

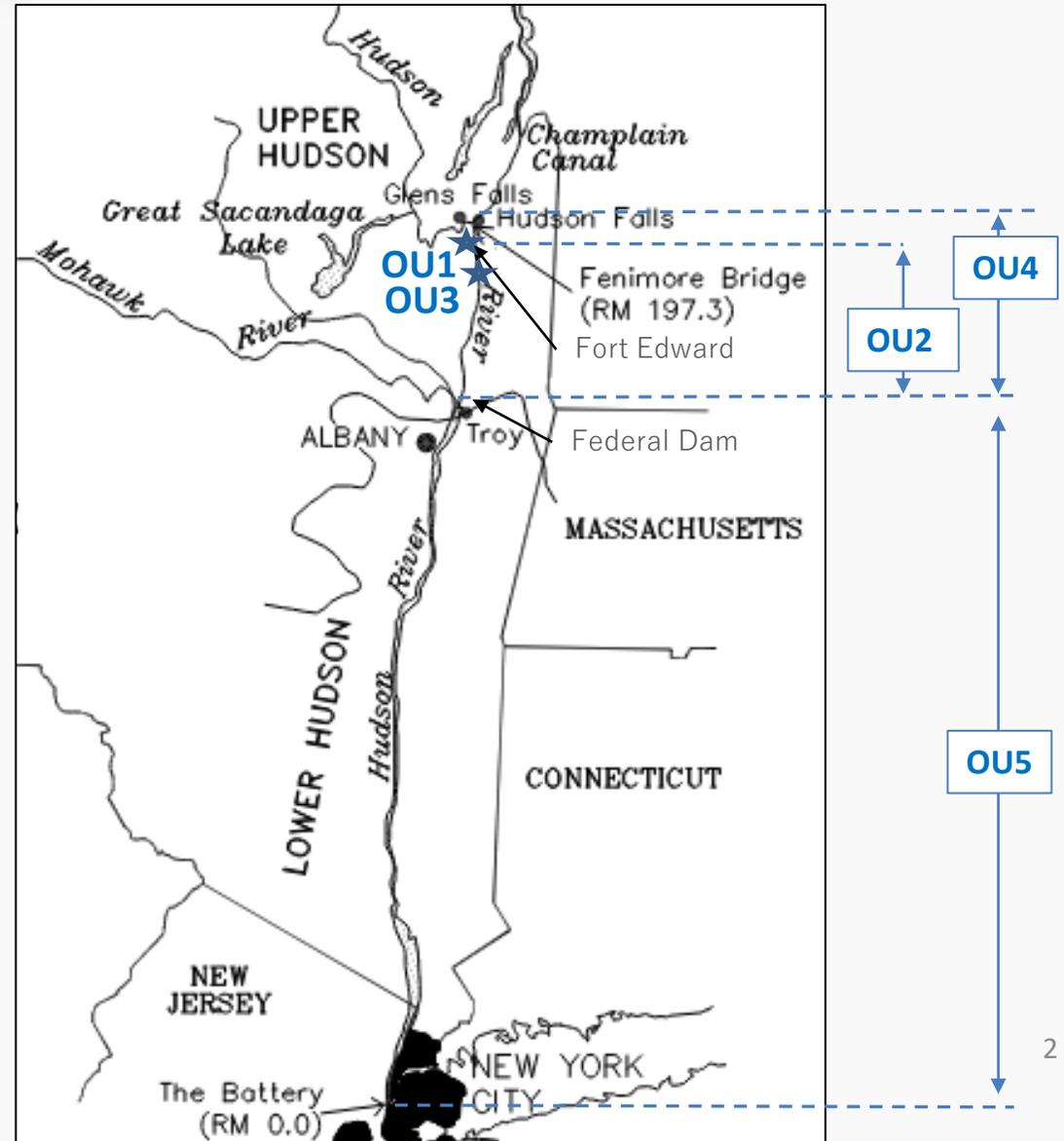
Hudson River PCBs Superfund Site

2022 SMWG REMEDY EFFECTIVENESS SYMPOSIUM

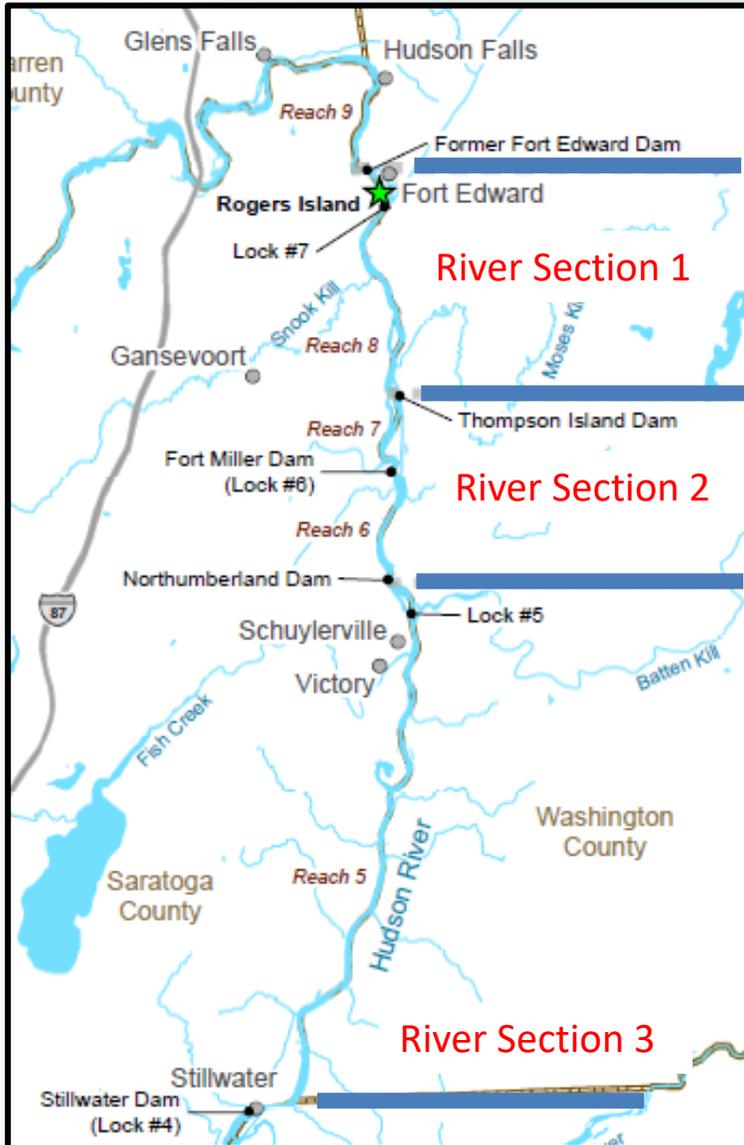
October 2022

Site Location – Background

- Located in New York State
- 200 miles from Hudson Falls to New York City
- GE discharges of PCBs begin in the late 1940s and ended in 1977
- Multiple GE-related PCB sources & discharges were discovered and controlled: 1974 to 1995
- Consists of four Operating Units
 - OU1: Remnant Deposits - Completed
 - **OU2: River Sediments – Natural Recovery/OM&M**
 - OU3: Rogers Island - Completed
 - OU4: Floodplain – RI/FS Underway
 - OU5: Lower River – Sampling and Investigations



OU2 RAOs



- 2002 Record of Decision required dredging of the river bottom followed by monitored natural attenuation
- Remedial Action Objectives (RAOs):
 - Reduce the cancer risks and non-cancer health hazards for people eating fish from the Hudson River by reducing the concentration of PCBs in fish.
 - Reduce the risks to ecological receptors by reducing the concentration of PCBs in fish.
 - Reduce PCB levels in sediments in order to reduce PCB concentrations in river (surface) water that are above surface water ARARs.
 - Reduce the inventory (mass) of PCBs in sediments that are or may be bioavailable.
 - Minimize the long-term downstream transport of PCBs in the river.

