Portland Harbor Pre-RD Group PDI Data Evaluation Approach and LOE

Task Lead: Kyle Vickstrom

Data Validation/QA Review – **LOE** (b) (4)

- GIS Data
  - Assessment Team
    - Lead: Rob Parsons
    - Support: Malena Foster
  - 2018 bathymetry survey data
  - Sediment, water, and fish tissue spatial data
    - Spatial distribution check against field data (QC check)
- Laboratory Analytical Data
  - Assessment Team
    - Lead: Catherine Love
    - Support: Mary Lou Fox, others
  - Media
    - Surface sediment
    - Subsurface sediment coring
    - Fish tissue
    - Surface water
    - Sediment traps
    - Porewater

Data Evaluation – **LOE** (b) (4)

Green (Level A): must-do/no regrets data evaluation; component of EPA's baseline record evaluation and information for remedial design oversight
Yellow (Level B): Important evaluation to perform; likely will be used to seek ROD amendment
Red (Level C): speculative, may be performed/response to potential Pre-RD Group evaluation and conclusions

- **CSM Update**
  - SMA footprints, contamination horizontally and vertically, COC loading to Site, fish tissue COC changes over time, deposition/erosion
  - Visual observations/field notes
  - Hard substrates/rip rap/bedrock areas
    - Gravels, cemented cobbles, hardpan, etc.
- **Food Web Model/Analysis**
  - Assessment Team
    - Lead: Kyle Vickstrom
    - Support: Jennifer Jones, Jason Silvertooth, Wardah Azhar, Eric Blischke
  - Evaluations
    - Conceptual-level food web analysis of the relationship between surface sediment and fish tissue COC concentrations
      - Quantitative estimate between SMB and surface sediment
      - Is there a fundamental difference between the RI food web model and the 2018 dataset?
- **Bathymetry**
  - Assessment Team
    - Lead: Rob Parsons
    - Support: Malena Foster
  - Evaluations
    - Absolute bathy change 2009 to 2018 (complete)
      - Annual snapshot: rate of change
      - Need to add SMA, FMD, and Nav channel overlays

        - Contour and hill-shade relief maps
        - Consistency evaluation between 2018 and previous surveys
            - Are areas dynamic or consistent (accretion vs. erosion)?
            - Deposition and stability needed to evaluate MNR
            - Add overlays for SMA, FMD, Nav channel, and residuals management covers
        - Elevation clearances for dredging and capping in sediment decision units (SDUs) – nav channel/FMD vs. intermediate vs. shallow
        - Estimate dredge volumes in sediment management areas (SMAs) based on current bathymetry
        - Riverbed stability and recovery potential (accretion vs. erosion)
- **Surface Sediment**
    - Assessment Team
        - Lead: Kyle Vickstrom
        - Support: John Kern, Eric Blischke, Malena Foster, Mary Lou Fox, Howard Young, Wardah Azhar, Jonni Wallingford
    - Evaluations
        - Establish baseline mean and 95% upper confidence limit on the mean (95UCL) concentrations, also known as surface-weighted average sediment concentrations (SWACs) for ROD Table 17 COCs (plus total PAHs) using the stratified random samples (SRS) alone and the SRS plus SMA samples
            - S e-wide SWACs
            - Rolling river mile (RM) SWACs (RM 1.9 to 11.8)
                - Separate river sides: 21 segments (10 RM segments with east and west side and Swan Island Lagoon [SIL])
                - Both sides: 1-mile river segments (RM 1.9 to 11.8)
                - Narrative: rolling RM SWACs more representative than the 2-3-mile segments for the human health RAOs (rolling RM used in HHRA)
            - 2- to 3-mile river segments (9 segments; river centerline divides E and W portions)
                - Segment 1 E&W: RM 9 to 11.8
                - Segment 2 E&W: RM 7.5 to 9
                - Segment 3 E&W: RM 5 to 7.5
                - Segment 4 E&W: RM 1.9 to 5
                - Segment 5: SIL
                - In tandem with fish tracking data, assess the representativeness of these segment delineations (see fish evaluations)
            - SDU-specific SWACs (ROD Table 17)
                - SDUs shown on ROD Figure 29 and Table 24
            - D/U Reach SWACs (ROD Table 17)
                - Separate SWACs for the Downtown and Upstream Reaches
                - One combined upriver SWAC
                - Statistical determination of difference between Site, Downtown Reach, and Upstream Reach (ANOVA or ANCOVA)
                - Potential for Site recontamination?
            - SWACs vs. RALs (*preparations for ROD challenge)
                - New SWACs could lead to new RALs
                - This evaluation may be performed by Pre-RD Group but may not be performed during this task
                - Narrative: Strong policy discussion with rationale on why new SWACs should not lead to new RALs
            - Factoring in hard substrate bottoms
                - Stratified sampling equation, non-normal distributions
                - Narrative for exposure to receptors (proportion of no substrate in SWACs)

