Chesapeake Bay Program
Science. Restoration. Partnership.

STRATEGY REVIEW SYSTEM - LOOKING BACK QUESTIONS

Brook Trout Outcome

December 2023

CELEBRATING ACCOMPLISHMENTS & BEST PRACTICES:

1. **Since your last QPM, what key successes would you like to highlight to the Management Board?**
   - FY2022 GIT-Funded project (contracted to Trout Unlimited): *Facilitating Brook Trout Outcome Attainability through Coordination with CBP Jurisdictions and Partners*
   - ICARE eDNA Project by Aiman Raza (UMBC): *Temperature and Spatial Effects on eDNA Dynamics to Inform Brook Trout Management Practices*
   - USGS Karst shallow & deep groundwater work & Blue Ridge (*Than Hitt can provide citations*)
   - MARYLAND:
     - MD working with County leaders/local jurisdictions to get BT Projects off the ground using BIL funding (TU is a partner in this effort)-$1.2 million AOP project with TU, Garrett County, Town of Lonaconing
     - MD collaborating with Abandoned Mine Lands programs to prioritize AMD treatment
     - MD Stream Monitoring Network- Long Term monitoring sites to evaluate population and habitat trends
     - Identified new BT populations and attempted reintroduction of BT in one area (stocked 30, recovered 2)
     - USFWS work in Maryland
   - PENNSYLVANIA: PA is working on similar initiatives (re: AOP Training, Abandoned Mines, road stream crossing improvements, etc.).
   - VIRGINIA: VA working with AOP Training with VDOT
   - WEST VIRGINIA:
     - WV Working with Division of Highways at both state and local district levels, and some of these projects are in the CB Watershed
     - Repatriation efforts on WV streams

EVALUATING PROGRESS:

2. **Are we, as a partnership, making progress at a rate that is necessary to achieve this outcome? Would you define our outlook as on course, off course, uncertain, or completed? Upon what basis are you forecasting this outlook?**

   This outcome is Off Course. Our exact progress will be better understood once the FY2022 GIT-Funded outcome tracking project (*Facilitating Brook Trout Outcome Attainability through Coordination with CBP Jurisdictions and Partners*) is completed in early 2024.

3. **How would you summarize your recent progress toward achieving your outcome (since your last QPM)? If you don't have an indicator, would you characterize this progress as an increase, decrease, no change, or completed?**

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Creating a tool to track outcome progress was needed to quantify any progress made to date. Once this GIT-funded effort is completed in 2024, we will have a better understanding of what efforts have been most effective, where they have been most effective, and can create an informed plan to move forward.

It is important to know and worth mentioning that PA and MD are still discovering new populations that were previously undocumented. It is very challenging to track a baseline that is constantly moving (i.e., gains and losses).

LESSONS LEARNED:

4. **If our outlook is off course, what has been the most critical influencing factor or gap that needs to be addressed to accelerate progress?**
   - LAND USE CHANGE (esp. forest cover & agriculture) → Chesapeake WILD → *more money available for land protection. Local protection of priority brook trout watersheds by via zoning, conservation easements, conversion of unforested land to forested (e.g. agricultural riparian areas, abandoned mine lands).*
     - *Removal of "heater" impoundments*
   - ACID-MINE DRAINAGE: Working with state abandoned mine divisions to prioritize BIL funding for AMD restoration in CB watersheds that are most likely to recover/repatriate.
   - INVASIVE SPECIES: Brown trout and other hatchery fishes, terrestrial species like wooly adelgid/hemlocks), etc.
     - Interactions with climate change, land-use change, etc.
     - Evaluate state stocking practices of put and take fish on top of brook trout
     - Identify potential streams where brown trout are causing impacts to brook trout populations and determine if removal is necessary.
   - GENETICS/REPATRIATION: Identify opportunities, needs, barriers to use repatriation as a brook trout recovery tool in each of the jurisdictions.

5. **For actions not completed, what is preventing us from taking action? Are these actions still needed?**
   See answers provided in Q#4

6. **What have we learned over the past two years that we'll need to consider in the coming two years?**
   - THERMAL TMDL: Potential regulatory tool to enforce thermal load reductions in certain jurisdictions. Limited to urban MS4 counties.
   - *See answers provided in Q#4*

ASSESSING OUR EFFORTS & GAPS:

7. **Are you being successful in your job? If so, what are the factors that have made you successful? If not, what are the factors that are impeding your success?**
   - MARYLAND: Has extensive genetic inventory on many BT populations, which is a progression from statewide assessment! Initial collaborations with UMD completed genetic work throughout the state. Maryland continued with a statewide patch assessment and is adding to their genetic inventory. One of the variables rated is effective population size. From there, we evaluated what streams lacked data, then went out to conduct fin clips to later analyze.

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- **Cont.**: building partnerships with NGOs; communicating with Abandoned Mines to prioritize work; have discovered several new populations; the biggest hurdle is willing landowners and also having the resources/capacity to reach out to them and scale-up work.

