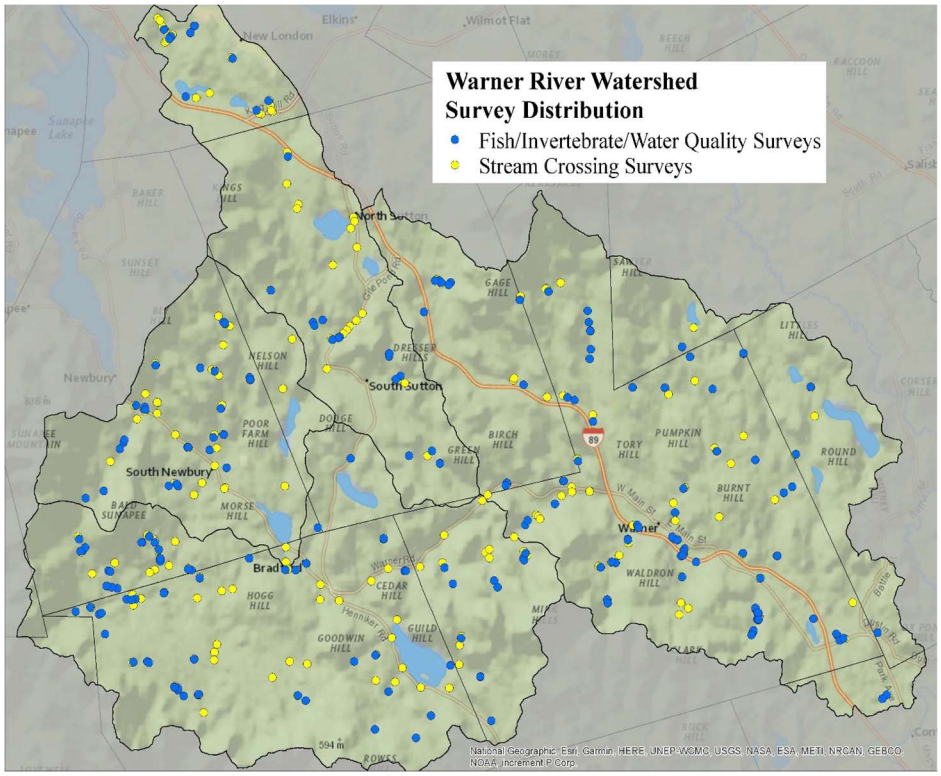
Update on the watershed - the Warner River

This is a Summary of the years of good work by our volunteers and the investment in the watershed. Systematic data is now in place to drive future decisions and work, but we need to continue the processes to monitor for any changes driven by development or change in environmental patterns that threaten the watershed. **Next steps:** Monitoring by Town Conservation Committees, Support to culvert processes to enhance connectivity, and Understanding of the changes to fish population.

Additional needs for volunteer actions beginning this spring. Leadership from Fish and Game and the Basil Woods TU will continue. (One new face. Greg Swick has replaced George Embley who has taken a step back from active participation.) Heads up for direct contact.

From: Ben Nugent, Fish and Game Biologist

Hello everyone! We hope this note providing an update for the Warner River Watershed Conservation Project finds our dedicated volunteers and friends well. We're looking forward to resuming stream monitoring again this field season and there will be opportunities to provide assistance for a variety of reasons. This will mark the 14th year of this volunteer dependent effort in the watershed. Over the course of this project, we have amassed a list for the contact emails from a great number of volunteers. In order to ensure we maintain a list of volunteers who are still interested in receiving these updates and/or to sign up for field sampling days, please send an email to Greg Swick (justswick@gmail.com) to confirm you are still interested. Greg will likely send this same request when we announce our first volunteer day in mid-April. Thank you.



Distribution of survey locations throughout the Warner River Watershed

To date, there have 232 electrofishing surveys with 155 corresponding macroinvertebrate and water quality studies in the watershed. Additionally, data from over 200 stream crossing structures (i.e., culverts and bridges) have already been collected. This high level of information provides us with the ability to effectively prioritize efforts targeting restoration, protection, and enhancement of cold water streams throughout the complete drainage area. We would not be in this position without the

overwhelming volunteer contribution we've received since 2012. Without question, this luxury of local support and interest is unique for us and we'd like to ensure the momentum that has been developed is maintained in the future.

We are very fortunate to have a collaborative effort which has relied upon a high level of volunteer support and local project ownership focused on cold water streams and long term monitoring at this scale. This is truly unique for New Hampshire and we hope that what has developed here can be used as a modeled approach elsewhere. This is undoubtedly a result of the dedication of George Embley. Although all of you are well aware of George spearheading volunteer support staff coordination, he has been central in the overall management and direction of this project. To summarize George's roles throughout the years as being "instrumental" or "steadfastly dedicated" would be vast understatements. Without question, we would not be near the level of collected information and tools we now have to guide future actions to sustain wild brook trout. To date, approximately 5,000 hours of volunteer time and over half a million dollars has been directed to these projects which largely promote the resiliency of wild brook trout. These existing investments are only expected to be catalyzed by the foundation that George has helped develop. While more outside funding to protect and restore brook trout populations will likely come into the watershed, George has also established something more endearing - passion for this resource and its benefit to our community. His efforts have fostered the establishment of a collective awareness which emphasizes the reflection on how our imprint on the watershed's landscape can subsequently influence the wild brook trout, water quality, and the aquatic macroinvertebrates that rely on cold water streams.

George Embley (left) and project volunteers after conducting a landowner site visit in Bradford.

