

Meeting Minutes of the Trout Committee of the Southern Division American Fisheries Society

Meeting was convened on Tuesday, April 6, 2021 in conjunction with Southern Division American Fisheries Society Annual Meeting using the provided virtual platform Cvent.

The meeting was called to order by Justin Heflin at 9:00 AM Eastern Time.

Old Business:

Approval of 2020 Minutes:

The 2020 meeting minutes were sent out through email including round table discussions. With no objections, Jim Habera made a motion to approve the minutes. Steve Reeser seconded, and the motion passed.

Treasurer's Report- Christy Graham:

Balance as of last year was \$6,597.36. The only expenses this year were for award plaques and there was no income bringing the remaining balance to \$6152.83. Steve Reeser asked if that balance is reflective of money that was contributed to the Wild Trout Meeting. A check of \$1,000 was sent to the Wild Trout Symposium in support of their meeting prior to it being canceled (2020); they are holding on to the money for their next meeting. That check was taken out prior to this year so the balance is correct. With no further discussion, Jim Habera made a motion to accept the treasury report. Matt Sell seconded, and the motion passed.

Membership List Update:

An electronic version of the membership list was sent out via e-mail prior to the meeting with a request for everyone to update their contact information. The list will be posted on the website after this meeting.

Website Update:

The website has not been updated since 2019 and will be updated after the meeting with the new membership list as well. The Proceedings Document, past meeting minutes, membership list and pertinent information is on the website.

MicroFish Update:

Jack Van Deventer was unable to attend, however sent in the following update on the successfulness of MicroFish: "The website for MicroFish (microfish.org) has been modernized and updated. There has been a huge increase in MicroFish 3.0 free downloads. There are now 72 countries using MicroFish Software. The most active countries of late are Argentina, Honduras, Israel, Cassava, Madagascar, Norway, The Netherlands, Switzerland and Vietnam. MicroFish 4.0 for Excel is available but has not been actively promoted. I am making supplemental enhancements and will announce the MicroFish 4.0 product near the end of the summer 2021 field season. Again, none of this would've happened if it weren't for the guys on the SDAFS Trout Committee. This partnership has benefited fisheries around

the world. Thank you again for the Trout Committee for steering this effort. It couldn't have been completed without the help of the Trout Committee.”

New Business:

Meeting locations for 2022:

Everyone was in favor of keeping the meeting, which was planned for 2020 at Hungry Mother State Park in Virginia, in the same venue. Brad Fink will work with Steve Reeser to set up the meeting. This is on the South Fork of the Holston River and has modernized cabins to stay in. The dates were finalized for May 16-18.

Eastern Brook Trout Joint Venture Update:

Jake Rash reports on Eastern Brook Trout Joint Venture Group (EBTJV). Lori Maloney is the new coordinator for EBTJV. Steve Perry is stepping down after many years. Jake Rash encourages everyone to reach out to her or anyone involved to see if/how they can get involved. There are new products for the including the range-wide status assessment to document the presence/absence of Brook Trout throughout their range. Efforts are underway to improve workflow and make things automated to import and export information.

Jonathan Lieman of Maryland Department of the Environment is part of a team putting together a total maximum daily load for temperature, which is the first of its kind for the mid-atlantic. This would include a symposium “Planning for Coldwater Fisheries Resources: Modeling and Managing Temperature Impairments” at the National AFS meeting this year. What are your thoughts on how to get submissions for abstracts for this symposium? Jake Rash said the Trout Committee is a good place to start and we can talk to Lori about our network of contacts through EBTJV. Lieman added the Water Quality Section and the Habitat Sections are supporting it and promoting it, but support from the Trout Committee and managers would be beneficial. He will send us more information to send to colleagues that may be interested.

Election of Officers for 2022-2023:

Sarah Baker of Georgia DNR was nominated by Matt Sell to be the Chair-elect for 2022-2023. Jake Rash seconded and the motion was passed.

2022-2023 Officers

Chair: Sally Petre (Tennessee)

Chair-elect: Sarah Baker (Georgia)

Past-chair: Justin Heflin (Kentucky)

Treasurer: Christy Graham (Arkansas)

Other New Business:

- Nathan Recktenwald of Missouri mentioned that due to restructuring of the agency he is not sure of his ability or what level he will participate in Trout Committee.

- Steve Reeser asked if people would be able to make it to the in-person Trout Committee meeting next year considering potential travel restricts, reduced travel budgets, and/or Wild Trout Symposium the same year. There was consensus that financial assistance may be needed among state representatives, but they won't know until budgets are finalized and each state is different.
 - Steve Reeser made a motion that we will offer travel assistance for state representatives to the 2022 meeting if necessary. Matt Sell seconded it. There was more discussion about how much funding will be allocated to representatives. Brad Fink and Steve Reeser will get together and get a cost estimate for this. After discussion, a vote was made to pass the original motion and passed.
- Wes Neal—the immediate past president of the SDAFS is here and stated that any of the SDAFS officers are available if there are any needs from the Committee or AFS members.
- Steve Reeser suggested our next meeting be a themed and to keep the theme that was originally planned, which was R3. There was consensus among members that R3 theme would be very useful for all of us to learn from each other.
- Matt Sell announced the Chesapeake Bay Program Science and Technical Advisory Committee is sponsoring a Brook Trout Workshop tentatively scheduled for this fall. The purpose of this meeting is to bring experts in fish and Brook Trout genetics together to provide managers practical knowledge on fish genetics, how to use genetics data sets to support management and how to inform current and planned restorations. The dates for that are September 28-29, 2021.
- Jake Rash mentioned the paper many folks on the Trout Committee have contributed to (Kazyak et al *Under Review*. Population genetics of Brook Trout in the southern Appalachian Mountains) is about to come out and this will be a great addition to our literature and lead to further discussions on the management of Brook Trout.
 - Shannon White with USGS took the lead of writing a rebuttal to the paper published last year regarding potential efforts to try and speciate Brook Trout within the Great Smoky Mountains National Park. The rebuttal was accepted with minor revisions and should be published soon. Shannon White thanked everyone and asked for more input on the discussion of speciation as we continue forward.
- Alan Heft says best wishes to everyone. After 33 years of being a fish biologist being on the Trout Committee was the highlight of his career.

