

2018 SDAFS Trout Committee Meeting  
Gaston's White River Resort, Lakeview, AR  
15 May 2018

The meeting was called to order at 8:34 a.m. (Central) at the James A. Gaston Visitor Center at Bull Shoals-White River State Park.

Members and guests in attendance were:

*J. Spaulding (Chair), J. Habera, B. Simcox, and S. Petre (TN); J. Rash (NC); D. Zetner (U. of AR Pine Bluff); D. Thorne, (WV); B. Batten—Asst. Chief of Fisheries, C. Graham (Treasurer), and K. Nault (AR); M. Kulp (NPS/GSMNP); J. Heflin (KY); S. Reeser (VA); T. Whelan (Past Chair) and N. Rechtenwald (MO);and J. Casey (USFWS). M. Sell (Chair-elect, MD) and K. Swallow (AR) joined by conference call.*

*\*Italics = TC members.*

A quorum (10 members) was determined to be present.

Old Business:

**2017 Meeting Minutes:** The 2017 meeting minutes were briefly discussed and no changes were suggested. S. Reeser moved to accept, M. Kulp seconded the motion, and the 2017 meeting minutes were approved by voice vote.

**Treasurer's Report:** C. Graham gave the TC Treasurer's report. The Committee currently has \$4,869.49 and the only expense during the past year was for Dan Rankin's Distinguished Service award (see below). No funds were provided to the AFS (Parent Society). T. Whelan moved to approve the Treasurer's report (J. Habera seconded). The report was approved by voice vote.

**Membership List:** Chair J. Spaulding circulated the membership list for edits/updates.

**Website Update:** J. Habera reported that the TC website issue has been resolved (SDAFS is currently providing at no fee) and information on the site has been updated. He requested input anyone might have regarding the site's content and photos that anyone might want to provide for use on the site.

**MicroFish 4.0 Update:** Jack Van Deventer was unable to attend and M. Kulp gave a brief review of MF 4.0. There is no mechanism yet to pay Jack for the software. The TC suggested that Jack be asked to make MF 4.0 generally available and M. Kulp will follow up with him. Discussion followed regarding ho other agencies enter fisheries data in the field or at hatcheries.

New Business:

**Officer election:** Chair J. Spaulding called for any volunteers for the office of Chair-elect (there were none). M. Kulp then nominated D. Thorne (WV) and M. Sell seconded. Thorne agreed to serve and became Chair-elect by acclamation.

**Selection of Location for 2019 TC Meeting:** Given the current 3-year rotation, the 2019 TC meeting is due to be held in conjunction with the SDAFS Spring meeting. However, the 2019 and 2020 SDAFS meetings will be in Galveston, TX and Little Rock, AR respectively, and were generally not regarded as ideal meeting

venues. The TC had discussed hosting an overdue East Coast Trout Management & Culture Workshop VI (in 2019) at last year's TC meeting in KY and discussion ensued regarding the potential for going forward with it at Frostburg, MD in 2019. The TC meeting would be held there, possibly with an EBTJV meeting as well. Sell offered that he and A. Heft (MD) could coordinate with Frostburg State Univ. and J. Rash, S. Reeser, and D. Thorne volunteered to assist. The TC agreed to go forward with East Coast VI with the understanding that it will require TC financial support. M. Sell will follow-up with Frostburg State Univ. and keep the TC updated. He also requested that anyone else willing to help with East Coast VI should contact him.

**Biosecurity Subcommittee Update:** J. Rash gave a presentation on the impacts of nonnative and invasive fish pathogens to NC's trout resources and its managers. He emphasized that movement of infected fish is the main vector for whirling disease (WD). He also reviewed NC's WD and gill lice monitoring efforts and results and suggested that the TC could recommend how wild trout screening could be standardized to ensure that results are comparable.

The state representatives on the TC then discussed what biosecurity measures are being taken to prevent the spread of aquatic nuisance species (ANS) in their respective states.

**Montauk Trout Park Flood:** T. Whelan gave a presentation on the epic flood that occurred at Montauk Trout Park (MO) in April/May 2017 and its impact on the hatchery there. The hatchery at the Park lost over 500,000 fish, but many were recovered.

**Distinguished Service Award:** J. Habera announced that Dan Rankin (SC) had been selected to receive the TC's Distinguished Service Award. The awards subcommittee (J. Habera and the EXCOM) recognized Dan's 25 years of service on the TC—including a term as Chair in 2009, his hosting of the 2007 TC meeting at Devil's Fork State Park, SC (Lake Jocassee), and his contributions to many other TC meetings over the years. Habera will congratulate Dan on behalf of the TC and ensure that he receives his award plaque. Previous recipients of the TC's Distinguished Award are Monte Seehorn, Larry Mohn, John Boaze, Steve Moore, Jeff Durniak, Mike Shingleton, and Mark Hudy.

**Working with Non-Profit Groups:** Chair J. Spaulding led a discussion about the benefits of working with various non-profit groups. His example was a local flyfishing group in the Nashville, TN area that helps maintain an access area. The N. AR Flyfishers donated funds for signage and used line disposal containers. In MO, these groups assist with River Strong river clean-ups and Kids' Fishing Days. Trout Unlimited is involved with habitat improvement work in AR and MD.

**Other Committee Priorities:** This discussion centered around public outreach and new challenges associated with that, including marketing (S. Reeser), social media (AR can use webpages separate from their "official" page; TN cannot), and how to accomplish the '3 Rs' of improving angler participation (recruitment, retention, and reactivation).

Chair J. Spaulding also briefly discussed the trend toward low harvest levels in trout fisheries and that the TC might develop a document on how to manage for this given that most regulations are based on a certain level of harvest.

Meeting adjourned at 4:00 p.m.