George has decided to reduce his responsibilities to the Warner River Watershed Conservation Project. Not only are we truly grateful for his support since 2012, we are also appreciative of Sally Embley's generous donation of George's time. We're sure George's "to do" list has lengthened since jumping into this project, but we still hope to see him at streamside from time to time. Greg Swick, the conservation chair of the Basil Woods Trout Unlimited chapter, has graciously taken over helping to coordinate

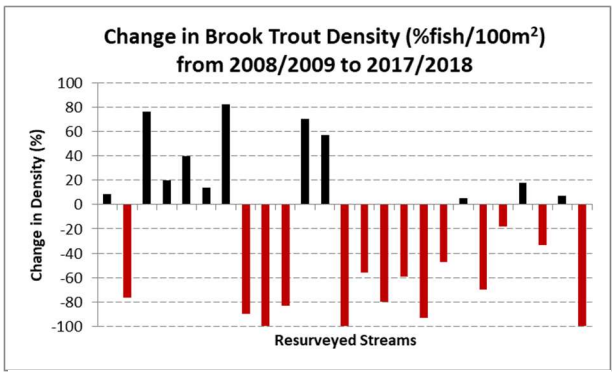
volunteers and assist with project management. We appreciate Greg enlisting to help and please be on the lookout for emails from Greg announcing various volunteer opportunities throughout the year.

In an effort to preserve the strong level of local interest and project ownership, we are excited to highlight the initiation of town level water quality monitoring teams beginning to be established in the watershed. The Basil Woods Trout Unlimited chapter has generously funded water quality meters for town teams to monitor streams they have interest in. In 2024, conservation commissions from Bradford and Warner coordinated these surveys after Trout Unlimited and NH Fish and Game provided training to volunteer participants. Data collected from these surveys will summarize long term trends in water quality and potentially signal concerns and responsive actions if declines or other impairments are detected. Additionally, this information will also be integral in supporting and leveraging current and future cold water stream restoration and protection projects. We hope to engage other conservation commissions to expand this effort to provide a more collective illustration of how land use and weather patterns could influence water quality through the greater watershed. Although the Warner River Local Advisory Committee coordinates other ongoing water quality monitoring using a slightly different approach, it is expected both datasets will complement each other nicely.

Established town volunteer teams helping to monitor streams within the Warner River Watershed

While the general need for additional baseline electrofishing surveys has been reduced, we still plan to utilize this sampling method at select sites this year to compare results from older surveys, particularly after we observed some reductions in wild brook trout, presumably, from periods of drought. This will also help create trend data to show fluctuations in fish populations giving us a potential representation for status of fish population densities in the general area.

This graph illustrates some of the fluctuations observed in wild brook trout density from some older surveys (2008-2009) and surveys conducted through the project in 2017 and 2018. While some populations were noted to increase in density, the majority of these electrofishing locations noted a reduction in brook trout density. Three of these locations did not find brook trout where they



Wild Brook Trout Density Comparisons (2008-2018)

previously occurred. It will be interesting to see how some of these populations responded after some years of more average rainfall amounts.

This summer, we're also committed to utilize our volunteer contingency to collect data at a culvert replacement project in Warner along Red Chimney Rd. Not only will these surveys help display potential responses of fish and aquatic macroinvertebrates after removing a barrier culvert which amplified erosion rates, this monitoring is being used to provide in-kind match contributions for the federal funds we received for this project. **Please be on the lookout for emails from Greg during the summer announcing these opportunities to help out.**

This culvert replacement project was funded primarily through an Aquatic Restoration Mitigation program grant (NH Department of Environmental Services) and further contributions from the town of Warner, the Merrimack River Watershed Council, and the American Rescue Plan Act. Through the collective volunteer survey efforts in the watershed, we were able to successfully justify the use of these competitive funds to replace a 6 foot wide by 3.7 foot high elliptical perched culvert with a 16 foot wide by 6 foot high box culvert with a natural stream bed. Wild brook trout and other aquatic species are now able to move freely to complete necessary life cycle strategies and find more favorable water temperatures through this stream crossing location along Red Chimney Rd in Warner. We were also fortunate enough to work towards facilitating addressing other problematic culverts by receiving funding to support the development of engineered culvert replacement designs at two other culverts along this stream.

Before (left) and after (right) of the 2024 Ballard Brook culvert replacement project (outlet side) along Red Chimney Rd, Warner

The new box culvert is anticipated to be much more flood resilient and able to accommodate flows well in excess of the 100 year storm event. Flow height at the former culvert pipe was predicted to overtop Red Chimney Rd as low as the 25 year storm event. While routine maintenance for the town of Warner is expected to be reduced to maintain the new box culvert, there is still some needed follow up work required in the spring of 2025. Volunteer opportunities will be announced through email to assist with tree planting within the project area to increase shading and streambank stability. The Merrimack River Watershed Council will be coordinating this event currently scheduled for **April 26**. This group will be utilizing funds they have received for the plant supplies and equipment. More details for this volunteer opportunity will be shared in the next email from Greg Swick in the next week or so. Also, depending on how the streambed within the new crossing structure responds to the spring runoff, there may also be a need to help strategically install some larger stones to maintain streambed elevations in and around the box culvert. **Please also be on the lookout for emails from Greg calling for these volunteer opportunities to help finalize the construction of this project.**

Unrelated to this particular stream, we've been working with the town of Bradford to facilitate up to four more culvert replacement projects. We will keep everyone informed if funding materializes for these additional habitat reconnection and flood mitigation efforts. We may also be in need for volunteer assistance regarding a potential land conservation project along the West Branch Warner River in Bradford. We already have existing surveys slightly upstream of the target parcel but it would be nice to gather information on the fish, aquatic macroinvertebrate, and water quality parameters specific to the targeted parcel. This data will be helpful to provide a narrative for leveraging funding assistance for conservation in upcoming grant applications.

Thanks again, everyone. I hope to see you on the water.
Ben Nugent
NH Fish and Game Department