AMERICAN FISHERIES SOCIETY

Winter 2018 NEWSLETTER

INSIDE THIS ISSUE

President's Message

I hope all of you have a had a great holiday season with your families. It seems that "old man winter" is pounding at the door. With snow on the ground and below freezing temperatures, I am reminded why I wouldn't make it up north. As my tenure as chapter president is coming to an end I have a few random thoughts to share.

First, I would encourage all of you to participate in AFS in some way. These past 2 years have been very rewarding to me. There are many avenues where you can be involved: participating at meetings, giving presentations, working within a committee, helping with the newsletter, or serving on the EXCOM. Whatever path you choose I promise that it will be a learning and rewarding experience.

I have realized that I am becoming the old man in the room. Time has flown, hair has gone, and hopefully I have learned somethings. I have advice to both young and old. For students and young professionals, gain as much experience as possible. The job market for our profession is becoming increasingly crowded. Set yourself apart by gaining knowledge through volunteering, working as a technician or an intern. Ask advice from those that have been in the profession. Yeah, we are old and gray but with that old and gray comes knowledge from things experienced. I have also noticed that most students are no longer interested in fisheries management. There are still a lot of jobs that require fish management experience but very few candidates have that experience. For the old and gray, be good mentors to younger professionals. Take time to teach but also take time to listen. I have

often found that students and young professionals have great ideas that we need to consider and implement.

Finally, for my last newsletter I want to thank you. I want to thank all of you for your support and making NCAFS the best chapter in the society. Your efforts have made this an outstanding year. If you are not a part, I would encourage you to join us by volunteering in some way. I look forward to seeing all of you in Morganton in February. Tyler has been working hard to make this meeting another enormous success.

Stay warm and see you there!

Submitted by Corey Oakley, NCAFS President

NCAFS Treasurer's Report as of 1/5/2018

1. NCAFS checking – $7,924.18;
2. NCAFS PayPal – $96.29;
3. NCAFS Edward Jones General Fund –$49,730.61;
4. NCAFS Edward Jones Ichthus Fund or Student Fund – $31,180.53;
5. Robust Redhorse Conservation Committee – $8,834.13;

NCAFS donated $600 to help sponsor the 2018 Southern Division of the American Fisheries Society Annual Meeting to be held in San Juan, Puerto Rico. NCAFS is also donating money to Valle Crucis Community Park to develop a snorkeling program similar to the program at New River State Park. NCAFS will also be helping Shad in the Classroom purchase two new tanks to help expand the popular kids' educational program. In addition, we have already received several generous donations from Duke Energy and RK&K (http://www.rkk.com/) and are looking forward to another successful meeting in Morganton, NC.

Just a reminder, if you renewed your membership through AFS, but only paid $7.00, you will owe an additional $8.00 for 2018 membership. You can complete your membership fee by sending me a check for $8.00 (make check out to Kelsey Lincoln and mail to 2430 Turner Road, Mebane, NC, 27302), by paying me directly at the annual meeting, or simply by adding $8.00 to your registration total when you register for the meeting using our website/Pay Pal. As always, feel free to contact me if you have any questions (kelsey.lincoln@ncwildlife.org or 336-290-0052).

Hope to see you all at the meeting!

Submitted by Kelsey Lincoln, NCAFS Secretary/Treasurer

Save the Date - 2018 NCAFS Annual Meeting!

The 2018 Meeting of the NC Chapter of the American Fisheries Society will be held February 20–22, 2018 at the Morganton Community House, in Morganton, NC. Accommodations available at the Hampton Inn of Morganton. Please visit the meeting webpage for more information: https://nc.fisheries.org/2018-ncafs-meeting/

Morganton Community House, location of the 2018 NCAFS Annual Meeting.

Events include:
Feb. 20: Evening Social
Feb. 21: Climate Change Workshop (see below) and Annual Meeting Presentations
Feb. 22: Continued Presentations and Business Meeting

2018 NCAFS Annual Meeting Workshop - Climate change, climate models, and best practices for using them for impact assessments and adaption planning.

