Stream Health Workgroup December Meeting

Friday, December 16, 2022, 10:00-12:00 ET

Link to Meeting Materials

PARTICIPANTS:

Alana Hartman, WVDEP	**Ally Bartell,** MD DNR	**Brandon Alderman,** AECOM	**Brittney Flaten,** DNREC
Camille Liebnitzky, City of Alexandria	**Claire Buchanan,** ICPRB	**Denise Clearwater,** MDE	**Emily Burgess,** AECOM
Gregory Noe, USGS	**Joe Berg,** Biohabitats	**Katlyn Fuentes,** Chesapeake Research Consortium	**Kelly Maloney,** USGS
Kristen Saacke Blunk, Headwaters LLC	**Kyle Hodgson,** MD DNR	**Lindsay Powers,** MD DNR	**Lori Maloney,** EBTJV
Mark Southerland, Tetra Tech	**Matt Cashman,** USGS	**Nancy Roth,** Tetra Tech	**Renee Thompson,** USGS
Rosemary Fanelli, USGS	**Sara Weglein,** MD DNR		**Shane Kleiner,** PA DEP

MEETING NOTES:

ANNOUNCEMENTS:

Workgroup Co-Chairs Sara Weglein & Alison Santoro (MD DNR)

- **FY2021 GIT Funding Project:** Data review and Development of Multi-Metric Stream health indicators
  - **Focuses on question:** *Following the implementation of management efforts, how is stream health changing and how can we better characterize the response through non-biological metrics?*
  - This phase of the project will create a matrix of hydraulic and geomorphic metrics of stream health that may be used as additional indicators of the outcome goal.
  - **Tetra Tech is finalizing the framework and data sources, and preliminary results will be shared Spring 2023.**
- **FY2022 GIT Funding Cycle:** Literature Review: Building Climate Resilience in Stream Restoration Practices
  - **Project Questions:** *How would common stream restoration techniques perform when faced with climate change? What is the long-term resiliency of stream restoration projects?*
  - Project will review existing research on stream restoration techniques and variable parameters of climate change to determine which techniques are better suited for dynamic climate patterns. It will assess the ability of restoration projects to maintain their integrity with predicted changing patterns. Also assess the ability of stream restoration designs to mitigate the effects of climate change on the landscape.
  - **The Scope of Work is being drafted right now and the call for proposals will be released in early 2023.**

- *Maintaining Forests in Stream Corridor Restoration* presentation by Lisa Fraley-McNeal: (**LINK**)
    - Project commissioned by Urban Stormwater Workgroup
    - Final deliverables were released Summer 2022
    - Lisa-Fraley McNeal presented a summary to the Urban Stormwater Workgroup.

EFFECTS OF RSC RESTORATION ON WATER QUALITY AND BENTHIC MACROINVERTEBRATES IN NORTH BRANCH MUDDY CREEK

Lindsay Powers & Kyle Hodgson (MD DNR)

- **NORTH BRANCH MUDDY CREEK:** West River Watershed, located at the Smithsonian Environmental Research Center in Edgewater, MD. This creek used to be characterized by a deeply incised channel. Restoration efforts aimed to address issues related to nutrient/sediment flow, eutrophication, and habitat loss. Project was completed in February 2016.
    - **RSC = Regenerative Stormwater Conveyance** → reconnects to floodplain; restore riffle-pool sequences, and increases water storage, sediment deposition, and nutrient & sediment processing.
- **PROJECT GOALS:**
    - Reduce peak flows during storm events, decreasing erosion
    - Enable greater retention of nutrients and sediments
    - Improve habitat quality and diversity
- **METHODS:**
    - Water chemistry monitoring & biological monitoring was conducted to understand the effects of RSC. Biological monitoring was conducted 2 years pre-restoration, and 6 years post-restoration.
    - 9 biological monitoring sites (3 restoration sites and 6 control sites).
    - Water quality monitoring stations & DO loggers located above and below each restoration reach.
- **INFLOW RETENTION:** water chemistry analyses showed large increases in percentages of input retained; only effects on orthophosphate and total phosphorus retention were statistically significant; marginally significant reductions in ammonium and total nitrogen
- **DISSOLVED OXYGEN (DO):** mean daily DO concentrations significantly lower at downstream station compared to the upstream station in 30 of 34 months form 2016-2021; the pattern observed for DO saturation levels was similar; large blooms of iron-oxidizing bacteria are likely contributing to low DO concentrations downstream; increased dissolved organic carbon (DOC) from decomposing woody debris could contribute to lower DO
- **TEMPERATURE:** Daily mean temperatures were significantly higher at the downstream monitoring station compared to the upstream stations in 15 out of 25 months from 2018-2021
- **BENTHIC MACROINVERTEBRATES:** surveys indicated post-restoration increases in density/abundance, but so far not seeing upward trajectory indicating biological uplift
- **NON-METRIC MULTIDEMENTIONAL SCALING (NMDS):** no significant benthic macroinvertebrate community similarity between pre- and post-restoration samples
- **CONCLUSIONS:**
    - Significant reductions of orthophosphate and total phosphorus