Distinguished Service Awards:

Recipients include:

Alan Heft of Maryland Department of Natural Resources for his 15 years of distinguished service (2005-2020) including Committee Chair (2010) and instrumental in organizing and seeing through East Coast Trout Management and Culture Workshops V (2012) and VI (2019).

Matt Kulp of National Park Service Great Smoky Mountains National Park for 25 years of distinguished service (1996-2021) including two terms as Committee Chair (2006 and 2014).

Steve Reeser of Virginia Department of Wildlife Resources 20 years of distinguished service (1996-1997 and 2001-2020) including Committee Chair (2004) and organizing East Coast Trout Management and Culture Workshop IV (2005).

Jack Van Deventer for distinguished service to the Committee in the development of MicroFish 3.0 (2006) and MicroFish 4.0 (2017). MicroFish is now used worldwide by Fisheries managers and researchers.

Jim Habera of Tennessee Wildlife Resources Agency for 30 years of distinguished service (1991-2021) including two terms of Committee Chair (1995, 2015).

Round Table:

Round table notes from each state were sent and are included below.

Final Thoughts

Send Matt Sell a picture of yourself so he can get it together for our annual photo!

A motion was made to adjourn the meeting by Jim Habera and seconded by Jake Rash. Meeting adjourned at 12:11 PM.

Round Table

Arkansas

Submitted by Christy Graham (AGFC)

The Arkansas Game and Fish Commission (AGFC) Trout Management Program (TMP) has conducted a number of activities over the last year with regard to stocking, sampling, and research. The TMP is currently conducting a year-long creel survey on the Greers Ferry Tailwater (TW) and will be starting a year-long survey on the Bull Shoals and Norfolk TWs this fall. The results from those surveys will be important to determine whether decreased stocking rates of Rainbow Trout from 2015-2017 have had a negative impact on angler catch rates in the fisheries.

The TMP finalized a management plan for the Spring River Trout fishery. This is the first management plan for the fishery. Results from data collected by the TMP, along with public input solicited during a public workshop, prompted the TMP to propose and implement regulation changes including a regulation to limit harvest of trout over 14 inches to one fish per day. Prior to the regulation change, there were no regulations for Rainbow Trout outside the daily limit of 5 fish. A number of anglers indicated support for a protective regulation in order to improve catch of larger fish, and data from electrofishing surveys indicated few big fish in the Spring River. The TMP will also begin a revisit of the Beaver TW management plan this summer, which was last revised in 2011. A copy of the Spring River plan can be found at www.agfc.com.

The TMP has been conducting a seasonal sampling study on Dry Run and Norfolk TW. The creek runs adjacent to the Norfolk National Fish Hatchery (NFNH) and is well known for being full of trophy trout. In February, the TMP conducted an electrofishing sample on Dry Run Creek. A total of 799 trout were collected during sampling, including 723 Rainbow Trout, 69 Brown Trout, 7 Cutthroat Trout, and one Tiger Trout. Of the 723 Rainbow Trout collected, 41% were under 12 inches and 33% were over 14 inches. Large Rainbow Trout were abundant during the sample, and included 18 individuals over 20 inches, of which 3 were longer than 24 inches. Of the 69 Brown Trout collected, 27 were longer than 20 inches, of which 11 were greater than 24 inches, and 15 weighed more than 5 pounds. A total of 7 Cutthroat Trout were collected, all of which were the Snake River Finespot subspecies. Cutthroat trout ranged from 17 to 22 inches. AGFC also collected a Tiger Trout (Brook Trout x Brown Trout hybrid) in the upper end of Dry Run Creek. This same fish was tagged 188 days earlier (during the July 2020 electrofishing sample) and had grown 2.3 inches during that time. Each season, large Rainbow Trout and all Brown and Cutthroat Trout are being implanted with PIT tags to monitor growth, survival, and movement in Dry Run Creek and Norfolk TW.

For the last few years, the TMP has been partnering with the University of Arkansas-Pine Bluff on a Brown Trout spawning study in the Greers Ferry TW. For the last two years, redd surveys have been conducted during the spawning season (at two week intervals). We have also PIT tagged Brown Trout seasonally since Fall 2018. Preliminary results from the study are supporting 3 conclusions: 1) spawning happens differently each year, but Brown Trout appear to spawn anywhere in the tailwater when conditions are right (correct substrate size, flow, and water depth); 2) Brown Trout do not move much from where they were tagged; and 3) Brown Trout growth rates are slow in Greers Ferry TW. The final

results from the study will be important to understanding the population dynamics on Greers Ferry TW and will aid in assessing the efficacy of our current fishing regulations.