Presented by Ryan Boyles, Acting Director, DOI/USGS Southeast Climate Science Center

Ryan Boyles is a physical scientist with the USGS Southeast Climate Science Center. As a former State Climatologist and extension faculty at NC State University, he has spent his entire career working to help other disciplines better use climate data and climate science. In this workshop, he'll cover some of the basics of what drives climate changes and how climate models work. He'll also review some best practices on how to actually use the science and models for natural resource management. Workshop participants will interact with Ryan and each other to better understand when and how climate science can be used to better understand habitat and species dynamics and make climate-smart adaptation.

NCAFS Nominations Committee and Ballot

The Nominations Committee is pleased to present the 2018 NCAFS ballot for President-Elect. Chapter members running for President-Elect are Jake Rash and Tim Savidge. Please take a moment to evaluate the candidate sketches and cast your vote on the electronic ballot (link located below).

Jake Rash is Coldwater Research Coordinator for the NC Wildlife Resources Commission, where he assists with the coordination of applied research and management of the State's trout resources. He received his B.S. in Zoology from NC State University (2000) and M.S. in Fisheries and Wildlife Sciences from Virginia Tech (2003). After graduate school, he worked with freshwater mussels as a Research Specialist at Virginia Tech until he joined the NCWRC. He became an American Fisheries Society (AFS) Certified Fisheries Professional in 2008. Throughout the years he has been fortunate enough to participate in the North Carolina, Virginia Tech, and Virginia chapters of AFS, and in 2012, he served as Chair of the Southern Division AFS Trout Committee. Although he spends his days at work thinking about fish, he enjoys spending his free time trying to find fish with monofilament and fly lines. In addition, he truly loves spending time with his family and following NC State athletics.

Tim Savidge is currently an Aquatic Biologist with Three Oaks Engineering, Inc. in Durham, NC (http://www.threeoaksengineering.com/). Tim is a native and long-time resident of North Carolina and has been a member of NCAFS for 5 years. He has over 28 years of experience in natural community classification, floral and faunal identification, wetland and stream delineation and protected species surveys and has worked in watersheds across the Southeastern US. He previously worked for the Catena Group as well as the North Carolina Department of Transportation. Tim is perhaps most well-known for his work with imperiled freshwater mollusks and fishes and he has played an important role in many recent stream

restoration projects in North Carolina. He was one of the instructors of the freshwater mussel identification workshop at the 2017 NCAFS meeting in New Bern. Although Tim's focus has been primarily geared toward non-game freshwater species, he has some level of understanding of all aspects germane to the society. Prior to his professional career in freshwater ecology he was involved in the commercial Snapper/Grouper industry in North Carolina, which lead him to pursuing and receiving his MS Degree in Marine Biology from UNC-Wilmington. His philosophy on resource management and conservation mirrors the multi-discipline representation within the NCAFS and he looks forward to becoming more involved in the organization.

Click here to access the 2018 NCAFS Ballot

Polls close at midnight, February 7th, but you must be a paid chapter member to vote!! For those chapter members who vote, your name will be entered in a drawing for a 2018 AFS Parent Society membership (a value of $95).

Submitted by Mike Gangloff, Nominations Committee Chair

2018 Call for Chapter Award Nominations

The Chapter presents two awards on an as-warranted basis to recognize outstanding contributions by both chapter members and others (https://nc.fisheries.org/awards/). The Jerry R. Finke Distinguished Service Award recognizes Chapter members who have distinguished themselves by service to the Chapter, the AFS, or the fisheries profession. The Fred A. Harris Fisheries Conservation Award recognizes non-Chapter members who have distinguished themselves by service or commitment to the Chapter or the fisheries and aquatic resources of North Carolina.

The Awards Committee is soliciting nominations from the membership for both of these awards for 2018. If you are aware of a deserving individual or organization, please nominate them! Nomination letters should be no more than two pages long and provide specific information on the accomplishments of the candidates and why they qualify the candidate for the award. Qualifications for the Distinguished Service Award should extend beyond simply doing an outstanding job on regular chapter duties (e.g., officer or committee member responsibilities) and be based primarily on extraordinary efforts or new initiatives.