## Roundtable Discussions

### SOUTHERN DIVISION AMERICAN FISHERIES SOCIETY GREAT SMOKY MOUNTAINS NP ROUNDTABLE ITEMS

Gaston's Resort, AR

16 May 2018

#### ***Brook Trout Restoration: Anthony Creek***

- 3<sup>rd</sup> order stream in the Abrams Creek watershed; no BKT pops documented since 1950's
- Used 5 removals in 2017 and 2 additional removals in 2018 to restore 2.8 km
- Capture efficiency was 40-89% for YOY and 78-90% for adults
- 2,284 RBT removed (945 YOY, 1,339 adult) in 2017; 52 removed (29 YOY, 23 adult) in 2018
- Translocated 269 BKT from Bunches Creek in Oct 2017; plan to move additional 300-400 fish from upper Deep Creek in 2018
- THANK YOU to TWRA for assistance

#### ***Brook Trout Restoration: Little Cataloochee Creek***

- 3<sup>rd</sup> order stream in Cataloochee Creek watershed; had existing sympatric BKT/RBT pop
- Shocked ~400 BKT prior to treatment and placed in refuge areas to preserve genotype
- Used VIP's to complete project due to Hurricane Irma onset
- Use of LIDAR to set treatment stations resulted in most efficient treatment to date
- Result is 13 streams now restored in GRSM totaling 30.25 miles
  - 4 via antimycin, 5 multiple removals, 3 annual removals, 1 no fish
- THANK YOU to NCWRC for assistance

#### ***Restoration of Brook Trout Across Their Native Range Using Fish Toxicants and Electrofishing; Are We Successful Ecologically and Socially? – AFS National August 2018***

- A survey of 17 state agencies and 2 National Parks indicates that 12 of 17 states (71%) and both national parks (100%) have been using fish toxicants, electrofishing and/or simple translocation into fishless areas to restore Brook Trout populations over the last 30 years.
- Of 162 projects, 123 (76%) have successfully restored Brook Trout back to their native range, including 53 ponds (79% success rate) totaling roughly 1,249 ha and 70 streams (74% success rate) totaling 185.7 km.
- Rotenone has been used for all 53 pond restoration projects and 1 stream restoration project whereas antimycin has been used for 6 stream restoration projects.
- Causes associated with the 39 unsuccessful projects included: ineffective chemical treatment (38%), poor habitat (21%), failure to remove target species (18%), unknown (13%) and ineffective barriers (10%).
- Public meetings, agency reports and press releases were used by 8 of 14 (57%) of agencies conducting Brook Trout restoration projects.

- Public perception was overwhelmingly positive and/or neutral in 98% of projects with one record of project sabotage.

### ***Assortative Mating Study***

- Both within-stream and between-stream groups were successfully crossed in the laboratory setting 42 successful crosses (18 control, 24 treatment)
- Observed differential peaks of gamete production within and among source stream brood stock, despite common garden conditions.
  - Spawning started at 13C
  - 2015 temps lowered 3-7C over 90 days (spawning lasted >120 days)
  - 2016 temps lowered 3-7C over 6 days (spawning lasted <60 days) and resulted in differential peaks of gamete production
- Once fertilized, eyed and hatched percentages were not sig diff among groups
- We observed markedly different fertilization success rates within-population (66.7%) and between-population (91.7%) from the 42 crosses (N=18 control, N=24 treatment).
- Observed significant ( $P < 0.05$ ) differences between within-population and between-population groups in each of our linear mixed effects global models for each trial stage of development (i.e., fertilization rate, eyed egg rate, and hatch rates).
- Tukey's HSD comparisons revealed only one significantly ( $P < 0.003$ ) different fertilization rate among the forty five pairwise comparisons in each of our three stages of trails.
- Observed differential peaks of gamete production within and among source stream brood stock, despite common garden conditions, that appeared to have limited fertilization success rates between interstream and control groups.
- Despite differential peak gamete timing, intrastream crosses performed equally, and, in some instances, better than those between control groups. Our results suggest differential responses to shared environmental conditions (i.e., temperature and/or photoperiod) may contribute to mismatched spawning phenology (i.e., gamete production timing) among restoration founder stocks leading to introgression (i.e., genetic admixture).
- The application of contemporary genetic techniques could help determine if these possible local adaptations are genetically fixed or may break down over time in restored populations with mixed source stocks.
- These findings demonstrate the need to apply contemporary conservation genetics tools to future wild trout restoration projects using translocated source stock towards the goal of "genetically-robust", naturally reproducing populations with the ability to cope with current and future perturbations.
- THANK YOU to TNACI staff (crossing methods) & TWRA for trucks, staff, PIT tags

***Investigating the Neutral Genetic and Phenotypic Variation Within and Among Isolated Headwater Brook Trout Populations within GRSM – Weathers et al. in print***

- Purpose was to determine how spatial isolation and restricted gene flow influence contemporary phenotypic variation within and among native populations of Brook Trout (*Salvelinus fontinalis*) by examining the neutral genetic and phenotypic characteristics of 35 isolated headwater populations from Great Smoky Mountains National Park across a suite of 13 neutral microsatellite loci.
- Observed high levels of allelic fixation and considerable genetic differentiation among populations, subwatersheds, and watersheds that were consistent with patterns of isolation.
- Observed significant and positive associations between low allelic diversity and low estimates of effective number of breeder sizes. In contrast, much of the phenotypic variation observed occurred among individuals within populations. We observed considerably less phenotypic structure among streams, subwatersheds, and watersheds.
- Pairwise Mann-Whitney tests revealed no significant phenotypic differences among the populations of Brook Trout we examined from Great Smoky Mountains National Park. Similarly, we observed no significant relationship between the amount of phenotypic variation within populations and any of the examined measures of genetic diversity and/or the amount of habitat sampled, which suggests that unmeasured confounding variables may be influencing morphometric and meristic variation within populations.
- The observed patterns of genetic drift, allelic fixation, and isolation however, highlight the importance of enhancing population connectivity, but also suggest considerable phenotypic variability may persist in small, isolated populations.

***Relationships between indicators of acid-base chemistry and fish assemblages in streams of the GRSM*** – Baldigo et al. 2018 *Ecological Indicators*

- Matching chemistry and fishery information collected from 389 surveys performed at 52 stream sites over a 22-year period were assessed using logistic regression analysis to help inform the U.S. Environmental Protection Agency's assessment of the environmental impacts of emissions of oxides of nitrogen (NO<sub>x</sub>) and sulfur (SO<sub>x</sub>).
- Numerous logistic equations and associated curves were derived that defined the relations between acid neutralizing capacity (ANC) or pH and different levels of community richness, density, and biomass; and density and biomass of brook trout, rainbow trout, and small prey (minnow) populations in streams of the GRSM.
- The equations and curves describe the status of fish assemblages in the GRSM under contemporary emission levels and deposition loads of nitrogen (N) and sulfur (S) and provide a means to estimate how newly proposed (and various alternative) target deposition loads, which strongly influence stream ANC, might affect key ecological indicators.
- The implications of this study to the regulation of NO<sub>x</sub> and SO<sub>x</sub> emissions, water quality, and fisheries management in streams of the GRSM are discussed, but also qualified by the

fact that specific examples provided need to be further explored before recommendations concerning their use as ecological indicators could be proposed.

