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**President's Message**

The first day of autumn has already passed us by, signaling the end to the majority of our field work for the year and welcoming the joys of cool, crisp mornings and the changing colors of the leaves. As we make these transitions, we also prepare for upcoming scientific meetings and the opportunities to share with our colleagues what we have learned from our research, management, and education activities over the past year. To that end, please remember the 2014 Southern Division Spring Meeting in Charleston, South Carolina, which will be held from January 22-26, 2014. Additional information, as well as the call for abstracts can be found at: <http://sdafs.org/meeting2014/>.

Even more important, please plan to attend and participate in the 2014 NC AFS Annual Chapter Meeting. We will be meeting February 18-19, 2014 at the Millennium Hotel in Durham, North Carolina (2800 Campus Walk Avenue, Durham, NC, 27705-4479). Brena Jones of the NC WRC is our President-Elect and is Chair of the Annual Meeting Committee. Please see the article from Brena later in the newsletter with meeting information and the first call for abstracts. Please contact Brena, if you need additional details right away.

Greg Cope

## **2014 NCAFS Annual Meeting**

Save the date for the **2014 Annual Meeting of the North Carolina Chapter of AFS!**

Join us at the [Millennium Hotel in Durham](#) (2800 Campus Walk Avenue, Durham, NC, 27705-4479) on the 18-19<sup>th</sup> of February, 2014 for an unmissable two days of excellent presentations covering the latest in our state's fisheries research and everyone's favorite annual raffle by NCSU's Student Fisheries Society. There will be a continuing education workshop on Tuesday morning, followed by technical sessions in the afternoon and Wednesday morning, finished off with our NCAFS business meeting. The hotel will be honoring state and federal government lodging rates.

**First Call for Papers** – Students and professionals are highly encouraged to contribute oral presentations for the annual meeting. Topics may include completed projects, works in progress, and case histories. All presentations will be scheduled for 20 minutes, including a 5-minute period for questions. Please send all abstracts electronically to Brena Jones at [brena.jones@ncwildlife.org](mailto:brena.jones@ncwildlife.org) by January 21, 2014. Abstracts should include presentation title, author names, addresses (including phone and e-mail if available), and several keywords for future search capability. Please limit text to 250 words or less. It is assumed that the first author listed will be the presenter unless otherwise noted. If you are a student presenter, please make note of that on the abstract. For additional information feel free to contact Brena by e-mail or by telephone (919-707-0369).

Watch your chapter newsletter and your inbox for updates and reminders regarding abstract submission, rates, lodging, and meeting registration. If you have any questions, please contact Brena Jones.

Mark your calendars now and fill out that travel authorization!



**The Millennium Hotel, Durham, NC**

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## September 2013 Treasury Report

NC AFS Financial Summary  
(8/30/2013)

<u>Account</u>	<u>Current Balance</u>	<u>Balance 1 year ago</u>
Edward Jones Account 1	\$31,577.74	\$30,810.88
Edward Jones Account 2	\$34,412.78	\$30,240.30
Wells-Fargo Checking	\$5,541.26	\$7,109.00
Wells-Fargo Savings	\$2,915.17	\$5,912.94

*Submitted by Todd Ewing, Secretary-Treasurer*

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## NCSU Student Subunit Report

We hope everyone was able to get out and enjoy the beautiful and somewhat rainy weather we had this summer and are looking forward to the start of a new fall semester. Our first update comes from the most recent 143rd Annual AFS Meeting held in Little Rock, Arkansas which was yet another successful and well planned meeting. SFS members Dan Brown, Jesse Fischer, Jared Flowers, Jodie White, and Kelsey Lincoln had the opportunity to attend and present their research. Other members Dr. Jim Rice and Dr. Derek Aday also attended the meeting. In addition, past SFS member Patrick Cooney won the John E. Skinner Memorial Scholarship, was a runner-up for the Best Student Writing Award and won the Fisheries Society of the British Isles Student Travel Award.