Please submit nominations to John Crutchfield at John.Crutchfield@duke-energy.com **Nominations will be accepted until Monday, January 22, 2018.** If you have any questions, please call John at 980-373-2288. The chosen recipients will receive the awards at the annual meeting to be held in Morganton, NC on February 20-22, 2018.

Submitted by John Crutchfield and Greg Cope, NCAFS Awards Committee Co-Chairs

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Good Work! – Recent Publications by NCAFS Members

Buckwalter, J. D., Frimpong, E. A., Angermeier, P. L., and J. N. Barney. 2018. Seventy years of stream-fish collections reveal invasions and native range contractions in an Appalachian (USA) watershed. Diversity and Distributions. 2018; 24;219-232. https://doi.org/10.1111/ddi.12671.

Buczek, S.B., W.G. Cope, R.A. McLaughlin, and T.J. Kwak. 2017. Acute toxicity of polyacrylamide flocculants to early life stages of freshwater mussels. Environmental Toxicology and Chemistry 36: 2715-2721. http://onlinelibrary.wiley.com/doi/10.1002/etc.3821/abstract

Buttermore, E.N., W.G. Cope, T.J. Kwak, P.B. Cooney, D. Shea, and P.R. Lazaro. 2018. Contaminants in tropical island streams and their biota. Environmental Research 161: 615-623. http://www4.ncsu.edu/~tkwak/Buttermore%20et%20al%202018.pdf

Campbell, L.A. and J.A. Rice. 2017. Development and field application of a model predicting effects of episodic hypoxia on short-term growth of Spot *Leiostomus xanthurus*. Marine and Coastal Fisheries, 9: 504–520. http://onlinelibrary.wiley.com/doi/10.1080/19425120.2017.1362492/full

Engman, A.C., T.J. Kwak, and J.R. Fischer. 2017. Recruitment phenology and pelagic larval duration in Caribbean amphidromous fishes. Freshwater Science 36: 851-865. http://www4.ncsu.edu/~tkwak/Engman%20et%20al%202017b.pdf

Engman, A.C., J.R. Fischer, T.J. Kwak, and M.J. Walter. 2017. Diurnal feeding behavior of the American Eel *Anguilla rostrata*. Food Webs 13: 27-29. http://www4.ncsu.edu/~tkwak/Engman%20et%20al%202017a.pdf

Hain, E. F., Kennen, J. G., Caldwell, P. V., Nelson, S. A. C., Sun, G., and S. G. McNulty. 2017. Using regional scale flow-ecology modeling to identify catchments where fish assemblages are most vulnerable to changes in water availability. Freshwater Biology. 2017:00:1-18. https://doi.org/10.1111/fwb.13048.

Ivasauskas, T.J., W.N. Xiong, A.C. Engman, J.R. Fischer, T.J. Kwak, and K.R. Rundle. 2017. Relationships among catch, angler satisfaction, and fish assemblage characteristics of an urban small impoundment fishery. Journal of the Southeastern Association of Fish and Wildlife Agencies 4: 31-38. http://www4.ncsu.edu/~tkwak/Ivasauskas_et_al_2017.pdf

Lee Pow, C.S.D., J.M. Law, T.J. Kwak, W.G. Cope, J.A. Rice, S.W. Kullman, and D.D. Aday. 2017. Endocrine active contaminants in aquatic systems and intersex in

common sport fishes. Environmental Toxicology and Chemistry 36: 959-968. http://www4.ncsu.edu/~tkwak/Lee_Pow_et_al_2017a.pdf

Lee Pow, C.S.D., K. Tilahun, K. Creech, J.M. Law, W.G. Cope, T.J. Kwak, J.A. Rice, D.D. Aday, and S.W. Kullman. 2017. Windows of susceptibility and consequences of early life exposures to 17B-estradiol on medaka (*Oryzias latipes*) reproductive success. Environmental Science and Technology 51: 5296-5305. http://www4.ncsu.edu/~tkwak/Lee_Pow_et_al_2017b.pdf

Mycko, S. A., Kanno, Y., & Bettinger, J. M. (in press). Using angling and electric fishing to estimate Smallmouth Bass abundance in a river. Fisheries Management and Ecology.

