



Tennessee Chapter American Fisheries Society Newsletter



Winter 2020-2021

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Jan 31 Award Nominations
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meeting begin

Officers

President— Mark Rogers
President-Elect—Cole Harty
Treasurer/Secretary—Shawna Fix
Past President— Brandon Simcox

<https://units.fisheries.org/tn/>

PRESIDENTS MESSAGE

Dear Tennessee Fish Colleagues,

This time last year, nobody could have predicted what the year 2020 would be like. In our December 2019 newsletter, Past-President Brandon Simcox hoped we all had “a safe and productive year”. That message has not changed, but DANG! If we could have placed all our Chapter savings on a bet that there would be no NCAA basketball March Madness Champion or any game winners we would have either been laughed out of the casinos or started hosting our meetings at all-expense paid resorts. The past year has flown by in some respects and dragged on in others. We had a great meeting planned for Gatlinburg for March 2020 and then stuff happened. The ExCom had to make a hard decision and I think we were ahead of the curve in cancelling. Much thanks to the Edgewater Hotel and Conference Center in Gatlinburg for their understanding of our canceling and releasing us from contract obligations.

Despite the meeting cancellation, we still conducted a successful business meeting. Brian Alford was awarded Outstanding Fisheries Scientist in recognition for his contributions to fisheries education and research in the State of Tennessee. No other awards were given out. There were officer and committee changes. Brenda Pracheil finished her term on the ExCom, Mark Rogers accepted the Presidency from Brandon Simcox, and Cole Harty became President-Elect. Will Collier had been serving as Awards Chair for several years and Meredith Harris took over that role and is the sitting Historian and Awards Chair. Fishing derbies were canceled, and thus, there were no financial contributions to those or student presentation awards. While expenses were low, there was also no fundraising through workshops, meeting registrations, or an auction.

For our 2021 Meeting, the TN AFS ExCom has decided to host a virtual meeting. The meeting is scheduled for **February 25-26**. All of us want to see each other's faces and we will miss the interpersonal chats and interactions. There will be a student presentation session, a professional symposium, posters, awards, and great science shared. It will be a bit different, yet successful. The Southern Division of AFS has also decided on a virtual format, **April 6-9**. Please try to block those dates on your calendar, attend, and contribute a talk or poster. Registration, the call for award nominations, and abstracts submission information for the TN meeting are below in this newsletter.

I am hoping that virtual meetings will allow a better opportunity for professionals and students that have travel limitations or conflicts to tune in, learn, and share their projects and science. It should be a great opportunity for those that don't like standing in front of a crowd to sit in a comfortable setting and basically talk to themselves about the cool stuff they are doing. Any complaints about the food service or beverage options this year is your own fault.

Getting back to my introduction on predicting the future, many times that is what is expected of us by constituents, politicians, agencies, students, and other stakeholders. Will this species go extinct? Will this invasive species ruin our aquatic ecosystems? Is fishing going to get better? Is this, that, or the other problem going to go away? Can you fix this? I am not aware that any of us have a crystal ball, yet we strive to use data and science to do our best for conservation and management. We don't get the forgiveness that weather forecasters do and many folks we are responding to have already made their own conclusions... We should be proud of what we do and a lot of the process of doing better is learning from others. That is what AFS (see mission statement below) and these meetings are about; to learn and share with others so we can all keep improving. I encourage you all to keep on keeping on and I'll see you on the radio (or WebEx or Zoom).

The mission of the [American Fisheries Society](#) (AFS) is to improve the conservation and sustainability of fishery resources and aquatic ecosystems by advancing fisheries and aquatic science and promoting the development of fisheries professionals.

--Mark Rogers

Annual Chapter Meeting: February 25-26, 2021 –Virtual

The Tennessee Chapter of the American Fisheries Society will hold its 2021 annual meeting February 25-26th 2021 virtually! More information about the meeting and how to get registered will be posted on the Tennessee Chapter website <https://units.fisheries.org/tn/>.

****CALL FOR ABSTRACTS** Abstract deadline – February 1, 2021**

The Tennessee Chapter of the American Fisheries Society will be hosting a special symposium session with select talks focusing on "Emerging Issues and Past Lessons Learned". This is the same symposium that was originally planned for the 2020 meeting. The 2021 symposium talks will raise awareness of new threats to fisheries and conservation in Tennessee (or nearby states). Presentations highlighting past issues of high importance and solutions and lessons learned are also encouraged. We hope for a diversity of submissions from agency, NGO, and university members so we can raise awareness of resource challenges.

We strongly encourage submissions to be included in this symposium, but the meeting will also feature presentations outside the scope of the topic.

Oral presentations should be no more than 15 minutes (including time for questions and/or discussion).

Poster presentations will look a little different this year. Individuals will be expected to submit a pdf of their poster before the meeting and will present their poster live during the virtual meeting. Presenters

will need to prepare a 2-3 minute “lightning intro” to spark interest in their posters during the meeting. Posters will be distributed in electronic form prior to the meeting to all attendees.

Abstract Submission

Those who wish to give an oral or poster presentation at the 2021 TN AFS Virtual meeting are required to submit abstracts by **February 1, 2021**. See website <https://units.fisheries.org/tn/> or e-mail Cole Harty if you have questions about the meeting or abstract submissions. Please follow these instructions for submission:

Send abstracts as a MS Word document in an e-mail to Cole Harty at cole.r.harty@tn.gov with subject line: “TNAFS2021: author names in your abstract” (e.g., TNAFS2021 CampbellCristobal)

Use the same name for the abstract file (e.g., TNAFS2021 CampbellCristobal).

Please include the associated information requested below with the abstract.

