Post-Remediation Monitoring of the Buffalo River, New York

Kristin Searcy Bell (ksbell@ramboll.com) and Victor Magar (Ramboll, Chicago, IL)
Steve Bagnull (Anchor QEA, Newtown, PA)
Mark Reemts (Anchor QEA, Columbia, MD)
Mary Sorensen (Ramboll, Atlanta, GA)
Katrina Leigh (Ramboll, Cleveland, OH)
Hilda Fadaei (Arcadis, Hanover, MD)
Mary Beth Giancarlo (EPA GLNPO, Chicago, IL)
Richard Galloway (Honeywell, Morris Plains, NJ)

Background/Objectives. The Buffalo River sediment remediation was completed in 2015 under the Great Lakes Legacy Act. The 79-acre remedy included dredging 440,000 cubic yards of material, cap placement in the adjoining City Ship Canal, and backfill at selected locations. The remedy was designed to achieve surface-weighted average concentration (SWAC) remedial goals for PCBs, mercury, and lead, and a discrete remedial goal for PAHs, within five years following remediation. In conjunction with sediment remediation activities, five habitat-restoration projects were constructed within the Buffalo River Area of Concern (AOC). In agreement with USEPA's Great Lakes National Program Office (GLNPO), post-remediation monitoring was required two and five years after remedy construction to assess the effectiveness of the remedy and document progress towards achieving remedial goals. In 2017, the two-year monitoring event was implemented.

Approach/Activities. The following activities were conducted as part of the Buffalo River, Year 2, post-remediation monitoring:

- Surface sediment samples were collected and analyzed for PAH, PCB, mercury, and lead levels to determine the reduction in surface sediment concentrations compared to pre-remediation baseline conditions.
- Bathymetric surveys were conducted, and were used with sediment core information to estimate post-remediation sedimentation rates in the remediated areas and to project surface sediment recovery during the remaining three years under evaluation.
- Bathymetric surveys and visual inspections were conducted to evaluate the cap stability.
- Benthic and fish community surveys were performed to contribute to the data required for removal of Buffalo River AOC beneficial use impairments.
- Habitat restoration areas were monitored to evaluate plant conditions.

Results/Lessons Learned. Findings from the Year-2 monitoring event demonstrated the majority of discrete and SWAC-based sample locations achieved site-specific remedial goals. Most of the sample locations that did not achieve the COC-specific remedial goals in Year 2 were likely due to the presence of dredge residuals, and are expected to achieve the remedial goals in Year 5, based on a surface sediment recovery model and location-specific sedimentation rates. Bathymetric surveys demonstrated more than two feet of natural sedimentation in the upstream dredged areas, and sediment deposition and cap stability in the cap area. The benthic community and fish community assessment results were compared to baseline conditions prior to sediment remediation. The benthic community assessment, in general, suggests no change over time, and the 2017 fish community assessment showed no change or a very slight improvement. Visual inspections of the habitat restoration areas demonstrated emergent plantings struggled to become established in most of the planting locations, while submerged aquatic vegetation was thriving in some restoration areas. This project provides a unique glimpse into a dredge remedy without the placement of post-dredge

backfill material. Relying on natural depositional processes in lieu of backfilling resulted in a reduction of greenhouse gas emissions and local truck and river traffic, as well as significant costs savings for the project sponsors. Post-remediation monitoring will continue in Year 5 (2020), and findings will continue to demonstrate whether the remediation and natural recovery have achieved the project remedial goals for the AOC.