Myers, B.J.E., A.J. Lynch, D.B. Bunnell, C. Chu, J.A. Falke, R.P. Kovach, T.J. Krabbenhoft, T.J. Kwak, and C.P. Paukert. 2017. Global synthesis of the documented and projected effects of climate change on inland fishes. Reviews in Fish Biology and Fisheries 27: 339-361. http://www4.ncsu.edu/~tkwak/Myers_et_al_2017.pdf

Owensby, D.P, J.A. Rice, and D.D. Aday. 2017. Mortality, dispersal, and habitat use of stocked juvenile Muskellunge *Esox masquinongy* in two western North Carolina Rivers. North American Journal of Fisheries Management 37(1):108-121, DOI: 10.1080/02755947.2016.1245222. http://onlinelibrary.wiley.com/doi/10.1080/02755947.2016.1245222/abstract

Pandolfo, T.J., T.J. Kwak, W.G. Cope, R.J. Heise, R.B. Nichols, and K. Pacifici. 2017. Declining occurrence and low colonization probability in freshwater mussel assemblages: a dynamic occurrence modeling approach. Freshwater Mollusk Biology and Conservation 20: 13-19. http://www4.ncsu.edu/~tkwak/Pandolfo_et_al_2017.pdf

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Milburnie Dam Removal Mitigation Bank Project Aquatic Species Monitoring Underway

Dam removals have become an increasingly popular compensatory mitigation option to offset unavoidable impacts to regulated aquatic resources in the Southeast. The interagency North Carolina Dam Removal Task Force (DRTF) was formed to prioritize dam removal and develop guidelines on how to demonstrate chemical and biological improvement and provided a mechanism for determining mitigation credits. The DRTF is comprised of staff from the N.C. Wildlife Resources Commission (NCWRC), N.C. Division of Water Resources (NCDWR), N.C. Division of Marine Fisheries, N.C. Division of Coastal Management, N.C. Natural Heritage Program (NCNHP), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and the U.S. Army Corps of Engineers (USACOE).