            - Having hard substrate information allows for comparisons of recoverable sediment concentrations against each other (don't have historical non-recoverable areas from RI)
        - Summary stats for Site, Downtown Reach, and Upstream Reach (SRS only)
            - Tabular summary for all sediment COCs
            - Figure: gradational color-coded SRS cells for Site and D/U Reach
        - Refine active remedial SMA footprints based on ROD Table 21
            - RAL and PTW exceedances
            - Subsurface data also required by EPA to refine SMAs (horizontal and vertical extent)
            - Figure: revised SMA footprints based on surface sediment data (Site-wide and 2-river mile segment maps)
        - Point-by-point comparison to RALs and PTW thresholds
            - Figure: surface sediment concentration dot maps (2-river mile segments); binned by RALs or CULs
        - Paired difference method evaluation of 2018 SRS samples with closely located 2004 RI surface sediment samples
            - Heat map
            - MNR rate assessment
            - Incorporate bathy (net erosive, depositional, dynamic)
            - Narrative explaining why this is an invalid comparison
        - Develop list of potential focused COCs for future monitoring (subset of ROD Table 17)
        - Paired evaluation of surface and subsurface sediment data to understand:
            - Extent and volumes (at depth) of contamination
            - Surface sediment data will have changed will core data may remain similar to that from RI/FS
            - Depth at which contamination will need to be addressed
- **Subsurface Sediment Cores**
    - Assessment Team
        - Lead: Malena Foster
        - Support: Tom Cook, Howard Young, Wardah Azhar, Eric Blischke, Rob Parsons
    - Evaluations
        - Refine SMA footprints based on ROD Table 21
            - RAL and PTW exceedances
        - 3 D visualization modeling of surface and subsurface sediment
            - Focused COCs
            - Extent of contamination horizontally and vertically
            - RI/FS data, post-FS data, and 2018 PDI data
        - Replacement coring analysis
            - Likely dispute item
        - Inclusion of lithology for data interpretation/CSM evaluation
            - Update CSM
- **Fish Tracking and Fish Tissue**
    - Assessment Team
        - Lead: Jennifer Jones
        - Support: Malena Foster, Mary Lou Fox, Jason Silvertooth, Eric Blischke, Karl Gustavson (EPA), John Kern
    - Evaluations
        - Fish Tracking
            - Determine home range of smallmouth bass (SMB)
                - Assess representativeness of Segments 1-5 (see surface sediment evaluations)
                - Assess whether SMB can be associated with remedial outcomes based on movement/home ranges in tandem with fish tissue data

            - Field Summary Reports from Pre-RD Group
                - 3-Month Report
                - No documentation of routine (monthly) checks
                - 23 fish still in receiver arrays (20 is minimum)
                - Some fish left Site, majority staying within area where they were released
                - Receiver batteries dying/need to be replaced
                - 6-Month Report
                - Expected later in October-November 2018
                - 12-Month Report
                - Expected in April-May 2019
            - Movement data is complicated
                - Provide HTI-Vemco information to J. Kern
                - Betsy Ruffle (AECOM) fish lead
                - Fish leaving is a biased assessment for home range
        - Fish Tissue
            - Determine current levels (baseline) of fish tissue COCs in SMB (ROD Table 17)
                - Site-wide
                - Segments 1-5 (see surface sediment evaluations)
                - D/U Reach
            - Summary stats for Site, Downtown Reach, and Upstream Reach
            - Comparisons between 2018 and 2002, 2007, 2011, and 2012 fish tissue data (MNR assessment)
            - Statistical evaluations of PCB differences and changes in fish tissue (FS Section 3.6.1.3)
            - Develop list of potential focused COCs for future monitoring (subset of ROD Table 17)
- **Surface Water**
    - Assessment Team
        - Lead: Wardah Azhar
        - Support: Jason Silvertooth, Malena Foster, Eric Blischke
    - Evaluations
        - Baseline conditions
            - Summary stats for Site, Downtown Reach, and Upstream Reach
        - Current contaminant loading rates
        - Comparison between 2018 data and FS database/Post-RI/FS data (Site data)
            - MNR assessment
        - Develop list of potential focused COCs for future monitoring (subset of ROD Table 17)
- **Sediment Traps**
    - Assessment Team
        - Lead: Wardah Azhar
        - Support: Jonni Wallingford, Malena Foster, Eric Blischke
    - Evaluations
        - Summary stats for both transects
        - Sediment loading rates (qualitative assessment)
        - Contaminant loading rates (qualitative assessment)
        - Comparison between 2018 data and Site data (MNR assessment)
        - Develop list of potential focused COCs for future monitoring (subset of ROD Table 17)
- **Porewater**
    - Assessment Team
        - Lead: Wardah Azhar
        - Support: Jonni Wallingford, Howard Young, Eric Blischke
    - Evaluations
        - Comparison of porewater dissolved As and Mn data to laboratory-derived porewater concentrations from the bulk sediment collection