The TMP experimentally stocked Tiger Trout (Brown Trout x Brook Trout) in Bull Shoals TW in May 2020. Although we have little information on their survival and growth rates to date, anglers are still catching them in the tailwater. We will also resume stocking of the Snake River Finespot subspecies of Cutthroat Trout in the Bull Shoals and Norfolk TWs. For two years, we attempted stocking the Yellowstone subspecies. However, that subspecies experienced poor survival in the hatchery and post-stocking.

Georgia

Submitted by Sarah Baker (GA DNR)

Trout Management Plan Update

- **Last plan from 2001**
 - All regional managers' input on the plan.
 - Updated Plan includes six programs: Wild Trout Management, Habitat Conservation and Enhancement, Management of Hatchery Supported Waters, Hatchery Production Program, Public Relations, Disease Monitoring and Biosecurity
 - Currently in review by headquarters staff. Will update accordingly in response to their comments.

Hatchery Production Program

- **Hatchery Renovations**
 - Lake Burton Hatchery is underway, and the hatchery is completely offline. Estimated cost is \$5.1 million for the hatchery and we have already spent 1 million on the replacing the 80-year-old dam and intake structure. We did not want to renovate a facility below this aging structure. Project was scheduled to be completed in Jan 2021, but will now be completed sometime late spring 2021.
 - Goal of the project is not to increase production but make production more consistent in years of drought or low rainfall and replacing aging infrastructure to last another 50 years. The project includes the addition of dual drain circular tanks and the use of bulk liquid oxygen and low head oxygen units at the facility.
 - Reduced trout stocking program 30% for the 2020 stocking season and will have a similar impact to the 2021 season.
 - Looking forward to receiving new fish to put into the newly renovated Lake Burton Hatchery to learn how to operate in the renovated facility.
- **10-inch trout**
 - Began raising and stocking 10-inch fish in 2018, will continue in foreseeable future
 - Funding from license fee increase in 2018
 - Very popular with anglers
 - Cons: more trips, higher feed costs, cramped hatcheries.
 - Angler satisfaction outweighs all cons, even with forecasted budget issues related to the pandemic we will still try to grow these larger trout at reduced numbers to conserve on feed cost.
 - Must lower stocking target numbers for future (usually stock 1.0 – 1.1million)
- **Brook Trout stocking**
 - GA program typically focuses on RBT with about 10% BNT
 - When Burton is back online, we should be capable of accepting BKT eggs and or fingerlings. Hopeful to find a source, as Brook Trout are popular among anglers.
 - Will not stock on or near native Brook Trout populations.
- **Covid-19**
 - Hatchery staff identified the locations of stocking points that had been closed due to COVID-19 which greatly impacted trout anglers; specifically, in the metro-Atlanta area. Staff did their best to continue trout stocking efforts in locations that were open and accessible to the public.

Angler Communication

- Weekly blog post by regional biologists on Georgia DNR Wildlife Resources Division website: <https://georgiawildlife.blog/category/fishing/>
- Trout Stream Interactive Map updated annually with information on accessibility, generation schedule links, regulations, and angling recommendations. <https://gadnrwrld.maps.arcgis.com/apps/webappviewer/index.html?id=af50967627004b178ccd7264124fe5fd>
- All rodeos and workdays cancelled in 2020 due to covid. 2021 also having many restrictions.
- Including fly-fishing in BOW programs.

Disease Prevention:

- Trout from private sellers continue to be sampled and sent to the Southeast Cooperative Fish Parasite & Disease Laboratory (Auburn University Fish Disease Lab/Coop) to be examined for whirling disease and gill lice.
- In addition to the Soque watershed, the Noontootla Creek watershed now has gill lice (discovered in January on privately owned water; confirmed by Auburn).

Wild Trout Monitoring:

- Georgia DNR continues its efforts to document and evaluate the populations of wild Brook Trout, Brown Trout, and Rainbow Trout. A single file containing all historical records of sampling efforts is being created so as to help managers utilize these records for future analyses. Yoichiro Kanno and George Valentine are working to compile these data for their project.
- Historically sampled streams are in need of being revisited and their records updated. Starting a protocol and rotation of sampling these streams, in addition to our annual standardized sampling streams.

Great Smoky Mountains

Submitted by Matt Kulp (NPS)

