

Tracking Sediment Recovery in the Upper Hudson River: Baseline, Remediation, and Recovery

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Background/Objectives. The remedial action objectives (RAOs) for the Upper Hudson River, as stated in the 2002 Record of Decision (ROD), include reduction of the cancer risks and non-cancer health hazards for people eating fish from the Hudson River by reducing the concentration of PCBs in fish and reduction of the PCB mass that may become bioavailable. These objectives are closely related to the surface sediment PCB concentration throughout the Upper Hudson. In the selected remedy, reduction of PCBs in surface sediment is achieved through two important processes: 1) sediment removal by dredging and backfilling, and 2) monitored natural recovery (MNR). Both processes are required to achieve the goals of the ROD. The objective of this presentation is to assess the surface sediment concentrations during the pre-dredging, dredging and post-dredging periods and quantify the rate of change in PCB concentration through time. In addition, the reduction of the surface sediments after dredging will also be presented.

Approach/Activities. The Hudson River PCBs Site is one of the most extensively monitored contaminated sediment sites with a data record spanning a period of more than 30 years. The various monitoring studies provided numerous sediment data sets. The post-remedial long-term sediment recovery rate is being assessed as part of the Operation, Maintenance, and Monitoring (OM&M) program. Under a Consent Decree, General Electric Company (GE) must collect surface sediment PCB data in the dredged and non-dredged areas so that recovery rates can be reliably estimated in the future. More recently, New York State Department of Environmental Conservation (NYSDEC) collected more than 1,000 surface (0-2 inch) sediment samples in 2017. The most recent sediment data sets permitted the calculation of the post-remediation mean surface sediment PCB concentration for each river reach and river section. Temporal changes in surface Tri+ PCBs are evaluated in two ways: first, using a matched location comparison approach to develop overall pool-wide estimates of central tendency using proximal locations that have been occupied across multiple surveys, and second, by fitting first-order decay models to the full time record with data stratified by sediment texture.

Results/Lessons Learned. Surface sediment PCB concentrations continue to decrease with time. The available data indicate recovery rates similar to those predicted at the time of the ROD, and these declines are generally consistent with other media including surface water and fish. Areas where dredging occurred have decreased extensively, with recently deposited sediments under 1 mg/kg Tri+ PCB. In non-dredged areas, declines are consistent with ROD model forecasts. The reductions in the section-wide surface sediment concentration achieved by dredging alone were 87%, 36%, and 5% in River Sections 1, 2, and 3, respectively. The presentation will also discuss the uncertainties in determining the rate of decline that are associated with differences in sample collection methods across multiple sampling programs.