

ICMGP 2024

CAPE TOWN • SOUTH AFRICA • 21 - 26 JULY

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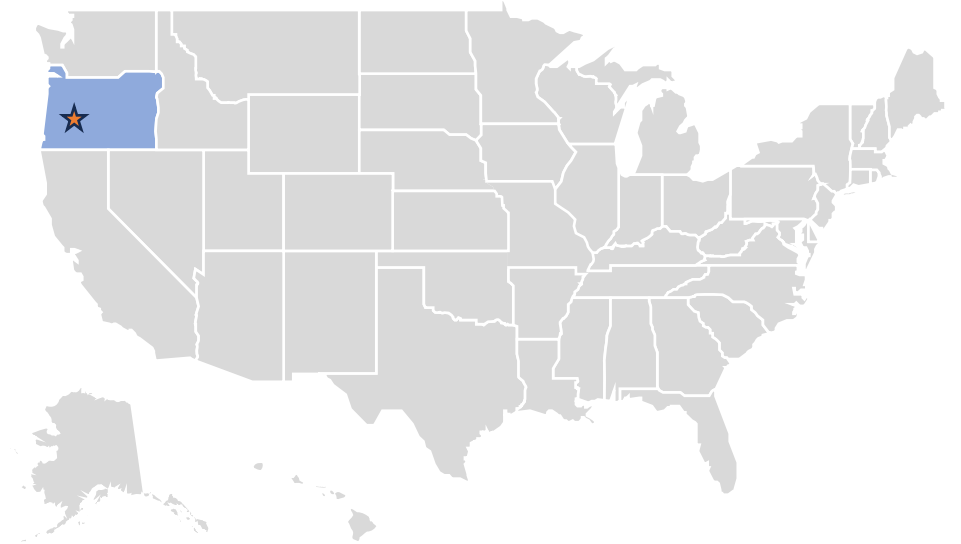
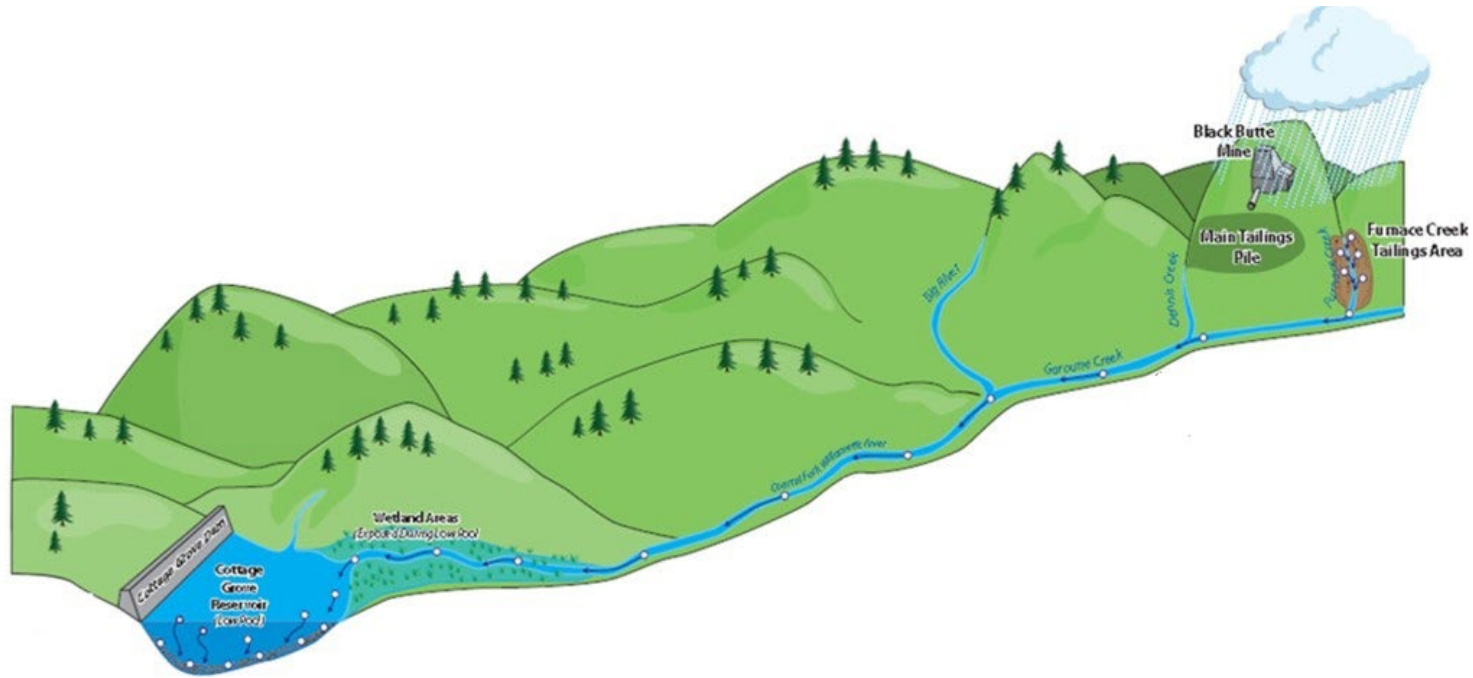
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Characterizing Mercury Dynamics in a Flood Control Reservoir Downstream of Historical Mercury Mine



Site Overview



Black Butte Mine Adit



Rotary Furnace

- **Location:** Cottage Grove Reservoir, Oregon, USA
- **Hg Source:** Former Black Butte Mine
- **Problem:** High Hg in fish tissue
- **Administration:** Part of Black Butte Mine Superfund Site
- **Management:** Flood control