### ***Evaluating Mercury Levels in Fish within Eastern National Parks***

- Nationwide study with USGS that collected 2,174 fish from 92 sites in 31 parks.
  - Within GRSM, collected 254 fish from 17 sites.
  - Sampled 3 pops in 2015 and 14 in 2016
- Species included:
  - 44 smallmouth bass (*Micropterus dolomieu*)
  - 81 rainbow trout (*Oncorhynchus mykiss*)
  - 13 brown trout (*Salmo trutta*)
  - 116 brook trout (*Salvelinus fontinalis*)
- GRSM 2015 Preliminary Results (3 Sites):
  - Blacknose Dace - 0.025-0.271 ug/g ww
  - Brook Trout – 0.022-0.062 ug/g ww
  - Smallmouth Bass – 0.134-0.487 ug/g ww (LRV mean=0.317)
- ***[EPA Human Consumption Criteria is 0.3 ug/g ww]***

### ***Chimney Tops 2 Fire Impacts to Fish and Water Quality***

- Fire perimeter encompasses approximately 17,964 acres in Sevier County, TN
  - ~11,000 acres within Great Smoky Mountains National Park (GRSM) (2% of park acreage)
- Roughly 55 stream miles affected within GRSM
- 19 species of fish reside in the streams within the burn area
- Water chemistry and turbidity data have been within normal range to date.
- Majority of burn severity low to moderate with very limited severe within park.
  - Duff layer still intact in most areas so soil absorption rates still good: minimal flood potential.
  - Duff layer still intact throughout majority of burned area.
  - Extensive root systems and seed banks remained in place throughout burn area.
- No sig impacts to fish or water quality due to CH2 fire within GRSM.

### ***Potential for Fishing Permit at GRSM***

- Working on proposal for fishing permit for GRSM
  - Would be in addition to State license for either NC or TN
- The Papadogiannaki (2009) study indicated roughly 5-8% of visitor's fish while enjoying GRSM, which equates to between 565,740 to 905,184 anglers per 2016 visitation (11,314,802) (<https://irma.nps.gov/Stats/Reports/Park/GRSM>).
- Looking at potential daily, weekly and annual license structure.

## North Carolina Wildlife Resources Commission

### Update to the Southern Division of the American Fisheries Society Trout Committee

#### 2018 Annual Meeting

#### Bull Shoals, Arkansas

15 – 16 May 2018

Report submitted by Jake Rash

#### ***Salmincola spp.***

- Since September 2014, NCWRC biologists have documented new biological threats to salmonids within the State. Gill lice (Copepoda: Lernaepodidae: *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. Relevant publications:

Ruiz, C. F., J. M. Rash, D. B. Besler, J. R. Roberts, M. B. Warren, C. R. Arias, and S. A. Bullard. 2017. Exotic “gill lice” species (Copepoda: Lernaepodidae: *Salmincola* spp.) infect Rainbow Trout (*Oncorhynchus mykiss*) and Brook Trout (*Salvelinus fontinalis*) in the southeastern United States. *Journal of Parasitology* 103:377–389.

#### ***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 four major river basins (Catawba River, French Broad River, Watauga River, and Yadkin River basins). The NCWRC has 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. Relevant publications:

Ruiz, C. F., J. M. Rash, C. R. Arias, D. B. Besler, J. R. Roberts, R. Orelis-Ribeiro, M. R. Womble, J. R. Roberts, M. B. Warren, C. L. Ray, S. Lafrentz, and S. A. Bullard. 2017. Morphological and molecular confirmation of myxospores of *Myxobolus cerebralis* (Myxozoa: Myxobolidae) infecting wild-caught and cultured trout in North Carolina. *Diseases of Aquatic Organisms* 126:185–198.

#### ***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.

#### ***General Aquatic Nuisance Species***

- The NCWRC has developed a website devoted to aquatic nuisance species (ANS): [www.ncwildlife.org/ANS](http://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. Relevant publications:  
Rash, J. M., C. F. Ruiz, and S. A. Bullard. 2017. Impacts of nonnative and invasive fish pathogens to North Carolina's trout resources and its managers. Pages 307–313 in R. F. Carline and C. LoSapio, editors. Science, Politics, and Wild Trout Management: Who's Driving and Where and Where Are We Going? Proceedings of the Wild Trout XII Symposium, Bozeman, Montana.

### ***Brook Trout Genetics***

- The NCWRC has been collecting genetic information for the State's Brook Trout in conjunction with trout distribution efforts. Recently, 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. These results represent a valuable baseline for management and restoration efforts of Brook Trout in North Carolina. Relevant publications:

Kazyak, D., J. Rash, B. Lubinski, and T. King. 2018. Assessing the impact of stocking northern-origin hatchery Brook Trout on the genetics of wild populations in North Carolina. *Conservation Genetics* 19:207–219.

Kazyak, D. C., B. A. Lubinski, J. M. Rash, and T. L. King. 2017. Understanding the genetic characteristics of wild Brook Trout populations in North Carolina thanks to the guidance of Dr. Tim King. Pages 111–117 in R. F. Carline and C. LoSapio, editors. Science, Politics, and Wild Trout Management: Who's Driving and Where and Where Are We Going? Proceedings of the Wild Trout XII Symposium, Bozeman, Montana.

### ***Brook Trout Restoration***

- The NCWRC has used recent genetic data to plan Brook Trout restoration activities. Currently, two reintroductions are planned for 2018 via the translocation of fish from selected source populations.

### ***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 2018, 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 and Clemson 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.

### ***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, NCWRC staff began working with Duke Energy biologists to couple hydroacoustic and gill-net surveys to evaluate this unique fishery.

### ***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 and as a member of the Science and Data Subcommittee.

### ***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). The initial stockings in 2016 were incredibly popular with anglers, and given the success of those efforts and availability of trout, the NCWRC repeated these trout stockings in late 2017. In addition, 2017 stockings included selected impoundments within the piedmont region of North Carolina.

### ***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](http://www.ncwildlife.org/trout). Recently, information concerning [Stream Flow Conditions](#), [Aquatic Organism Passage](#), and [Trout Handling Advice](#) were posted.

### ***Evaluation of Advanced Fingerling Brown Trout Stockings in Bridgewater Tailrace***

- The NCWRC has worked to establish a put-grow-and-take Brown Trout fishery in Bridgewater Tailrace since 1995. These efforts have been successful in establishing a fishery; however, recent NCWRC surveys and angler reports indicate that success has been intermittent. Long-term water quality data suggested that thermal bottlenecks in the system may limit trout survival. In 2016, the NCWRC completed a five-year evaluation of a new management approach focused on stocking

approximately 10,000 advanced Brown Trout fingerlings (200–255 mm total length) following the period of a potential thermal bottleneck. Study results indicated fast growth and a fishery comprised primarily of age-1 trout. On 1 August 2018, a new regulation for this fishery will become effective: two-fish creel and 14-in minimum size limit.