  - Marginally significant reductions of ammonium and total nitrogen
  - Significantly lower mean daily DO conc. & saturation levels downstream
  - Significantly higher daily mean temperatures downstream
  - BIBI scores, number of taxa, and Shannon-Weiner scores dropped; shift to dominance of tolerant organisms
- **QUESTIONS/COMMENTS: For additional questions, please contact Lindsay Powers (Lindsay.powers@maryland.gov) or Kyle Hodgson (kyle.hodgson@maryland.gov).**
  - **Sara Weglein:** At the MD Water Monitoring Council Conference yesterday, **Dr. Mike Williams** (UMD) presented on a regenerative stormwater conveyance project in Campus Creek. For that project, they did not use woodchips as media to fill the channel, hypothesizing that the woodchips were contributing to a drop in Dissolved Oxygen (DO). However, Dr. Williams observed similar patterns in DO compared to this project.
  - **Camille Liebnitzky**: To confirm, results show that there is no uplift yet?
    - **Lindsay Powers:** Not consistently. The most recent data showed that the benthic IBI scores in the bottom two thirds of the restoration are lower than their pre-restoration scores.
    - **Camille:** Have results from other stream restoration projects indicated how many years after restoration it takes to see benthic uplift?
    - **Lindsay**: Not sure on the average time, but from what I've read, it can take a while – over a decade in some cases.
  - **Matt Cashman:** Based on these project results, what are the next steps? Are other design options being explored that may have less of an impact to DO?
    - **Sara Weglein:** Work is being done to see what exactly is leading to DO issue, to alleviate these effects moving forward.
  - **Rosemary Fanelli:** I wonder if the design contributed to the DO & Temperature patterns that were observed. Do you know how deep those pools were in the area?
    - **Lindsay Powers:** The maximum depth recorded of the restoration reach did increase post-restoration. The change was significant enough that the water and stagnation conditions could have impacted temperature and DO.
    - **Rosemary:** Regarding stability over time: has the site been fairly stable in terms of the structures moving during various events?
    - **Kyle Hodgson:** The structure itself looks good and has held well over storm events. One observed change is that the canopy has opened noticeably over time due to some poplars dying.

IMPACT OF UT SASSAFRAS RESTORATION ON POLLUTANT LOADS, WATER QUALITY, AND BIOLOGY

Allyson Bartell (MDNR)

- **PROJECT LOCATION:** tributary to the Sassafras River in Cecil County, MD; 525-acre watershed, mostly agricultural land use; high nutrient export area
- **PROJECT GOAL:** primary goal to reduce sediment and nutrients from reaching the Bay
- **RESTORATION APPROACH:** Natural Channel Design (NCD)
- **MONITORING METHODS:**

  - Load Monitoring began in 2018 as a (before/after method)
  - DO & Temperature monitoring began in 2018 (before/after/control method)
  - Fish & Benthic monitoring began in 2018 (BACI Method)
- **FLOW & WATER QUALITY DATA COLLECTION:** combined fixed frequency and event-based sampling → Baseflow, storm flow, & water quality monitoring
  - **PRECIPITATION PATTERNS:**
    - Pre-restoration: wetter than historical average
    - First year post-restoration: closer to historical average
    - Second year post-restoration: driest of all monitoring years
  - **DISCHARGE & PRECIPITATION:** post-restoration year 2 received most precipitation in winter months, influencing discharge more in summer months
- **CONCLUSION:**
  - All nutrient & sediment flow weighted mean concentrations (FWMCs) decreased in post-restoration period except for SSC
  - DO has decreased post-restoration
  - Temperature increased post-restoration
  - Newly constructed beaver dam in 2021 impacted control temperature and DO data
  - Mixed responses from biological communities – no clear pattern of decline/improvement after 2 years post-restoration monitoring
- **For additional questions, please contact Allyson Bartell (allyson.bartell@maryland.gov).**