Abstract Format

Abstract word limit is 250 words and should include the following information:

Presenter: Matt Campbell
Email: Matt.Campbell@iastate.edu
Author(s): Campbell, M.A.¹ and M. Cristobal²,
¹Affiliation with address.
²Affiliation with address.

Title: Cyclones vs. Ducks in Fiesta Bowl!

Abstract: 250 word maximum

Student Presentation: Yes or No

Presentation type: Oral or Poster

Would you like to be considered for symposium? Yes or No

Are you willing to be a judge? Yes or No

If so, oral presentation or poster?

Contact President-Elect, Cole Harty, cole.r.harty@tn.gov with any questions.

Student presenters are invited to compete for the Best Student Paper and Poster Awards. Professional presenters are invited to compete for Best Symposium Paper and Poster Awards.

REGISTRATION--Due by Feb 22nd, 2021

Registration will be simple this year. In order to still fund our student presentation awards and raise money for our future SDAFS meeting, we will be charging \$10 for students/retirees and \$25 for professionals. Visit <https://tnafs.square.site/> to register. Please remember to also pay your annual dues. If anyone has registration questions or financial concerns (especially students), please contact Shawna Fix at smitchell@tnaqua.org.

Award Nominations!

Our membership is full of dedicated professionals, and it's time to recognize them for their efforts. Please review the award criteria below and send nominations to Meredith Harris mhh@tnaqua.org by **January 31st**. Applications should be limited to one page.

Lifetime Achievement Award

Nominee should either be retired or within five years of retirement and have had a long history of significant contributions.

Distinguished Service Award

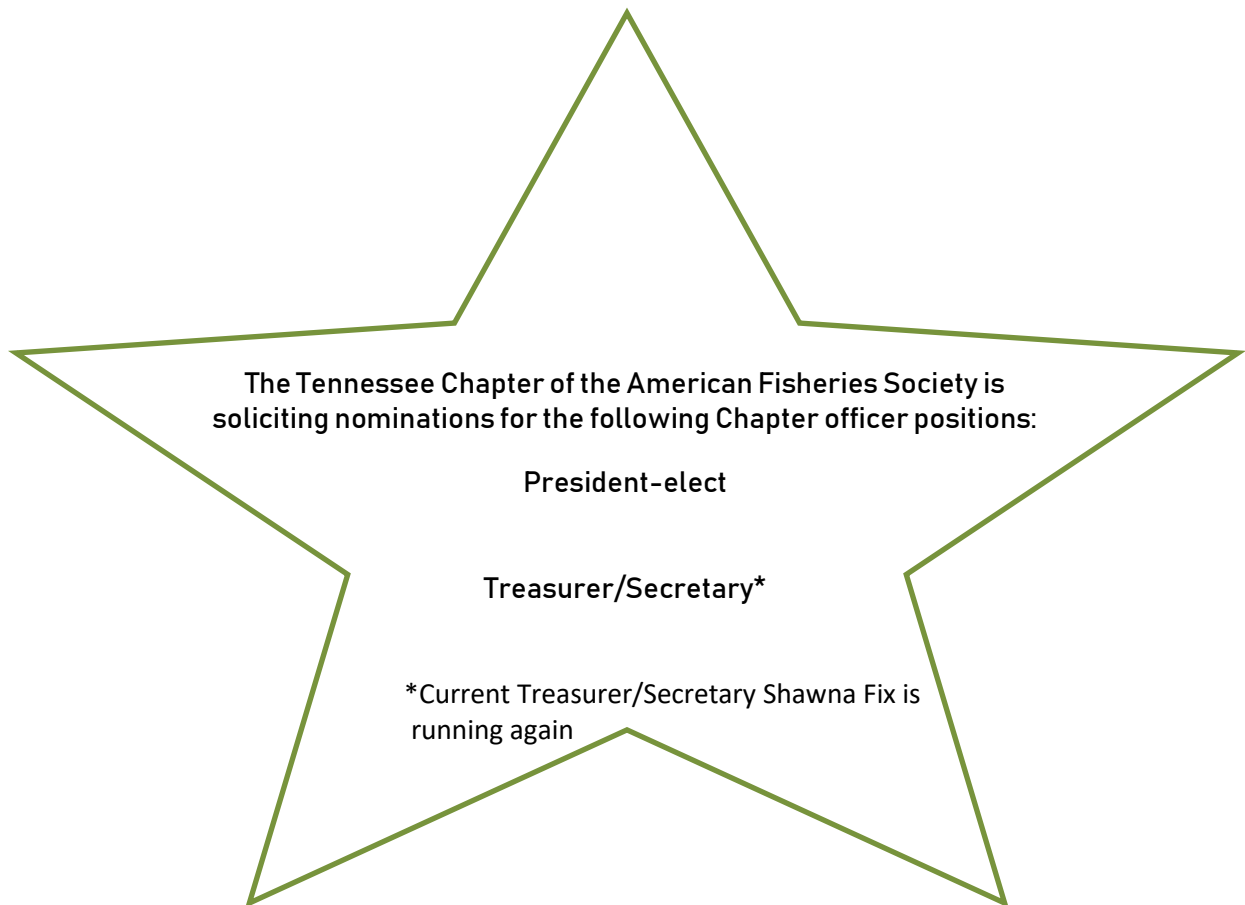
To be bestowed on individuals that served as a Chapter officer for more than five years or served the chapter as chair of a long-standing Chapter committee for more than five years.

Outstanding Fisheries Scientist

To be bestowed on the biologist in their early to mid-career for making significant contributions in the past year or over several years.

Friends of Fisheries Award

This award shall be made to non-Chapter member(s) who have distinguished themselves by service or commitment to the Chapter or the fisheries resources of Tennessee.