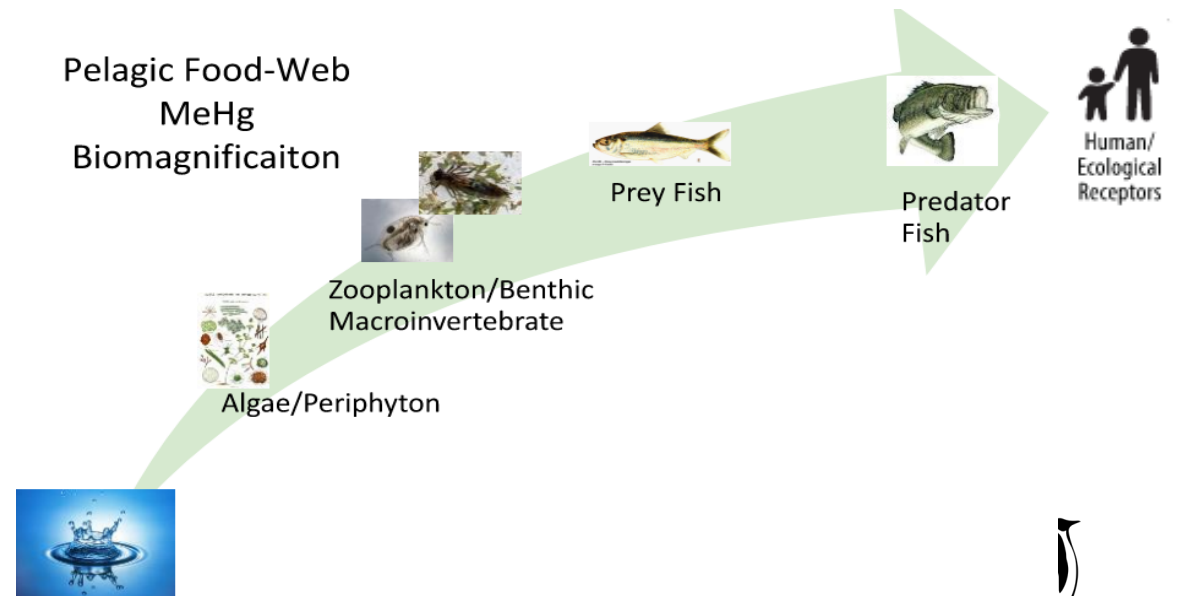
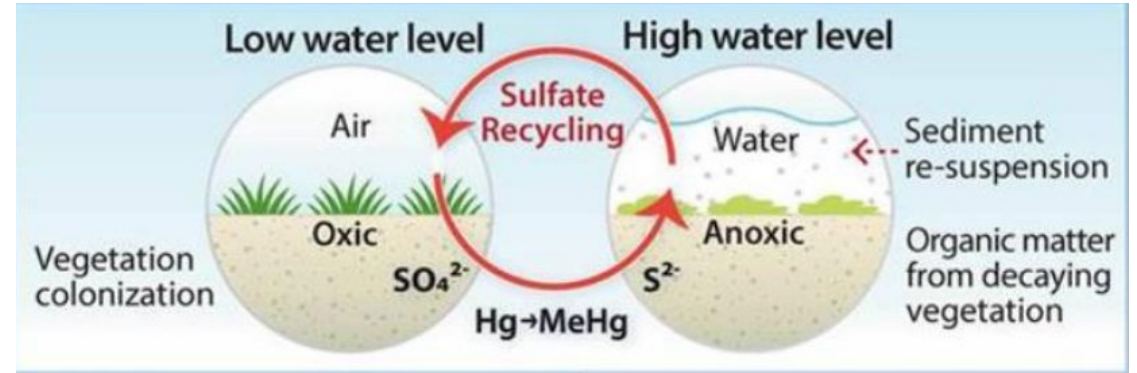


Study Goal:

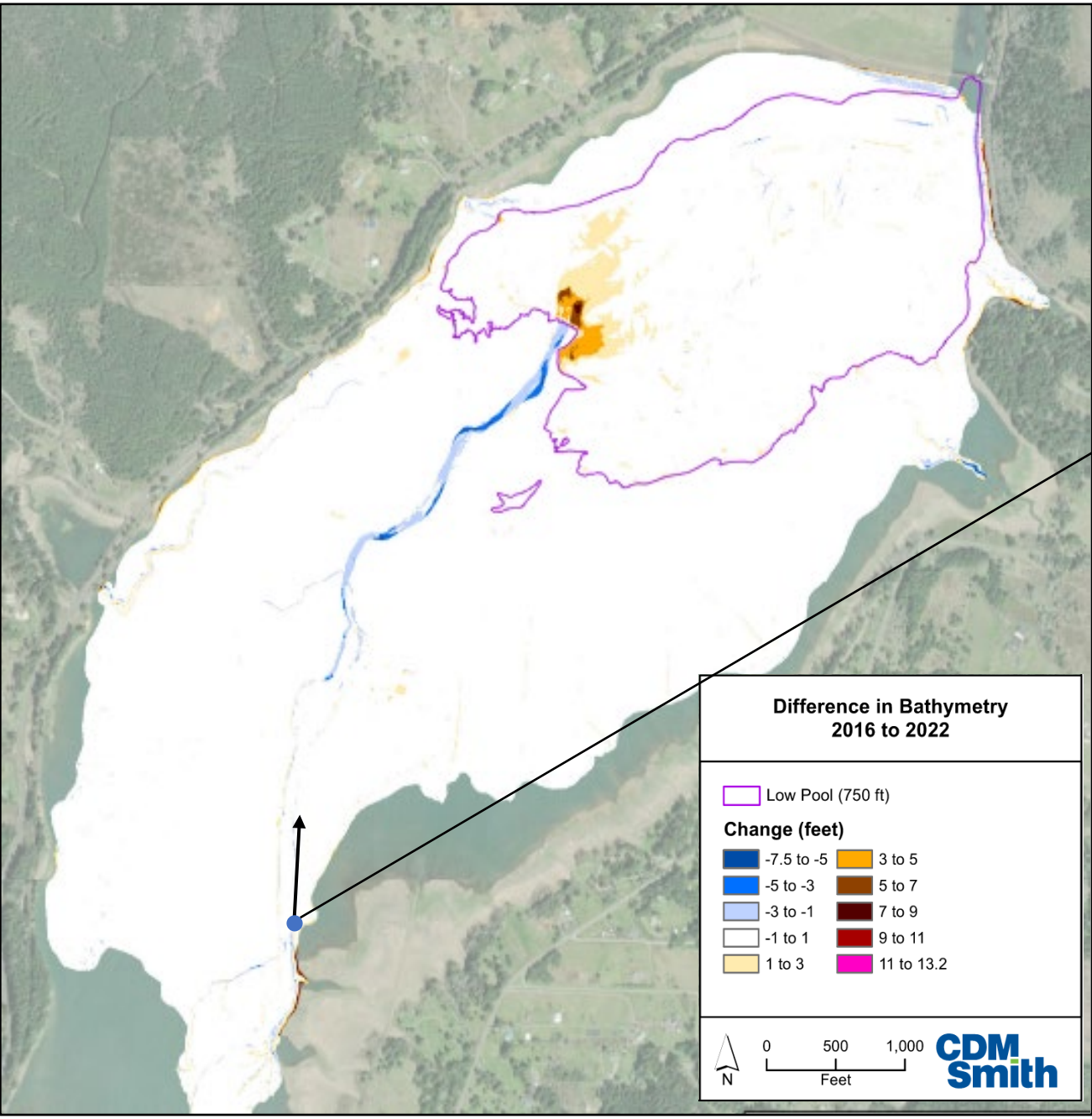
Characterize mercury contamination and dynamics to support remedy selection

Initial Assumptions:

1. Mercury-contaminated particles deposited throughout CGR
2. Two key zones: wetlands and sediment
3. Wetlands key for methylmercury production
4. Shallow well-mixed reservoir with no hypolimnion
5. Methylmercury bioaccumulates in food web