SFS stayed busy this summer and fall by continuing to participate in some of our annual and local outreach events. Throughout the summer we volunteered with the Historical Yates Mill County Park helping children catch fish with cane poles. We were also given the opportunity to run the cane pole fishing section during Yates Mill's annual Fall Harvest Celebration on September 21 where thousands of people gathered to participate in the numerous stations set up throughout the park. We would like to thank Rebeccah Cope for helping organize this event and inviting us to participate (we are sure the bluegill living close to the boardwalk were also thankful).



**Several SFS members gather around Yates Mill's mascot during the Fall Harvest Celebration.**



**Jodie White helps a successful angler hold his recently caught bluegill.**

On September 28, we set up a fisheries station at the NCWRC National Hunting and Fishing Day at Lake Wheeler. Here we helped kids make fishing hats and practice their angling skills on the most sustainable fishery yet, Backyard Bass, complete with plastic fish. We would like to thank Beth Gunn for helping to organize this event and again for inviting us to participate.

Finally, we packed up our electrofishing gear and headed out to Lake Waccamaw to participate in a BioBlitz of Lake Waccamaw State Park where scientists gathered to identify the fauna and flora of the park. In addition to some of the unexpected spiders that found us while camping, the Waccamaw killifish, golden topminnow, and tadpole madtom were among several of the fish species we found. We would like to thank Bryn Tracy for bringing this event into light and organizing the fisheries portion. Next year the BioBlitz will take place at Lake James and we hope to get even more volunteers to participate!



**Elizabeth Hassell, Caitlin Bradley, and Bryn Tracy seining for fish.**

We would like to welcome anyone who is in town or available to stop by our next meeting on Tuesday, November 5 at 5:30 in the lobby of David Clark Labs at NCSU. If you have an event or opportunity you would like SFS to get involved with or if you have any questions please don't hesitate to contact Jared Flowers ([hjflower@ncsu.edu](mailto:hjflower@ncsu.edu)) or Kelsey Lincoln ([kjlincol@ncsu.edu](mailto:kjlincol@ncsu.edu)). For more information about our student subunit visit our website (<http://clubs.ncsu.edu/sfs/>) or visit our Facebook page.

*Submitted by Kelsey Lincoln, SFS co-president*

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## **News from the North Carolina Chapter American Fisheries Society Awards Committee**

### **2013 Student Travel Award Presented**

The N.C. AFS Chapter established a Student Travel Award Program in 2005 for the specific purpose of encouraging professional growth of students and maximal participation of undergraduate and graduate students at the annual meeting of the American Fisheries Society. Monetary support is provided to qualifying students via a travel award of \$200 to \$400 to help defer the cost of meeting travel, registration, and accommodations. The 2013 award was for travel to the 143<sup>rd</sup> Annual American Fisheries Society meeting held September 8-12, 2013 in Little Rock, Arkansas.

The 2013 award winner was Kelsey Lincoln, a student from N.C. State University. She received a cash award of \$400 from the Chapter's Ichthus Fund account, which was established specifically to foster student involvement. Kelsey is co-advised by Drs. Derek Aday and Jim Rice.



The 2013 N.C. AFS Student Travel Award winner, Kelsey Lincoln pictured performing field work for her graduate research.

Submitted by Greg Cope and John Crutchfield

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### North Carolina's Imperiled Fish Fauna, Part XII

Submitted by Bryn H. Tracy, Wayne C. Starnes, Fred C. (Fritz) Rohde, and Ryan Heise on behalf of the NCWRC's Scientific Council of Fishes

As mentioned in the Chapter's 2010-2013 newsletters, there are approximately 215 indigenous, described, and undescribed species of strictly freshwater fishes in North Carolina. Of these, 26% are state or federally listed: Endangered (17), Threatened (17), or Special Concern (22) (Harris et al. 2010). It is the responsibility of the 15 member Scientific Council on Freshwater Fishes to submit its recommendations to the Nongame Advisory Committee of the North Carolina Wildlife Resources Commission (NCWRC) if changes in imperilment classifications for any species are warranted. To communicate our findings with the chapter membership, this is the 12<sup>th</sup> of 16 planned articles on the species that the Council believes have become more imperiled since the last listing in 2006. Thus acquainted, it is hoped that chapter members can serve as additional "eyes and ears" to expand our vigilance for these rare or highly localized fishes.