Student Updates

University of Tennessee–Knoxville Student Sub-Unit

By: Kyler Hecke, UTK AFS Student Subunit Grad. Student Representative

The **University of Tennessee–Knoxville (UTK) AFS student subunit** is part of a joint organization with the UTK student chapter of the Wildlife Society. Together, this organization is called the UTK Student Chapter of the Wildlife and Fisheries Society (UTKWFS), with around 100 members. We have had a busy, yet successful year since our last update for the newsletter. Like many other subunits, the COVID-19 pandemic has caused us to move towards communicating and interacting “virtually.” While our subunit was unable to go to some conferences and had to cancel some volunteer events due to this pandemic, we did our best to be a “virtually” active subunit.

In January, we had a few members help Tennessee Wildlife Resources Agency with Rainbow Trout stockings and creel surveys in a community pond in Maryville, TN. We hosted our 2020 UTK Wild Game Dinner in mid-February, a public event where various types of wild game are cooked multiple ways and served at a buffet-style dinner. At this event, we have a live and silent auction, and proceeds from the wild game dinner provide funding to send members to professional meetings and other events throughout the year. We had a successful wild game dinner this year. In late February, we were able to send



Our members that attended the 2020 SDAFS meeting in Little Rock, AR. (Photo by Derek Owens)

some members to the 2020 SDAFS annual meeting in Little Rock, AR, where they presented their research, attended scientific talks, and attended professional-development workshops. During the month of March, many of our members aided a grad student with their research on Sickle Darters. At one of our March bi-weekly meetings, we were able to host **Gerry Dinkins**, the Curator of Malacology at the McClung Museum of Natural History and Culture. Mr. Dinkins gave an outstanding presentation on his work with mussels. April was a busy month for our subunit, we hosted a virtual “Snorkeling for Science” workshop for our subunit; five members participated in the virtual workshop. The workshop was taught by our grad student representative, **Kyler Hecke**. In late April, we were able to do a virtual educational-outreach seminar on stream ecology for science classes at William Blount High School in Maryville, TN. Our subunit ended the semester by holding online officer-elections. Our officers for the 2020-2021 school year will be: **Andrew Julian** as President, **Gus McAnally** as Vice-President, and **Kyler Hecke** as Grad. Student Representative. Over the summer, most of our members worked summer internships, jobs, or undergraduate research projects. During the summer, we also created a Twitter page to share all the events our members are doing, follow our student subunit page by searching “@utkwfs” on Twitter.

We kicked off the new school year by hosting a back-to-school virtual meeting on Zoom for everyone to meet our new officers and members. During the fall semester, we had bi-weekly zoom meetings during for our members so we could keep them engaged and involved. In late August, some of our members volunteered with a graduate student to track the movement of the rare Sickle Darter. Also, in late August, our members participated in the American Fisheries Society's "Day of Service-Virtual Stream Cleanup" by hosting a stream cleanup on Third Creek at Vestal Park. In September, many of our members volunteered with sampling and fish



Members participating in a stream cleanup on Third Creek Tyson Park as a part of the American Fisheries Society's "Day of Service-Virtual Stream Cleanup". (Photo by Gus Engman)

translocations as a part of the Pigeon River Recovery Project associated with the Pigeon River. In September, we hosted a virtual professional development workshop taught by graduate students in the department of Forestry Wildlife and Fisheries (FWF) at UT, the workshop was titled "Going to Graduate Workshop and Q&A" and was attended by 21 members. Also, in September, some of our members participated in the 2020 Virtual AFS Meeting and presented on their research and participated in professional development workshops. During the month of October, we hosted another virtual professional development workshop that was taught by graduate students in FWF at UT, the workshop was titled, "Resume and Cover Letter Building and Critiquing" and was attended by 21 members. We were able to pay for 5 of our members to virtually attend the 2020 Southeastern Association of Fisheries and Wildlife Agencies Annual Meeting at the end of October, where members attended scientific presentations and student workshops. In early November, we hosted a virtual professional development workshop that was taught by **Dr. Lisa Muller**, the workshop was titled "Diversity and Inclusion in Natural Resources:" and was attended by 10 members. Also, in November, we had a seminar speaker during each of the bi-weekly meetings for that month. At one meeting, we had **Daryl Ratajczak**, the National Wildlife Program Leader for the Bureau of Land Management, and we had **Tami West** an aquarist at Ripley's Aquarium of the Smokies as a seminar speaker for our other meeting. As the semester winds down, our members are gearing up for Lake Sturgeon sampling once again and preparing for a busy spring of staying an active subunit.

Tennessee Tech University Student Sub-Unit

By: Mark Rine; TN Tech University Representative

2020 has been a year of challenges and adjustments, but with perseverance, our **Student Fisheries Association** chapter has worked diligently to attend virtual conferences and plan for future events in 2021. Although several of our events were canceled this year, we are already planning for the fishing derby and fish fry in hopes that they will happen in the Spring of 2021. Our attention and efforts were redirected this year to increase our member numbers and to strengthen our organization's structure from the foundation up. Our executive board has worked together to create a better experience and stronger communication for our members.

In February, two of our members attended the Southern Division Meeting in Little Rock, Arkansas. **Aaron Coons** presented his ongoing research with a poster, *Habitat Use of the Longnose Darters (Percina nasuta), in Missouri*. Our subunit was also able to assist the Tennessee Wildlife Resources Agency with building and placing fish attractors throughout Fall Creek Falls Lake in Spencer, TN.