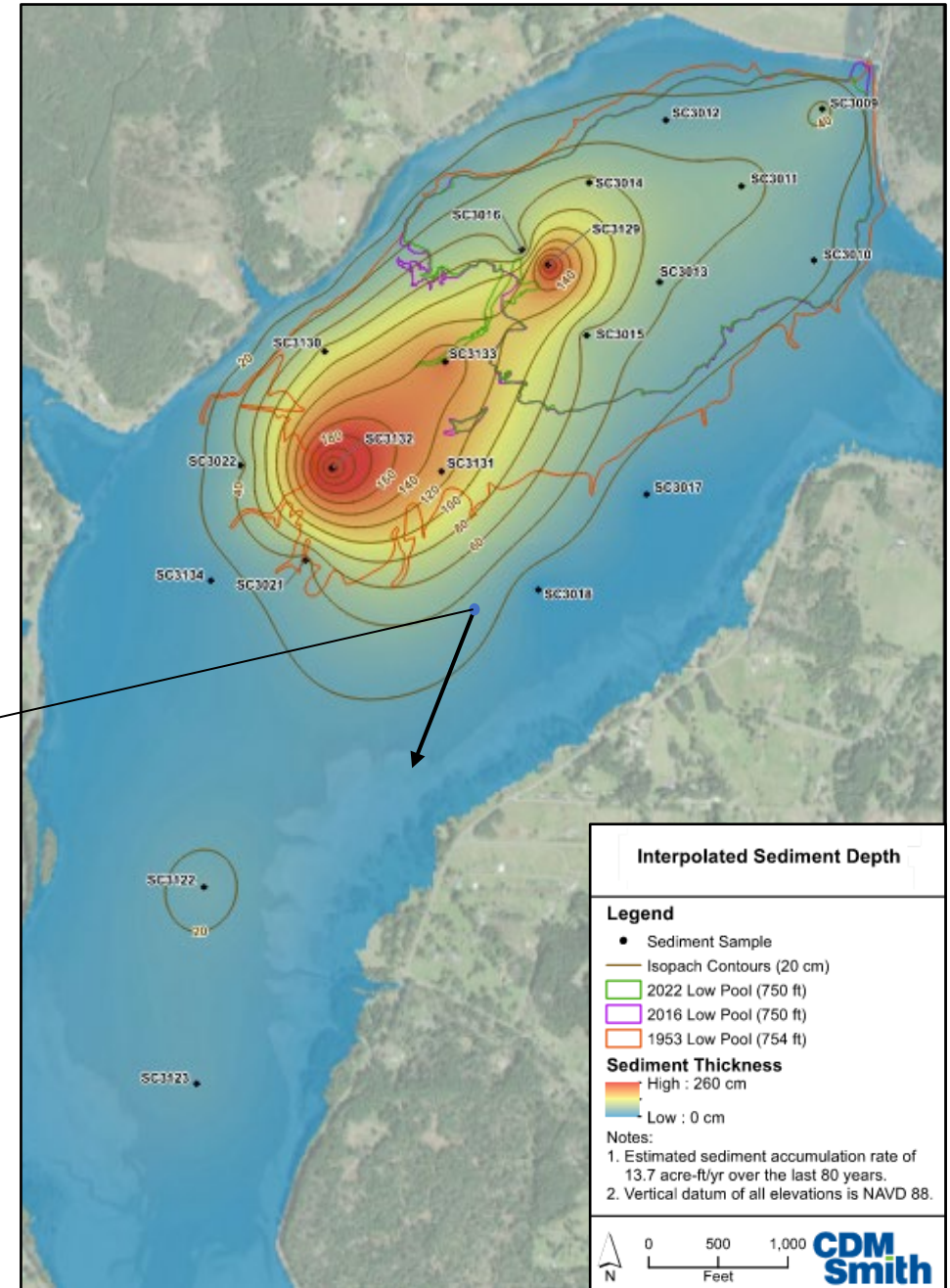
Depositional Areas Identified Using Differential Bathymetry



River flowing through reservoir during low pool

Sediment Depth

- Cores advanced to pre-lake soil
 - Shallow - Manual
 - Deep - Vibratory
- Sediment depth from cores interpolated throughout CGR





