

## **Mystic River Watershed Initiative Science Forum**

Thursday May 4, 2017 | 8:30am – 12:30pm

EPA Region 1 Office | Boston, MA

Meeting Summary

Prepared by the Consensus Building Institute

### **Welcome and Introductions**

Mel Coté, Lynne Hamjian, and Art Johnson (EPA Region 1) and Patrick Herron (Mystic River Watershed Association) welcomed participants to the Mystic River Watershed Initiative Science Forum and thanked the planning committee. They expressed their appreciation for this semi-annual event and noted their interest in learning together about the many research projects happening in the Mystic River Watershed and future plans. Patrick thanked the participating partners for their work that leads to a better understanding of how this watershed functions and improves it as habitat for humans and non-human species.

Ona Ferguson, facilitator from the Consensus Building Institute, led group introductions and reviewed the day's agenda. The Science Forum was designed to enable people to both share information and deepen their connections and collaboration.

This summary provides a high-level snapshot of projects described in the presentations. Presenters are listed in section titles and participants are listed in the appendix. For more details on particular projects, see the presentation slides on the MyRWA website: <https://mysticriver.org/epa-steering-committee>

### **Freshwater Mystic Nutrient Study**

Phosphorous Loading Work – *Andy Hrycyna, Mystic River Watershed Association (MyRWA)*

Many urban waterways in the United States have ecologically damaging levels of phosphorous due to organic materials swept into the waterways from storm water run-off. The Mystic River and its major tributaries are no exception, and have been listed on the Commonwealth's 303(d) list due to their elevated levels of phosphorous and chlorophyll. Andy presented on this project that measures and models relevant indicators of this nutrient problem in the Mystic River. Excess phosphorous levels are a primary contributor to impairment in water bodies: they foster algal blooms and invasive plant growth, which then causes eutrophication (low oxygen levels) that harm fish populations. These environmental impacts can also cause summer blooms of cyanobacteria in the river, threatening drinking water quality and public health.

Using hundreds of samples taken by auto-samplers and manually from boats, the MyRWA research team has monitored phosphorous across the Mystic River watershed since 2013 with the goal of catalyzing a cooperative and regulatory solution to the problem. The team initiated a partnership among MWRA, EPA, DEP and USGS in 2014. That partnership has resulted in installation of new stream gauges and intensive collection of water quality data through 2017.

As a window into the dynamics of excess nutrients within the watershed, Hrycyna presented on

water quality data collected during a harmful algal bloom that occurred during Summer 2016. The Massachusetts Department of Conservation and Recreation applied contact herbicide in the area of Blessing of the Bay to resolve an infestation of Eurasian milfoil that impeded navigation. Within just a few weeks, the milfoil was much reduced but the river turned green. Data gathered by MyRWA, MWRA and USEPA revealed that the herbicide application caused the release of a significant amount of phosphorus into the water column that led to elevated chlorophyll and a significant cyanobacteria bloom. Mr. Hrycyna used this as an example of how management actions can have unintended results, noting that there are complex trade-offs to be made when balancing multiple functions of the river like ecological health and human use.

#### EPA Buoy – Tom Faber, EPA Region 1

EPA has deployed a solar-powered water quality-monitoring buoy in various regions of the Mystic since 2010, including Wedge Pond and Spy Pond. The buoy collects a range of measures like temperature, conductivity, pH, turbidity, chlorophyll, and phycocyanin every 15 minutes. Since 2015, these measures have been live-displayed on the EPA website as part of a regional water quality monitoring effort with partners like the Town of Somerville and MyRWA. On June 8, 2016, EPA relocated the buoy into the Blessing of the Bay, an area they identified for its high recreational use and history of algae blooms. Mr. Faber demonstrated the interactive data display at <https://www.epa.gov/mysticriver/live-water-quality-data-mystic-river>. EPA periodically collects grab samples to correlate buoy displays with lab data when servicing the buoy.

