and Wildlife Conservation Commission, FWC) are two separate agencies. Water Management Districts in Florida are rapidly establishing MFLs for riverine systems across the state to help in developing water withdrawal schedules while at the same time the FWC is still trying to determine how or if these water withdrawals will affect aquatic resources.

While this question is new in Florida, western states such as Arizona, California, and Colorado have been wrestling with these issues for decades and their experiences can offer important lessons for Florida. In 1922 the Colorado River Compact was created to develop water management plans for the Colorado River basin and since that time hundreds of irrigation projects, dams, and diversion canals, and other water extraction projects have been created to provide water for irrigation, water supply, industrial, and hydropower purposes. Concurrent with these projects, native fish within the Colorado River basin have greatly declined and most of the remaining native fish populations in the basin are protected under the US Endangered Species Act. In 1987 the Colorado River Recovery implementation Program was initiated as an attempt to allow continued development of water resources in the Upper Colorado River while still protecting rare fish species (mostly humpback chub, Colorado pikeminnow, razorback sucker, and bonytail chub). Participants in this recovery program include representatives from a variety of State and Federal agencies, water users, and environmental groups. This program was formed in reaction to escalating debates over water rights, flow recommendations, and observed declines in the health of fish

populations. These users were acutely aware that water development in the Colorado Basin could be greatly impeded if these fish species on the Endangered Species List were not protected and their populations recovered. Water users feared that reduced stream and river flows associated with continued development could be seen as jeopardizing the existence of the rare native fish and force water users to abandon some planned projects. The Colorado River Recovery Program was thus implemented as a model program of consensus-based decision making which would allow for water needs to be met while also protecting aquatic resources (Brower et al. 2001).

So after 20 years how successful is this program? Brower et al. (2001) reviewed the success of the Colorado River Recovery Program as an example of consensus based management. These authors found that the recovery program had promoted research on the native fish and it had also facilitated the development of new water resources involving over 200 new projects totaling 700,000 acre-feet of water. Additionally, all of the relevant stakeholders had been included in the process and none of the approved projects at this time had been litigated. However, the native fish populations were not recovering and some species have been locally extirpated during this 20 year period. So the success is mixed- water development has continued although the native fish have not recovered and are likely to remain on the endangered species list for some time.

So what happened? Brower et al. (2001) suggest that in measuring progress, the recovery program does not focus on the status of fish populations, but instead focuses on checklists that are included in annual reports that delineate program accomplishments- thus program success has been measured by bureaucratic achievement and not in specific objective like recovering native fish populations. As long as particular program actions are implemented (such as protecting habitat) program participants assume that the program is successful. In Brower et al.'s view, if success were measured by changes in the fish populations, then the recovery program would likely be judged a failure.

So what actions can we take in Florida to insure that we do a better job of meeting our water demands while not jeopardizing our native fish populations? Brower et al. (2001) cautions that although the consensus-based approach assured that all of the participants have a voice in the decision process; these voices are not equal in volume. The majority of the fiscal resources available for this recovery program come from revenues generated by water users such as hydropower and water supply. Because these groups in essence sign the checks, other groups generally heed to the programmatic decisions put forward by these groups.

In Florida the Water Management Districts have legal taxing authority to generate revenues to meet their stated mission while the FWC relies mainly on appropriations and license revenues. The 2007 budgets tell the story, the South Florida Water Management District, one of five water management districts in the state, has a budget of $1.4 Billion dollars while the entire Florida Fish and Wildlife Conservation Commission has a budget of roughly $268 million with $14.5 of that allocated to land acquisition. The Water Management Districts are the ones taking the lead to rapidly establish minimum flows and levels for water bodies in the state to help meet water demands while the FWC is playing "catch-up" to try and determine how modified flows may impact aquatic resources- an extremely difficult job particularly for an agency whose main focus for most of its existence has been in managing commercial and sport fisheries. This is coupled with little existing historical information on stream and river ecosystems in Florida to draw from and very limited staff and funding available to advance FWC's understanding and ability to work with the Water Management Districts to make informed decision – all while 1060 new people a day are added to our state.

