

BIENNIAL STRATEGY REVIEW SYSTEM

Chesapeake Bay Program



Logic and Action Plan: Post- Quarterly Progress Meeting

Brook Trout 2020-2021 [NOTE: make sure to edit **pre-** or **post-** in the text above, to tell the reader whether this logic and action plan is in preparation for your quarterly progress meeting or has been updated based on discussion at the quarterly progress meeting.]

Long-term Target: Restore and sustain naturally reproducing brook trout populations in Chesapeake headwater streams with an eight percent increase in occupied habitat by 2025.

Two-year Target: 137 km² of restored brook trout habitat per year.

Instructions: Before your quarterly progress meeting, provide the status of individual actions in the table below using this color key.
Action has been completed or is moving forward as planned.
Action has encountered minor obstacles.
Action has not been taken or has encountered a serious barrier.

Additional instructions for completing or updating your logic and action plan can be found on [ChesapeakeDecisions](#).

Factor	Current Efforts	Gap	Actions	Metrics	Expected Response and Application	Learn/Adapt
<i>What is impacting our ability to achieve our outcome?</i>	<i>What current efforts are addressing this factor?</i>	<i>What further efforts or information are needed to fully address this factor?</i>	<i>What actions are essential (to help fill this gap) to achieve our outcome?</i>	<i>What will we measure or observe to determine progress in filling identified gap?</i>	<i>How and when do we expect these actions to address the identified gap? How might that affect our work going forward?</i>	<i>What did we learn from taking this action? How will this lesson impact our work?</i>
Scientific and Technical Understanding: Monitoring of restoration and	Eastern Brook Trout Joint Venture (EBTJV)	Current monitoring, including the EBTJV 5-year assessment, does not capture all of the restoration and conservation activities	4.2 Streamline progress reporting process for partners.	Development of a database or spreadsheet that tracks the number of projects benefiting brook trout in the watershed. Once that	These actions will hopefully set up the framework for greater and more complete long-term tracking of work	

conservation activities.	catchment assessment conducted every five years. Other stakeholders have various programs contributing to conservation of high-quality habitat for brook trout.	being done that benefit brook trout. A systematic process to collect, collate and analyze all stakeholder brook trout habitat restoration and conservation projects is needed.	4.3 Track progress for partner-specific activities	database or spreadsheet is developed, we can track progress through an increase in the number of projects recorded annually or semi-annually.	benefiting brook trout in the watershed. The framework will be established by the end of 2020. Going forward, this will allow for better targeting and prioritization of brook trout work throughout the watershed.	
			4.4.2 Work to identify a common set of brook trout metrics to be used across the watershed.			
			1.3 - Identify and increase engagement with local government and non-profit work benefiting brook trout conservation.			
Scientific and Technical Understanding: Habitat Stressors	USGS, NPS, USFS and academic institutions have active research programs. Other stakeholders have various programs to reduce stressors	Better understanding of spatially explicit linkages between brook trout populations and stressors is needed to inform restoration and conservation decisions.	2.2 Interactive effects of temperature and brown trout on brook trout.	Increased knowledge of factors affecting groundwater inputs to streams and an expanded model to predict where groundwater inputs are most likely to occur. Increased knowledge of invasive brown trout – brook trout dynamics and how this affects brook trout populations.	Results will provide natural resource managers new tools and information to identify potential restoration sites, high quality habitat for conservation and effects of brown trout by better understanding the stressors affecting brook trout.	
			2.1 - Model groundwater influence on stream temperature at the reach-scale across the Chesapeake Bay headwaters.			
			4.5 - Continue existing brook trout population monitoring programs.			