**Waccamaw Killifish, *Fundulus waccamensis*, Hubbs and Raney 1946**  
**Current Status: Special Concern, Proposed Status: Threatened**



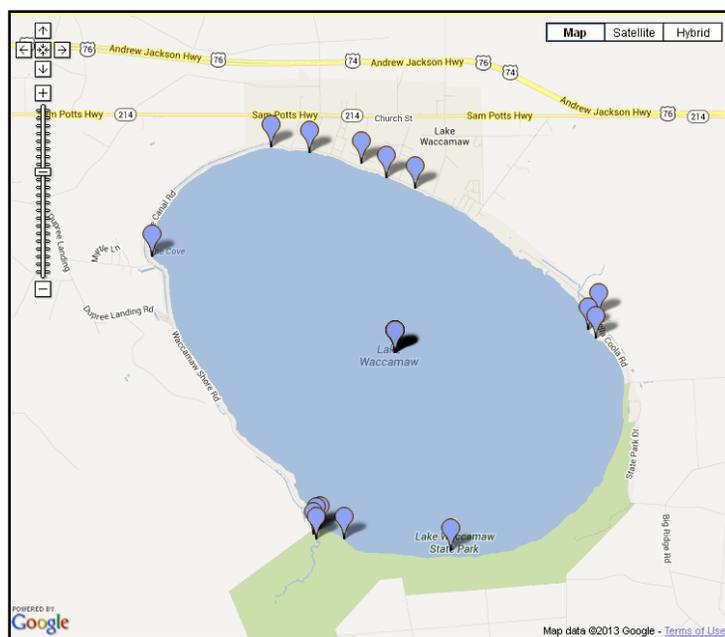
Photograph courtesy of Southeastern Fishes Council, courtesy of Fritz Rohde, <http://www.sefishescouncil.org/>.

Description - The Waccamaw Killifish has an elongate head and body, slender caudal peduncle, flattened snout, small scales, silvery to olive base color, dark bars on the sides, and blue-green to green-gold iridescence, especially on males. Adults are 45 to 85 mm standard length and modally have 52 to 58 lateral line scales (range 50-64) and 4 or 5 gill rakers. The depth of the caudal peduncle is 2.8-3.5 times in the length of the caudal peduncle (Menhinick 1991). Males have 15 to 20 dark vertical bars usually wider than the light interspaces and females have 12 to 16 narrow dark vertical bars. The Waccamaw Killifish may be confused with the Banded Killifish, *Fundulus diaphanus*, but the Banded Killifish has modally 36-39 lateral line scales (range 34-46), and depth of the caudal peduncle is 2.0-2.8 times in the length of the caudal peduncle (Menhinick 1991). It is not known to occur in the lake.

The Waccamaw Killifish and “Lake Phelps” Killifish (which will be discussed in the next series on North Carolina’s imperiled fish fauna) were formerly considered a single species (Bailey 1977; Shute 1980; Menhinick 1991), with the Lake Phelps population possibly introduced from Lake Waccamaw. Subsequent genetic and morphometric analyses by Grady, Krabbenhoft, Quattro, and Rohde (unpublished data) suggest these two killifishes evolved independently in their respective lakes from isolated populations of the Banded Killifish T. J. Krabbenhoft, Department of Biology, University of New Mexico is conducting further studies on the systematics of this species group.

