

## **Habitat Reconstruction at the Hudson River PCB Superfund Site: The Roles of Active Planting and Natural Recolonization/Recruitment**

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**Background/Objectives.** The Upper Hudson River portion of the Hudson River PCBs Superfund Site extends approximately 40 miles between Hudson Falls, New York and the Federal Dam at Troy, New York. In addition to the removal of over 2.6 million cubic yards (MCY) of sediment and placement of almost 1.4 MCY of fill materials, project requirements included replacement and reconstruction of approximately 29 acres of riverine fringing wetland (RFW), 350 acres of unconsolidated river bottom, 91 acres of submerged aquatic vegetation (SAV), and 11.6 miles of shoreline habitat through a combination of planting and natural recolonization. The SAV installation represents one of the largest freshwater habitat reconstruction efforts of its kind. Nearly 1.2 million SAV and over 250,000 RFW plants and approximately 1,700 pounds of seed mixes were installed between 2010 and 2016. From design of habitat reconstruction through its implementation, GE, USEPA, and state and federal stakeholders developed the SAV and RFW reconstruction approaches and planting plans, supporting habitat backfill designs, and installation, maintenance, and monitoring approaches in an adaptive management context.

**Approach/Activities.** The project adaptive management approach to habitat reconstruction reflects an overall preference for the use of local plant stock and invasive species management in conjunction with natural recolonization (recruitment of native species to habitat reconstruction areas). Habitat reconstruction was implemented within individual reconstruction areas on a river that consists of multiple reaches or pools. The large overall scale of the reconstruction project involved area-specific considerations such as locally varying plant communities as well as seasonally and annually variable river flows that prompted the use of active planting and seeding in conjunction with natural recolonization. Initial monitoring has focused qualitatively (benchmark phase) on the status and progress of individual reconstruction areas. However the overall habitat reconstruction success will be evaluated quantitatively at larger scales that will include multiple reconstruction areas. As the project transitions into the next phase of habitat monitoring the overall conditions of both planted and natural recolonization areas will be monitored and evaluated, including the extent of natural plant recruitment.

**Results/Lessons Learned.** This presentation will discuss benchmark habitat reconstruction monitoring observations and potential challenges to transitioning into the longer-term success criteria evaluation phase. Specifically, we will discuss lessons learned from taking an adaptive management approach to large-scale SAV and RFW habitat reconstruction under the constantly varying environmental conditions of the Hudson River system and how these variable conditions have influenced plant community dynamics from year to year. We learned that the roles of planting, seeding, and natural recolonization in habitat reconstruction can vary across the project area, over time, by plant community and by stressors. Lessons learned regarding applications to potential response actions and viewing habitat recovery from various perspectives on monitoring approaches in the transition from benchmark to success criteria monitoring, in an adaptive management context, will also be discussed. This presentation is of

interest to parties involved in the design, construction, monitoring, and oversight of large scale riverine habitat reconstruction at remedial sites.