Project Updates

1. Anthony Creek Brook Trout Restoration (2.6km)
 - a. Translocated 269 brook trout in Sept 2017 from Bunches Creek and additional 237 fish from Deep Creek in 2018.
 - b. 2018 recovery looked good; however 2019 and 2020 densities poor
 - c. 2020 monitoring indicates poor 2019, 2020 YOY production & poor recruitment
 - i. Two flood events in winter/spring of 2019 > 5,000cfs & two in 2020 >10,000cfs
 - ii. YOY production was down 57-100% both years
 - d. Will add additional BKT in 2021 to make up for poor recruitment due to flooding
 - e. THANK YOU to TWRA for assistance
2. Little Cataloochee Creek Restoration (2.8km)
 - a. Sept 2017 antimycin treatment (NCWRC, NC TU assistance)
 - b. Translocated 183 BKT (32 Coggins; 151 Correll Branch) in 2018
 - c. Performing better than Anthony Ck (50-75% recovered), but poor recruitment
 - d. Densities about 75% of pre-treatment RBT
 - e. THANK YOU to NCWRC for assistance
 - f. PARKWIDE: TOTAL 13 streams and 30.3 miles restored to date
3. 2021 Brook Trout Distribution
 - a. Will complete distribution on portions of 20% of unmapped park watersheds
 - b. Cheoah funds to work on NC watersheds near Cheoah/Fontana
 - c. Also will collect BKT tissue if present for future genetics analyses
 - d. 80% of park left to do; will complete additional 2-8% between 2021-2024
4. Antimycin Coming Back...
 - a. USGS bought intellectual property rights and original strains of Fintrol
 - b. Working with USFWS, USGS and EPA to reregister Antimycin and produce
 - c. Kulp, Dave Hering (NPS) and Dan Rankin (SC DNR), Teresa Lewis (YFWS) tasked with updating the SOP manual, which is appended to the label
 - d. Should have production in summer/fall 2021
5. 2020 Volunteer Service
 - a. Total of 1,549 hours donated in 2020*
 - b. 1,054 field hours, 495 water quality hours
 - i. * includes Govt COVID shutdown (Mar-May 2020)

Kentucky

Submitted by Justin Heflin (KDFW)

Routine fall electrofishing in the Cumberland tailwater was conducted on 1 and 2 November 2020 at six locations throughout the tailwater. Overall catch rates of rainbow trout have been consistent over the past three years. Catch rates improved for rainbow trout in the 15-20 inch slot limit and for fish over 20 inches. Although relative weights for rainbow trout improved slightly, they are still lower than pre-drawdown condition.

Brown trout catch rates continue to decline in the tailwater. In 2020, catch rates of brown trout less than 12 inches took another large decline for the second consecutive year. Although the catch rates of fish over 20 inches increased slightly in 2020, they remain low. Relative weights for brown trout showed a slight decline during 2020.

Brook trout numbers are still low in the tailwater, and fish that are observed during sampling are stocker size.

During 2020, 150,490 rainbow trout were stocked in the tailwater. In addition, 37,239 brown trout and 15,875 brook trout were stocked. Approximately 500 cutthroat trout were also stocked in to the tailwater.

For 2021, rainbow trout (166,600), brown trout (30,000), brook trout (6,000), and cutthroat trout (10,000) will be stocked in the Cumberland tailwater. A portion of the stocked rainbow trout will be 15 inches to help bolster the population. Additional trout will be stocked if surplus trout are available.

Kentucky has formed an in-house trout committee. Our main focus is to update and rewrite the statewide management plan. We asked several surrounding agencies for their plan. Thank you to the states that sent us your plan. We have gone through the Kentucky's old plan and figured out the sections that updating and revision. We will be starting the writing process soon.

New stockings

Dog Fork Creek was stocked for the first time since the 1960's. A large ice storm knocked out a lot of the canopy cover roughly 20 years ago. Since then, the canopy has regrown, and temperatures have recovered. The stocking is an attempt to reestablish a wild population. The stocking involves backpacking trout a mile and a half into a wilderness area. A big thank you to Backcountry hunters and anglers. Without them the stocking would not be able to happen.

Chimney Top Creek was switched from brooks and brown trout to rainbows. The habitat is limited in Chimney Top. The hope is that the rainbows will be better suited than the browns for the smaller pools. And since the creek is very limited on thermal refuges, rainbows may have a better chance at over summering.

Spring 2020 stocking in Fins and other lakes were canceled due to Covid. But we did see a large spike in number of licenses purchased last year.

Laurel River lake is no longer getting stocked with trout. Over the past few years, the number of fish stocked has been cut due to decreased fishing pressure and water conditions. It is planned to not stock laurel in 2021. Those fish will be reallocated. Most of which will be going to Cumberland tailwaters.

Trail cameras are being used in all districts to assess fishing pressure on our streams. They have been used in several districts, for a few years, to assess angler pressure. Since then, the last few districts have jumped on board. The hope is to use the angler pressure in management decisions.

Maryland

Covid hit Maryland hard as to what they were allowed to do so they had a shortened season. Despite this, a lot of work was accomplished.

Brook Trout

In 2018 they had finished the statewide survey of Brook Trout. From that they understood the trout distribution and then completed a strategic plan. First was to assess patches of Brook Trout habitat using different criteria and identify data gaps. The last year was used to fill the data gaps for Brook Trout.

From these surveys, they found an across-the-board decline of Brook Trout occupied habitat, with the middle portion of the state facing the most decline (50% decline in Brook Trout occupied habitat) compared to the western portion of the state (15% decline). From this they passed a regulation to help conserve Brook trout populations. The regulation is catch and release for Brook Trout east of I-81, and catch and release of Brook Trout west of I-81 in put-and-take stocked waters. It seems to be well supported. An important part of this was to make sure people knew how to tell the difference between Brook Trout and other trout. They surveyed trout stamp buyers in the state and found although overall folks got about 8/10 correct, however certain user groups were not as good at telling the difference. Thus they improved signage and gave all trout stamp buyers a pocket guide.