REPORT OUT ON THE 2022 RESTORING THE WETLANDS OF THE CHESAPEAKE BAY WATERSHED WORKSHOP:

Katlyn Fuentes (Chesapeake Research Consortium; Habitat GIT and Stream Health Workgroup Staffer)

- The *2022 Restoring the Wetlands of the Chesapeake Bay Watershed Workshop* was held on August 2-3, 2022. The Meeting Minutes, and other presentation/workshop materials can be found at **this link**.
- **STATUS OF WETLAND OUTCOME:** This workshop was a requested by the CBP Management Board following an evaluation of the status of each of the CBP's 31 outcomes in July 2021. The Wetland Outcome is 85,000 acres created or restored and 150,000 acres enhances by 2025. To date, only approximately 9,000 acres have been restored.
- **The Management Board tasked the Bay Program with bringing key people together ensure the Wetland Outcome by:**
  - Understanding the major barriers to wetland outcome attainability
  - Identify innovative approaches to wetland restoration/creation
  - Develop an Action Plan
- Following the workshop, the workshop steering committee began working with jurisdictional representatives to draft jurisdictional-specific action plans. Additional action plans were included by various federal agencies and NGOs as well. The draft Action Plan contained a summary of the workshop, a list of recommendations, and the individual action plans drafted by each state/agency/NGO. This draft was presented to the CBP Management Board for consideration in November 2022.

- At the December 2022 Management Board Meeting, the workshop steering committee provided a report out on the workshop, and each jurisdiction provided brief summaries of their individual wetland action plan.
    - *The Management Board reached consensus on the path forward as outlined in the Action Plan.*
- This Action Plan was finalized in January 2023, and has since been published to the Wetland Workgroup and Habitat Goal Implementation Team (HGIT) webpages.
- **For questions/comments related to the workshop and/or the Wetlands Action Plan: please contact Chris Guy (chris_guy@fws.gov) and Katlyn Fuentes (fuentesk@chesapeake.org).**
- **To join the Wetlands Workgroup: please contact Pam Mason (mason@vims.edu) and Katlyn Fuentes (fuentesk@chesapeake.org).**

MEMBER & INTERESTED PARTY UPDATES

- ***STAC Stream Restoration Workshop on the State of the Science and Practice of Stream Restoration in the Chesapeake Bay Watershed***
    - Steering Committee is meeting monthly and is close to completing complete agenda.
    - **DATES OF WORKSHOP:** March 21-23, 2023
    - **LOCATION:** TBD but mostly likely in Maryland in the Annapolis Area
- **Brook Trout Workgroup: FY2021 GIT Funding project is currently underway.**
    - Project will create a database on restoration projects in the watershed.
    - Presently, the Project Steering Committee is drafting a list of stakeholders with data or who might want to be informed on this project.
    - **If you have suggestions on folks to include on this list, or have additional questions pertaining to this project, please contact Lori Maloney (**lori.maloney@canaanvi.org**).**
- **New Publication on Factors Affecting Stream Conditions:** https://www.usgs.gov/centers/chesapeake-bay-activities/science/enhanced-understanding-factors-affecting-stream-condition
    - Paper highlighted in the summary can be found here: https://link.springer.com/article/10.1007/s00267-022-01723-7
- **Kristen Saacke Blunk** announced that NFWF is convening a "wetlands" focused Agriculture Networking Forum on 1/12/2023.
- **Claire Buchanan** announced that a report is in the works, (draft) title: "Stream Biological Health in the Chesapeake Bay Watershed". Planning on submitting the draft to select personnel for review today. Feedback will be submitted by January 2023, after which the summary will be sent to the Stream Health Workgroup for review.

MEETING ADJOURNED.

Next Meeting: Friday, February 17th, 2023, from 10:00-12:00 ET.

KEY: ACTION ITEMS, KEY TAKEAWAYS