At the recent Florida Stakeholder's Fish and Wildlife Forum (http://wild.ifas.ufl.edu) there were many stakeholder groups in attendance but *none* that represented freshwater fish resources. A clear outcome from this meeting was that stakeholder involvement in the management process will likely greatly increase in Florida in the coming years. Where are the stakeholders that will represent freshwater fish and the waters where these species live? If stakeholders are not involved does this imply that these resources are not as important as resources with vocal interest groups?

Modifications to riverine flow regimes in Florida through surface and sub-surface pumping to meet water demands should be viewed as a large-scale experiment and research efforts should be directed at developing techniques to predict and test ecosystem responses to flow modifications and associated changes in available habitat. Unlike the Colorado River basin where many of the native fish species were endangered, and the threat of legal jeopardy forced resource managers to be cognizant of how their actions may or may not impact these species, in Florida most of our riverine fish species currently do not have any Federal listing status under the Endangered Species Act. It is in the best interest of everyone that these species remain off the lists by being proactive and monitoring the status of at least some of the species previously defined by FWC as "species of concern".

Stakeholders and management agencies in Florida should work to establish measurable goals related to aquatic resources such as fish populations expressed in terms of real resource issues at hand. While the idea of protecting habitat and setting an adequate minimum flow level are intuitively appealing, without rigorous evaluation of how fish populations respond to these treatments we can not be certain how our resources respond to the chosen management action.

The conflicts between those charged with meeting water demands and those who are charged with protect-

ing the resources who use the water are unavoidable. There is tremendous uncertainty in how aquatic resources will respond to modifications in flow regimes within the state. Uncertainty in resource response to management actions is not uncommon, and Gunderson (1999) cautions against replacing "…the uncertainty of resource issues with the certainty of a process…." Ultimately value judgments have to be made as to what our aquatic resources in Florida will look like. If stakeholders and agencies decide that stream and river fish resources, game and non-game species, are important to Florida and are valued at the same level as the water that they live in, then adequate financial resources must be made available to the agencies involved in managing these species. Ultimately we do not want to be successful in process only when our desire is real resource protection.

References

Barnett, C. 2007. Mirage: Florida and the vanishing water of the eastern U.S. The University of Michigan Press. Ann Arbor, MI.

Brower, A., C. Reddy, and J. Yelin-Kefer. 2001. Consensus versus conservation in the Upper Colorado River Basin Recovery Implementation Program. Conservation Biology 15:1001-1007.

Gunderson, L. 1999. Resilience, flexibility and adaptive management-antidotes for spurious certitude? Conservation Ecology 3.

NEW TITLES

Status, Distribution, and Conservation of Native Freshwater Fishes of Western North America. Mark J. Brouder and Julie A. Scheurer, editors. 208 pages, Symposium 53. Publication date: June 2007

Bluegills: Biology and Behavior. Stephen Spotte. 214 pages. Publication date: June 2007

Anadromous Sturgeons: Habitats, Threats, and Management. Jean Munro, Daniel Hatin, Joseph E. Hightower, Kim McKown, Kenneth J. Sulak, Andrew W. Kahnle, and François Caron, editors. 420 pages, Symposium 56. Publication date: June 2007

Salmonid Field Protocols Handbook: Techniques for Assessing Status and Trends in Salmon and Trout Populations. David H. Johnson, Brianna M. Shrier, Jennifer S. ONeal, John A. Knutzen, Xanthippe Augerot, Thomas A. ONeil, and Todd N. Pearsons, plus 37 contributing authors. 478 pages. Publication date: May 2007. Published by the American Fisheries Society in association with State of the Salmon.

Sockeye Salmon Evolution, Ecology, and Management. Carol Ann Woody, editor. 129 pages, 11-page color gallery. Publication date: May 2007.

Aquatic Stewardship Education in Theory and Practice. Barbara A. Knuth and William F. Siemer, editors. 187 pages. Published by the American Fisheries Society. Publication date: April 2007.