### ***Trout Age and Growth***

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

### ***Citizen Science***

- Anglers have expressed interest in providing information relative to trout habitat. In conjunction with Trout Unlimited, the NCWRC will launch an ArcGIS Survey123 project to allow anglers to document potential habitat improvement projects. Through this tool anglers, can take images, record notes, and share locations of potential improvement projects (e.g., improper culverts, failing stream banks, sources of sedimentation), with data stored in a geospatial database that is shared real-time with management partners.

### ***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.

### ***Contribution of Stocked Brown Trout and Rainbow Trout in Apalachia Reservoir***

- Located in the far western portion of North Carolina, Apalachia Reservoir has suitable trout habitat year-round and a clupeid forage base. Brown Trout and Rainbow Trout of two sizes, small (254 mm TL) and large (380 mm TL), were stocked to determine the best size and species to create a trophy ( $\geq 600$  mm TL), put-grow-and-take fishery. Trout were tagged and stocked in December 2012–2015, collected with annual boat electrofishing and gill-net surveys, and evaluated via a 12-month angler creel survey. Large Brown Trout were highly piscivorous within the first four months after stocking, whereas the smaller trout of both species took longer to switch to piscivory and fed mostly on macroinvertebrates. Brown Trout were in better condition than Rainbow Trout throughout the study period. Brown Trout were more popular with anglers, persisted longer in the reservoir and reached larger sizes than Rainbow Trout. Considering the better performance of Brown Trout and angler preference, we recommend continued stocking of Brown Trout at both sizes.

**Tom Whelan**  
**Montauk Hatchery Manager**  
**Missouri Dept. of Conservation**

Historic spring flooding was the big story for Missouri in 2017. On April 29<sup>th</sup> and 30<sup>th</sup> Montauk Hatchery received eleven to twelve inches of rain that resulted in the lost 580,000 fish. This was the only time on record that all four of the rearing systems at the hatchery went under water. Of the fish lost, 85% survived by escaping to the river and 15% died in the raceways. To accommodate the fish loss, stocking rates for the four trout parks (Montauk, Maramec, Bennett Spring and Roaring River) and Lake Taneycomo were reduced 30% for the rest of 2017. For the most part, fish production numbers as well as stocking rates have returned to normal for 2018.

In 2003 the process of developing a “Plan for Missouri Trout Fishing” was started. This plan provided direction for how Missouri’s trout program would be managed. The plan was developed to provide quality trout fishing for trout anglers in Missouri. The plan included goals and objectives that focused on three priorities for Missouri’s trout program – more successful fishing trips, spread the harvest of trout out more equitably among anglers, and provide additional trout fishing opportunities. This process included a comprehensive review of trout management and a re-structuring of management designations following a system of **blue, red and white ribbon trout management areas**. The **blue ribbon** areas include parts of large, cold streams with excellent trout habitat and smaller streams that support naturally reproducing rainbow trout populations. Harvest is limited on these areas. They provide excellent catch-and-release fishing and the chance to harvest a large trout. The **red ribbon** areas have high-quality trout habitat stocked primarily with brown trout. They also provide good catch-and-release fishing and the chance to harvest large trout. The **white ribbon** areas are coldwater streams capable of supporting trout populations year ‘round and receive periodic stockings of rainbow trout and on occasion brown trout. They provide great opportunities for catching and harvesting trout and occasionally a large trout.

This plan was written by a team of employees from the Department’s Fisheries, Protection and Resource Science divisions. This process started with three public meetings held in early 2003 to here from anglers, agency partners and others interested in the trout program.

In 2009 “A Plan for Allocation and Stocking of Trout in Missouri” was developed. This document provided framework and guidance for trout stocking conducted by the Missouri Department of Conservation. Missouri’s current trout program consists of four trout parks, Lake Taneycomo, thirty-three winter trout fishing areas in urban lakes and ponds, nine blue ribbon trout areas, three red ribbon trout areas and nine white ribbon trout areas.

Some of the highlights that have taken place since these two plans were developed include:

Acquisition of key tracts of land along the Barren Fork Creek and Mill Creek Blue Ribbon Areas.

Creation of a new White Ribbon Area on Hickory Creek.

Expansion of the winter catch-and-release season in the trout parks and the establishment of a winter catch-and release season on Hickory Creek.

Multiple renovation projects at Shepherd of the Hills, Roaring River, Montauk, Maramec Spring and Bennett Spring Hatcheries to enhance and sustain fish production.

Some of the goals identified in these two plans that The Department of Conservation will continue working towards are:

Continued Evaluation of new and renovated hatchery facilities to determine if goals of increased production and average size of fish stocked has been attained.

Continued effort to acquire additional land or easements along coldwater streams.

**Nathan Recktenwald**  
**Fisheries Management Biologist**  
**Missouri Dept. of Conservation**

Nathan Recktenwald discussed a few items from the “Plan for Missouri Trout Fishing, 2017 Status Report”. Since biosecurity was discussed on the first day of the meeting, Nathan further discussed that Missouri’s Private fish hatcheries are now responsible for their own fish health inspections and coordinate interstate fish transfers with the USDA veterinarian. Technical assistance regarding fish health, hatchery design, and maintenance is still provided when requested.

Nathan mentioned that Private conservation groups have assisted the Department in many ways including:

- Providing volunteer angler instructors for angler recruitment and retention
- Assisting and hosting “Kids Fishing Days” at the four trout parks and other winter trout areas
- Providing volunteer labor for constructing instream habitat structures on Trout Areas
- Tree Plantings
- Wader wash station maintenance
- Stream clean-up and water quality monitoring

Nathan also reiterated that Protection Division staff has remained vigilant in their trout enforcement efforts. Agents continue to enforce the Wildlife Code to curtail potential trout related violations. For example, a few years ago (during FY-16) agents performed routine compliance checks that resulted in 44 trout enforcement group saturation patrols with approximately 209 citations written. More common violations included: fishing without a permit, over-limit of trout, no trout permit, illegal bait, possession of trout in closed season, and littering. Furthermore, in the Ozark Region, 1310 staff hours and 24 days of group patrols were conducted in trout parks and an additional 1120 staff hours and 20 days of group patrols were conducted in other trout areas.

