

West Virginia Brook Trout Conservation Strategy

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Brook trout (*Salvelinus fontinalis*) are the only salmonid (trout, char, or salmon) native to West Virginia. Consequently, the brook trout fishery is an extremely valuable recreational resource and an important part of WV's natural heritage. Nearly 60% of WV trout anglers say that they fish for brook trout, and brook trout are the predominant wild trout fishery in WV. This fact makes WV unique compared to neighboring states (e.g., VA, MD, TN and NC) where wild trout fisheries are dominated by exotic brown and rainbow trout. Brook trout are recognized as a key indicator of stream quality and a quintessential component of WV mountain streams.

Since the early 1900s brook trout populations have undergone a dramatic reduction in size and geographic range. Brook trout have been extirpated from nearly 25% of their historic range in WV and exist as greatly reduced, highly fragmented populations in 85% of their current range¹. Causes of these losses can be attributed to a range of factors, including: acid precipitation, mining, urbanization, water use, loss of riparian vegetation, loss of instream habitat complexity, overfishing, competition with introduced species (e.g., rainbow and brown trout), dispersal barriers (e.g., culverts), and regional climate changes. Regardless of the causes, a century of declining brook trout populations has resulted in highly altered stream ecosystems and lost economic revenues and recreational fishing opportunities statewide.

Unless immediate action is taken to reverse these trends, we would expect continued extirpations and reductions of brook trout populations to occur in 25-50% of their remaining range. In fact, state biologists agree that within 20 years brook trout could exist as a relict fishery with little or no economic value and are at risk of becoming regionally threatened within 30-40 years. However, biologists also agree that thoughtful conservation actions could not only slow the rate of population losses, but could be used to successfully restore and grow an economically valuable brook trout fishery. Implementation of science based, watershed scale conservation strategies could be used to protect existing populations, reestablish fishable populations, and expand population size and range throughout the state. Doing so would not only restore the brook trout fishery, but it would produce significant downstream benefits, including benefits to other recreational fisheries (e.g., stocked trout streams and smallmouth bass rivers) and other aquatic species (e.g., endangered mussels). A restored brook trout fishery could serve as the basis of a vibrant, natural asset based economy in WV.

To address these issues, a group of individuals representing West Virginia University, US Geologic Survey, WV Division of Natural Resources, Trout Unlimited, the Freshwater Institute, US Fish and Wildlife Service, and the US Forest Service met on three occasions from February – June 2006. The group is referred to as the "WV Brook Trout Conservation Group." The following document is a summary of the group's progress towards implementing a conservation strategy for brook trout populations in West Virginia streams and watersheds.

¹ Hudy, M., T.M. Thieling, N. Gillespie, and E.P. Smith. 2005. Distribution, status and perturbations to brook trout within the eastern United States. Final Report: Eastern Brook Trout Joint Venture, USFWS, Washington, DC. 76 Pages.

CONSERVATION GOAL

Given the importance of brook trout to the state of West Virginia and the entire Appalachian region, the overall goal is to:

Implement statewide strategies that protect, restore, and enhance healthy brook trout populations in West Virginia.

A healthy population is one that maintains itself through local reproduction (*wild*), possesses a genetic composition that is appropriate to the region (*native*); is comprised of a large enough number of individuals across a range of sizes to support angler harvest (*fishable*); is well connected to other populations in the region through dispersal corridors (*connected*); is part of a balanced ecosystem and does not threaten the status of other species of concern (*balanced*); and does not pose a health threat to people if eaten (*consumable*).

CONSERVATION PRIORITIES

The conservation goal will be reached by addressing the following priorities:

- Priority 1: Habitat and Population Protection*
- Priority 2: Habitat and Population Restoration and Enhancement*
- Priority 3: Assessment, Monitoring, and Research*
- Priority 4: Outreach, Partnerships, and Capacity Building*
- Priority 5: Enhanced Socio-Economic Value to the State*

CONSERVATION STRATEGIES

The WV Brook Trout Conservation Strategy will be implemented by following a two-tiered approach. Tier 1 represents a series of statewide goals and objectives (presented here). Tier 2 represents a series of goals and objectives directed at specific targeted watersheds. A targeted watershed is any 4th – 5th level watershed (i.e., 8 – 10 digit HUC) that has been identified as a high conservation priority. Targeted watersheds will be identified across three regions of the state that follow major river basin divides (Figure 1).