Tennessee Tech was also able to host a Rare Fishes Meeting in March, which allowed many of our members to attend and interact with local biologists. Four graduate students were also able to present, including **Abbey Holsopple** and **Adam Walker**, who discussed their ongoing research, *Project Plans; Distribution, Habitat Use, and Population Status of the Striated Darter, Etheostoma striatum, in the Duck River System, TN*. **Aaron Coons** was also able to give an oral presentation for his longnose darter research. **Jennifer Caudle** presented a portion of her thesis work, *Temporal Changes in Freshwater Fish Communities: Implications for Management and Conservation*.

A few of our members completed summer internships with Tennessee State Parks and the Tennessee Wildlife Resources Agency

throughout the summer. The graduate students continued to work on their field research, which spans from endangered species work to nutrient composition and covers several different states, including Tennessee, Virginia, and Missouri.

In September, **Aaron Coons** was also able to present his oral presentation, *Habitat Associations of Longnose Darters (Percina nasuta), in the St. Francis River, MO*, at the AFS virtual meeting. He also received the AFS Best Student Paper Award!

In October, **Brittany Bajo** received the Student Research Scholarship Award through the Organization of Fish and Wildlife Information Managers (OFWIM). She attended their virtual conference and presented a side project titled *Field Validating a Suitable Habitat Model for Freshwater Mussels of the Gasconade River, MO*.

November's Southeastern Fishes Council virtual conference was attended by many of our members. **Aaron Coons** presented his oral presentation again and received the 3rd place award for the Dave Etnier Best Student Oral Presentation Award. **Mark Thurman**, the fisheries program manager at Tennessee Wildlife Resource Agency, was also able to visit the SFA chapter and discuss the ongoing management and research for the Alabama bass, *Micropterus henshalli*.

This month 2 of our members were also able to give hybrid seminars that allowed the students, staff, and community to attend both in-person with social distancing measures and virtually using Zoom. **Jennifer Caudle** presented a portion of her thesis, *Managing Freshwater Fish Communities: Evaluating Evidence of Temporal Change and Predicting Biotic Integrity*. **Parker Hildreth** presented his undergraduate research, *Faxonius placidus: A model for integrative species delimitation of stream-dwelling crayfish*.

Tennessee Tech University Grad Student Project Update

By: Tom Flanagan

In Tennessee, trout anglers represent 15% of all freshwater anglers and make an estimated 1.4 million trips per year, accruing an estimated expenditure of \$53 million. Tennessee Wildlife Resources Agency (TWRA) stocks approximately one million trout into tailwaters each year, creating and maintaining angling opportunities throughout Tennessee. Two popular tailwaters stocked with rainbow trout (*Oncorhynchus mykiss*) are Norris on the Clinch River and Fort Patrick Henry located on the South Holston River. Previous studies conducted in the Norris tailwater state that stocked catchable rainbow trout experienced poor survival and did not contribute to the hold over fishery whereas stocked fingerling rainbow trout experienced higher survival. Both the Norris and Fort Patrick Henry tailwaters have documented natural reproduction of rainbow trout. This study aims to estimate survival and recruitment of stocked rainbow trout in the Norris and Fort Patrick Henry tailwaters and evaluate how stocked fingerlings, stocked catchables, and naturally reproduced rainbow trout contribute to the fishery. We also want to determine if growth rates between stocked fingerlings, stocked catchables, or naturally reproduced rainbow trout differ. In 2019, Rainbow Trout fingerlings (n=111,417) and adults (n=10,175) were marked to distinguish hatchery fish from wild produced fish. The fingerlings were released into the Norris tailwater at three sites and the adults were released into Fort Patrick Henry tailwater. Rainbow Trout fingerlings (n=8,445) were marked and stocked into the Fort Patrick Henry tailwater. In 2020, Rainbow Trout fingerlings (n=17,986) and adults (n=10,456) were tagged with coded wire tags in the right cheek. The fingerlings were stocked in the Norris tailwater and the adults were stocked in the Fort Patrick Henry tailwater. Rainbow trout fingerlings (n=7,910) were tagged via coded wire tags. Coded wire tags were used to distinguish cohorts between stocking years. Stocking numbers vary for the Norris tailwater fingerlings due to hatchery shutdowns related to the Covid-19 pandemic. Rainbow Trout in both the Norris and Fort Patrick Henry tailwaters were collected using backpack and boat electrofishing equipment. Captured fish were measured (mm), weighed (g), checked for marks and coded wire tags, PIT tagged, then released. Both hatchery raised fingerlings and naturally reproduced fingerlings were captured in the Norris tailwater; the bulk of fish captured were unmarked Rainbow Trout. A substantial number of hatchery raised catchables were captured in the Fort Patrick Henry tailwater and no hatchery raised fingerlings were captured. A small number of naturally reproduced fingerlings were captured in Kendrick Creek while backpack shocking. Preliminary results indicate the Norris tailwater Rainbow Trout population is supported by natural reproduction whereas the Fort Patrick Henry tailwater population is heavily supported by the stocking of catchable Rainbow Trout. Further analysis needs to be performed to determine survival, recruitment, and growth estimates for both tailwaters. Capture rates were low for marked fish, so an extension of this project will be needed to gain population parameters from the mark-recapture study. The results from this study will inform TWRA managers if stocking regimes are supporting the trout fisheries and are cost effective for Norris and Fort Patrick Henry tailwaters. Results from this study could influence future stocking numbers and sizes of Rainbow Trout in the Norris and Fort Patrick Henry tailwaters. This project will be extended for another 2 years to track PIT tagged fish, increase capture rates of marked fish, and explore fish movement throughout the tailwaters.