Nathan also discussed how the historic/record flood of 2017 impacted the fish populations in the North Fork of the White River, Current River, and Eleven Point River. Nathan added to Shane’s comments about the current Triploid Brown Trout research project being conducted on Lake Taneycomo, North Fork of the White River, and Current River. Preliminary results suggest that there is a potential for increased growth in Taneycomo, but the North Fork of the White River and Current River preliminary results do not suggest

considerable benefits of stocking Triploid vs. Diploid Brown Trout. Nathan further discussed that there has been an increase in angler concern about Striped Bass migrating into the North Fork River from Norfolk Lake after a low-head dam removal in the river, but the lake has been stocked with Striped Bass since the 1970's and continues to provide a great trout fishery. Increased education about the Striped Bass situation has helped decrease angler anxiety. The historic flood was approximately 7-feet higher than any previous flood on record. The 2017 flood significantly changed and in some cases damaged instream habitat and the riparian corridor along the river.

Nathan and Tom also mentioned the Rainbow Trout Genetic Strain Evaluation in the Eleven Point River was completed, and suggested that if anyone wanted more information to ask. One specific management implication from the study included stocking exclusively Fish Lake Strain Rainbow Trout and splitting the one-time annual stocking into a spring and fall stocking trip.

## **Shane Bush**

### **Fisheries Management Biologist**

#### **Missouri Dept. of Conservation**

Lake Taneycomo was impounded in 1913 and is Missouri's oldest hydroelectric reservoir. The lake is riverine in nature, 22 miles in length, and encompasses 2,080 surface acres. Prior to 1958, Lake Taneycomo supported one of Missouri's best warm-water fisheries. This changed in 1958 when Table Rock Dam, located in the headwater of Lake Taneycomo, began discharging cold hypolimnetic water into Lake Taneycomo. Rainbow Trout were first stocked into Lake Taneycomo in 1958. Brown trout were first stocked in 1980. Since that time more than 30 million Rainbow and Brown Trout have been stocked. Lake Taneycomo is Missouri's largest and most popular trout fishery, but it also contains an excellent warmwater fishery in the lower sections of the lake. It annually receives in excess of 140,000 fishing trips and anglers catch an estimated 500,000 trout annually.

In 1997, a 12 to 20-inch slot length limit on Rainbow Trout and an "artificial lures" only restriction in the upper three miles of Lake Taneycomo was implemented. The purpose of this regulation was to provide a refuge for Rainbow Trout to grow larger than stocked size and to provide anglers with trophy fishing opportunities. This regulation was also meant to allow for angler harvest of Rainbow Trout below 12 inches in order to maintain moderate densities of Rainbow Trout and reduce overcrowding. However, based on the most recent creel survey conducted in 2008-2009, nearly all Rainbow Trout caught in this regulation zone are released by anglers. Electrofishing CPUE values have increased tenfold since the regulations went in to effect in 1997. Additionally, the size structure of Rainbow Trout has remained steady and fluctuated very little in the special regulation zone throughout the past 20 years, indicating that the regulations are working.

Angling fishing pressure and Rainbow Trout harvest rates have decreased while Rainbow Trout angler catch and release rates have increased since the regulations went into effect in 1997. As of 2009, anglers only harvested approximately 200,000 of the 700,000 Rainbow Trout stocked annually. Additionally, Rainbow Trout electrofishing catch rates for all sizes of Rainbow Trout have continued to rise since 1997. Based solely on the decline in angling fishing pressure and harvest rates combined with steadily increasing

electrofishing catch rates, it appears that the stocking rate of 700,000 Rainbow Trout annually may be contributing to overcrowding in Lake Taneycomo and may also be inhibiting the growth rates and reducing the size of Rainbow Trout available for anglers to catch.

A roving angler creel survey began on Lake Taneycomo in January 2017 and will continue through December 2018. Approximately 70 percent of anglers interviewed said they would support a moderate reduction in stocking rates. Rainbow Trout were stocked at the full stocking rate of 700,000 during one year of the creel survey and will be stocked at a reduced rate of 560,000 the second year of the survey to determine if angler catch rates change as a result of reduced stockings. If angler catch rates do not decline as a result of the reduced stockings, recommendations will be made for stockings to continue at the reduced rate to improve the size and condition of Rainbow Trout in the lake.

A total of 13,862 triploid Brown Trout were marked with an adipose fin clip and stocked into Lake Taneycomo from 2013-2015. Three large triploid Brown Trout were caught and reported by anglers in 2017. All of the fish caught exceeded 30 inches, representing above average growth compared to the diploid Brown Trout regularly stocked into Lake Taneycomo. The first triploid Brown Trout that were stocked into Lake Taneycomo were produced in 2011. Therefore, all three triploids caught in 2017 had exceeded 30 inches by age six or less. Comparatively, the mean length at age-5 for a diploid Brown Trout is 21 inches.

AFS SD Trout Committee - May 15-16, 2018 - Gaston's Resort , Arkansas

### **Virginia Dept. Game and Inland Fisheries**

Steve Reeser, Fisheries Biologist, [steve.reeser@dgif.virginia.gov](mailto:steve.reeser@dgif.virginia.gov)



VDGIF has a new logo and three word mission (Conserve, Connect, Protect)

#### Wild Trout Management Plan

Started development of first Wild Trout Management Plan in January 2018. Similar format to Stocked Trout Management Plan (Issues, Goals, Objectives, Strategies). Working with Key Stakeholder Committee. Hope to be endorsed by our Board in October 2018.

#### Wild Trout Health

Planning on sampling wild trout populations in Virginia (particularly in SWVA) for the USFWS Wild Fish Health Survey (Lamar, PA). 2018, semi-systematic collections of different watersheds. Will be looking for WD, Gill Lice and other pathogens as part of the USFWS wild fish health survey. Have not documented the presence of WD in any wild populations to date (not sure about SNP). Not observing any issues in wild

populations. Working to get all 5 of VDGIF coldwater hatcheries AFS Blue Book certified. Lined raceways at Marion, getting UV at Coursey Springs, Actually using limestone to improve WQ at Montebello Hatchery. Mention new hatchery coordinator Brendan Delbos. Also Megan Kirchgessner VDGIF Vet.

### Wild Brook Trout Genetics

Continue to provide samples to Jason Coombs (UMASS), Andrew Whiteley (MSU) and Keith Nislow (USFS) looking at effective population size. 2017-2018 providing samples from brook trout populations that were established via re-location of wild trout some from 1993, 1997, 2005, 2008 etc. and samples from source populations (do not have fin clips from the translocated trout). Still waiting for results from 2016 samples. DGIF will probably be doing more brook trout population genetic investigation in future because of needs coming from wild trout management plan. What do others feel about using the term SA Brook Trout? Is this still relevant in 2018?