Overview Of Remedy - Removal followed by MNR

- Dredging Criteria-

- River Section 1: Dredging of sediments with MPA (mass per unit area) greater than 3 g/m² Tri+ PCBs or surface concentration (0-12 inches) > 10 mg/kg Tri+ PCBs
- River Section 2 & 3: Dredging of sediments with MPA greater than 10 g/m² Tri+ PCBs or surface concentration > 30 mg/kg Tri+ PCBs
- Post-dredging residual sediment concentration target of 1 mg/kg Tri+ PCBs



River Section	Percent Area Dredged	Acres
River Section 1	60%	307
River Section 2	20%	85
River Section 3	4%	95

OU2 Remedy and Status



- Currently in natural recovery phase of remedy
 - Extensive monitoring of fish, water, and sediment
- Dredging with limited capping conducted in two phases between 2009 to 2015 (no dredging in 2010)
- Peer Review 2010 – no dredging, modifications to implementation of project
 - 2.7 MCY of sediment removed
 - 310,000 lbs PCBs removed (2x plan)
 - 500 acres of river bottom dredged
 - 4,800 barge loads; 23,000 lockages
 - 2.12 billion gallons of water treated
 - 1.4 million plants; 18.4 acres seeded
 - Net load to the Lower Hudson River in Phase 2 of dredging was 0.7 percent (less than the Resuspension Performance Standard of 1 percent) of the Tri+ PCB mass removed