Wetlands

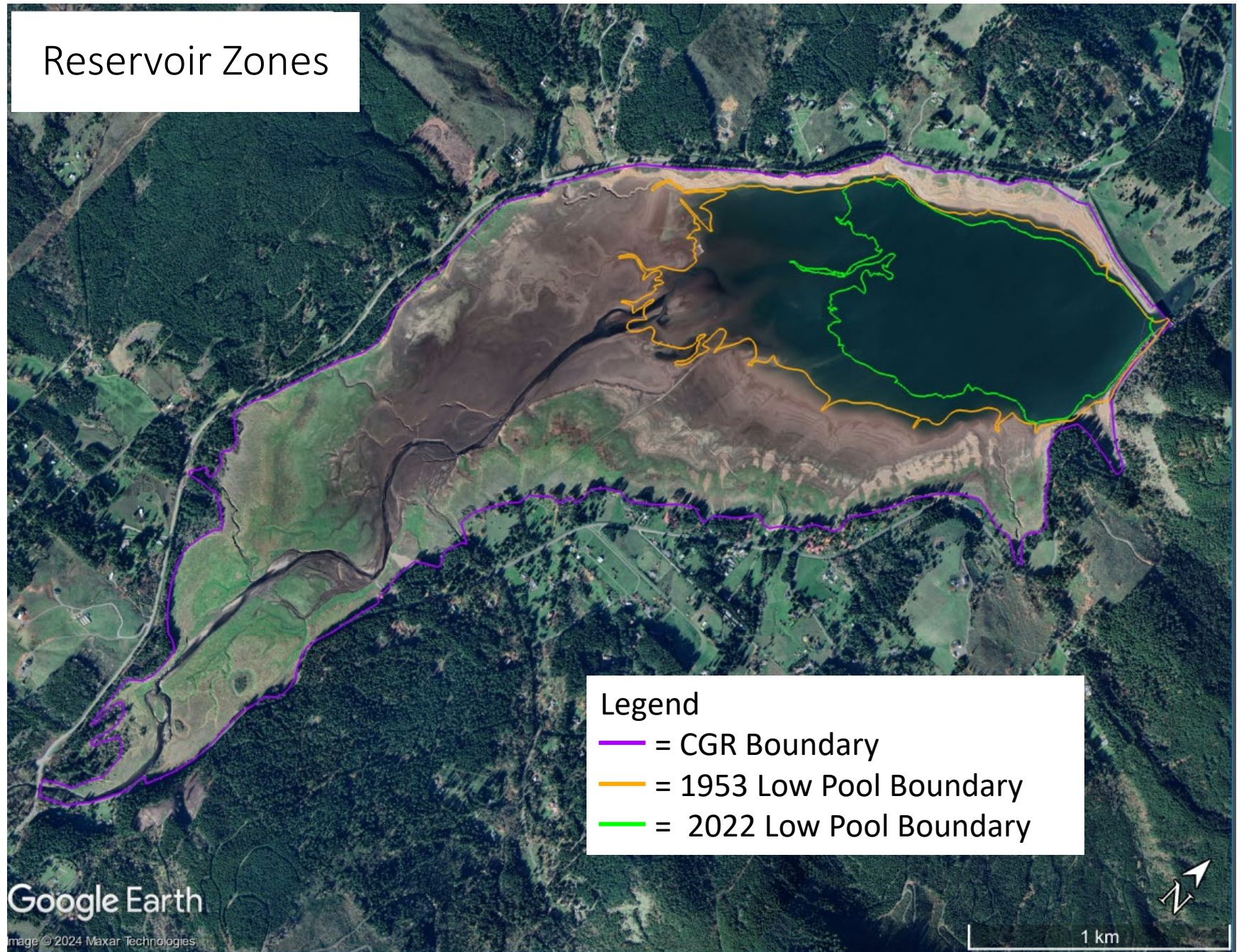


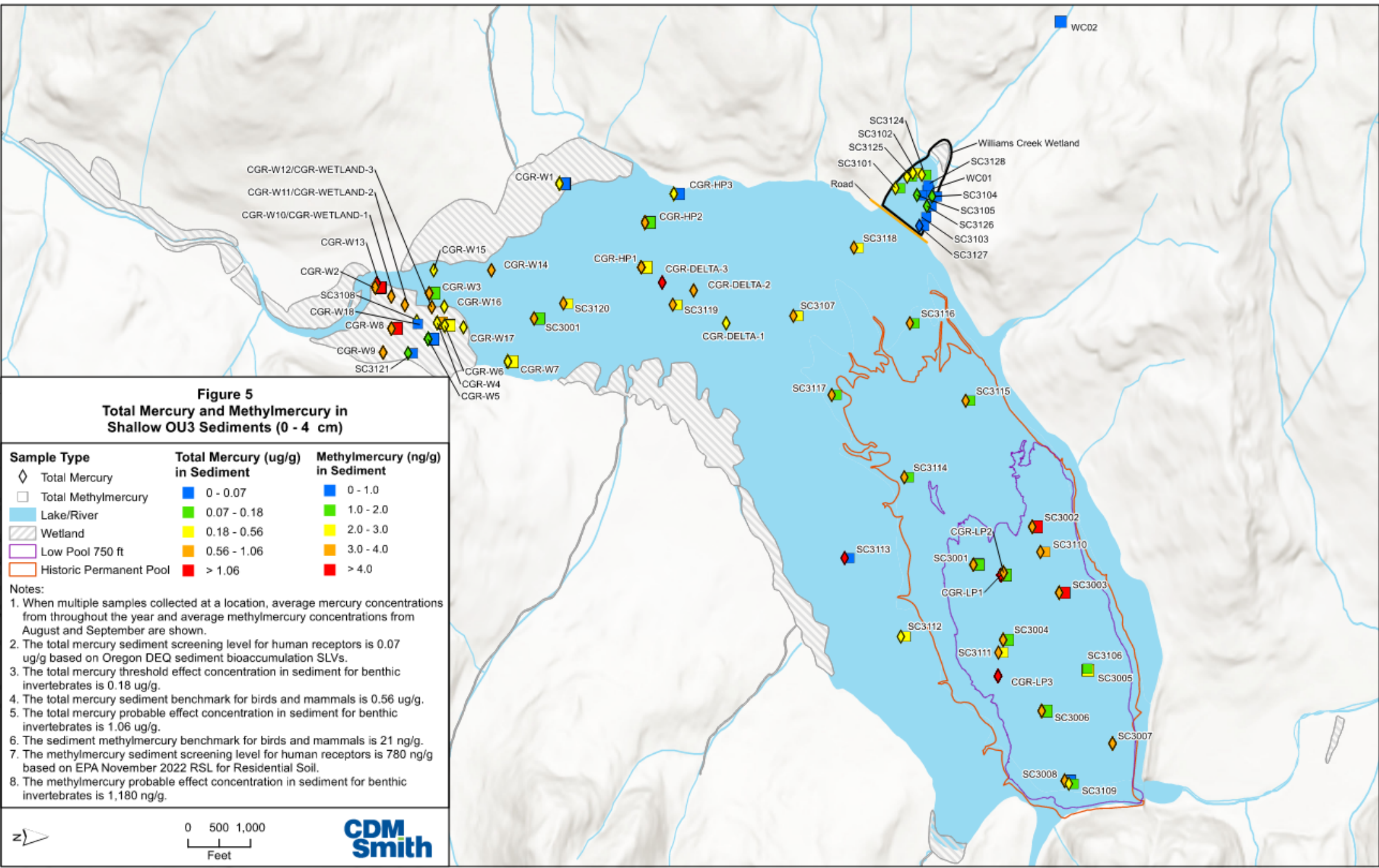
Seasonally Inundated



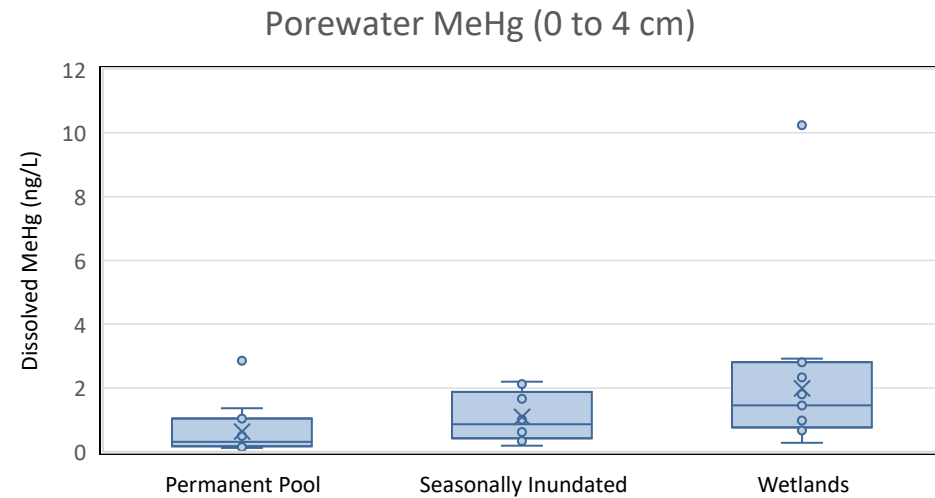