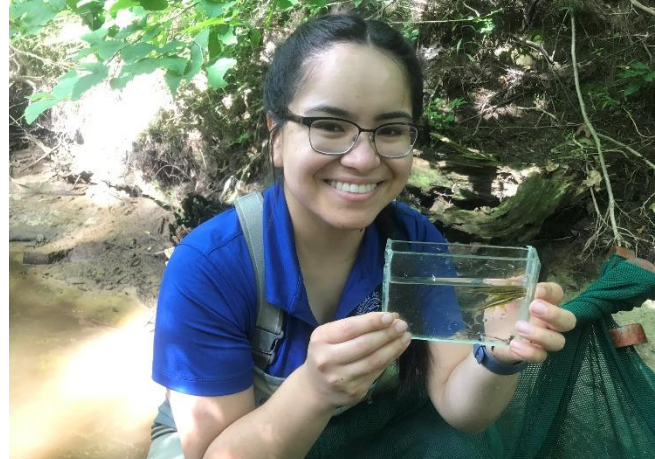


Professional Updates

Tennessee Aquarium Conservation Institute (TNACI)

By: Shawna Fix and Meredith Harris ; TNACI

Despite the pandemic, TNACI has been able to continue on with their conservation work. Surveys for Laurel Dace have expanded outside of their historical range with the help of some predictive modeling. So far, no new populations have been found however this work will continue into 2021. A few young of the year were found in Horn Branch, a stream in the southern population, reviving hope that the southern population still persists. Prior to this, southern population Laurel Dace had not been seen since 2014. Despite this great news, one stream in the northern population of Laurel Dace was found to be heavily infested with a trematode parasite. It is unknown exactly what effect these parasites will have on the fish, but we are working with Auburn's parasitology lab to look into the species of trematode and come up with a plan of action to study and potentially mitigate this threat. We owe a huge thanks to all of the volunteers that helped in the field this summer! We could not have done it without them.



Research technician, Fabiola Lopez, with her first Laurel Dace!

In TNACI's Propagation Room, over four hundred Southern Appalachian Brook Trout were propagated and released into Shell Creek in June with the help of Trout Unlimited and TWRA. This is the first stocking of Shell Creek since eradication of nonindigenous trout earlier in the year by TWRA. Unfortunately, for the first time in twenty years, no Lake Sturgeon were spawned by the Southeastern Lake Sturgeon Working Group. While TNACI certainly felt a lot emptier without the usual 1500 tiny juveniles as a result, we were not totally sturgeon-less as a little over a hundred were held overwinter from 2019. These individuals came in very useful after the team identified an effective means of detecting the rate of after the discovery of autopolyploidy – a genetic condition in which embryos retain an extra set of the mother's chromosomes usually as an artifact of mechanical shock during artificial fertilization – in the reintroduced fish. In August, blood was drawn from all 106 sturgeon and sent to Warm Springs Fish Health Lab where samples were run through the Coulter Counter Analysis. This first look at the rate of autopolyploidy in the propagated sturgeon revealed that under 2% of this random sample possessed the extra chromosomes. Further sampling will determine whether similar rates exist across different age classes. After the results came in, all but the two autopolyploids and two cohorts with normal ploidy were released into the Tennessee River so they may fulfill their role in the ecosystem!

The University of Tennessee

New Assistant Professor Dr. Gus Engman

Gus Engman is a new member of the Tennessee Chapter of the American Fisheries Society. He joined the department of Forestry, Wildlife and Fisheries at the University of Tennessee in June as an Assistant Professor of fisheries conservation and has already taken on the role of faculty advisor to the UT student subunit. Gus has been active at multiple levels of AFS throughout his career, including as president of the Puerto Rico chapter, organizer of the 2018 SDAFS meeting in Puerto Rico, and as a member of the international fisheries and education sections. Gus moved to



Knoxville from Raleigh where he completed his PhD and postdoc in the USGS Fish and Wildlife Coop unit at NC State University studying the fishes of Puerto Rico's rivers, streams, and estuaries. His research most commonly addresses the influences of anthropogenic stressors like urbanization, dams, and climate change on inland fish assemblage structure and fisheries. Currently, Gus is the principal investigator of the Pigeon River Recovery project and is very excited about initiating new research in the amazing aquatic biodiversity hotspot that is the state of Tennessee.

Pigeon River Recovery Project

By: Justin Wolbert; Pigeon River Recovery Biologist

The 2020 Pigeon River Recovery Project (PRRP) was impacted by COVID-19, just as I assume everybody's field seasons were. The annual planning committee meeting and several field efforts were canceled, but there were several successful events that persisted later in the summer. The Pigeon/Little River IBIs took place and we found a Swannanoa Darter at the Denton site for the first time since 2009. In October, approximately 400 Muskellunge were stocked in the Pigeon River, making this the third consecutive year for the species. In February, we received the first angler report of a Muskie being caught in the river. Successful translocation efforts were made from Wilhite Creek (Stripetail Darter) and the Nolichucky River (Bluebreast Darter).

In July of 2019, we placed 18 total mussel silos in the river containing *Villosa iris* (Rainbow Mussel) and *Alasmidonta viridis* (Slippershell Mussel) at three sites on the Pigeon River. Some of the *V. iris* were from the Marion, NC hatchery and others were wild stock from the Little Tennessee River. All of the *A. viridis* were wild stock from the Mills River in North Carolina. We extracted the mussels from the river in October



2020. We also returned to the original mussel collection locations in NC and collected more individuals for comparison. The goal of the study is to determine growth, survival, and fecundity and to investigate if hatchery-reared mussels differ from translocated wild individuals. We also teamed up with the UTK School of Veterinary Medicine to analyze gut microbiome, hemolymph, and histological samples from the specimens. Preliminary results suggest that all mussels were growing well and thriving with no signs of disease.