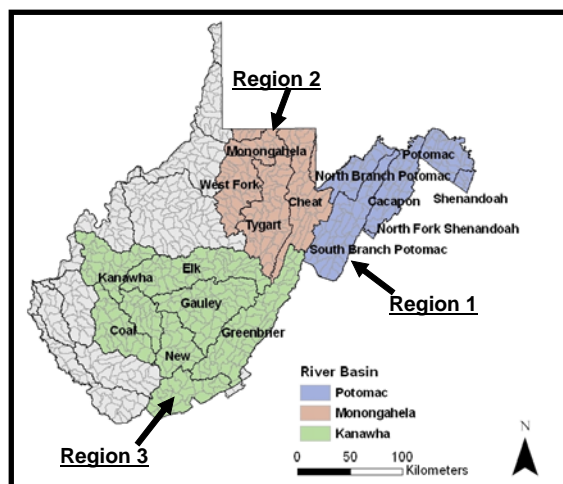


Figure 1. Region 1 is the Eastern Panhandle region (shown in blue), which is comprised of the upper Potomac River watershed (headwaters of the North Branch and South Branch of the Potomac downstream to the Shenandoah River). Region 2 is the Northern Allegheny Mountains region (shown in pink), which is comprised of tributaries of the Monongahela River basin (headwaters and mainstem tributaries of the Cheat and Tygart Valley Rivers). Region 3 is the Southern Allegheny Mountains region (shown in green), which is comprised of tributaries of the Kanawha River basin including the Greenbrier, New, Gauley, and Elk River watersheds.

Priority 1: Habitat and Population Protection

Goal 1.1: Eliminate threats and secure long-term protection of intact brook trout habitats.

Strategy: The state conservation group will develop a prioritized list of threats and needs for long term habitat protection specific to 100% of the intact watersheds within the state. Intact watersheds include Big Run (Potomac Basin), Seneca Creek (Potomac Basin), Gandy Creek (Monongahela Basin), and Mill Creek (Monongahela Basin). Prioritization and implementation of actions will begin by December 2007. Key strategic actions needed to protect brook trout habitat statewide include:

- Classification of intact brook trout streams and ensuring that these streams are protected under relevant state and federal laws.
- Elimination of acidification threats through “at-source” reductions of acid loads.
- Implementation of habitat protection measures during times of crisis (e.g., post-flood).
- Implementation of brook trout specific BMPs for activities that produce non-point source pollutants (e.g., sediments and nutrients) on state, federal, and private lands.
- Expansion and integration of state, federal and private programs that support riparian zone conservation along brook trout streams (e.g., CREP, WHIP, Partners for Fish and Wildlife, and state, county, and private conservation programs). This should include efforts to integrate alternative mitigation programs.

Goal 1.2: Eliminate threats and secure long-term protection of intact brook trout populations.

Strategy: The state conservation group will develop a prioritized list of threats and needs for long term brook trout population protection specific to 100% of the intact watersheds within the state. In most cases, population protection will require habitat protection measures as described in Goal 1.1. Additional direct population protection measures include:

- Changes to fishing regulations to reduce fishing related mortality and allow expansion of intact brook trout populations.
- Reducing atmospheric mercury deposition to avoid fish consumption advisories.
- Eliminating exotic fish stocking in intact brook trout streams.

The group will develop a prioritized list of population protection measures by December 2006 and begin implementing these measures by December 2007.

Goal 1.3: Minimize and mitigate threats to prevent further habitat degradation of reduced, greatly reduced, and extirpated populations.

Strategy: The state conservation group will identify critical habitats within reduced, greatly reduced, and extirpated watersheds and implement strategies needed to ensure long-term habitat protection as outlined in Goals 1.1 and 1.2. Implementation of these measures will begin by December 2007.

Priority 2: Habitat and Population Restoration and Enhancement

Goal 2.1: Increase population productivity through habitat improvement within intact watersheds (i.e., expand on core populations).

Strategy: The state conservation group will identify limiting factors in intact watersheds and initiate actions needed to expand intact brook trout populations and connect them to surrounding watersheds. Specific actions may include: culvert replacement, riparian improvement, and sediment and nutrient reductions. The group will initiate population enhancement activities in intact watersheds by December 2008.

Goal 2.2: Restore habitat conditions needed to improve population productivity and expand brook trout range in reduced and greatly reduced watersheds.

Strategy: Perhaps the most important goal in the statewide conservation strategy is to improve population productivity in reduced watersheds and expand brook trout population range within West Virginia. Our overall goal is to improve brook trout populations, such that 10% of the greatly reduced watersheds can be reclassified as reduced and 10% of the reduced watersheds can be reclassified as intact by the year 2020 (i.e., 20% improvement by 2020). To meet this goal, the state conservation group will follow a targeted watershed approach. Under this approach the group will identify key watersheds and develop highly specified targeted watershed strategies. Table 1 lists the watersheds for which the group will develop initial strategies and the time frame for development. The group will continue to develop and implement targeted watershed strategies until we have met our overall goals.