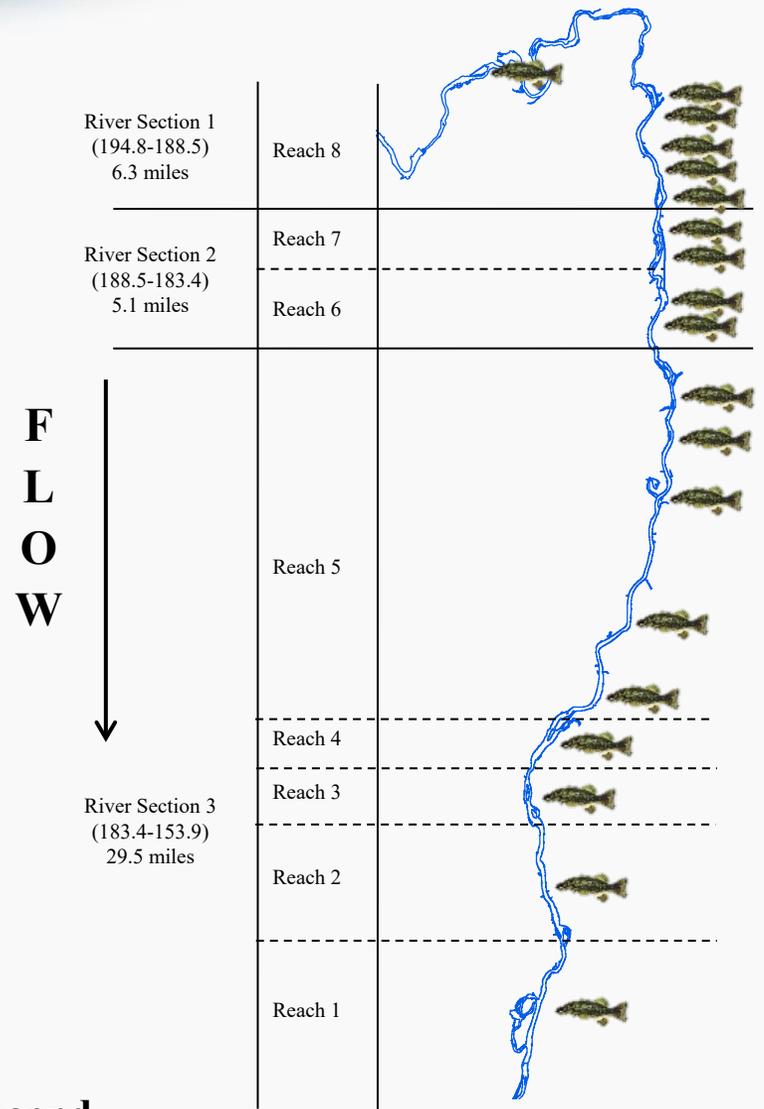
ROD Scope/Schedule Deviations

- The 2002 ROD anticipated a completed design by 2004, followed by 6 years of dredging
 - Design/planning took 5 years longer than ROD anticipated
 - Dredging took place from 2009-2015
- Twice as much mass removed
 - 310,000 lbs PCBs removed, ROD anticipated 154,000 lbs
 - Depth characterization challenges due to sampling through debris



Baseline Monitoring Program (Pre-dredge)

- Pre-dredge monitoring of water and fish was implemented between 2004 – 2008 while design was being completed
 - Historic water, fish, and sediment data collected prior to 2004 dates back to 1980's
- Water Sampling Program
 - Generally weekly sampling at 8 locations
 - 2 upstream of the dredging, 3 within the dredge area, and 1 just downstream of dredging area, and 2 in the lower river
- Fish Sampling Program
 - Approximately 450 fish collected annually
 - 16 sampling locations across 5 Reaches (pools)
 - Spring: black bass, perch, ictalurids
 - Fall: forage fish and pumpkinseed
 - Fish collected from background station upstream of project area
 - Additional fish collected from the Lower Hudson River



Legend



Current Monitoring Fish Station

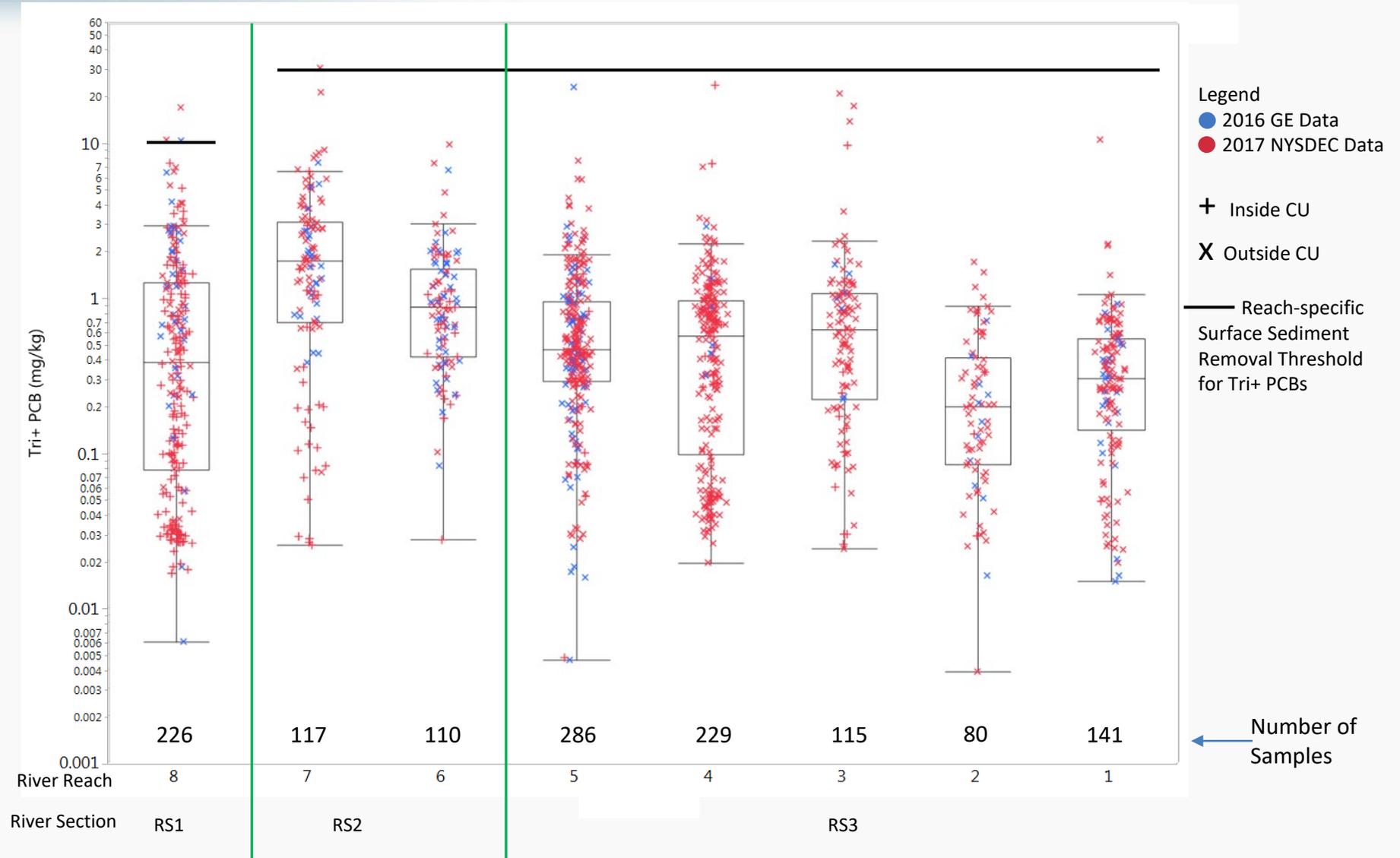
(Flow to Lower Hudson River)