Tailwaters

North Branch Potomac River Tailwater—This historically was a popular fishery due to large fish that were produced from net pens. These net pens unfortunately got whirling disease and we had to shut this down. The trout fishery here changed significantly due to that and it's rebounding really nicely, particularly in the lower end. Catch rates are very, very high and use is becoming very high. There was push to increase regulations. We are in the process of doing a largescale roving creel survey at the access surveys. This will help us manage our fishery and determine if/what regulations to place on this fishery.

Missouri

Submitted by Nathan Recktenwald (MDC)

- Due to hatchery renovations and reduced water quality from recent flood events, the Missouri Department of Conservation is reducing Rainbow Trout stockings by approximately 20% in trout parks, ribbon areas, and winter fishing programs.
- Shepherd of the Hills hatchery in Branson, MO propagates Brown Trout for Lake Taneycomo and many Ozark streams. The hatchery currently utilizes the Sheep Creek strain of Brown Trout but is looking to switch to a different strain that is better suited for the hatchery and stocked water bodies. Shepherd of the Hills is the only hatchery left that produces the Sheep Creek strain. The strain is susceptible to furunculosis while in production and, from experience, the strain tends to be highly mobile after being stocked during rises in water level. With the Ozarks currently experiencing frequent flooding events over the past two decades, the current weather pattern has led to poor recruitment of the current Brown Trout strain. Managers will be looking into ways to mitigate for the loss of recruitment which includes utilizing the Crawford strain and phasing out the Sheep Creek strain of Brown Trout. Managers may also try stocking smaller sizes of trout to shorten the overall time in the hatchery system and to allow more time for fish to adapt to the stocking environment. Overall, trout management efforts may look different in the future because of the shift in weather patterns and resulting changes in habitat.
- Other managers participating in the roundtable discussion had mentioned reducing or eliminating Brook Trout stockings from areas where there had been natural reproduction occurring on streams. In Missouri, the North Fork of the White River's naturalized Rainbow Trout population has experienced multiple years of record low recruitment which may be attributed to flooding, stress, dam removal, loss of habitat, urbanization, decreased water quality, and interspecific competition. A proposal was initiated to stock Rainbow Trout in the river to bolster the overall numbers to satisfy the angling community. The Eleven Point River is an example of an Ozark stream where stocked rainbows are also put in the same system as spawning rainbows. This stocking practice has bolstered the trout fishery for decades, and the North Fork River proposal would be similar to what has been accomplished in the Eleven Point. The proposal has had both wide-ranging support and non-support from the public. There have been no decisions made at this point on future actions.

North Carolina

Submitted by Jake Rash (NCWRC)

Trout Angling Access Working Group

Sufficient public access for trout angling remains a major challenge for anglers in North Carolina, while finding ways to ensure long-term viability of public access is cited routinely by anglers and NCWRC staff as a priority issue. As such, staff have been working on possible solutions for many years, but momentum is building inside and outside of the agency for real solutions to this critical issue. In 2019, the NCWRC began engaging a small group of key stakeholders through the creation of a Trout Angling Access Working Group to develop a collaborative and sustained approach to address the issue.

Socioeconomic Studies

Approximately 36,000 electronic surveys were sent to customers within the NCWRC license database between Jan–Mar 2020 to gain insight on potential classification changes and other Public Mountain Trout Waters (PMTW) issues from a random sample of trout anglers. We received 3,609 responses, but only 1,745 of the respondents fished in PMTW in 2019. Thus, our results reflect a sample size of 1,745 trout anglers selected randomly. When asked about how acceptable it would be to combine the two classifications (Catch and Release/Artificial Flies Only Trout Waters and Catch and Release/Artificial Lures Only Trout Waters) into a single Catch and Release/Artificial Flies and Lures Only Trout Waters, 83.5% of respondents replied it was neutral–perfectly acceptable (neutral=24.6%; somewhat acceptable=16.8%; and perfectly acceptable=42.1%) compared to 16.5% of respondents opposed to the change (somewhat unacceptable=7.9% and totally unacceptable=8.6%). On 1 August 2021, the single regulation will replace the two catch-and-release regulations used previously. Relevant publications since previous Trout Committee update:

Robinson, K. W., and J. M. Rash. 2020. 2020 Public Mountain Trout Water angler survey: exploring characteristics of recreational trout anglers and attitudes towards reduction of regulatory stream classifications. North Carolina Wildlife Resources Commission, Federal Aid in Sport Fish Restoration, Raleigh.

Identification of Natural Barriers

Thanks to numerous efforts throughout the years, identification of anthropogenic barriers to aquatic organism passage in high-elevation waters of North Carolina is fairly robust. However, the same cannot be said relative to identification and documentation of barriers that occur naturally. The NCWRC has been working with biologist at the Southeast Aquatic Resources Partnership (SARP) and North Carolina Geological Survey to develop geospatial methodologies to help identify these features, which are critical to Brook Trout conservation. This effort is challenging, but the project is ongoing and holds promise.

Brook Trout Genetics

The NCWRC has been collecting genetic information for the State’s Brook Trout in conjunction with trout distribution efforts. In 2016, the U.S. Geological Survey genotyped 7,588 Brook Trout representing 406 collections from across North Carolina at 12 microsatellite loci. Results of this effort found genetic

diversity within populations to be low and that little, if any, gene flow occurs among populations. In addition, the majority of populations show limited evidence of introgression by northern origin hatchery strains. Since 2016, additional Brook Trout have been examined, and approximately 500 additional individuals will be processed in 2021. These results represent a valuable information for management and restoration efforts of Brook Trout in North Carolina. Relevant publications since previous Trout Committee update:

Kazyak, D. C., B. A. Lubinski, J. M. Rash, T. C. Johnson, and T. L. King. (*Online Early*). Development of genetic baseline information to support the conservation and management of wild Brook Trout in North Carolina. *North American Journal of Fisheries Management*. Available: <https://afspubs.onlinelibrary.wiley.com/doi/10.1002/nafm.10569>.