Goal 2.3: Re-establish self-sustaining brook trout populations in currently “extirpated” watersheds.

Strategy: The group’s strategy for re-establishing brook trout populations in extirpated watersheds is similar to that of Goal 2.2. The state conservation group will follow a targeted watershed approach and our overall goal will be to recover populations in 10% of the currently extirpated watersheds by the year 2020. Key elements of this strategy include: 1) identifying those watersheds where temperature and habitat conditions are such that reintroduction of brook trout is feasible; 2) identifying genetically appropriate source populations; and 3) working with landowners and local communities to provide for long term protection of brook trout habitats and populations in re-established watersheds. Table 1 lists two watersheds that the group will target for developing brook trout reintroduction plans by December 2007.

TABLE 1. Summary of watersheds targeted for habitat and population protection, restoration, and enhancement by the state conservation group. Included are proposed dates for completing targeted watershed conservation strategies.

| River Basin | Targeted Watershed | Current Status | Goal | Strategy Deadline |
|------------------|--|-----------------|---------|-------------------|
| Potomac | Abrams Creek (North Branch Potomac) | Greatly Reduced | Reduced | 12/1/2006 |
| Potomac | Thorn Creek (South Branch Potomac) | Reduced | Intact | 8/1/2007 |
| Potomac | Rockymarsh Run (Potomac mainstem) | Extirpated | Reduced | 12/1/2007 |
| Potomac | Bullskin Run (Shenandoah) | Extirpated | Reduced | 12/1/2007 |
| Monongahela | Shavers Fork (Cheat) | Reduced | Intact | 12/1/2006 |
| Monongahela | Big Sandy Creek (Cheat) | Greatly Reduced | Reduced | 8/1/2007 |
| Kanawha (Reg. 3) | West Fork Greenbrier (Greenbrier) | Reduced | Intact | 12/1/2007 |
| Kanawha (Reg. 3) | MF Williams River (Gauley) | Greatly Reduced | Reduced | 8/1/2007 |

Priority 3: Assessment, Monitoring and Research

Goal 3.1: Assess current population and habitat conditions.

Strategy: The state conservation group will conduct region-specific field assessments of brook trout populations and their habitats. Assessments will follow statistically valid sampling designs, and data from the assessments will be used to construct models capable of predicting brook trout distributions continuously throughout the state. Information from field assessments will then be used to validate and refine, if necessary, maps of current brook trout population status at the 6th level subwatershed scale (Hudy et al. 2005). Data collection, archiving, and predictive modeling will be spatially explicit and GIS compatible. The group will complete this goal for all three regions of the state by December 2009.

Goal 3.2: Quantify genetic variability and identify genetically unique brook trout populations.

Strategy: The state conservation group will conduct surveys of microsatellite genetics of brook trout populations throughout the state. The genetic surveys will address three objectives: 1) to quantify intra and inter-basin variation in genetic structure; 2) to identify the presence and extent of a “southern Appalachian” brook trout strain in Region 3 of WV; and 3) determine if extant brook trout populations are genetically appropriate for their region or if there is evidence of inter-basin transfers (e.g., transfers from the upper Monongahela River to the Kanawha River and / or the Potomac River). This goal will be completed for all three regions of the state by December 2009.

Goal 3.3: Establish sampling protocols and facilitate access to data.

Strategy: The state conservation group will establish a common set of sampling and data management protocols designed to ensure data validity, utility, and accessibility. Such protocols will include a list of biological, physical, and chemical variables that should be collected during field assessments in order to be included in the database. The group will establish guidelines on data collection, common unit expressions, quality control and assurance, and data transfer to a designated repository. The designated repository will develop a spatially explicit, web-based, data management framework that is available to EBTJV partners. The group will complete this goal by December 2007.

Goal 3.4: Identify threats and factors limiting brook trout populations.

Strategy: The state conservation group will conduct region-specific field research designed to identify factors limiting brook trout populations throughout their current and native range. Research will also be conducted to improve our understanding of how to protect, restore, and enhance brook trout populations and their habitats. Research projects will focus on how local and regional factors interact to determine brook trout population dynamics in each of the three regions of the state. The group will identify and initiate at least three critical research projects by December 2008. Research will be continued on an “as needed” basis.

Goal 3.5: Establish long-term monitoring to assess program effectiveness.