#### Update on the Phosphorous Technical Advisory Committee – Tobey Stover, EPA Region 1

EPA has a new focus on Total Maximum Daily Load (TMDL) alternatives because they provide EPA with the flexibility to work on projects without going through the extensive process of preparing a TMDL for each waterbody/pollutant combination. The Phosphorous Technical Advisory Committee, a MyRWA partnership with DEA, DEP, MWRA, has some funds to go through EPA headquarters to get started on this road looking at the impact of stormwater pollutants on the Mystic River watershed. Currently, EPA has several subcontractors working for the Technical Advisory Committee analyzing existing data, selecting targets for phosphorous and response parameters. The committee also gives recommendations on potential future data gaps and modeling approaches. As the first part of the contract wraps up this fall, committee members hope to find additional funds to complete modeling on runoff, loading and phosphorus-chlorophyll dynamics. Mr. Stover expects the Phase I report including analysis to be finished by the end of 2017.

### **Climate Resilience**

#### MWRA's Pragmatic Approach to Climate Change – Stephen Estes-Smargiassi, MWRA

Mr. Estes-Smargiassi presented the Massachusetts Water Resource Authority's comprehensive climate adaptation and mitigation efforts, in which MWRA is "trying to be pragmatic." Their long-term approach to implementing adaptive measures is centered on making sure that their tap water and waste disposal services continue in case of flood events and droughts. To achieve this goal, MWRA has looked at their facilities to identify what likely problems there would be during a major storm event (100-year flood events are increasingly likely under current climate

change projections). They have implemented temporary flood barriers, elevated electronic and computer equipment, created remote operation and control centers, and held practice sessions in those backup centers, among other measures. MWRA is also working on drinking water conservation to reduce the impact of drought periods: they are raising rates to reduce demand and they are building larger reservoirs to store more rainwater. In addition to the adaptive precautions MWRA has taken to rehab their wastewater plants and pump facilities to account for 100-year flood levels set by FEMA and 2.5 feet of sea level rise, they generate renewable energy on-site at facilities like Deer Island in order to power their plants, save taxpayers money, and reduce their carbon emissions.

#### Mystic River Watershed Modeling Tool – *David Bedoya, Stantec*

As part of the recently completed Cambridge Climate Change Vulnerability Assessment (CCVA), Stantec developed an integrated Mystic Watershed Modeling Tool. This hydraulic model unifies an existing FEMA floodplain model (HEC-RAS) with a model of Cambridge's sewer systems and sea level rise. This model allows the user to seamlessly assess combinations of precipitation, sea level rise and storm surges. Because the model captures riverine and drainage system flooding to a high degree of accuracy, planners can identify the areas around the Mystic River that might be flooded due to storm surge waters and sea-level rise. The model was used in the Cambridge CCVA to identify Alewife Brook as the area most susceptible to flooding from sea level rise in the future, despite its distance from Boston Harbor. This integrated model is a valuable resource for modelers and policy makers, as identifying flood areas and extents allows city planners to plot flood mitigation measures at various scales.

#### **Mystic River Fish Advisories and MyRWA** – *Rafael Mares, Conservation Law Foundation*

The Lower Mystic is included in the Boston Harbor fish advisory which is based on fish tested from Quincy Harbor. The presence of endemic fish and a history of intense industrial use raised the prospect that fish within the Mystic River may not be safe to eat. The Conservation Law Foundation, MyRWA, GreenRoots (formerly Chelsea Greenspace), NOAA and the UMass Boston Green Harbors Project collaborated on a project to survey fishing practices and test fish for the presence of toxicants. The project surveyed 165 members of the community in Summer 2014 and found that 64% of all fishers do fish in the Mystic, of those, more than half consume their catch. The team then sampled tissue from many endemic fish and shellfish species – their lab analysis found dangerous levels of arsenic, PCBs, Dieldrin, and/or DDT in almost all samples.

Project partners are now working with the MA Department of Public Health to update and redesign a fish advisory for the Lower Mystic that includes warnings about the toxicity of endemic fish species and images of those species, as well as pictures of the migratory fish species that are okay to eat. They also recommend that these advisories be posted both online and along the banks of the Lower Mystic, in order to help local residents make informed decisions.