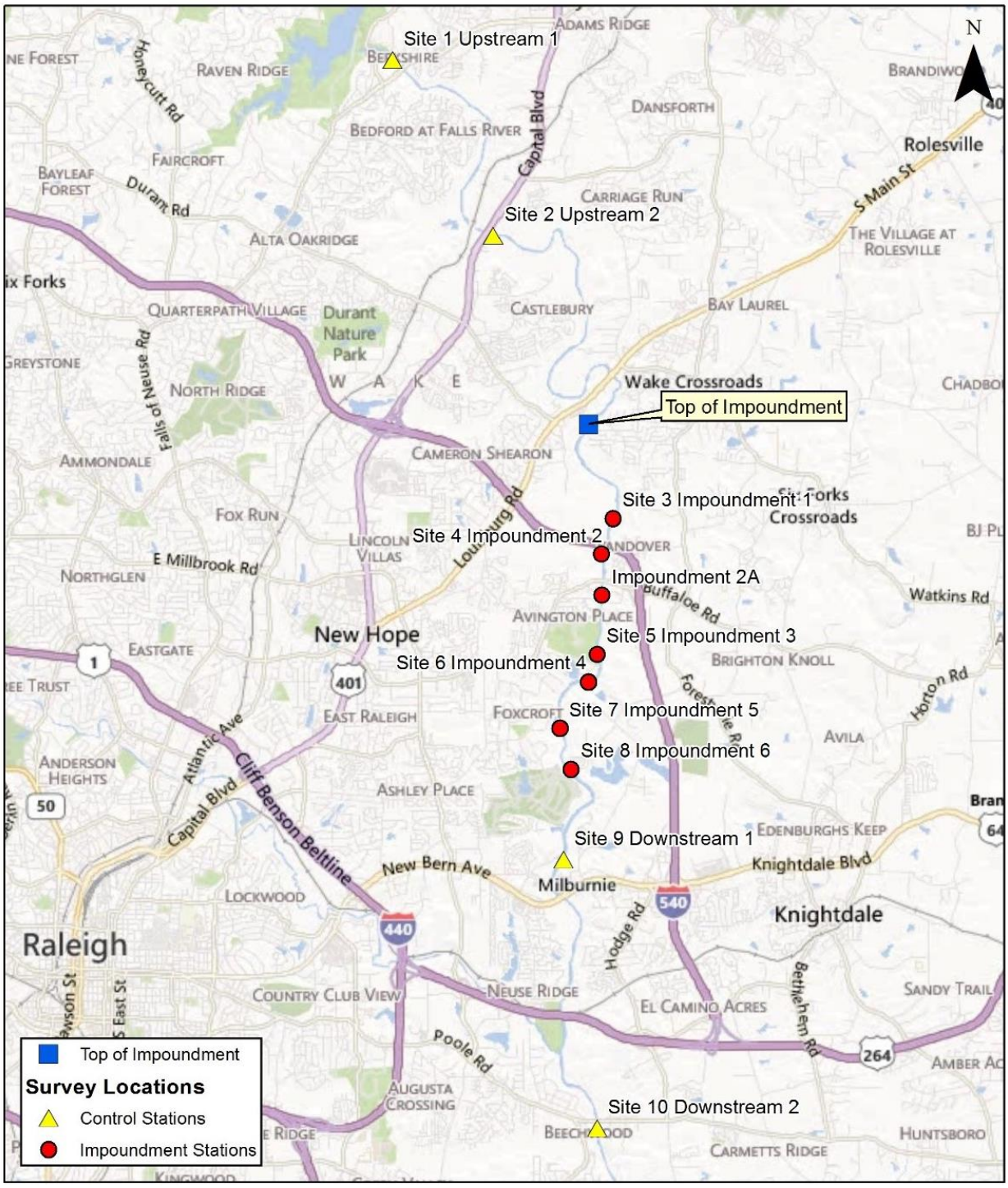
The monitoring guidelines, which include various success criteria that determine the amount and type of mitigation credits potentially awarded, have evolved over the years as projects have been implemented. The success criteria, or Performance Standards fall into three main restoration categories: 1) "appropriate aquatic community" criteria, 2) "Rare, Endangered and Threatened (RTE) Species and 3) water quality improvements. Additional site-specific mitigation credits can also be awarded from other benefits, such as restoration of anadromous species passage, demonstrated downstream benefits and human benefits such as independent research, or increased recreational value.

The Milburnie Dam on the Neuse River near Raleigh, North Carolina was removed in the fall of 2017 by Restoration Systems L.L.C (RS), the project sponsor, to establish the Milburnie Dam Mitigation Bank (MDMB). The goal of the project is to restore 32,590 linear feet of the Neuse River to pre-impoundment lotic conditions.

During the development of the project, pre-removal aquatic species surveys were conducted within the impoundment. These efforts were designed to characterize the aquatic faunal community and water quality conditions of the impoundment and compare them to un-impounded control sites upstream and downstream. The aquatic faunal groups targeted in the pre-removal surveys included freshwater fish, mussels, snails and macroinvertebrates.