<p>Scientific and Technical Understanding: Climate Change</p>	<p>USGS, NPS, USFS, and academic institutions have active research programs. Other stakeholders have various programs to reduce stressors</p>	<p>Understanding of effects of drought on brook trout population viability</p>	<p>2.2 Interactive effects of temperature and brown trout on brook trout.</p> <p>2.3 - Understand effects of drought on brook trout population viability</p> <p>4.5- Continue existing brook trout population monitoring programs.</p>	<p>Increased knowledge across a suite of scientific metrics including flow, precipitation, evapotranspiration, brook trout abundance and body size.</p>	<p>Results will provide natural resource managers new tools and information that account for how climate change and other stressors interact; improved conservation decisions that consider adaptive potential of brook trout populations and location of vulnerable habitats.</p>	
<p>Scientific and Technical Understanding: Genetics and Genomics</p>	<p>USGS, NPS, USFS, and academic institutions have active research programs. Stakeholders have various programs to reduce stressors</p>	<p>Better understanding of population genetics and functional genomics, and their role in informing conservation and restoration decisions.</p>	<p>3.1.1 Evaluate if reintroduction efforts have been successful at transferring genetic diversity from source stocks and the implications for genetic rescue of small, isolated populations</p> <p>3.1.2 Work with EBJTV to host brook trout genetics workshop for managers.</p> <p>4.5 -Continue existing brook trout population monitoring programs.</p>	<p>Progress towards our goal could be measured in a variety of ways, including an increase in the number of programs using genetics information in conservation and restoration decisions, the amount of traffic to the future genetics portal, and by surveying managers after the genetics workshop.</p>	<p>Projects focused on the population genetics of eastern brook trout and brook trout in Maryland are currently underway and anticipated to be completed in 2020. A draft online genetics portal identifying distinct brook trout populations will be established by 2020. A survey has been distributed to managers in the region to document restoration projects to scope out potential</p>	

			3.1.3 Develop online genetics portal		opportunities to evaluate from a genetics perspective	
Partner Coordination: Coordination with restoration groups to target opportunities to increase habitat and presence	Trout Unlimited Home Rivers Initiative (restoration); various state efforts.	Better coordination among state, NGO, and BTWG partner engagement in brook trout restoration/monitoring efforts.	4.3 Track Progress of partner-specific Activities	Identify key points of contact and maintain regular communication/engagement.	Better coordination and communication will help identify restoration opportunities and reporting.	
			4.4 - Improve monitoring of restoration activities and existing populations			
			4.5 -Continue existing brook trout population monitoring programs.			

ACTIONS – 2020-2021					
Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
Management Approach 1: Management Approach 1: Identify and Communicate Priority Focal Areas for Brook Trout Conservation					
1.1	Develop cache of outreach/communication products for quick response to requests.	1.Develop white paper synthesizing state of current knowledge (beneficial/harmful BMP's, economic benefits, co-benefits). 2.. Develop a coldwater education tool for presenting to state and municipal government environmental regulatory and permitting agencies to inform and educate as to needs and life history requirements of trout.	USGS, BTWG, EBTJV, state partners, NGO partners.	Chesapeake Bay watershed	September 2020

ACTIONS – 2020-2021

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
1.2	Collaborate with other Action Teams on communication strategies and products.	Meet and coordinate with other Action Teams.	USGS, BTWG, CBP Workgroups, CBP Communications Team, LGAC.	Chesapeake Bay watershed	December 2021
1.3	Identify and increase engagement with local government and non-profit work benefiting brook trout conservation and restoration.	Work to identify groups outside of governmental agencies that are conducting brook trout restoration and conservation projects in order to better capture all of the activities in the watershed affecting progress toward the outcome	USGS, BTWG	Chesapeake Bay watershed	Ongoing
Management Approach 2: Consider Climate Change and Emerging Stressors in Determining Restoration Priorities					
2.1	Model groundwater influence on stream temperature to forecast future change scenarios at the reach-scale across the Chesapeake Bay headwaters.	<p>1. Collect environmental covariates for landscape modeling based on geomorphic features associated with groundwater-surface water.</p> <p>2. Apply multiple modeling techniques to evaluate covariate relationships to observed mean-daily temperatures and evaluate model predictive performance.</p> <p>3. Summarize observed temperatures for observed and predicted stream sites based on known thermal thresholds for native brook trout.</p>	USGS	Chesapeake Bay watershed	Collect environmental data: December 2020. Apply modeling techniques: December 2021. Model results: next work plan
2.2	Interactive effects of temperature and brown trout on brook trout.	1. Work with the CBP Communications team to develop a concise summary of the effects of invasive species on brook trout for online distribution.	USGS, CBP	Chesapeake Bay watershed	Concise summary: June 2020