### Long-term Stream Temperature Monitoring

VDGIF collecting hourly temperature from 50+ wild trout streams across Virginia. Started collecting data in 2011. VDGIF has other WQ data and trout population data (multiple years) for many of these streams.

### Upper Passage Creek

September 2017, latest relocation of wild brook trout. Partnered with USFS and TU. Excellent press coverage. Check out our little YouTube video. Will be checking this summer for natural reproduction.

## **Kentucky**

### **Justin Heflin**

Statewide Brown Trout Regulation Change:

- Old reregulation was 1 at 12 inches
- New Regulation is 1 at 16 inches
- Changed to clean up the different, special regulations and to unify the state on brown trout

Enhanced Size of Rainbows from a 9 inch average to 12 inch on several 3 streams

- We took ¼ of the stocking and changed the average size to 12 inches
- What feedback we have got has been very positive
- Did reduce numbers slightly but it gave an opportunity to catch nice fish.

New Brown Trout stockings on a couple of lakes with holdover capabilities

- Two lakes in hopes to start a holdover brown trout fishery
- This is the first year of the program

Added a new lake to the fins (Fishing in the Neighborhood) program

- 44<sup>th</sup> lake
- First privately owned lake in the program

- All lakes are stocked with trout and catfish seasonally

Trail camera projects on both FINS lakes and streams.

- Time-lapse software has been a huge help for trail camera picture counts
- Assessing use and looking into what else we can do with the data

## **Maryland**

### **2018 Trout Committee Roundtable – Maryland**

#### **Matt Sell and Alan Heft**

#### Brook Trout Sampling

- Maryland is currently in the last year of a 5-year synoptic assessment of all known historical brook trout populations. This work is being done at the catchment scale (14 digit HUC) and includes more than 400 individual samples. Significant progress has been made toward sampling all of these catchments, where permission allows.
- Many of the brook trout populations in Maryland are found on privately owned property. This poses challenges for sampling in terms of access. Therefore, a pilot program was initiated in 2018 to attempt to obtain landowner permission to sample for brook trout where they historically occurred on private property. After determining landowner names and addresses using GIS, a permission letter was mailed to them with a simple form to cut off and mail back to us. Thus far, we have received a number of permissions which will establish access in areas otherwise off limits to us.
- Annual monitoring in the upper Savage River watershed will continue in 2018, marking the 11<sup>th</sup> year of the effort. This work was initiated during 2007 to determine response of the brook trout population in the watershed to a catch-and-release regulation adopted during 2006.
- Historically brook trout sampling in Maryland had been governed by the Brook Trout Field Sampling Manual/SOP. Before the start of our next 5-year sampling effort, MD Fishing and Boating will establish a wadeable streams SOP that will direct not only brook trout sampling, but all trout and non-game sampling conducted in Maryland. The Trout Committee's Standardized Sampling Guidelines for Wadeable Trout Streams will be used to assist in the development of this document.
- Efforts from a SWG grant to investigate presence/prevalence of gill lice in brook trout in Maryland is ongoing, to date no gill lice have been observed on brook trout in Maryland.

#### Brook Trout Habitat Enhancement

- A large woody debris project is slated to begin during the summer of 2018 on Big Run in the Savage River watershed. This project was initially designed to follow a 'chop and drop' method, however modifications needed to be made to ensure that the felled trees did not become mobile in the system. Therefore, a modified design was completed and work is ready to begin. This project will reintroduce large woody debris to an area that is generally denuded of this type of habitat.
- Investigations into the re-connection of multiple tributaries in the upper Savage River are underway. Multiple tributaries become disconnected from the mainstem Savage River during low flow periods and serve as a barrier to upstream movement to a population of fluvial, migratory brook trout. Bear Pen is being considered as a pilot project to determine if expanding the effort into the rest of the watershed is warranted.

#### Thermal Resilience in Brook Trout



- MD Fishing and Boating is cooperating with Dr. Than Hitt (USGS, Leetown Science Center) in an effort to determine whether adaptation to local thermal stress is occurring. Adult fish from a thermally unstressed (Crabtree Creek) and thermally stressed (Walker Run) population were moved to Dr. Hitt's stream lab to investigate functional differences between the F1 generation of these two populations. Although there were complications with the survival of some adults and the lack of progeny, the original study has been modified. Currently, the focus is on behavioral differences between the source stocks using video and PIT tag arrays. Results are forthcoming.

#### Angler Preference Surveys

- A wild trout angler preference survey was conducted during 2017 to determine wild trout angler's opinions and attitudes toward wild trout management in Maryland. Some highlights include; The majority of Maryland anglers fish for wild trout **and** stocked trout (61.5%), 30% fish only stocked trout, 8.5% fish only wild trout; Maryland wild trout anglers were generalists overall as to fishing method (fly/artificial/bait), no one method was dominant; support for the upper Savage River catch and release regulation is unequivocally in favor, and anglers believe the fishing has improved since implementation; support for more conservative statewide brook trout regulations is very strong (86% support), with catch and release and tackle restrictions the most supported methods (i.e. what was used in the USR); majority of anglers support not stocking hatchery trout where wild trout occur, strongest for where wild brook trout occur; harvest was the least important aspect of the value of brook trout, anglers value wild trout and brook trout specifically as a non-consumptive resource; and importance of hatchery trout to anglers was very high, and provides a consumptive opportunity that reduces pressure on wild trout.

#### Socio-economic Survey

- A state-wide angler survey was done in 2016, from a wild trout perspective it was estimated that angling for wild trout contributed \$27,000,000 annually to Maryland's economy, \$16,000,000 for wild brown trout angling, and \$9,000,000 for wild brook trout angling.

#### Aquaculture/Biosecurity Issues

- In addition, our largest coldwater hatchery (Albert Powell State Fish Hatchery) began experiencing flow problems during 2017. A regional drought seemed to be the cause for the reductions in flow, although the flows were reduced to historically low levels. This resulted in crowding of fish in the raceways and the need to be stocked at a smaller size to reduce crowding and disease issues in the hatchery. Flows have returned to normal at this point and the true cause of the event was never determined, despite exhaustive efforts by the Maryland Geological Survey.
- Due to increased biosecurity issues and more stringent disease control requirements, Maryland has lost one of its major trout suppliers thus increasing demand on the state hatcheries. In addition, some local angling groups are struggling to find fish to stock due to distance and/or availability.

