



RCBRA Ecological Risk Assessment Overview

Hanford Advisory Board
River and Plateau
Committee

October 2011

Purpose

- River Corridor Baseline Risk Assessment – Ecological Risk Assessment Draft C (RCBRA-Eco) has been submitted to the Regulators
- Information presented forms the basis for ecological risk in the River Corridor RI/FS documents
 - The RCBRA-Eco is an evaluation across the River Corridor
 - The RI/FS documents use Operable Unit-specific information from the RCBRA-Eco
 - RI/FS documents also evaluate OU-specific information to further refine risk assessment information.

RCBRA Ecological Risk Assessment

- Evaluates ecological risk for current conditions in upland, riparian and near shore environments
 - Evaluates remediated sites and affected areas to determine if cleanup under the interim RODs is protective of the environment
 - Provides “Basis for Action” for cleanup of waste sites
 - Provides Ecological Preliminary Remediation Goals (PRGs)
 - Risk-based soil concentrations that are protective of ecological receptors
 - Provides recommendations for consideration in the RI/FS and other actions at the Hanford site

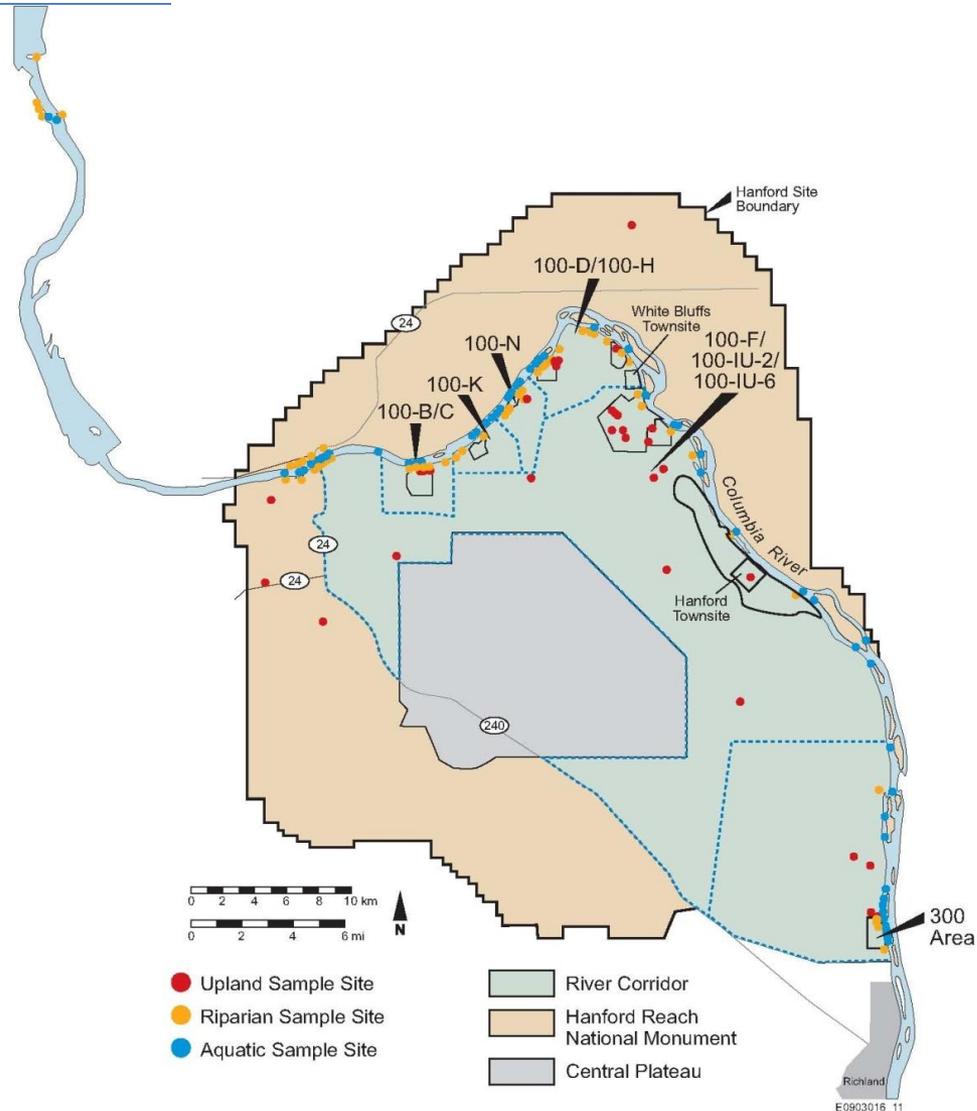
Ecological Study Zones



Sampling Summary

- Characterizes potentially contaminated media in the upland, riparian, and near-shore environmental zones
 - Surface surveys, fly over data, and groundwater plume maps used to guide potentially contaminated areas
 - 20 remediated waste sites (and 10 reference sites) in the upland zone
 - 18 potentially affected areas (and 7 reference sites) in the riparian zone
 - 48 potentially affected areas (and 9 reference sites) in the near-shore zone
 - Data set includes over 165,000 sample data results, including results from the 100-B/C and 100-NR-2 ERAs

Sampling Summary (cont'd.)



Sampling Summary (cont'd.)