Tennessee Wildlife Resources Agency

TWRA Region I

By: Tim Broadbent; Regional Fisheries Manager

Region I continued maintenance of deep water fish attractors established lakewide and established additional shallow water fish attractors throughout the year. Those programs are very popular with anglers. Although we still work with wooden stakes, we are currently testing plastic structures in various designs. These plastic structures require less maintenance and allow the habitat crew to expand outside traditional sites and reservoirs. A couple of experimental styles below:



Region I just completed the sixth year of Florida largemouth bass stocking in Harmon Creek, Blue Creek, and Eagle Creek. Approximately 150,000 FLMB were stocked in 2015 - 2020. Future sampling efforts in these embayments will focus on growth rates within each stocked embayment and percent FLMB collected compared to baseline data.

As reported last year, silver carp have been collected in all Mississippi River tributaries, below the spillway at Reelfoot Lake and below Cheatham Dam. We have also collected silver carp below Pickwick Dam and commercial fishers have continued to collect bighead/silver carp in the Big Sandy area. The Agency developed an ACHIP program that contributes to the price/pound of Asian carp harvested by commercial fishers. The total harvest of Asian carp from Kentucky and Barkley reservoirs in the states of Tennessee and Kentucky has reached nearly 17 million pounds. Although the leading distribution edge has been documented to Wheeler Dam, densities have remained low in Pickwick Reservoir.

Federal grants have also been obtained to assist the wholesale fish markets with improvements including building walk-in freezers, storage buildings, improved road surfaces and loading docks for delivery trucks, and purchasing large ice machines, storage totes, forklifts, and pallet jacks.

Region I obtained funding from the USFWS to hire two interns to conduct larval light trap surveys and larval egg tows on Kentucky and Barkley reservoirs in 2017 - 2020. These collections have been conducted since 2017 and Asian carp reproduction has not been documented. The Agency will be contacting universities in 2021 to hire two more interns to continue sampling efforts. In addition to the intern positions, four new full time positions were approved by the Tennessee Fish and Wildlife Commission and should be hired in 2021.

In addition to silver carp, bighead carp, and grass carp, black carp fingerlings have also been documented in the Mississippi River. Black carp pose a threat to the native mussel populations and six adult black carp specimens have been collected from Tennessee waters (Reelfoot Lake, Kentucky and Barkley reservoirs). Region I personnel continue to attend Ohio River Basin and Lower Mississippi River meetings to discuss sampling strategies and funding possibilities to determine densities, effective sampling gear, and reproduction of Asian carp. Although adult populations have been documented in Region I waters, reproduction has not been recognized.

The Biological Acoustic Fish Fence (BAFF) has been installed at Barkley Lock since November 2019, but very few data points have been collected due to lightning strikes that damaged the electronics in March. In addition, Covid19 restrictions have prevented the contractors from travelling to service their equipment. BAFF utilizes sound, light, and bubbles to hopefully restrict movement of Asian carp from below Barkley Dam into Barkley Reservoir. Over 300 fish have been tagged below the dam and receivers have been installed in and above the lock to detect passage of fish thru the BAFF.

In addition to the standardized sport fish sampling in Region I waters, the Region I fisheries crews have developed standardized sampling surveys to determine how Asian carp densities may change over time. These surveys consist of sampling standardized areas with electrofishing gear and with experimental gill nets. Since the management of Kentucky and Barkley reservoirs is shared by the state of Tennessee and Kentucky, similar standardized sampling protocols were developed by each state.

The stream crews completed assigned surveys (sampled 30 streams and small rivers) and have established the "leading edge" of silver carp distribution in the major rivers, creeks, and streams feeding Kentucky Reservoir. As previously mentioned, larval light traps were set in Kentucky Reservoir from 2017- 2020 to monitor Asian carp reproduction; young-of-year fish have not been collected. However, silver carp from the 2015 year class continue to dominate the population. The locks at Kentucky and Barkley dams are heavily used for commercial navigation, resulting in over 6,500 lock openings per year. It is during these lock cycles that carp swim upstream into Kentucky and Barkley lakes, thus a low percentage of fish

collected during surveys have been from younger year classes. Asian carp will be our biggest management issue for the future.

Sauger were stocked in 2011 and that continued for five years. Due to low population numbers and low catch by anglers, walleye stocking will be initiated in 2020.

The state lakes and hatchery crews have worked to improve state lake facilities and evaluate fish populations. The Humboldt Hatchery is the largest in Tennessee and has been assigned the Florida Largemouth Bass program. The crew completed the FLMB rearing facility and produced over one million fingerlings in 2020. Sauger, catfish, blacknose crappie, sunfish, Florida LMB are the primary species raised at Humboldt and trout and alligator gar are also received and stocked from the hatchery. New stocking strategies may allow the hatchery to begin rearing striped bass and/or hybrid striped bass.

The winter trout program has also been a success in Region I and the Agency stocks approximately 12 small ponds throughout Region I with over 12,000 trout. We are currently evaluating stocking strategies and have been utilizing trail cameras to evaluate usage.

We are also working on developing new small impoundment stocking strategies to determine if lower numbers can continue to provide good densities, especially with catfish. This project utilizes summer sampling to determine catfish densities.

TWRA Region III

By: Travis Scott; Region 3 Rivers and Streams Manager

The much-anticipated results from a multi-year Brook Trout genetics report set the tone for Region III Rivers and Streams' wild trout work. Staff spent much of the sampling season conducting headwater distribution surveys of wild trout streams to look for potential barriers as well as describe linear ranges. Additionally, brood Brook Trout were collected from two streams and will be propagated at both Tellico Hatchery and TNACI. The information crews gathered in 2020--and over the last several years--will guide the stocking of fingerlings in 2021 and other Brook Trout restoration projects. In addition, Region 3 Streams worked closely with volunteers to develop a Fall trout fishery on North Chickamauga Creek that will hopefully become a new delayed harvest stream. Region 3 and Region 2 biologists worked to develop, implement, and evaluate a pilot Community Fishing Program for TWRA. Initial results appear promising and TWRA hopes to expand the Community Fishing Program throughout Tennessee.