#### **Connecting Students to a Major Fish Migration** – *Beth MacBlane, MyRWA*

MyRWA's new Mystic River Herring Education Program is documenting the number of river herring (bluebacks and alewives) passing through the Mystic Lakes dam and engaging many people in that migration. It builds off the foundation of MyRWA's popular volunteer-run herring

migration program by taking the next step of engaging technology to make the natural phenomena more accessible. In collaboration with the Massachusetts Division of Marine Fisheries, MyRWA has installed an underwater camera in the fish ladder to track the herring that pass through the Upper Mystic Lake dam. The camera is triggered to take brief video clips when herring enter. Anyone can now go to <http://www.mysticherring.org> to watch short video clips and help count fish. MyRWA is partnering with six school districts in the watershed to involve K-12 classrooms in this project: they have done teacher trainings, visited classrooms, helped develop curricula, and coordinated field trips to get students involved. Now that they are installed, the underwater video camera and website will remain in place indefinitely, with a second camera to be installed at Winchester Center Falls dam in 2018. MyRWA hopes this project will not only expand data collection to inform estimates of and behavior during the river herring migration in the Mystic River Watershed, but also increase awareness and appreciation of the migration, particularly among participating students.

### **Additional Science in the Mystic**

#### Invasive Species – Andy Hrycyna, MyRWA

There is an ongoing effort to control water chestnut on the Mystic River. Each summer, a thousand volunteers have helped by hand-pulling the invasive plants. This has made a significant dent in its proliferation, especially when coupled with the mechanical pulling deployed by the Department of Conservation and Recreation (DCR). However, these control efforts have a trade-off: Eurasian milfoil has sped into the ecological niche opened up by that management. MyRWA is considering various collaborations to control that species as well, with awareness of the effect of pesticide on water quality last summer (*see Phosphorous-Loading Study above*). MyRWA considers invasive species worth managing because they reduce biodiversity by supporting far less complex foodwebs than indigenous species. MyRWA has received a National Fish and Wildlife grant to invest in the greenways of the Mystic Rivers and bring stakeholders together.

#### Sources of Contamination on Alewife Brook and Enforcement – Todd Borci, EPA

EPA Region 1 has ongoing enforcement efforts in the Mystic. They will release their 2016 report card soon. EPA actions will improve the water quality in the Mystic River watershed by eliminating sewer discharges that are not supposed to exist. The enforcement section of EPA uses a new forensic approach to getting towns to fix their old, cracked, leaking sewer pipe infrastructure. The effort uses a new subset of sampling that finds traces of acetaminophen and other medicines to identify sewer leakage into streams. The pharmaceutical testing has added a useful tool to clarifying whether an illicit source of contamination exists. Almost every community on the watershed is under some kind of enforcement action with either EPA or the state. EPA is also coordinating with the state and watershed association to ensure coordination.

The EPA water enforcement section is glad to take information and tip-offs about water contaminants. They want to act on combined sewer overflows whenever possible – if you see something, say something! Mr. Borci commented on the lack of affordable alternatives for testing stream water for sewage contamination. He would like to see more laboratories offer the testing for pharmaceuticals

#### Industri-plex OU-2 Construction Completion and Mitigation – Joe Lemay, EPA Region 1

EPA's project manager for the Industri-plex Superfund site in Woburn presented on the construction of a primary treatment zone, aeration zone, and settling zone to rehabilitate the industrial waste, as well as the construction of public amenities in the region. The cleanup includes an HBHA pond remedy to clean up the manufacturing chemicals left behind by a chemical and glue manufacturing facility at this site. EPA is using a super-aeration technique where high concentrations in a confined space are treated with ammonia to breakdown contaminants. Bacteria then consume the ammonia. As the Halls Brook Holding area was viable habitat before being converted into a treatment cell, the responsible parties were required to mitigate this loss of habitat at HBHA. EPA negotiated three mitigation solutions: the parties 1) constructed 2.4 acres of wetlands, 2) removed debris from the floodplain and restored it with walking trails and education stations, and 3) installed a fish ladder at the Center Falls Dam in Winchester. Responsible parties installed the fish ladder in fall 2016, in collaboration with the city of Winchester and the MA Division of Marine Fisheries.