Type Specimen and Type Locality - The Waccamaw Killifish was described by Carl L. Hubbs and Edward C. Raney in 1946 based upon 260 specimens collected by Raney, E. A. Lachner, and R. A. Pfeifer from the sandy shoals along the north shore, near the Jones Hotel on NC 214, on the night of March 30, 1941, in Lake Waccamaw, Columbus County, North Carolina (Hubbs and Raney 1946). The holotype is at the University of Michigan’s Museum of Zoology (UMMZ), Catalogue No. 138473.

Range - The Waccamaw Killifish is endemic to Lake Waccamaw and its adjacent canals (Shute *et al.* 1981; Menhinick and Braswell 1997; Krabbenhoft, *et al.* 2009). In Lake Waccamaw, it is the only killifish normally present, but in the adjacent canals, it occurs with the Lined Killifish, *F. lineolatus* and now the recently invading Golden Topminnow, *F. chrysotus*. Thirty years ago, the population of the Waccamaw Killifish was estimated to be 1-10 million fish (Lindquist and Yarbrough 1982). In a collaborative effort, NCWRC and State Parks are conducting long-term monitoring surveys. Annual catch-per-unit-effort data (2009-2012) indicate that Waccamaw Killifish continue to be abundant and are widely distributed in Lake Waccamaw (Heise *et al.* 2013).



**Global distribution of Waccamaw Killifish, Columbus, North Carolina. Map is based upon material vouchered and databased at the North Carolina State Museum of Natural Sciences; the database was queried June 07, 2013. The locality marker in the center of the lake is for a record with imprecise locality information rather than a true capture point.**

Habitat - Lake Waccamaw is a 3,615 hectare Carolina bay lake that is unique because of its water chemistry (near-neutral pH) and large size, as compared to other natural bay lakes. The Waccamaw Killifish occurs in large schools in shallow water along the sandy to muddy shorelines, often in association with submerged or emergent vegetation (Shute, 1980, Shute *et al.* 1983); it also occurs in canals adjacent to the lake.

Life History and Ecology - Unlike many killifish species that occur predominantly near the surface, the Waccamaw Killifish is an epibenthic species, spending most of its time near the bottom, and seems to be an opportunistic feeder consuming primarily benthic chironomid larvae and amphipods (Shute 1980; Lindquist and Yarbrough 1982). During spawning, which occurs from April through August, males defend territories with lateral displays and spawn with passing females on silty substrate. Adult females contain about 30 to 50 mature eggs (Shute *et al.* 1983).

Rationale for Designation - Lake Waccamaw is a very unique environment, once thought to be in danger of accelerated eutrophication (Lindquist and Yarbrough 1982; Casterlin, et al. 1982). It is now threatened by the exotic and invasive aquatic macrophyte *Hydrilla verticillata* which was discovered in the northwestern side of the lake in 2012. The infestation is relatively recent (perhaps 1-3 years) and treatment was initiated in June 2013 (Heise, et al. 2013). Lake Waccamaw is supplementally classified as Outstanding Resource Waters by the North Carolina Division of Water Quality. Waccamaw Killifish and all endemic or unique organisms occurring in Lake Waccamaw deserve special attention. The Waccamaw Killifish is assigned State Threatened status, which is consistent with the status of other species endemic to Lake Waccamaw (e.g.,

Waccamaw Silverside, *Menidia extensa*, Waccamaw Darter, *Etheostoma perlongum*, and “Broadtail” Madtom, *Noturus* sp. cf. *leptacanthus*).

Recommendations - Continued attention should be given to preventing accelerated eutrophication and widespread coverage by *Hydrilla* in Lake Waccamaw. Lake Waccamaw receives partial protection by the presence of the Lake Waccamaw State Park along its southeastern shoreline, which could be useful for habitat protection and restoration activities, if needed. Further genetic studies of the two lake-endemic killifishes and nearby populations of the Banded Killifish are needed to resolve the systematic and taxonomic questions of this group.