TWRA Tellico Hatchery

By: Jon Ellis; Tellico Hatchery Manager

The Tellico Hatchery crew recently concluded their fall 2020 Southern Appalachian Brook Trout spawning efforts. Brood fish collected from the Gulf Fork tributaries and Rough Ridge were successfully spawned over the course of three weeks beginning 10/28/2020. While the Gulf Fork fish, which have been held at the hatchery over the last year to improve overall condition produced the majority of eggs; fish from Rough Ridge which were collected this fall were fecund and gave an impressive yield. In all 992 eggs from



Brook Trout brood stock at Tellico Hatchery

Gulf Fork and 678 eggs from Rough Ridge were fertilized. Currently all viable eggs are being observed and treated on a daily basis, as are the recovered brood. It is our hope that the current brood, some of which were immature, will continue to mature and increase the overall egg yield for future spawns.



Brook Trout fertilized eggs at Tellico Hatchery

Other activities include continuing improvements to the current Brook Trout hatchery system by utilizing equipment purchased this past year with grants obtained from Trout Unlimited and TVA. This process, which will continue into the first of the year, includes installing a new tank system, doubling our current carrying capacity. As well as the addition of a mechanical building outside the Brook Trout hatchery which will house a reservoir tank, water chillers, and newly purchased gas infusion system. Significant effort has been put into this new design, and we are optimistic that the end result will be a state of the art Brook Trout facility, capable of producing quality fish, as well as remain fully functional in weather conditions unsuitable for Brook Trout propagation.

TWRA Region IV Reservoir Management

By: John Hammonds; Reservoir Biologist

Douglas Walleye

Walleye have not been stocked into Douglas Reservoir since the mid 1980's and have been self-sustaining since that stocking. Douglas is the only reservoir in the state of TN with a self-sustained, naturally reproducing Walleye population. Due to angler concerns and lower catch rates in our sampling, Walleye were stocked into Douglas, April 2020. Hatchery and Reservoir Management crews are working with Dr. Rogers and Tennessee Tech University to determine stocking success of walleye fingerlings stocked onto an existing natural walleye population through DNA sampling. In order to determine success, DNA samples were taken from the existing Douglas walleye fishery prior to the stocking, each combination of parent stock used at Eagle Bend Hatchery, and will be taken from gill net sampling for the next several years. The future of Douglas Walleye stocking will be determined based on the results of the DNA samples and subsequent years of sampling.

Fort Loudoun Florida Largemouth

In 2015, Florida Largemouth Bass were introduced into Fort Loudoun Reservoir in hopes to enhance the existing Largemouth Bass fishery. Intentions are that Florida Largemouth will survive to reproduce and "backcross" with their northern counterparts, producing a larger, faster growing and more aggressive "hybrid" within the reservoir. Although the F1 produced from a Northern strain and Florida strain backcross is not a true hybrid, because Florida Largemouth are not considered a separate species, it is however, a sought after fish amongst the Bass fishing community. DNA results from spring 2020 Fort Loudoun electrofishing sampling indicated the presence of both F1s and "pure" Florida Largemouth Bass from a 50-fish sample of fish less than 8 inches, after 5 consecutive years of stocking. It will take several more years to determine if this project will produce a similar Largemouth fishery like Chickamauga.

Fish Habitat

The habitat crew was able to procure a barge with leftover TVA grant funds that will be critical to deploy and place the 150 reef balls that were constructed this past summer. Also, a grant from Kenny Chesney's "No Shoes Reef" Foundation was awarded to purchase additional reef ball molds that will increase habitat production in the future.



TWRA Region 4 new acquired barge for deploying reef balls and other habitat improvement structures

Creel Survey

Creel surveys were difficult to gather during the pandemic, but our creel clerks still managed to collect beneficial data, above and beyond the normally asked questions. The Norris Tailwater survey included questions specific to angler gear and an effort is being made to determine if water conditions, fishing tackle, and/or locations determine angler success. Musky, Crappie, and Walleye fisheries were discovered

in Chilhowee Reservoir due to creel surveys, that would have otherwise gone undetected with normal fish sampling. Crappie and Walleye were stocked into the reservoir immediately following a drastic drawdown for dam repairs and Musky are being stocked upstream by our North Carolina colleagues, and are making their way downstream.

TWRA Region IV Reservoir Management

By: Sally Petre; Streams and Rivers Biologist

The Region IV streams and rivers crew has been busy despite COVID-19 restrictions. Last spring we finished up our winter trout stockings in downtown Maryville (Pistol Creek and Greenbelt Lake) and Fountain City (Fountain City Lake), Tn. The Maryville stocking was evaluated with help from the University of Tennessee Fisheries Student Sub-Unit. These locations had some of the highest angler use rates compared to other surveyed winter trout locations across the state, however for this lake, catch rates were very low (0.25 fish/hr). Based on these data, we increased the stocking rate of the lake this winter and are doing creel to determine if this changes the catch rate. These intown stocking locations throughout the state have high angler satisfaction and help with the TWRA R3 initiative, by providing stockings during non-traditional seasons and places.

Our crew also hired two interns, **Jacob Mowery** (University of Tennessee) and **Adam Freshour** (Lincoln Memorial University) for our busy summer field season. Mowery and Freshour started their internship by stocking fingerling Brook Trout into Shell Creek in partnership with TNACI, USFS, and USFWS. This was one of two creeks stocked this year with native Brook Trout for the first time. The second was Green Mountain Branch in Shady Valley, Tn and was a translocation of fish from surrounding Beaverdam watershed tributaries selected based on data from the statewide Brook Trout genetics dataset.