- VIRGINIA:
  - **SUCCESS**: Successful in monitoring, assessment, and repatriation.
  - **CHALLENGES**: One major factor impeding additional progress is that most BT streams are in national forests - there aren't many BT in private lands. We need to focus more BT efforts in VA with federal partners, since that's where most BT reside. Additional AOP funds will be necessary to do this.
- WEST VIRGINIA:
  - **SUCCESS**: Doing well on Chesapeake Bay-side; ongoing work in repatriation efforts; most of work is being done in the Valley in smaller streams that may/may not be suitable for BT (challenging in drought conditions). Ongoing groundwater work.
  - **CHALLENGES**: There is lots of support and partners on board. Overall in good shape, there aren't many barriers over things that we have control over. However, it would be beneficial to have additional NGO partners working on public lands.
- PENNSYLVANIA:
  - **SUCCESS**: Assessment work is going well and new populations have been discovered; there's lots of resources! There are 3M acres of state land in PA. DCNR has embraced improvements to fish passage and road surfaces. There are lots of active partners (incl. TU), but we're not at capacity for on the ground work (this is an opportunity for more work!). There's a state-wide emphasis on protecting existing populations.
  - **CHALLENGES:** Peer reviewed literature is telling us we really have an enormous and unaddressed gap regarding invasive trout species. They block gene flow, invade brook trout streams post AMD remediation, and use habitat projects to displace brook trout in sympatric populations. If we don't factor invasive trout into everything we mitigate (climate, habitat, AMD) we will ultimately be utilizing funding to create wild invasive brown and rainbow trout populations. Additionally, there's evidence that supports invasive trout negatively impacting native suckers, darters, hellbenders, crayfish, and macros.
    - **STOCKING REFORM/INVASIVE TROUT**: ~50,000 invasive trout have been stocked into kettle creek - a would be brook trout stronghold as per the EBTJV range wide assessment. It's all on public land with mature hemlocks/minimum development. How do we "protect the best" in that setting? How will the increased density of invasive species in a stream impact the culverts, AMD, and habitat efforts also being done in the same area?
    - https://www.flyfisherman.com/editorial/pennsylvania-isnt-doing-enough-brook-trout/469894
    - https://nativefishcoalition.org/nfc-documents/2022/5/11/p

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8. **Prioritize and summarize here the factors best tackled as a Partnership (or GIT/workgroup), that have the greatest impact to achieve our outcome.**

   See answers provided in Q#4.

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9. **For those high priority factors summarized above, what is getting in the way of addressing them or what gaps continue to exist despite the current efforts to address those factors?**
   - Lack of coordination with local jurisdictions to implement land use/conservation practices.
   - Lack of coordination with state abandoned mines to implement AMD treatment in brook trout priority areas.
   - Lack of genetic guidance on Brook trout repatriation efforts
   - Lack of protective zoning/development laws to prevent conversion of forested land to developed/impervious.
   - Lack of public awareness surrounding uniqueness and sensitivity of brook trout by the public, landowners, or lawmakers.
     - Greater public support for stocking of nonnative trout over conservation of native brook trout.

FOCUSING ON THE NEXT TWO YEARS: ACTIONS & NEEDED SUPPORT:

10. **Describe any scientific (including the impacts of climate change), fiscal, or policy-related developments that have already or may influence your work over the next two years.**
    - Abandoned mine drainage (AMD) funding to restore impaired streams
    - Thermal TMDL
      - More work in thermal refugia and resiliency
    - Land use
    - MARYLAND: Has a cattle exclusion law on farms. There has been a lag on enforcement, but the state is currently scaling up efforts.
    - *See additional answers provided in Q#6*

11. **Based on these developments and the learning discussed in the previous sections, summarize any new actions you are planning to address these gaps over the next two years.**
    - The workgroup will work with jurisdictions to determine if there is interest in targeting abandoned mine drainage (AMD) financial and technical resources in high-priority brook trout watersheds.
    - Pond removal
    - Projects/efforts funded through BIL
    - Discuss steps forward following the results in the MDE Dam Removal Guidance Document (coldwater was mentioned as a concern)

12. **Have you identified new needs, or have previously unmet needs, that are beyond the ability of your workgroup to meet and, therefore, you need the assistance of the Management Board to achieve? If yes, provide any detail that would assist the Management Board in assessing this need.**
    - TMDL
    - Engineering capacity
    - *See answers provided in Q#6*

13. **What steps are you continuing, or can you take, to ensure your actions and work will be equitably distributed and focused in geographic areas and communities that have been underserved in the past?**

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The ICARE eDNA project being conducted by Aiman Raza (UMBC) (*Temperature and Spatial Effects on eDNA Dynamics to Inform Brook Trout Management Practices)* will be completed 2024. As part of this project, next steps may be identified that could lead to another ICARE project with UMBC.