

## **In-Channel, Bank, and Floodplain Remediation: An Update on Progress on the Tittabawassee River**

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**Background/Objectives.** The Dow facility in Midland, Michigan, abuts the Tittabawassee River and is an active chemical manufacturing plant operating since the late 1890's. Past waste disposal practices at the Midland plant, resulted in dioxin and furan contamination that settled in portions of the river sediments and built up in some riverbanks and floodplain areas. A unique 2010 Administrative Settlement Agreement and Order on Consent (AOC) for the Tittabawassee River/Saginaw River & Bay Superfund Site established a flexible framework to evaluate current conditions and to assess response options to manage potential exposures or risks to human health and the environment from contamination in the sediments, banks, and floodplain of the Site. Subsequent AOCs identified response actions, typically on a segment-by-segment basis, progressing in an upstream to downstream fashion.

**Approach/Activities.** Sources of contamination to the River have been effectively controlled through successful waste management activities and early source control actions at the Dow facility on the upstream end of the Site. Dow has also implemented a number of remedies along the Tittabawassee River to address contamination in the sediments, banks and floodplain downstream of the facility that may contribute to potential exposures or risk to human health and the environment. Some response actions to date have included:

- In-situ containment and/or removal and disposal of in-channel sediments
- Stabilization and/or removal and disposal of bank soils to minimize or eliminate exposure pathways of bank contaminant deposits to the river
- Removal and disposal of floodplain soils above site-specific cleanup criteria to remove direct contact exposure pathways for residents and users of the floodplain

Pilot studies have been used throughout the project to identify appropriate technologies for larger scale remediation.

**Results/Lessons Learned.** The flexibilities in the project approach and AOC have led to rapid decision-making and implementation, resulting in cleanup and construction every year. Throughout the project execution, a goal has been to identify and implement best practices, learning from pilot studies and lessons learned in the early response actions. Work has generally progressed on a segment-by-segment basis from upstream to downstream in the River. Implementation is largely complete in Segments 1 through 3; post-removal site control and long-term monitoring efforts have therefore started in these segments. Construction in Segments 4 and 5 occurred in 2017 and 2018; short-term maintenance will take place in 2019, followed by post-removal site control and long-term monitoring efforts. Dow will continue to move downstream through the remaining Segments 6 and 7 after response options are selected; construction in and along the Tittabawassee River is expected to be complete in 2020 or 2021. Attention will then focus on the Saginaw River and Bay.

The poster will highlight key components of the work completed to date at the Site, showing progress of implementation from the pre-AOC early actions and pilot study work through current day construction and long-term monitoring.