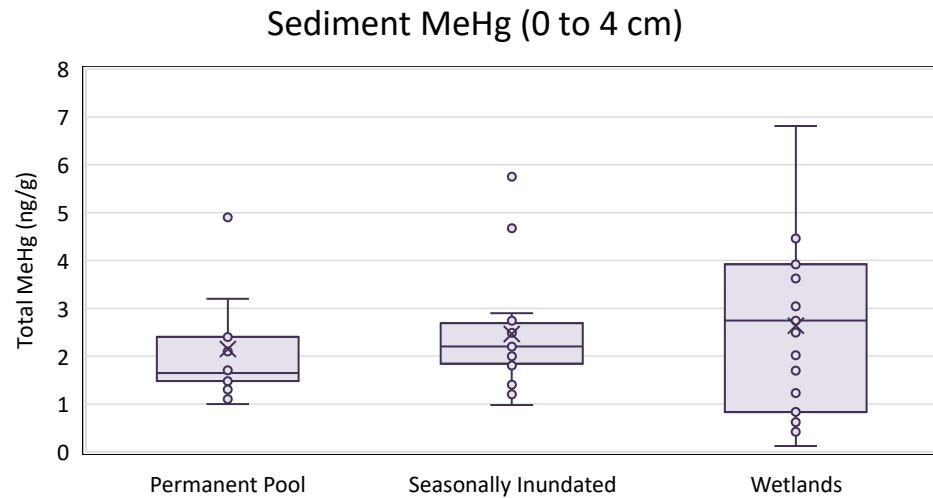
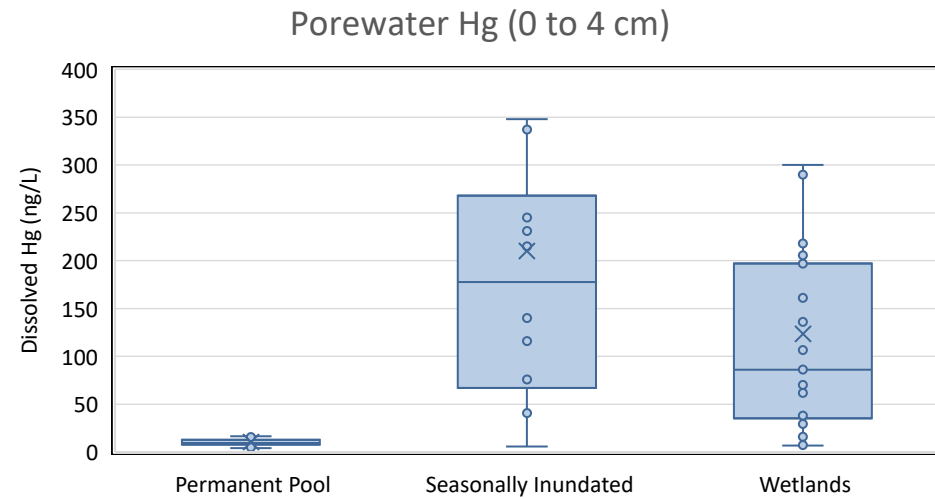
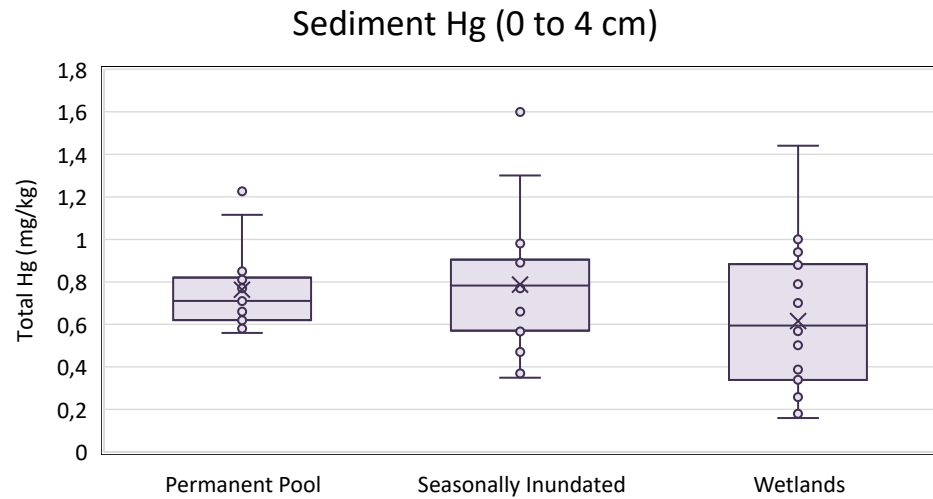
Permanent Pool

