

*River Corridor
Closure Project*

Columbia River Component Risk Assessment

Volume I: Screening Level Ecological Risk Assessment (DOE/RL-2010-117, Draft A)

Overview and key findings



U.S. Department of Energy
Richland Operations Office

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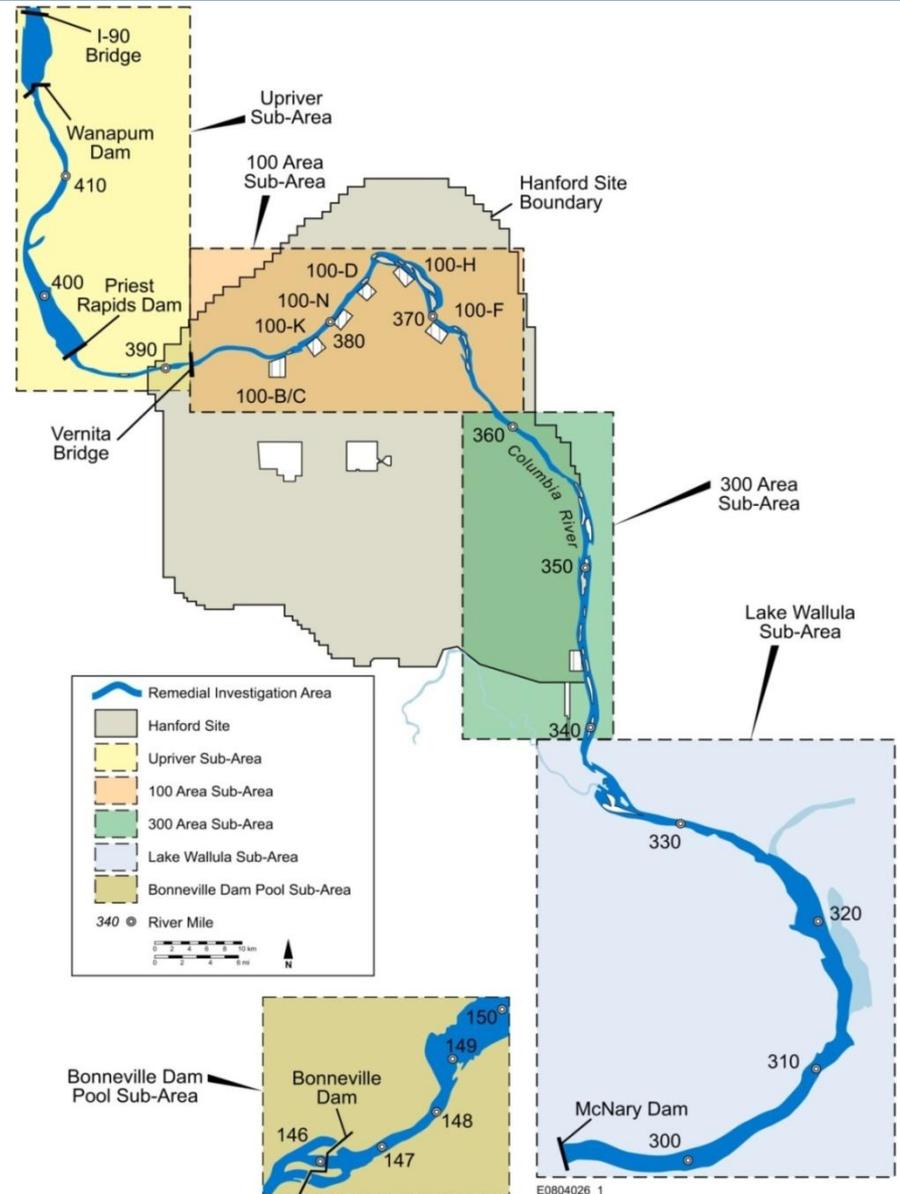
Protecting the Columbia River