Strategy: Following completion of the statewide population and habitat assessment (Goal 1.1), the state conservation group will develop and implement an annual brook trout population and habitat monitoring program. The monitoring program will provide information that can be used to constantly update brook trout population status statewide. It will also provide information needed to identify restoration and protection priorities. Finally, a monitoring program is necessary to assess the effectiveness of brook trout and habitat conservation actions and to guide an adaptive management framework. The framework for a long-term monitoring program will be developed and initiated by December 2008.

Priority 4: Outreach, Partnerships, and Capacity Building

Goal 4.1: Create ongoing communications plan to reach targeted audiences to increase awareness of brook trout and the conditions they represent.

Strategy: The state conservation group will create an ongoing communications plan that will enable consistent messaging to the public through press releases, schools, special interest groups, community organizations, professional conferences, workshops, and other venues as opportunities arise. Target audiences include any persons or organizations that have an interest or “stake” in WV brook trout policy and conservation projects. The tools to perform this outreach function include: workshops, newsletters, presentations, fact sheets, brochures, press releases and word of mouth. Using props such as the WV Brook Trout brochure, and the recent EBT: Status and Threats document will enhance and reinforce the message. A communications plan for increasing brook trout conservation awareness will be completed by December 2006 and regularly updated every 3 years.

Goal 4.2: Identify entities with complementary goals or mutual benefits with whom to establish partnerships.

Strategy: The success of the state brook trout conservation strategy will depend on the strength of partnerships and relationships established among stakeholders. The state conservation group will work to build a comprehensive consortium of partners by December 2006. Establishing partnerships with industry organizations is a priority of this group. Partners in this process will likely include, but are not limited to:

- WV Division of Natural Resources²
- WV Department of Environmental Protection
- WV Division of Forestry
- Eastern Brook Trout Joint Venture
- USFWS² – national office, West Virginia field office, refuges, and hatcheries
- USFS² – Monongahela Forest, regional office, national office
- TU² – state council, Back the Brookie program, state chapters
- WVU² – Division of Forestry and Natural Resources
- Shepherd’s College, Davis and Elkins College
- USGS² – national office, regional science centers, COOP units
- Office of Surface Mining
- The Nature Conservancy
- The Trust for Public Land
- The Conservation Fund² – national office, the Freshwater Institute
- WV Rivers Coalition and other Conservation Groups
- Coal Association and other Industry Organizations
- WV Farm Bureau and WV Forestry Association
- WV State Development Office

Goal 4.3: Identify and attract resources and the ability to distribute resources to projects.

Strategy: Using the information gathered in Priorities 1-3, the state conservation group will determine the type of resources needed to implement the conservation plan. Lead agencies and organizations will have the responsibility to arrange for and distribute resources in an efficient and accountable manner. Clear, concise proposals and fact sheets will be provided to interested partners. A plan for attracting resources will be completed by May 2007.

² Current member of the State Brook Trout Conservation Working Group.

Priority 5: Enhanced Socio-Economic Value to the State

Goal 5.1: Increase recreational fishing

Strategies: The goal to increase recreational fishing for brook trout will be met through: 1) increased access to high-quality/high-value fishing opportunities; 2) providing a diverse array of fishing opportunities, e.g., roadside, walk-in, remote, fly-fishing only, catch and release; and 3) promoting and publicizing West Virginia as a destination location for high-quality, wild brook trout fishing. A detailed plan for increasing recreational fishing in West Virginia will be completed by May 2007.

Goal 5.2: Increase the quantity and quality of recreational tourism infrastructure

Strategies: The state conservation group will coordinate with the state development office to increase the availability of state loans and grants for tourism businesses. The group also will work with the development office to assist private sector tourism businesses with advertising and promotion and with businesses training. A relationship with the development office and a strategic plan for growing the recreational fishing infrastructure will be in place by May 2007.

Goal 5.3: Increase local residents' quality of life

Strategies: The state conservation group believes that a fully restored brook trout fishery can have a significant, positive impact on the quality of life of West Virginia residents. To meet this goal, the group will seek to increase public access to recreational fishing opportunities, coordinate with local land use planning efforts to increase riparian green-space, coordinate with local watershed groups on stream cleanups, etc., and conduct public opinion/attitude surveys to quantify progress towards this goal. Initial efforts to partner with local planning commissions and watershed groups will begin by May 2007.

Goal 5.4: Increase local property values and property tax revenues

Strategies: The state conservation group will coordinate with local land use planning efforts and private developers to retain and/or restore green-space, fishing access and other land attributes that enhance local property values and tax revenues. The group will seek support from USFWS Partners for Fish and Wildlife Program to enhance the value of project properties. Finally, the group will work with the state development office to provide information to real estate agents/marketers regarding value-enhancing attributes in the local area (e.g., recreational fishing, green-space, high quality streams). Initial efforts to work with the development office and private developers will begin by May 2007.