#### Community Outreach

- This year MD Fishing and Boating will host the 3<sup>rd</sup> annual youth brook trout fishing clinic. During the clinic, kids ranging from 8 to 16 years old learn basic skills and techniques needed to target wild brook trout such as knot tying, casting, hook removal, and what trout like to eat. In addition, each kid is given a rod/reel, tackle pack, forceps, line cutters, a lanyard, and some other cool gear. The response to this event has been incredibly positive.

#### Website/Online Tools

- MD Fishing and Boating continues to maintain a “Brook Trout Program” website with information about the work we do and the management of brook trout resources. ([Brook Trout Program Webpage](#)) This site is currently undergoing an update.
- An online brook trout mapping tool has been established using the ESRI Online platform to share brook trout occupancy/population information with interested parties. The site hosts the most current distribution of brook trout in Maryland as well as some supporting data layers. Thus far, the web tool has proven extremely useful during the project review process for our staff and other agencies working in Maryland.

**2018 SDAFS Trout Committee Meeting, Gaston’s White River Resort, AR  
Roundtable for TN (TWRA)**

1. Statewide:

- *Statewide Trout Management Plan (2017-2027)*: Plan is finalized and available at [tnwildlife.org](http://tnwildlife.org). A includes a native Brook Trout management plan.

2. Brook Trout:

- *Brook trout DNA sampling*: Completed the remaining 42 streams during 2017 (two no longer have Brook Trout). Collected fin clips from 2,329 fish during 2016-17 representing 91 populations. Samples were obtained from over 75 stream km, including reaches above waterfalls. Analyses using microsatellite DNA markers are being conducted by D. Kazyak and the USGS lab in WV. Results are pending and will be used to update TN’s allozyme-based genetics information—particularly to confirm identities of native populations and determine effective sizes ( $N_e$ ) to help choose donor populations for restoration/enhancement projects.
- *Gill lice screening*: All Brook Trout collected for DNA samples in 2017 (1,081 fish from 40 streams) were also examined for gill lice. Most were from streams in the Watauga River watershed, where gill lice (*Salmincola edwardsii*) have been found in Brook Trout from some NC populations. None infected fish were observed
- *Brook trout restoration / enhancement projects*: Projects to restore Brook Trout in Stony Creek and enhance an existing population in Little Jacob Creek were evaluated in 2017 and are proceeding to completion in 2018. These will add 4 km of distribution (allopatric). A follow-up Rainbow Trout removal will be conducted in lower Little Jacob Creek, along with translocation of some supplemental fish from the original source populations later in the year. Lower Little Stony Creek will receive a supplemental stocking in May of ~300 fish produced by the TN Aquarium Conservation Institute (TNACI). A couple other projects are ready to proceed—pending results of the genetic analyses.

3. Tailwaters:

- *Whirling disease confirmed*: Whirling disease (WD) has been confirmed in the Wilbur (Watauga River) and South Holston tailwaters (source is unknown) through fish collected in 2017. Only a few adult Rainbows showing symptoms (cranial deformity) were observed during the March 2018 monitoring efforts. A public education campaign is underway emphasizing the prevention of spreading WD to other waters and includes a fishing guide article, Agency webpage, gear disinfection stations at fly shops, Clean/Drain/Dry signs, and the creel clerk on

the Watauga River. Additional tailwaters will be screened in 2018 (targeting fingerling-stocked Rainbows), along with selected wild trout streams.

- *Tailwater trout fishery management plans:* Management plans for the remaining three tailwater trout fisheries in Region 4 (east TN) are being developed (as in prescribed the new Statewide plan). The Boone and Ft. Patrick Henry tailwaters will be combined in one plan, which will emphasize the large, high- $W_r$  Rainbow Trout that are produced in each. The Cherokee tailwater (Holston River), which is subject to a thermal bottleneck each September, will be covered in a separate plan.

#### 4. Regulations:

*New delayed harvest (DH) areas:* Proposed DH regulations on two trout streams in east TN—Buffalo Creek in Grainger Co. and Doe River in Carter Co. (Roan Mountain State Park) were approved by the TN Fish and Wildlife Commission and will become effective this fall: Oct. 1-Jan. 31 for Buffalo Creek and Nov. 1-Feb. 28 for Doe River.

### **West Virginia Division of Natural Resources – report to SDAFS Trout Committee 16 May 2018 Submitted by David Thorne**

**Acidic Waters Mitigation Program** – Limestone sand treatment – In order to restore and maintain quality fisheries in approximately 400 miles of native Brook Trout streams (>60 waters treated) and 250 acres of small impoundments (5 waters treated), we continue to apply over 6000 tons of high-quality (>90%  $\text{CaCO}_3$  content) crushed limestone sand annually by direct application. In addition, 2 self-feeding rotary drum systems continue to operate in the Cranberry River watershed. After 2018, we will have only a single rotary drum system in operation (North Fork Cranberry River station). There are no plans to retire the North Fork Cranberry station, as the treatment it provides cannot be replicated with direct sand application. This program is perpetually self-funded through an endowed account.

**Native Brook Trout Distribution Assessment** – Catchment-level investigations into the current range and genetic composition of Brook Trout in both the Chesapeake Bay and Ohio basin drainages within West Virginia are ongoing. Genetic material has been and will continue to be catalogued from each individual collected for genomic assignment and familial relationships (effective breeding population, genetic diversity, etc.). A pending agreement with the Wild Genomics Lab at West Virginia University will provide for the analysis of all necessary genetics.

**Continuous updating of State Trout Waters (47CSR2 Appendix B-2) list** – We work continuously with the WV Department of Environmental Protection to improve this list for protection/environmental permitting needs. In 2018 we have engaged Trout Unlimited (both staff and grassroots members) as well as private consulting firms to cooperate in identifying undocumented waters for trout status. My office maintains authority for final determination whether to accept, deny, or follow-up on proposed listings.

**2018 Legislation** – One major change regarding trout management: A 200' buffer rule was established on fishing near State personnel engaged in the act of stocking public waters. No lines in the water or attempts to cast are permitted within the 200' radius. Some personnel had been restricted in performing their work

and/or felt threatened and intimidated by the presence of aggressive anglers when they would show up to stock in various places.