- Sample design provides multiple line of evidence at each study site
 - Abiotic – soil, sediment, surface water, pore water
 - Biotic – plants, terrestrial invertebrates, small mammals, birds, aquatic invertebrates, fish found along shoreline (sculpin, suckers)

Evaluation Methods

- Analyzed for suites of analytes based on results of Screening Level Ecological Risk Assessment (SLERA) and Data Quality Objectives (DQO)
 - Included radionuclides, inorganics, semivolatile organics, herbicides, pesticides, and PCBs
- Identification of Contaminants of Potential Concern (COPC)
 - Statistical comparison to background and reference concentrations
 - Specific evaluation based on reference data, sample locations, biotic media

Evaluation Methods (cont'd.)

- Contaminants of Potential Ecological Concern (COPEC)
 - PAHs evaluated individually and additively
 - Radionuclides evaluated using Biota Concentration Guides
 - All other COPCs evaluated individually against conservative screening levels
 - Washington Administrative Code screening values
 - EPA Ecological Soil Screening Levels
 - Ambient Water Quality Criteria

Evaluation Methods (cont'd.)

- COPEC Refinement
 - Literature based benchmarks
 - Washington Administrative Code screening values
 - EPA Ecological Soil Screening Levels
 - Ecological literature and toxicity studies
 - Toxicity tests using site-specific media
 - Sandberg's Bluegrass and Nematode survival in soil
 - *Hyalella* survival in sediment
 - Clam and *Ceriodaphnia* survival in pore water
 - Frog Embryo Tests in pore water

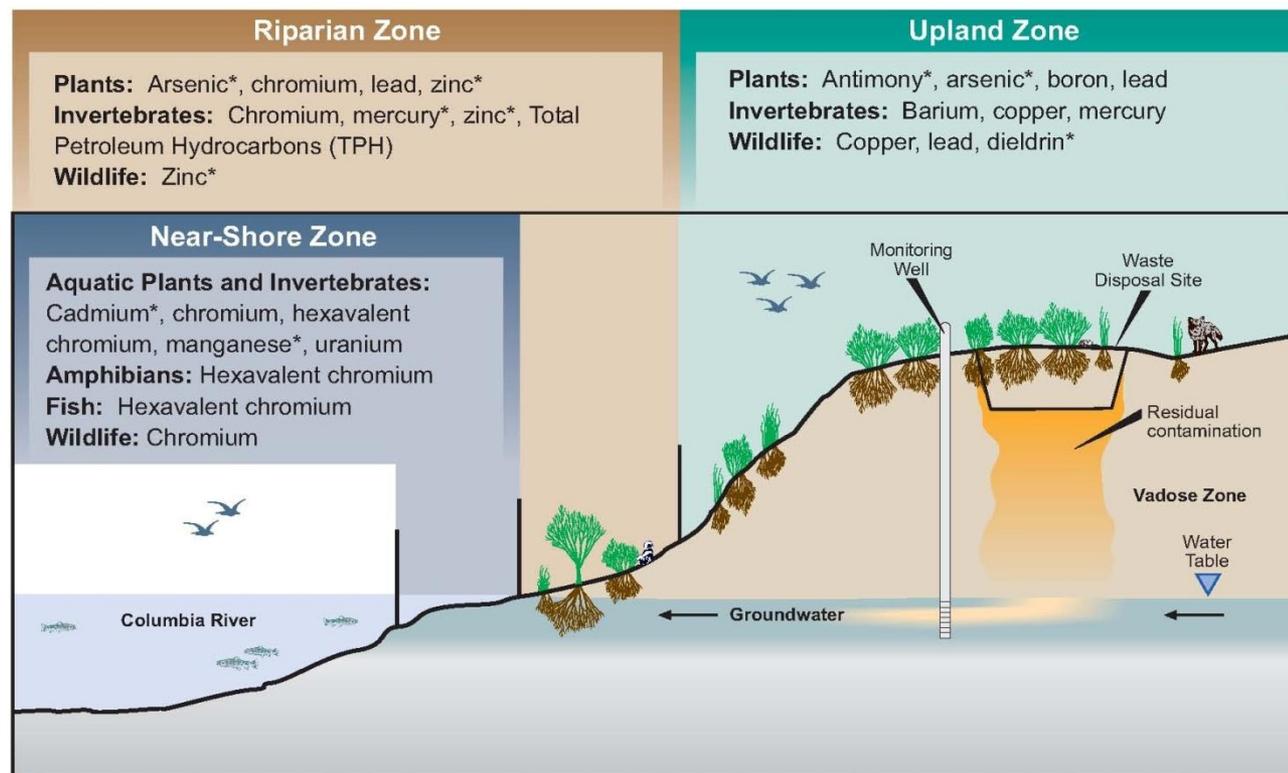
Results (cont'd.)

- Upland Zone
 - 39 COPECs based on initial screening
 - COPEC refinement identified 8 Contaminants of Ecological Concern (COEC)
- Riparian Zone
 - 22 COPECs based on initial screening
 - COPEC refinement identified 6 Contaminants of Ecological Concern (COEC)
- Near-Shore Zone
 - 22 COPECs based on initial screening
 - COPEC refinement identified 5 Contaminants of Ecological Concern (COEC)

Results

Contaminants Indicating Potential Risk to River Corridor Ecological Receptors

- Concentrations exceed levels that may cause observable effects
- Ecological preliminary remediation goals for soil are proposed that are protective of the receptors



*Lacks a clear tie to Hanford releases.

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Ecological Preliminary Remediation Goals

- Proposed for inorganic, organic, and radionuclide Hanford contaminants in soil
- PRGs developed reflect protection of Hanford receptors
- PRGs for plants and invertebrates based on a graded approach using screening values, bioassay results, and literature values
- PRGs for wildlife (birds and mammals) based on dietary intake and incidental soil ingestion models
- PRGs carried forward into RI/FS