#### Literature Cited and Recommended Readings

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- Casterlin, M. E., W. W. Reynolds, D. G. Lindquist, and C. G. Yarbrough. 1984. Algal and physicochemical indicators of eutrophication in a lake harboring endemic species: Lake Waccamaw, North Carolina. *Journal of the Elisha Mitchell Scientific Society*. 100:83-103.
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Submitted by Bryn Tracy

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## **NCWRC Wildlife Diversity Program Quarterly Reports**

The link below provides information on NCWRC's quarterly wildlife diversity reports, which contain updates on a wide variety of nongame research projects and survey results.

<http://www.ncwildlife.org/Conserving/Programs/WildlifeDiversityProgram/WDPQuarterlyReports.aspx>

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## **Spotlight on Students and Young Professionals**

### **Spotlight on Kelsey Lincoln**

Kelsey grew up in a small town southwest of Detroit, MI. She was fortunate enough grow up with a large woodlot in her back yard where she spent most of her time surprising her mom with frogs, snakes, and other woodland creatures. Her enthusiasm for ecology stemmed early on from her exploratory days in the woods observing the intricate relationships between plants and animals. By elementary school, she coaxed most of the children in the neighborhood to start a Bug Club and led a good hearted, though unsuccessful, picket rally one summer when condos replaced the beloved woods she'd grown up in. Her specific love of aquatic ecology was also ingrained in her childhood as she spent most of her summers snorkeling off the coast of Florida and in the Great Lakes.

Thus, after graduating from Salem High School in 2006 (whose mascot is a rock by the way) she knew exactly what field she wanted study. A true Spartan since birth, Kelsey attended Michigan State University and graduated with a degree in Fisheries and Wildlife in 2010. While at Michigan State she worked in a limnology lab studying the effects of invasive zebra mussels on strains of toxic algae, and in her spare time swam on the varsity swimming team (good to know when a boat with a dead motor needs to be towed to shore). After graduation she moved to Ann Arbor, MI, despite being within walking distance of the University of Michigan, to work for the USGS Great Lakes

Science Center on a project involving the restoration of spawning habitat for lake sturgeon and lake whitefish in the Detroit River.

After many hours spent identifying larval fish from the Detroit River, Kelsey moved on to studying bigger fish and traveled to North Carolina to pursue a Master's degree at North Carolina State University in Fisheries and Wildlife Conservation Biology. She is currently working with co-advisors Drs. Jim Rice and Derek Aday on a project funded by the North Carolina Wildlife Resource Commission to evaluate harvest and natural mortality rates, seasonal movement and habitat use of white bass in Jordan Lake using acoustic telemetry. She also is currently serving as the co-president of the NCSU student subunit of AFS and takes pride in organizing volunteer and professional opportunities for members.

When she isn't tracking white bass, Kelsey spends time accruing new hobbies like photography and guitar and attempting to master them. In the future she hopes to obtain a job in a state where winters aren't 6 months long, but more importantly one that allows her to continue to organize outreach events and work closely with the management and restoration of aquatic ecosystems.



**Kelsey Lincoln surgically implanting an acoustic telemetry tag in a white bass on the bank of the Haw River.**

*Submitted by Jim Rice*

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## **Spotlight on Dan Brown**

Dan Brown's path to graduate school took him around the world, or at least to the bottom of it. He grew up in central Ohio where he fostered an interest in fisheries by building minnow traps and seining nearby ponds. This interest in the field grew after attending a summer course at The Ohio State University's Stone Laboratory on Lake Erie, which lead him to pursue a Bachelor of Science in Biology with emphasis on

Fisheries and Aquatic Science at Grand Valley State University (Allendale, MI). After completing his degree in 2005, Dan knew that he would pursue a career in the field, but some opportunities are too good to pass up and so he ended up working for Raytheon Polar Services . . . in Antarctica . . . as a plumber.