### **Closing Comments**

Mel Coté and Patrick Herron, co-chairs of the Mystic River Watershed Initiative Steering Committee, offered participants a chance to ask questions or give feedback on the presentations they had just heard. Participants shared the following comments:

- Given the high level of contamination in areas around Chelsea, Boston and Revere relative to other areas, there should be more investment and resources for work on the Lower Mystic.
- A Forest Service representative offered to collaborate more. They are enhancing their work on urban forest restoration and green infrastructure. They also wanted to make it known that landscape-scale restoration grants and National Fish & Wildlife fish passage and riparian buffer grants are available to fund projects. Phosphorous loads and sediment impacts can be reduced if more of these measures are put in place. Erosion reduction is a part of the Forest Service's goals.
- It would be great if MyRWA worked to have their website serve as a clearinghouse for all of the work and data presented, as well as other presentations, videos and stream gauge data on the watershed.
- A commenter expressed concern that flooding related to climate change would overshadow the serious public and ecological health hazard of more frequent high-temperature days in the area.
- A commenter asked if sustainable energy production could be made more of a priority in long-term Superfund site remediation projects where energy intensity and emissions reductions should be an important consideration.

Patrick Herron closed the session by commending Elizabeth Glivinski for her dedication to managing the Mystic River Watershed Initiative over the past two years and for her help coordinating all of the day's speakers. Patrick said he is proud of the work MyRWA does with partners, and emphasized the organization's desire to partner with still more groups and individuals. He observed the incredible breadth of the parties and kinds of work being done in this watershed, from state agencies to nonprofits to companies. Patrick sees ongoing opportunities for synergies and improved outcomes through collaboration. He offered thanks to EPA for being a great partner and for hosting the forum.

## Appendix: Participants

Renee Angelo, *MWRA*  
Jeff Barbaro, *USGS*  
Erik Beck, *EPA*  
David Bedoya, *Stantec*  
Todd Borci, *EPA*  
Todd Callaghan, *CZM*  
Caitlin Chafee, *MWRA*  
Amber Christoffersen, *MyRWA*  
Michelle Coombs, *EPA*  
Mel Cote, *EPA*  
Ian Dembroski, *EPA*  
Stephen Estes-Smargiassi, *MWRA*  
Tom Faber, *EPA*  
Ona Ferguson, *CBI*  
Scott Friedman, *IEC*  
Sarah Gerould, *MyRWA*  
Elizabeth Glivinski, *EPA*  
Chris Goodwin, *MWRA*  
Karen L Grossman, *MyRWA*  
Lynne Hamjian, *EPA*  
Patrick Herron, *MyRWA*  
Elmire Hilaire, *MWRA*  
Karl Honkonen, *USFS*  
Art Johnson, *EPA*  
John Kilborn, *EPA*  
Sam Kumasaka, *CBI*  
Matt Liebman, *EPA*  
Carole McCauley, *Northeastern/MassBays*  
David Mendelsohn, *FEMA*  
David Mussina, *MyRWA*  
Karen Pelto, *DEP/EEIA*  
Stephen Perkins, *MyRWA*  
Ed Reiner, *EPA*  
Jen Relstab, *Horsley Witten*  
Michael Ripple, *Paddlers on the Mystic*  
Wendy Robinson, *Cambridge DPW*  
Eric Sanderson, *MWRA*  
Matt Shuman, *Town of Watertown*  
Toby Stover, *EPA*  
David Taylor, *MyRWA*  
Kathy Vandiver, *MIT/CEHS*  
Dave Van Hoven, *Stantec*  
John Walkey, *ACE/CCAG*  
Kathy Watkins, *Cambry DPW*  
Caitlyn Whittle, *EPA*  
Steve Winnett, *EPA*  
Catherine Daly Woodbury, *Cambridge DPW*  
David Wu, *MWRA*