OM&M Monitoring Program (Post-dredge)

- EPA developed post-dredge monitoring program with goal of being able to detect a 5% annual rate of decline over a 10-year period for fish, water, and sediment
- Water Column Monitoring
 - Weekly/monthly sampling of long-term monitoring stations
 - Includes two background, two within dredged areas, and one at downstream end of dredged areas
- Fish Program
 - Annual sampling of fish from 16 stations (consistent with Baseline Monitoring Program)
- Sediment Program
 - Sampling event every 5 years (750 Samples per event)
 - Sampling locations sited inside and outside dredge areas

Surface Sediment Evaluation

- ROD does not have a RAO for surface sediments concentration
- 2016/17 surface sediment sampling shows surface sediment remain below dredging criteria
- 2021 surface sediment data recently received and under review



Remedy Evaluation

- Fish, and Water column data have decreased since dredging and sediment concentrations remain below dredging criteria.
 - 2021 surface sediment data recently received and under review
- 2nd FYR (final released in 2019) deferred a protectiveness statement - not enough data available since the completion of dredging to make a determination
 - Analyses conducted as part of the 2nd FYR indicated that at least 8 years of data is required to assess trends in fish tissue
 - As expected, fish tissue data has significant variability
 - Long-term remediation goal (RG) of 0.05 mg/kg – ROD estimate: more than 50 years after dredging
 - Intermediate fish tissue concentration targets
 - 0.4 mg/kg (1 half-pound fish meal every 2 months) – 5 years after dredging
 - 0.2 mg/kg (1 half-pound fish meal every 1 month) – 16 years after dredging
 - OM&M plan designed for all media is to detect a 5% annual recovery rate after 10 years

Remedy Evaluation (cont.)

- EPA is currently engaged in conducting the 3rd FYR for the Site
 - Includes assessment of additional fish, water, and sediment data collected since the 2nd FYR was initiated
 - Expected to be released in 2023
- There are fishing restrictions (catch and release) for the upper Hudson River
- There are fish consumption advisories for the lower Hudson River
- EPA acknowledges that the consumption advisories are not fully effective in that they rely on voluntary compliance in order to prevent or limit fish consumption.
- Key Take Home Message for the Upper Hudson River:
 - Significant time is necessary to evaluate remedy effectiveness post dredging
 - Long term monitoring plans need to consider the time needed to account for variability in data and rates of decline

Questions?

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