Brook Trout Restoration

The NCWRC has used recent genetic data to plan Brook Trout restoration activities. Two reintroductions were conducted in 2019 via the translocation of fish from selected source populations (here is a [link](#) to a NCWRC YouTube feature). Additional restorations are planned for 2021.

Whirling Disease

On July 27, 2015, *Myxobolus cerebralis* (the parasite that causes whirling disease) was confirmed in Rainbow Trout collected from Watauga River – the first documentation of the parasite in North Carolina. Subsequent testing of oligochaete hosts and wild trout stocks found the parasite in eight major river basins (Catawba River, French Broad River, Hiwassee River, Little Tennessee, New River, Savannah River, Watauga River, and Yadkin River basins). The NCWRC initiated a three-year research project with researchers from Auburn University to explore the distribution (current and predicted) and life history characteristics of *Myxobolus cerebralis* in North Carolina. Additionally, a new species of *Myxobolus* has been documented within a Brook Trout population. Relevant publications since previous Trout Committee update:

Ksepka, S. P., J. M. Rash, C. Wenlong, and S. A. Bullard. 2021. Detection of *Myxobolus cerebralis* (Bivalvulida: Myxobolidae) in two non-*Tubifex tubifex* oligochaetes in the southeastern USA. *Diseases of Aquatic Organisms* 143:51–56.

Ksepka, S. P., J. M. Rash, B. L. Simcox, D. A. Besler, H. R. Dutton, M. B. Warren, and S. A. Bullard. 2020. An updated geographic distribution of *Myxobolus cerebralis* (Hofer, 1903) (Bivalvulida: Myxobolidae) and the first diagnosed case of whirling disease in wild-caught trout in the south-eastern United States. *Journal of Fish Diseases* 43:813–820.

***Salmincola* spp.**

Since September 2014, NCWRC biologists have documented new biological threats to salmonids within the State. Gill lice (Copepoda: Lernaeopodidae: *Salmincola*) have been found on Brook Trout and Rainbow Trout populations. Elsewhere within the United States, *S. edwardsii* and *S. californiensis* are known to parasitize salmonids of the genera of *Salvelinus* and *Oncorhynchus*, respectively. Taxonomic and molecular analyses of copepods confirmed the identification of both species in the State. In addition, anglers have been asked to report observations of gill lice during recreational outings, while the NCWRC will continue to sample Brook Trout and Rainbow Trout populations across the mountains of

North Carolina to document the distribution and status of gill lice. Researchers at Auburn University will also continue to explore life history characteristics of these copepods.

Didymo

Researchers from Tennessee Tech University collected cells of the microscopic algae in Tuckasegee River while conducting regional surveys in late 2015 – the first time the organism has been documented in North Carolina. In 2018, Tennessee Tech University researchers began a study to determine didymo prevalence in Tuckasegee River and other potential waters throughout the State. Anglers were equipped with sample kits in 2019 to continue assessment of the algae's spatial distribution. Additional information about this community science effort can be found at this ([link](#)).

Winter Stockings of Trout in Selected Small Impoundments

In November 2016, the NCWRC stocked selected small impoundments in the mountain region with trout. Community collaborators and the NCWRC have had long-standing partnerships to provide angling opportunities in these waters, which have focused primarily on channel catfish stockings in warmer months. Such stockings have been (and remain) dependent upon the availability of trout beyond the numbers needed to stock traditional stocked-trout resources (e.g., Delayed Harvest Trout Waters and Hatchery Supported Trout Waters). These stockings have been incredibly popular with anglers, and in 2019, they were expanded into the piedmont region of North Carolina.

General Aquatic Nuisance Species

The NCWRC has developed a website devoted to aquatic nuisance species (ANS): www.ncwildlife.org/ANS. Currently, this page provides specific information about whirling disease, gill lice, didymo, and hydrilla. Available information also provides details regarding minimal steps to help prevent the spread of ANS (these steps have also been incorporated into NCWRC signs and messaging): CLEAN equipment of all aquatic plants, animals and mud; DRAIN water from boats, live wells and all equipment; DRY all equipment thoroughly; and NEVER MOVE fish, plants, or other organisms from one body of water to another.

Trout Distribution

The NCWRC continues its efforts to document the distribution of North Carolina's wild Brook Trout, Brown Trout, and Rainbow Trout populations. To date, over 700 Brook Trout populations have been identified. The NCWRC continues sampling efforts to identify new populations and evaluate assemblages associated with legacy data. In 2021, the NCWRC will have a two-person crew focused on these collection efforts.

Long-term Trout Monitoring

In 2012, the NCWRC initiated efforts to obtain routine data on wild trout populations. Initial long-term monitoring efforts were completed in 1996; however, recent data are desired to gain a greater understanding of wild trout population dynamics in waters managed by the NCWRC. Colorado State University researchers are working with the NCWRC to evaluate population dynamics and future monitoring strategies. As appropriate, the NCWRC will continue to seek to partner with fellow resource agencies to develop more robust data sets.