Results showed marked differences in faunal composition within the impoundment compared to the control sites. In general, the un-impounded sites had higher overall species diversity, and higher number of RTE, and/or sensitive species across all faunal groups sampled than the impoundment sites. Using the results of the pre-removal surveys, project specific Performance Standards have been established by DRTF to document the success of the project, which will need to be demonstrated in a seven-year post-removal monitoring program. The “appropriate aquatic community” category consists of three components: mussels/snails, fish, and aquatic insects. The standards for mussels and snails are tied to increases in relative abundance, species diversity and percentage of habitat occupancy. Fish species metrics include darter species colonization, intolerant species colonization, adjustment in lotic species composition and increases in species diversity. Aquatic insect metrics include increases in lotic species and a percentage of filter/collector function feeding groups. The RTE category involves re-colonization, or expansion of particular fish and freshwater mussel species that are considered rare, threatened, or endangered in North Carolina, as well as the aquatic salamander *Necturus lewisi* (Neuse River Waterdog), which has been petitioned for federal listing under the Endangered Species Act. The water quality category is associated with increases in bioclassification levels. These performance standards must be met at a certain number of monitoring sites for a particular number of years to be considered successful and allow mitigation credits to be released.

The post-removal monitoring protocol will begin in 2018 and continue for seven years to determine if the project restoration goals are achieved. The locations of the monitoring sites are shown below.



As various success metrics have been achieved, mitigation credits will be released (in part). The total potential mitigation credits for this project are shown in Table 1.

Table 1. Milburnie Dam Mitigation Bank Potential Stream Mitigation Unit (SMU) Summary.

Credit Categories	Category Metrics	Credit Potential	Max Credit
Appropriate Aquatic Community	Mussels/Snails Fish Aquatic Insects	16,295 16,295 16,295	16,295
RTE	Habitat Associate Species Target RTE species	3,621 3,621 10,863	10,863
Water Quality	Aquatic Insects	5,432	5,432
Anadromous Fish Passage	Observation upstream of former dam	7,750	7,750
Downstream Benefits	Channel Geometry	500	500
Scientific Research	Dissertation and/or peer-reviewed publication	1,630	1,630*
		Max SMU Potential =	**40,840**

* These credits are only available if one or more of the General Criteria Performance Standards are not fully met and total awarded credits are less than maximum potential credit, 40,840.

While not part of the performance standards, Restoration Systems undertook a mussel salvage effort to lessen the loss of individual mussels. The salvage of mussels will not only reduce losses to the mussel fauna in the impoundment, but may also accelerate population expansion in the restored reaches by providing a parent stock. Two state threatened mussel species, Triangle Floater (*Alasmidonta undulata*) and Eastern Lampmussel (*Lampsilis radiata*) that occurred within the current impoundment are a component of the rare, threatened, and endangered species (RTE) success criteria.

Mussel salvage efforts took place on September 25, October 5, and October 11, 2017, as the reservoir was being dewatered. The salvage efforts were led by Three Oaks Engineering personnel Tim Savidge on September 25 and October 5 and Tom Dickinson on October 11 and utilized volunteers from the North Carolina Wildlife Resources Commission (WRC), the Neuse River Waterkeeper (NRW), North Carolina Department of Transportation (NCDOT), Appalachian State University (ASU), and North Carolina State University Student Subunit of the North Carolina Chapter of the American Fisheries Society (NCSU-AFS). The participants in the salvage effort are listed in Table 1 along with their affiliation.

Table 2. Mussel Salvage Personnel.

Name	Affiliation	Salvage Effort Date 2017
Tom Dickinson	Three Oaks	October 11
Nathan Howell	Three Oaks	September 25, October 05
Tim Savidge	Three Oaks	September 25 October 05
Chris Sheats	Three Oaks	October 11
Tom Fox	NCWRC	September 25
Zoe Nichols	NCWRC	September 25
Matthew Starr	NRW	September 25
Matt Haney	NCDOT	October 11
Mike Sanderson	NCDOT	October 05, October 11
Alden Sanderson	~	October 05
Freddy Ortega	ASU	October 05
Vincent Santini	ASU	October 05
Matthew Aupperle	NCSU-AFS	October 05
Sean Buczek	NCSU-AFS	October 05
Bobby Cope	NCSU-AFS	October 05
Stephen Parker	NCSU-AFS	October 05
Meredith Shehdan	NCSU-AFS	October 05
Bryn Tracy	NCSU-AFS	October 05
William Wood	NCSU-AFS	October 05

Since mussels occurring within the reservoir pool were largely restricted to bank habitats, the first salvage effort took place at the beginning stages of the removal process when water levels first began to drop, and the subsequent efforts followed and were scheduled in coordination with Restoration Systems staff based on the changes in water level since the preceding salvage effort.