Reservoir Zones





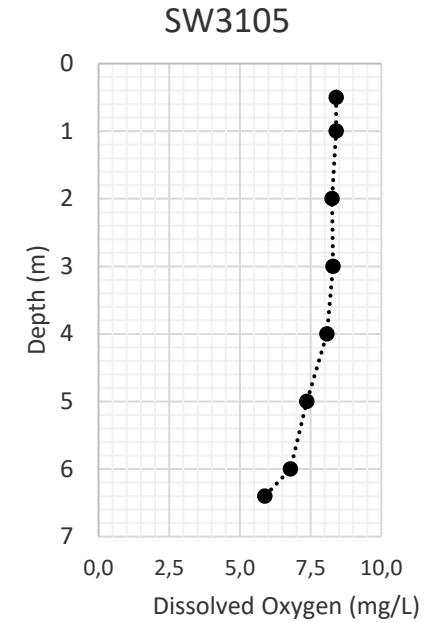
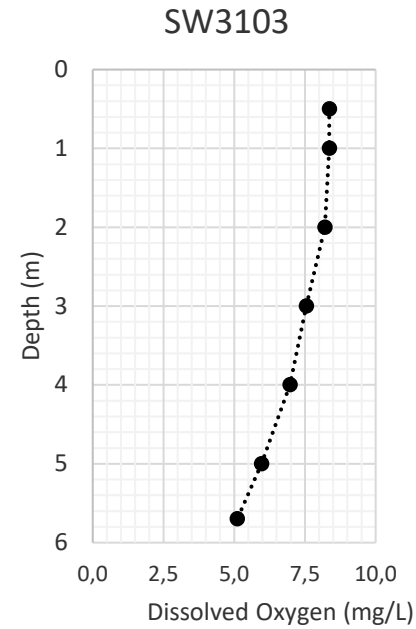
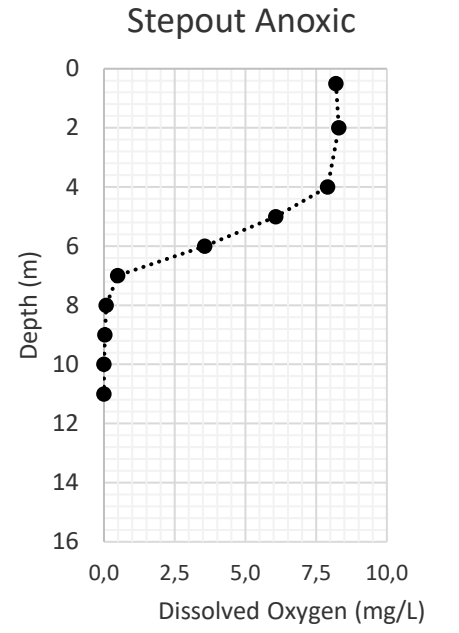
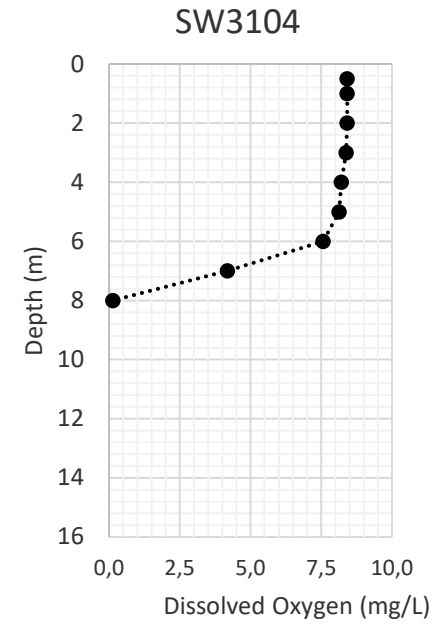
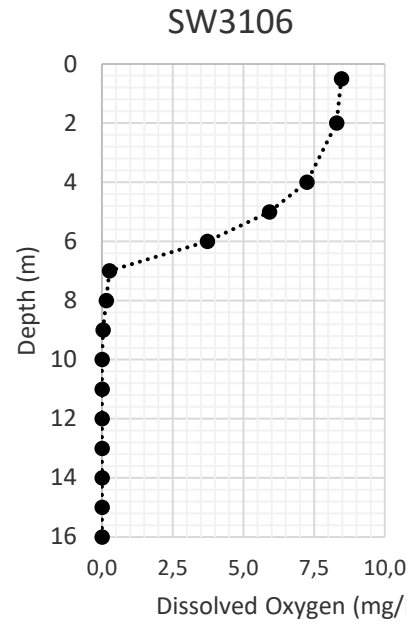
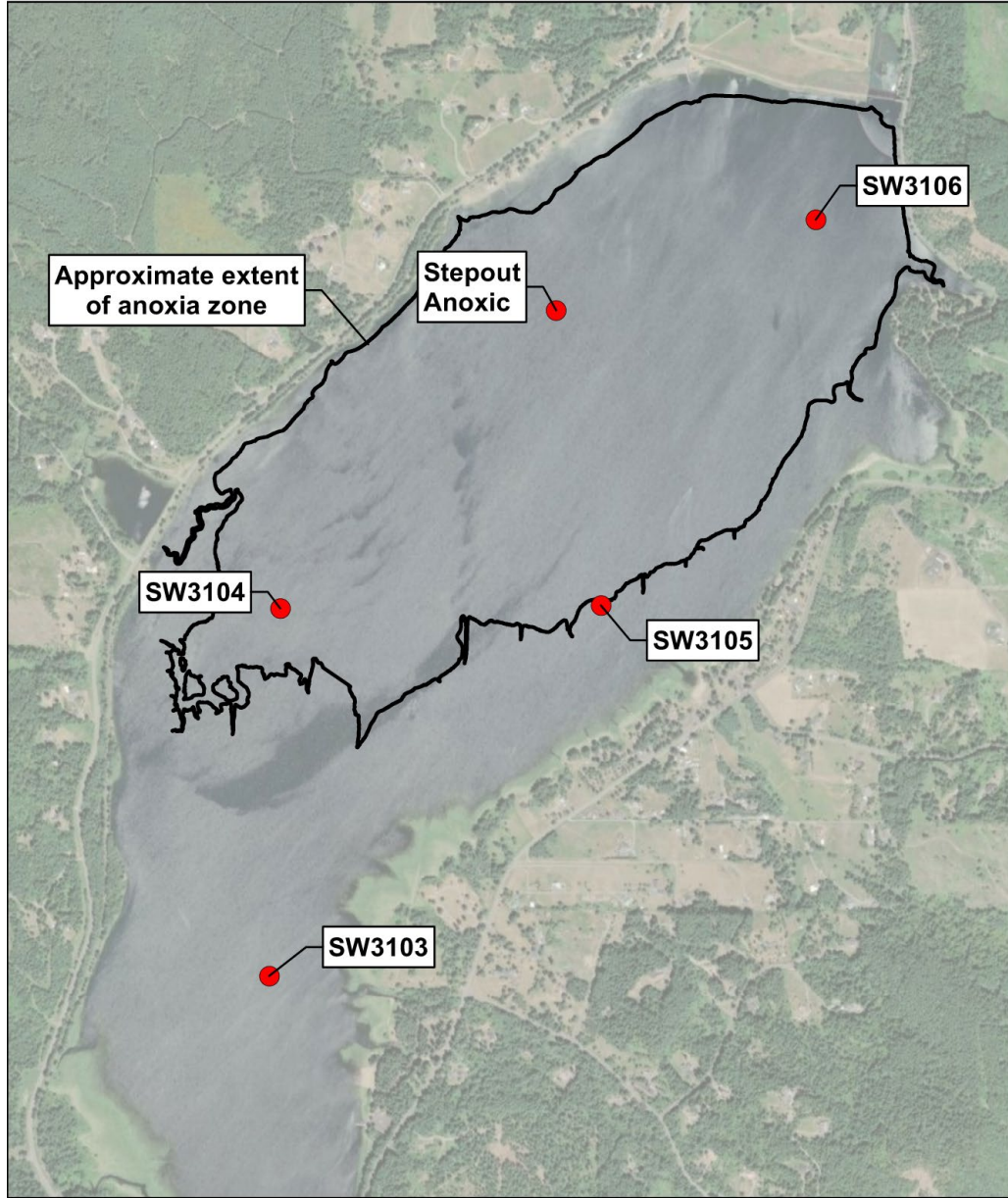
Sediment and Porewater Hg and MeHg by Reservoir Region