Brook Trout Population Responses to Climate Variation Across the Southeast USA

Led by researchers at Colorado State University, and in conjunction with researchers at the NCWRC, U.S. Geological Survey Leetown Science Center, Great Smoky Mountains National Park, and U.S. Forest Service Southern Research Station, this project seeks to take a manager-centric, co-production approach to characterize how and why climate change impacts on Brook Trout populations differ over space in the Southeast USA. This project is composed of three phases: (1) Evaluate the robustness of GIS-derived landscape data to predict spatial variation in measured stream temperature and link thermal regimes to trout population stability over time, (2) Predict spatiotemporal variation in trout abundance and project population responses to future climate patterns for all stream segments, and (3) Develop a web-based decision support tool to inform and engage federal, state, and local partners managing coldwater resources. Each phase will inform the next, and upon completion, this project will have three primary outcomes: (1) allow trout managers to update their sampling protocols by identifying how often and where to sample given limited time and resources, (2) inform prioritization efforts at regional scales (e.g., Southeast Conservation Adaptation Strategy [SECAS], Southeast Aquatic Resources Partnership [SARP], and Eastern Brook Trout Joint Venture [EBTJV]) by identifying climate refugia and populations at greater risk, and (3) function as a planning tool to assist managers with spatial prioritization of management actions by ranking streams based on their population vulnerability to climate variation.

Lake Nantahala Kokanee Salmon Population

Kokanee Salmon *Oncorhynchus nerka* were stocked in western North Carolina reservoirs during the early 1960s, but Lake Nantahala was only system that successfully produced a self-sustaining population that persists today. In 2014, the state record fish (4 lb and 1 oz) was caught, but since that time anglers have been reporting lower catch rates and the emergence of a Blueback Herring *Alosa aestivalis* population within the reservoir. Exotic to western North Carolina, Blueback Herring are a planktivorous competitor of Kokanee Salmon. In 2017 and 2018, NCWRC staff worked with Duke Energy biologists to couple hydroacoustic and gill-net surveys to evaluate this unique fishery. Staff have developed an ArcGIS Survey123 project to allow anglers to collect real-time information relative to their catches from Lake Nantahala and its Kokanee population. An experimental stocking of Kokanee in Lake Nantahala occurred in 2020 and will be monitored via gill-net collections and angler observations (Survey 123 project noted above). It is important to note that the Kokanee Salmon stocking in Lake Nantahala is a temporary deviation from our cold-water fisheries management program, which typically focuses exclusively on Brook Trout, Brown Trout, and Rainbow Trout; therefore, we will not consider stocking Kokanee Salmon in any other water bodies. Our intent for these experimental Kokanee Salmon stockings is to restore the historic population in Nantahala Reservoir and not to expand the range of Kokanee Salmon in North Carolina waters.

NCWRC Trout Page

The NCWRC continues to update its trout webpage to provide pertinent information concerning its trout management program in one place to help facilitate information exchange. The page can be found at www.ncwildlife.org/trout. Recently, a [Hatch Chart](#) developed in partnership with the North Carolina Council of Trout Unlimited was posted to help trout anglers match aquatic insect hatches in western North Carolina and has been well received.

Trout Age and Growth

The NCWRC lacks comprehensive trout age and growth data. To address this, otoliths from trout collected during the multi-year efforts with Auburn University to address trout health will be analyzed in partnership with Appalachian State University. This information will help develop spatial and temporal age data for North Carolina's self-sustaining trout populations.

Habitat Enhancement

The NCWRC is actively engaged with partners to identify and initiate coldwater habitat enhancement projects. Efforts span the range of trout distribution in North Carolina, which includes waters on public and private lands. Habitat enhancement activities remain a key aspect of trout management in the State.

Eastern Brook Trout Joint Venture

NCWRC has continued to be actively involved with the Eastern Brook Trout Joint Venture (EBTJV). Jake Rash serves as North Carolina's State Representative on the Steering Committee, Vice Chair of the Steering Committee, and a member of the Science and Data Subcommittee.

Tennessee

1. *R3*: Submitted by Brandon Simcox (TWRA)

- Tailwater Trout Fishing Forecast (quarterly fishing tips and information that are relevant to the season such as bug hatches, water conditions, etc.) continues to grow in reach by leaps and bounds.

Nov.1, 2019—Oct. 31, 2020: 14,337 views or **39.28 views/day**

Nov. 1, 2020—April 5, 2021: 12,747 views or **82.24 views/day**

- A Statewide Trout Angler survey in partnership with the University of Tennessee-Knoxville is planned for winter 2021-22 to help guide future trout management decisions.
- Creation of a Community Fishing Program is underway using trout and catfish in existing small urban ponds to provide close-to-home fishing opportunities. Creel will be used to analyze use/stocking rates.

2. *Native Brook Trout restorations and enhancements*: Submitted by Sally Petre (TWRA)

- New genetics data acquired from USGS for all TN populations are now being used to guide management/conservation decisions. Brook Trout were reintroduced into two new streams in 2020 (Green Mountain Branch and Shell Creek), yielding over 1.5 miles of new distribution. Plans for 2021 include translocating fish into another stream (Trail Fork), which will ultimately have 3.5 miles of Brook Trout habitat. A new bottomless arch culvert will also be installed in Trail Fork and one other Brook Trout stream to enhance dispersal of trout. Funding is provided through USFWS Bringing Back the Natives Grant, EBTJV, and several partnerships including USFS, NRCS, Trout Unlimited, and private landowners.
- Partnered with TU to monitor temperature in several streams, including some being considered for native Brook Trout restoration.