The salvage protocol involved floating (canoe or kayak) the impoundment and collecting stranded (Photograph 1) or soon to be stranded mussels along both banks and moving them further into the channel to areas that will retain water.

Photograph 1. Stranded Eastern Elliptio along recently dewatered bank in former Milburnie Impoundment

A total of 569 individual freshwater mussels comprising six species were salvaged from dewatered areas within the former impoundment and moved further into the channel to areas that are expected to retain water. Numerous fresh dead individuals were also observed along the banks, most of which appeared to have been preyed upon by Raccoon (*Procyon lotor*), although some appeared to have died as a result of desiccation. The number of dead mussels found were not recorded; however, there were significantly more (estimated 3-4 times as many) live individuals observed than dead. Additionally, there were several mussel "crawls" observed, where mussels had moved through the substrate in response to falling water levels. Those individuals were not moved to deeper water if it appeared that they could continue to move into the channel; however, if there appeared to be an obstruction to further movement (logjam, rocky barrier, etc.), the mussels were moved. The species salvaged in order of abundance are Eastern Elliptio (*Elliptio complanata*), Eastern Lampmussel, Paper Pondshell (*Utterbackia imbecillis*), Eastern Floater (*Pyganodon cataracta*), Triangle Floater, and Variable Spike (*Elliptio icterina*). The totals for each salvage effort are shown in Table 3.

Table 3. Live Mussels Salvaged from former Milburnie Dam Impoundment.

Species	**09/25/2017**	**10/05/2017**	**10/11/2017**	**Total**
Alasmidonta undulata	2	35	2	**39**
Elliptio complanata	82	227	64	**373**
Elliptio icterina	0	3	0	**3**
Lampsilis radiata	9	75	5	**89**
Pyganodon cataracta	0	19	2	**21**
Utterbackia imbecillis	6	34	4	**44**
Total	**99**	**393**	**77**	**569**

While the salvage efforts did not provide 100% coverage of the entire length of the impoundment, a large number of mussels were salvaged that otherwise would have died following the dewatering. The majority of these individuals are expected to survive and will serve as parent stock for colonization of the newly restored lotic habitats within the former impoundment. Photographs of some of the species salvaged and select habitat photos are provided below (Photographs 2 – 7).

Photograph 2. Triangle Floater salvaged from dewatered bank in Neuse River

Photograph 3. Eastern Lampmussel salvaged from dewatered banks in Neuse River

Photograph 4. Freshwater mussel "crawl" in response to lowering water level

Photograph 5. Searching for stranded mussels on newly exposed bank

Photograph 6. Newly exposed bank in former Milburnie impoundment

Photograph 7. Milburnie Dam during the dewatering process

Additional information about the Milburnie Dam Removal Project can be found at: www.milburniedam.com

https://milburniedam.com/wp-content/uploads/2017/10/MilburnieDam-MediaKit-Final-2.pdf

http://www.newsobserver.com/news/local/counties/wake-county/article186704673.html

https://www.facebook.com/RestorationSystems/

Submitted by Tim Savidge and Tom Dickinson of Three Oaks Engineering

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Call to Action!

If you want to contribute, have a story idea or would like us to include something in next quarter's newsletter, e-mail Kevin Hining kevin.hining@ncwildlife.org or give him a call at 336-213-9692. Also, if you want to become more involved with one of the many great NCAFS committees then please check the link below for information about each one, contacts, etc., https://nc.fisheries.org/who-we-are/committees/

Valuable Links

The American Fisheries Society Home Page offers a wealth of links to assist you in your fishy endeavors. Information on ordering AFS books, annual meetings, chapter links and joining the AFS can be found there.

This and archived NCAFS newsletters, along with links, chapter information, and upcoming meetings, can be found on the NCAFS website.