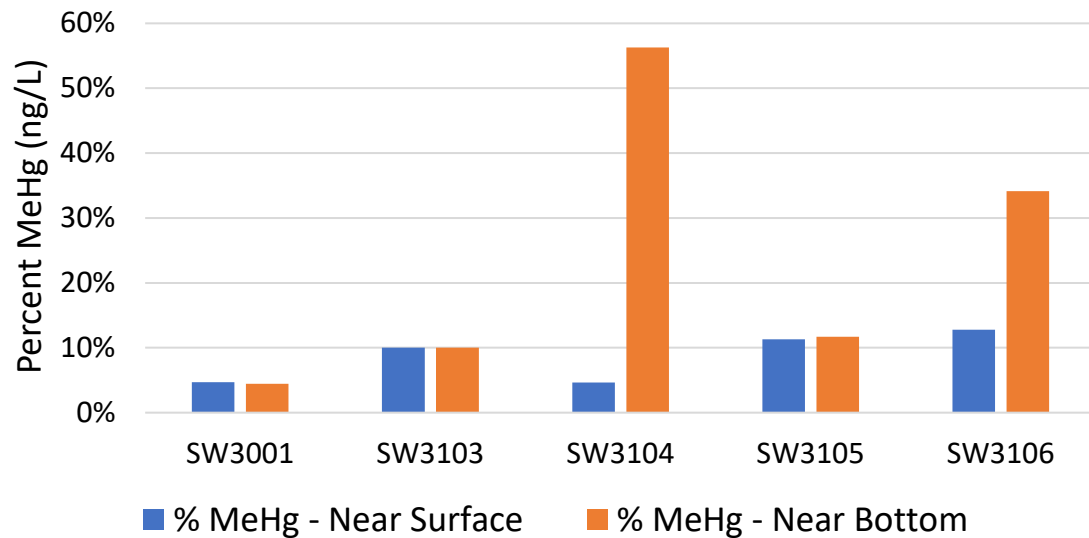
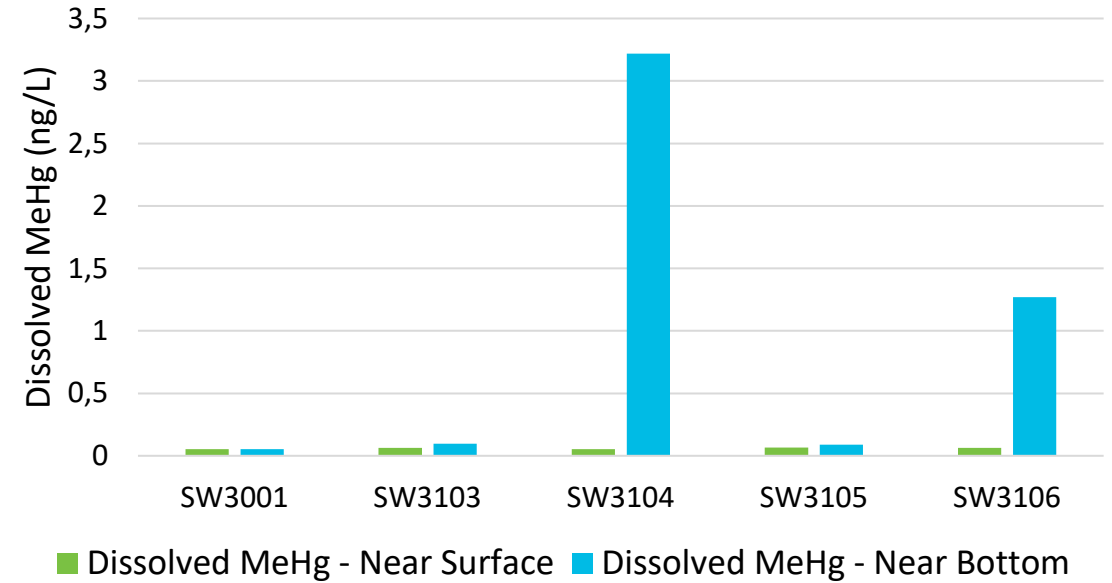
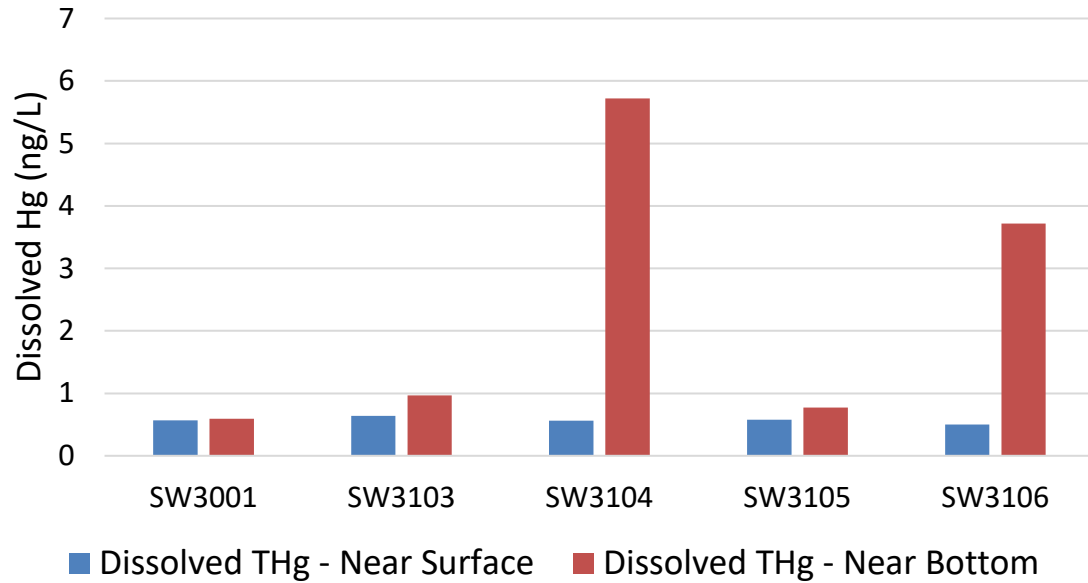
Note: Porewater Hg plot excludes one outlier for seasonally inundated (872 ng/L) and one outlier for wetlands (517 ng/L)