3. *Tailwater trout fisheries*: Submitted by Jim Habera (TWRA)

- The cooperative research project with Tennessee Tech to assess fingerling-stocked Rainbow Trout survival, growth, and recruitment in the Norris and Ft. Patrick Henry tailwaters is entering its third year (of four). Adult-stocked rainbows are also included in the Ft. Patrick Henry assessment. Preliminary results indicate that there is substantial natural reproduction by Rainbows in the Norris tailwater and limited recruitment of stocked fingerlings there and in the Ft. Patrick Henry tailwater. Adult-stocked Rainbows exhibit exceptional growth in Ft. Patrick Henry, with 10" fish surpassing 21" in 16 months.

4. *Hatcheries*: Submitted by Jim Habera (TWRA)

- A gas infusion systems (GIS) has been installed and is operating at Buffalo Springs Hatchery to address chronic and severe issues with N₂ supersaturation and low DO in the lower raceway sections. The system is producing excellent results but uses substantial quantities of liquid O₂.
- The Erwin Hatchery has made some generally unsuccessful attempts to culture albino Rainbows. The staff there have recently acquired several thousand 'Golden' Rainbow fingerlings from WV (xxxx Hatchery) and will work with those to see if they can achieve better results. The goal is to annually produce some of these 'novelty' fish, which anglers like, for inclusion in the spring stocking program (upper east TN) to enhance angler interest.
- Dale Hollow NFH has no Brook Trout or Lake Trout available for 2021; however, about 5k Cutthroat Trout will be stocked in the Boone tailwater this fall (3-4" now). Elk and Hiwassee river tailwaters to also receive some of these.

5. *Region 3* submitted by Justin Spaulding (TWRA)

- Staff collected Southern Brook Trout for propagation at TNACI and Tellico Hatchery. As of March 2021, TNACI had nearly 650 parr that will be stocked during May 2021. Distribution work was completed on five streams. Compared to agency distribution records, personnel added 2364 meters of Rainbow Trout range and reduced 1500 meters of Brook Trout range. Finally, crews conducted one-pass depletion surveys (n = 7) on five streams.
- Staff with Region 3 are also conducting traditional creel surveys on several Spring Trout Streams, which are mostly located in rural locations and on private land. These surveys will help managers prioritize stocking locations as well as test ways to measure angler use on these difficult to measure fisheries.

6. Erwin National Fish Hatchery submitted by Tyler Hern (USFWS)

- Erwin NFH increased egg production by ~1 million eggs in 2020 and plans to increase again in 2021.
- We phased out our Soda Lake brook trout strain due to poor performance. We have established a broodline of Sandwich strain Brook trout to replace the SLW's. Eggs of this new strain will be available in November 2021.

Texas

Submitted by Patrick Ireland

- Guadalupe River (Canyon Tailrace) – we are looking some form of habitat improvement project on the first 2-miles of the Canyon Tailrace (Guadalupe River, Comal County, TX) to provide better protection to rainbow trout that can survive in this stretch year round. A previous study indicated that predation is a major contributing factor to trout mortality.
- Reports from Guadalupe River Trout Unlimited (GRTU) and trout anglers on the Canyon Tailrace have indicated natural reproduction of Rainbow Trout. Texas Parks and Wildlife will make efforts to document if this is occurring.

Virginia

Virginia is going to implement Tiger Trout stocking and will report back over the next couple years on the success of the program

Wild Trout

Did eDNA sampling for Brook Trout in conjunction with USFS in 2019. Sampled 85 streams with the objective to determine presence/absence of Brook Trout. This allowed us to sample streams that we couldn't access previously. We did locate Brook Trout in streams that were not previously sampled based on eDNA. This could help determine trout distribution.

In 2020, paired electrofishing with eDNA sampling in previously sampled known Brook Trout streams to determine the effectiveness of methods and determine if trout have been extirpated from streams. Results still pending. But will be exploring if they want to use eDNA as a surrogate for electrofishing to determine presence/absence of Brook Trout.

Starting to research the impacts of stocking hatchery Brook Trout on wild Brook Trout populations by looking at populations upstream of just wild trout and populations where wild and stocked Brook Trout are present. Brad may be reaching out to you to people on the committee to see if you have any experience with this.

Virginia is monitoring streams with wild Brook Trout and Brown Trout coexisting and have not seen Brown Trout overtake Brook Trout.

Increase AOP training for biologists and implementation of AOP surveys during wild trout monitoring surveys. This will be done in partnership with "sister" agencies.

Outreach

Have been putting videos, etc., on social media about wild trout management and fishing to engage with the public. Did a Facebook Live with hatchery managers and fish biologists to take questions from the public. Over 100 people attended.

Launched marketing campaign called the Virginia Trout Slam. Anglers can catch all 3 species in one day, take pictures and send it in, the angler will get a bumper sticker. Over 100 people did it the first year. Supported this program by publicizing the stocking of all three species in waterbodies and it was successful.