The position was temporary, however, and like all good things it came to an end. Over the course of the next five years, Dan worked as a fisheries technician for EA Engineering, Science and Technology in Kentucky, the National Park Service at Crater Lake National Park, the Oregon Department of Fish and Wildlife in Tillamook, OR and the US Geological Survey in Klamath Falls, OR. It was during his time with the USGS investigating the response of the endangered Klamath largescale sucker to environmental conditions and habitat restoration that Dan knew he'd finally found his niche and decided to pursue an advanced degree.

In the fall of 2011 Dan began his Master's studies at NC State as part of the Fisheries Ecology and Aquatic Science lab advised by Jim Rice and Derek Aday. His research, funded by the NC Wildlife Resources Commission, is focused on the response of coastal largemouth bass to environmental and anthropogenic stressors in the Chowan River and its tributary creeks. He is specifically investigating how seasonal and episodic hypoxia and tournament displacement affect the distribution, movement patterns and survival of largemouth bass in an open system.

When Dan isn't working on his thesis, which he should be doing at all times, he enjoys running, cycling, playing soccer and travelling with his wife, Michelle.



**Dan Brown with a typical(?)  
Chowan River largemouth  
bass.**

*Submitted by Jim Rice*

## Thank You Letter to NCAFS

Greetings,

On behalf of the Association of Fish and Wildlife Agencies, and the Teaming with Wildlife steering committee, we would like to thank you and your representing organization for signing on to the national letter supporting conservation grant programs. These grants support important conservation work led by state fish and wildlife agencies and non-profit organizations. The letter was hand delivered to Senator Reed (RI) and Congressman Simpson (ID) and to Sally Jewell, Secretary of the Interior. Over 1,600 organizations added their name to the letter making this one of the largest and most diverse sign-on letters of its kind. If we are successful in fending off major cuts to the; State & Tribal Wildlife Grants Program, North American Wetlands Conservation Fund, Neotropical Migratory Bird Conservation Fund, Forest Legacy Program and Land and Water Conservation Fund, you can take pride in knowing that you were part of the effort to save these vital programs. Below I have provided links to both a copy of the national sign-on letter and the Association of Fish and Wildlife Agencies press release regarding our collaborative effort. Thank you again for signing on and lending your organization's name to this effort. If your organization is not currently a member of the 6,400 organizations that make up the national Teaming With Wildlife coalition and would like to join, please let me know. Thank you and have a great day.

Sincerely,

Robert Walker, Teaming With Wildlife Intern and TWW staff

[Final Sign-on Letter](#)

[National Sign-on Press Release](#)

### **Robert Walker**

Teaming with Wildlife Intern  
Association of Fish and Wildlife Agencies  
Email: [twwintern@fishwildlife.org](mailto:twwintern@fishwildlife.org)

*Submitted by Greg Cope*

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## **Meetings of Interest**

**2014 NCAFS Annual Meeting-** February 18-19, 2014, Durham, NC.  
<http://www.sdafs.org/ncafs/>

**2013 NCSU Student Fisheries Society-** First Tuesday of each month, Raleigh, NC.  
<http://clubs.ncsu.edu/sfs/>

**2014 SDAFS Meeting-** January 22-26, 2014, Charleston, SC.  
<http://sdafs.org/meeting2014/>

**144th Annual Meeting of the American Fisheries Society-** August 17-21, 2014,  
Quebec City, PQ. <http://afs2014.org/>

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### **Valuable Links**

The American Fisheries Society Home Page offers a wealth of links to assist you in your fishery endeavors. Information on ordering AFS books, public outreach, annual meetings, chapter links and joining the AFS can be found at <http://www.fisheries.org/>. You can subscribe to the NCAFS list serve at <http://lists.fisheries.org/listinfo.cgi/ncafs-fisheries.org> and check out the podcasts from the 2013 SDAFS meeting at <http://sdafs.org/spring-meeting-2013/podcasts-nashville-tn/>

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