Columbia River Component Ecological Risk Assessment

- Scope
 - Screening level ecological risk assessment
 - Refinement of earlier preliminary evaluation
 - Fish evaluation
- Provides data for River Corridor RI/FS documents
- Provides recommendations for RI/FS to consider
 - Monitoring
 - Evaluation of specific contaminants
 - Fate and transport impacts from River Corridor OU sources

Study Area Divided into Sub-Areas

- 120-miles of the Columbia River
- Extends Upstream and downstream of Hanford Site
- Shore to Shore



Media Sampled

- 530 fish
 - Sturgeon, whitefish, bass, carp, sucker, walleye
- 74 sediment locations
- 21 core locations
- 8 Island soil locations
- 35 surface water locations
- Phased pore water and sediment sampling
 - Identify areas of upwelling (685 locations sampled)
 - Identify areas of indicator contaminants (233 stations)
 - Co-located pore water, sediment, surface water (foot above bottom) for suite of contaminants (47 stations)
- ~ 244,000 sample data results

Contaminants of Potential Ecological Concern (COPEC)

- Selected by comparison to Reference samples or presence on Inclusion List
- COPECs compared to conservative No Observed Effect Concentration (NOEC) levels or threshold benchmarks
- COPECs > NOECs underwent refinement process
 - Number and magnitude of NOEC exceedances
 - Date and location of samples
 - Comparison to Lowest Observed Effect Concentration (LOEC)
 - LOECs are based on contaminant studies found in literature
 - Comparison to reference data for Inclusion List COPECs

COPECs Retained by Media

- Sediment
 - Hexavalent Chromium in the 100 and 300 Area Sub-areas
 - Total Chromium (hexavalent plus trivalent Chromium) in the 100 Area Sub-area
 - Selenium in the 300 Area Sub-area
- Shoreline sediment
 - Selenium in the 300 Area Sub-area
- Surface water – None
- Soil - None

Pore Water COPECs adjacent to Hanford Groundwater OUs

- 100-BC-5 – Hexavalent Chromium (Cr⁺⁶), Total Chromium (Cr), Aluminum (Al), Lead (Pb)
- 100-KR-4 – Cr⁺⁶, Cr, Manganese (Mn)
- 100-NR-2 – None
- 100-HR-3 – Cr⁺⁶, Cr, Al, Pb, Mn
- 100-FR-3 – Cr⁺⁶, Mn, Mercury (Hg)
- 200-PO-1 – Cr⁺⁶, Pb
- 300-FF-5 – Uranium, Al, Pb, Selenium (Se)

Fish Sampling Results

- Sturgeon, whitefish, walleye, bass, carp, and sucker
 - Comparison of fish tissue concentrations to literature-derived Lowest Observed Effect Levels (LOECs)
 - Comparison of fish condition factors between sub-areas
 - Sturgeon histology
- No COPEC concentrations exceeded LOECs in fillet or carcass.
- LOECs exceeded for cadmium, copper, selenium, and zinc in liver/kidney
 - Not likely Hanford-related
- No discernable Hanford-Site trends in fish condition factors

Sturgeon Histology

- Kidney, liver, gill, and gonad tissues from 30 white sturgeon collected
 - Sent to the Bozeman Fish Health Center for histological evaluation
- Upriver sturgeon data histology similar to downriver Sub-Areas
 - No effects from Hanford Site operations identified

Conclusions and Recommendations

- Three COPECs were identified that have potential for risk to ecological receptors.
 - Total chromium
 - Hexavalent chromium
 - Selenium
- Continued sediment monitoring for chromium and hexavalent chromium was recommended.
- No COPECs in this screening level ecological risk assessment were identified for further investigation in a baseline ecological risk assessment under the Columbia River Component program

Path Forward

- Regulatory review
 - 45-day review of Draft A
 - Address and incorporate comments
 - Prepare Rev 0 for issuance
- CRC Human Health Risk Assessment – out for regulator review in January 2012; same process
- CRC data is being included in the River Corridor OU specific RI/FS documents
- Discussions with regulators on next steps