**Native Brook Trout Spawning and Rearing Success** – A West Virginia University Research Aquaculture facility near Wardensville, WV was made available to WV DNR for use. We initiated a pilot project in September 2017 to collect gravid females and ripe males from a productive donor stream to produce wild progeny for restoration of a local stream. The opportunity exists at the facility to isolate as many as 10 different genotypes for rearing, maintaining genetic differentiation at a chosen scale. – *NOTE – since this report was presented to the TC in May, we have released approximately 70 wild-origin native Brook Trout progeny into the target stream with a local school group and statewide press in presence. This school group has adopted the stream for future monitoring and conservation education efforts.*

**Endangered Species Listings** – Two crayfishes and a darter have been elevated by the US Fish and Wildlife Service for recognition under the Endangered Species Act. All three listings have or will have implications on the DNR's trout program. The Big Sandy Crayfish *Cambarus callainus* is listed as Threatened while the Guyandotte Crayfish *Cambarus veteranus* is listed as Endangered. Both crayfish occur in non-traditional trout waters that get regular put-and-take stockings as well as supplemental fingerling stockings of Brown Trout. A quick pilot diet study in 2016 indicated Brown Trout consume crayfish as about 11 percent of their diet while Rainbow Trout diets were comprised of less than 1 percent crayfish. By contrast, Smallmouth Bass in the same study stream consumed crayfish at a rate of 60 percent of their diet. Upon discussion of this information, the USFWS granted WVDNR a reprieve on stocking, so long as we only used Rainbow Trout in the stocking plan in waters harboring either of the two crayfish. A more rigorous study of the crayfish, their habits, and their life history is underway, including effects of trout predation on the sensitive populations.

The Candy Darter *Etheostoma osburni* is under review and likely to be listed as early as October 2018. The Candy Darter is a species endemic to the New River drainage in WV and slightly into VA. The Variegated Darter has been introduced (likely via bait-bucket introduction) upstream of Kanawha Falls, a natural biogeographic break and well known fish distribution barrier. The two closely-related species easily interbreed and the Variegated Darter seems to be an invader species, rapidly spreading its genetic influence from identified introduction "hotspots". The Gauley River system upstream of Summersville Dam and the New River upstream of Bluestone Dam are the only areas that remain secure for the time being from the influence of Variegated Darter genes. The native Candy Darter range has significant overlap with the native Brook Trout range and it extends downstream into larger streams of more modest temperature regime that are very popular as stocked trout fisheries. Listing the Candy Darter as Endangered or Threatened and subsequent identification of critical habitat will dramatically alter the way we can manage trout fisheries and angling opportunities within the Candy Darter range.

**Hatchery Production and Stockings** – In 2018 WV DNR stocked approximately 700,000 pounds of Rainbow, Golden Rainbow, Brook, and Brown Trout) in over 200 waters. Approximately 190,000 individual Brown Trout fingerlings are planned for cooperative stockings (clubs, TU chapters, school groups) in approximately 60 locations.

**Weekend Stockings** – At selected locations (largely state park and small impoundment waters), stockings were planned for some weekends to meet needs of anglers and to stimulate interest in fishing and usage of

state park facilities. This seemed popular to anglers and will be discussed as a component of the pending Trout Management Plan.

**West Virginia Gold Rush** – A concept was turned into reality in April 2018. Golden Rainbow Trout have been reared separately from regular Rainbows in a hatchery with the plan of an all-Golden Trout stocking event. The fish were fed a color enhancing food for the last month or so to further add to their appearance. Over 50 state park and small impoundment waters were selected for a family-friendly circus-like atmosphere. Over 32,000 pounds of Golden Rainbow Trout were stocked into the waters over the course of the first week of April. Press releases and social media promoted the event and by all accounts it was popular and successful. Posts and smiles on social media would support this claim. One hundred seventy-five of the trout were tagged for promotional t-shirt giveaways, but only 50 of the tags have been submitted for their gift, so returns of stocked fish need evaluated. Initially anticipated to be a R3 activity to boost license sales, it looks like the results of early-season sales (1<sup>st</sup> quarter) are less than average (likely due to poor January and March fishing conditions. Perhaps the April sales numbers will reflect the Gold Rush bump. Plans are to make this an annual event as long as enthusiasm remains. It definitely had a positive impact on state park occupancy, according to our state parks partners.

**Special Regulations Areas** – We now have 28 special trout management areas on 26 streams and rivers, totaling over 85 miles. Catch-and-Release (C&R) waters are popular, and we have 18 areas on 16 waters totaling 46 miles. We manage three areas as Delayed Harvest of 3.2 miles. And we have seven special resource waters managed for Fly Fishing Only (FFO) totaling 36 miles.

We have proposals to the Natural Resources Commission to increase our C&R and FFO waters in 2019. One FFO area of native Brook Trout restoration in a small spring creek on a WMA approximately one mile long is under consideration. Four large native Brook Trout watersheds that have been restored/ improved from acidic conditions with limestone sand totaling 130 miles have been proposed for C&R regulations. All four of these watersheds are protected on Monongahela National Forest lands and three of the four are in Federally-designated Wilderness Areas.

**Trout Management Plan** – We are in the early start-and-stop process of creating a comprehensive trout management strategic and operational plan. Staffing flux and lack of a central project lead has created difficulties in maintaining momentum. It is the desire of those involved to get substantial input from trout fishery user groups, and target demographics have been identified as valuable team members to the planning process. A draft is anticipated in spring 2019.

**Administrative Changes** – Many rolling changes in the agency are shaping up now. Mark Scott, long-time New River area District Biologist, is settling in nicely now, replacing Bret Preston as Fisheries Assistant Chief. He is a popular hire among staff across the agency and vows to continue the path laid during Bret's tenure. He has a background in warmwater fisheries, so he will likely not have much influence on major changes in the wild or stocked trout programs, deferring to myself and our hatchery program manager Jim Hedrick.

**Online Fishing and Hunting Tool** – A nice application was developed to replace a poor effort at an online resource. Our GIS staff worked with the WV GIS Tech Center at West Virginia University to update map layers and implement a solid working web application for PC and mobile devices for accessing stream, reservoir, and fisheries resources. Feedback has been overwhelmingly positive and changes can be made rapidly, keeping the tool current and fresh.

**Trout Unlimited Southeast Regional Rendezvous** – The 2018 SE Regional Rendezvous was held in West Virginia at Canaan Valley State Park the weekend immediately following the TC meeting in Arkansas. Heavy rains made fishing opportunities appear non-existent, but folks from across the region wanting to fish were guided by knowledgeable local TU folks to some prime headwater secret spots. Pretty much every group that made an attempt was rewarded with good native Brook Trout fishing. The meeting was well-attended and there was lots of enthusiasm for the activities going on within the states throughout the region. The same problems were evident in the group as we recognize as state resource managers: aging participants and lack of recruitment of youth into the realm of trout fishing and coldwater conservation. Lots of discussions were had, both formally and informally; and of course no one had an answer or resolution to the problem. It was a good time and I took the opportunity to impress on the meeting participants the importance of working with their local resource biologists for the betterment of the trout fishery resources across the southeast region.