Anoxic Zone September 2022



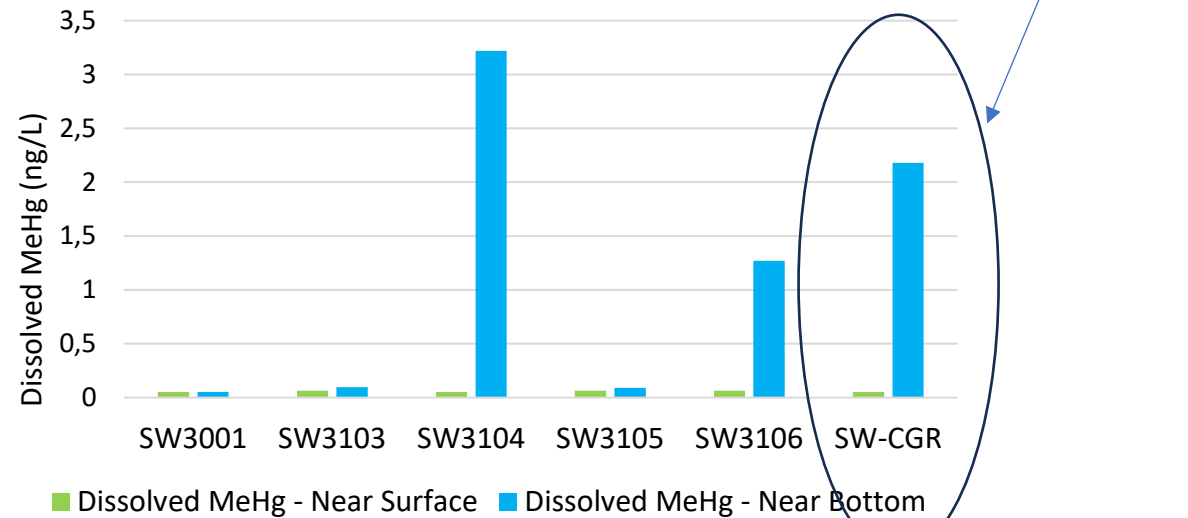
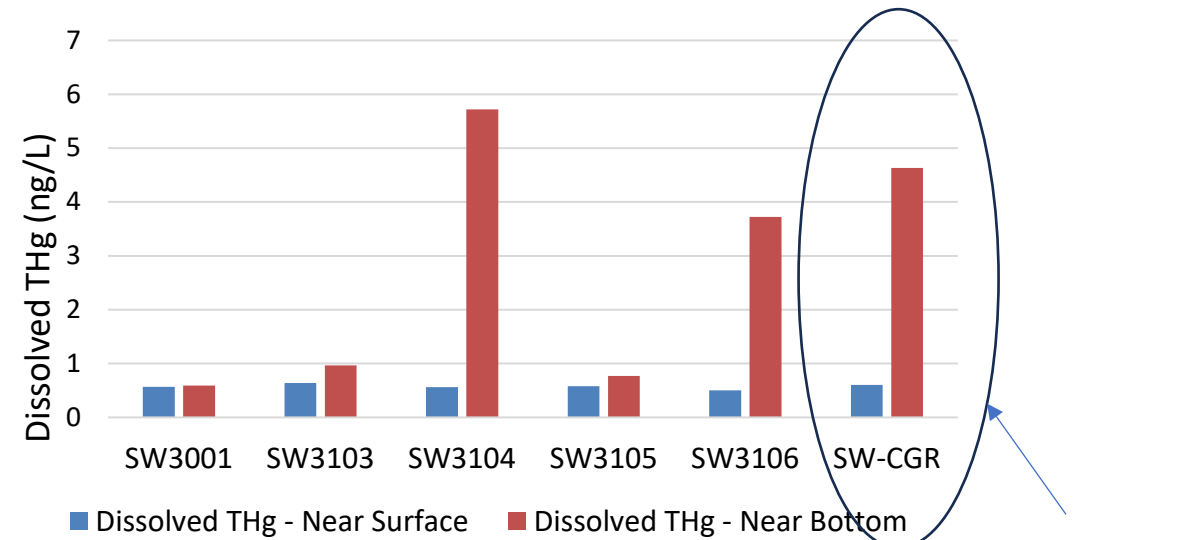
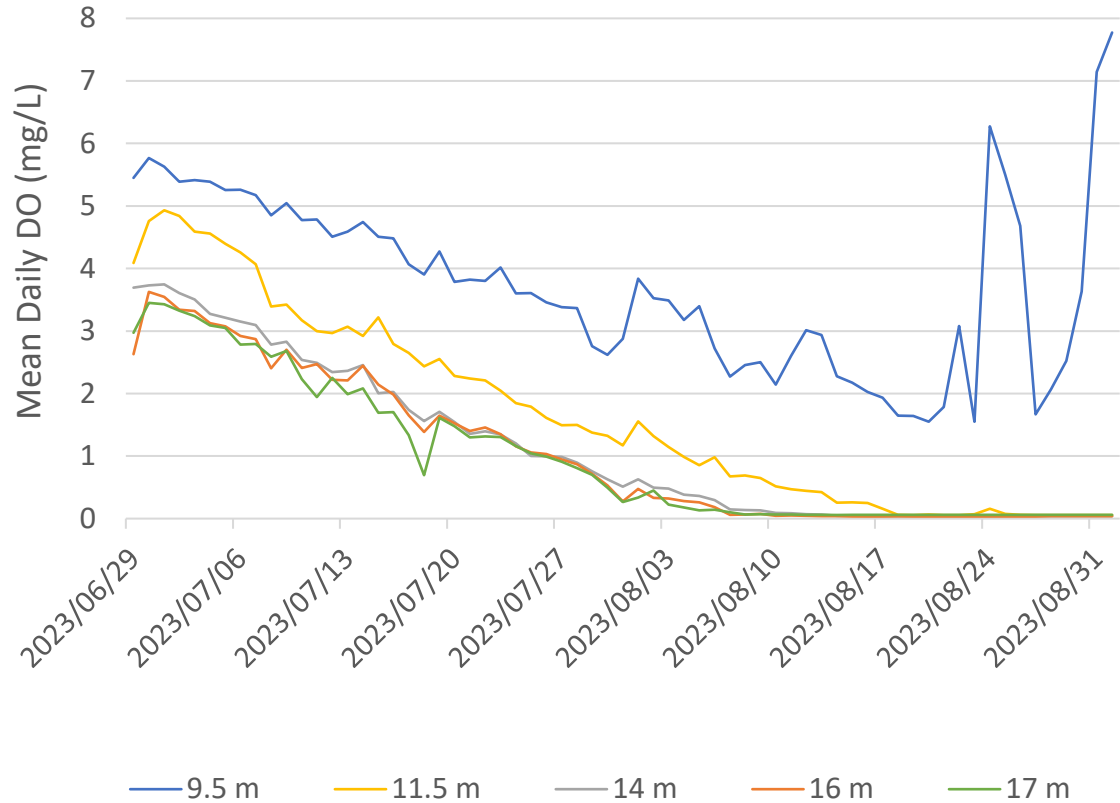
Comparison of Near-Surface and Near-Bottom Samples



- Near-bottom samples at SW3104 (seasonally inundated) and SW3106 (permanent pool) collected in anoxic zone
- SW3101 (permanent pool), SW3103 (seasonally inundated), and SW3105 (seasonally inundated) collected in oxygenated areas



2023 DO Monitoring



2023 Data

Key Conclusions



- Active sedimentation is within an isolated area, affecting Hg distribution



- Hg content and methylmercury production are distinct in each reservoir zone

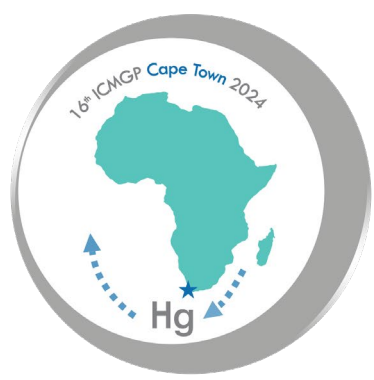


- Monitoring water quality throughout water column revealed a hypolimnion with elevated Hg and MeHg



- Integrated remedial approach will be needed that considers the variable processes affecting Hg and MeHg and transport to food web





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THANK YOU

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listen. think. deliver.



Questions