Interested in contributing something to the Shell-Cracker? Email Jackie Debicella at *jackiedebo@hotmail.com* with any articles or information that you would like to be included in the next issue. The deadline for the next issue is September 20th, 2007, so start fishing...

Student Section

Student Research Highlight

Examining Seasonal Movement and Habitat Occupancy Patterns of Adult Common Snook

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Acoustic telemetry was used in this study to examine seasonal movement and habitat use patterns of adult common snook, *Centropomus undecimalis*, an ecologically and recreationally significant apex predator found throughout the tropical Caribbean basin including south Florida. The goal of this research was to gain a better understanding of the ecological relationships between a population of adult common snook and a variety of habitats in Sarasota Bay, a large estuary in southwest Florida. Relocations of individual adult snook were used as a tool to identify "key" habitats which provide essential information that can be used to improve conservation management plans. I was particularly interested in answering the following research questions:

(1) Do snook demonstrate seasonal movement and habitat use patterns?

(2) Do individual snook exhibit site fidelity towards a specific habitat type and location?

(3) What are the impacts of large scale disturbance events on movement and habitat use?

(4) Can survivorship be predicted based on individual movement and habitat use patterns?

The last two research questions were specifically related to an unusually large red tide bloom that occurred in summer 2005. The red tide event provided a natural experiment to examine snook movement and habitat use patterns before, during, and after the red tide bloom. This "experiment" provided the opportunity to examine the impacts of an environmental disturbance event on habitat use and movement patterns of adult snook, which may have affected an individual's likelihood of survival.

Throughout the duration of this study (October 2004 to March 2007), I observed a population of 109 tagged adult common snook. My results show that snook used a variety of habitat types and spatial locations, and exhibited a range of seasonal movement patterns in Sarasota Bay. In addition, I found relatively

high site fidelity based on the habitat type and location of first capture and also found markedly different movement patterns that would generalize some fish as extensive transients and some as residents. This diversity in behavior could be an adaptive strategy that reduces the likelihood of any one cataclysmic event, such as a massive red tide bloom, irreversibly harming the snook population in Sarasota Bay.

For example, survivors of the red tide bloom generally spent extended periods of time through the fall and winter in the creek habitats found in northern Sarasota Bay, but during summer 2005 were found in the most southern areas of Sarasota Bay near an inlet to the Gulf of Mexico. This may have increased the probability of these fish surviving the red tide bloom because southern Sarasota Bay appeared to have lower levels of fish kills, likely due to the higher exchange rate with the Gulf of Mexico, and increased availability of freshwater over areas in the central and northern regions of Sarasota Bay.

This telemetry study provides insight into understanding the spatial and temporal utilization of habitats and may serve as a first step towards identifying essential fish habitat of adult common snook in Sarasota Bay, Florida. In this study, the relocations of individual fish were used as a metric to identify key habitat requirements for common snook. This is particularly important in linking the use of critical seasonal habitats, such as winter creek systems and summer spawning habitats, with environmental and anthropogenic threats in Sarasota Bay. The observed high natural mortality that occurred over a short time period in summer 2005 and the variation in movement patterns observed at the individual level demonstrate the interactions between episodic mortality and behavioral choices made by individuals that combine to shape the Sarasota Bay snook population. The initial assessment of this complexity highlights some of the challenges that must be overcome to develop effective management policies linking management of mortality levels with habitat. Information from this study may ultimately contribute an integral part of the ongoing research in the ecology of this species while simultaneously providing information to be considered for future conservation management purposes of snook and their critical habitats.

ANNOUNCEMENT

1st CALL FOR PAPERS
Southern Division Spring Meeting-2008

The West Virginia Chapter and Southern Division of the American Fisheries Society invite you to join us in Wheeling at the Oglebay Resort and Conference Center for the 2008 Southern Division Spring Meeting, February 28-March 2, 2008. The meeting's theme is "Headwater Streams to Large Rivers".

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