ACTIONS – 2020-2021

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
		2. Empirical analysis of brook trout population responses to brown trout management intervention.			Empirical analysis: December 2021
		3. Stakeholder presentations and a journal article.			
2.3	Understand effects of drought on brook trout population viability	1. Assess flows within wadable stream networks.	USGS	Chesapeake Bay watershed	December 2021
		2. Evaluate brook trout body size (growth) and demographic responses to low-flow conditions			
Management Approach 3: Refine and Apply Decision Support Tools					
3.1	Collect data on population genetics and functional genomics and evaluate their role in informing conservation and restoration decisions.	1. Develop a regional understanding of population genetic structure and its implications for conservation.	USGS, EBTJV	Chesapeake Bay watershed	September 2020
		2. Evaluate if reintroduction efforts have been successful at transferring genetic diversity from source stocks and the potential for genetic rescue to support small, isolated populations			December 2021
		3. Work with EBJTV to host brook trout genetics workshop for managers.			December 2020
		4. Develop online genetics portal			December 2020
Management Approach 4: Continue and Expand brook trout monitoring efforts					

ACTIONS – 2020-2021

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
4.1	Explore monitoring brook trout using eDNA as a cost saving measure.	Evaluate eDNA approaches to develop methodology/protocols, determine costs, etc.	BTWG, USGS, EBTJV, state partners, NGO partners.	Chesapeake Bay watershed	December 2021
4.2	Streamline progress reporting process for partners.	1. Canvass EBTJV, state, and NGO representatives with regard to obstacles to reporting progress/restoration tracking, possible solutions.	BTWG, USGS, CBP staff.	Chesapeake Bay watershed	March 2020
		2. Develop and maintain a tracking spreadsheet for all partners (including NGOs) to report on their work using a common set of brook trout attributes/metrics.			June 2020 for development of the spreadsheet, ongoing maintenance
4.3	Track progress of partner specific activities.	1. PA – There was low survival of the brook trout reintroduced into Limestone Run from the 2016 and 2017 stockings. A new source of brook trout was identified and additional brook trout were reintroduced in 2019. Monitoring will continue through 2021.	Pennsylvania FBC.	PA	Ongoing efforts
		2.MD – Continue statewide brook trout genetics survey and analysis in the Upper Savage River watershed and Big Pipe Creek.	Maryland DNR.	MD	
		3.VA- Implement strategies outlined in the Wild Trout Management Plan and begin/continue work on genetic monitoring projects including potential eDNA applications.	Virginia GIF	VA	
		4.NY - Complete new statewide trout stream management plan and	New York State DEC	NY	

ACTIONS – 2020-2021

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
		complimentary brook trout management plan			
		5. WV - Working with a student at WVU to create a database of all stream-related activities, including all restoration, habitat enhancement and AOP projects in West Virginia	West Virginia University and West Virginia DNR	WV	
		6. WV -Continued monitoring at Edward's Run and initiating monitoring at Dillon's Run in 2020. Continued captive breeding at Raymann Farm. Release of captive bred population in to the Potomac and Shenandoah in 2020.	West Virginia DNR	WV	
4.4	Improve monitoring of restoration activities.	Help coordinate efforts among partners to incorporate new information into monitoring and restoration programs and identify funding opportunities.	BTWG, USGS, EBTJV, state partners, NGO partners.	Chesapeake Bay watershed	Ongoing
4.5	Continue existing brook trout population monitoring programs.	1.MD – Complete 5-year statewide brook trout census of historically known/suspected/predicted brook trout populations.	Maryland DNR	MD	Ongoing efforts
		2.VA – Continue with long term monitoring projects including the VA Trout Stream Sensitivity Study, Coldwater Stream Survey,	Virginia GIF	VA	
		3.Continue support of the Eastern Brook Trout Joint Venture 5-year catchment assessment survey.	Eastern Brook Trout Joint Venture	Chesapeake Bay watershed	