Other projects our interns worked on were age-growth analysis on Smallmouth Bass in our rivers, fish distribution and IBI surveys on warmwater streams in the Upper Cumberland Watershed to help document presence of Rainbow Darter, which seems to be increasing in abundance and range as compared to other native species like Emerald Darter, and many other projects.

A culvert replacement project was also completed this year. After finding federally endangered Cumberland Darter, federally threatened Blackside Dace and state listed in need of management Cumberland Arrow Darter in the scour pools and riffles of an impaired road/stream crossing on Hatfield Creek in Campbell County, Region IV biologists worked to improve the crossing for fish passage. We partnered with USFWS (Partners for Fish and Wildlife and Southeast Aquatic Resources Partnership programs), Campbell County Roads Department and TDOT to replace the culverts with a bottomless arch bridge. Campbell County Road Superintendent, Ron Dilbeck said the old crossing washed away multiple times a year costing thousands of dollars each time, not to mention leaving residents stranded until waters receded. This was a win-win-win for the fish and habitat, the local residents, and the county.



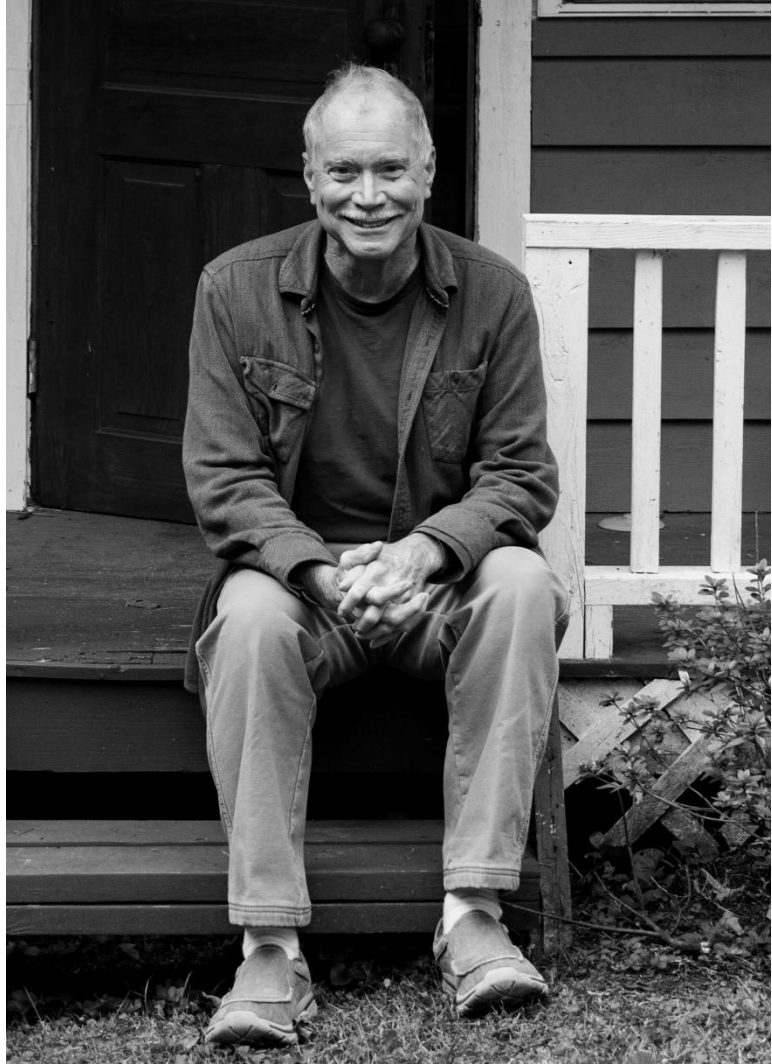
Before (left) and after (right) photos of the culvert replacement project on Hatfield Creek and Baird's Creek Rd. in Campbell County.

Tribute to Dr. Richard Strange

By: Jim Habera; TWRA

When Dr. Richard Strange called me just before Thanksgiving, I thought it was to plan a long-overdue fishing trip. Unfortunately, he wanted to let me know that he had developed a terminal condition and did not have much time remaining. Despite the circumstances, he was his typical upbeat self and I had hoped to see him again while there was time, but it was not to be. It came as shock when I received word just before Christmas that he had passed.

Dr. Strange was a long-time faculty member with the University of Tennessee's Forestry, Wildlife, and Fisheries (FWF) Department. During that time, he was also an active member of the Tennessee Chapter and served as editor of this newsletter for many years until his retirement in 2018. I met him as a new undergraduate student at UT in 1982. My first impression was that he had an unsurpassed ability to relate humorous stories from his personal life—as anyone who's had one of his classes will know. Richard was interested in trout biology and management and was an avid angler, so we naturally became friends. When I was ready to enter graduate school in 1985, he had a Brook Trout project available, so it was an easy decision to work together. We later continued that collaboration when I returned to the FWF Department during 1990-1998 as a research associate on the 'Wild Trout Project'—a cooperative effort with TWRA.



Our professional relationship and friendship further developed during those years and we spent a lot of time fishing locally and at the Outer Banks in North Carolina. I remember Richard once being asked if being a fish biologist made him a better fisherman. His answer was "no", which surprised me at the time—how could all our 'inside information' not make us better anglers? But over the years I've seen that he was right. Knowledge and information become little more than trivia unless they can be effectively applied. That's the basic definition of wisdom, and I'm grateful that he imparted some of his to me over the years. Richard's influence was an integral part of my career in fisheries and his legacy will continue through his many former students, colleagues, and friends.