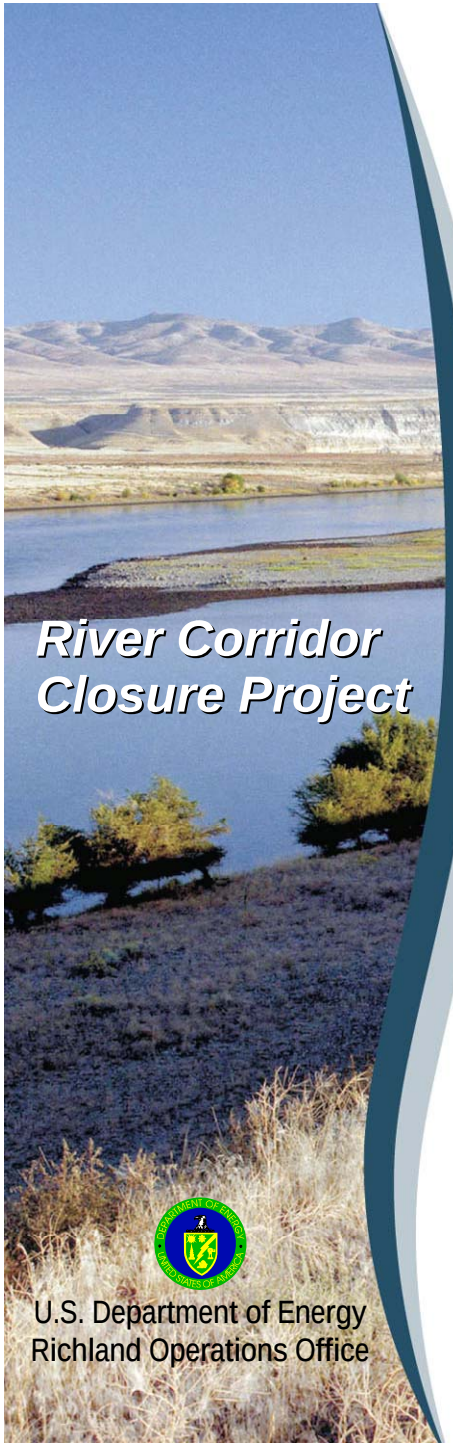


Columbia River Component Risk Assessment

Volume I: Screening Level Ecological Risk Assessment

(DOE/RL-2010-117, Draft A)

Overview and key findings

October, 2011

U.S. Department of Energy
Richland Operations Office

Protecting the Columbia River

Columbia River Component Ecological Risk Assessment

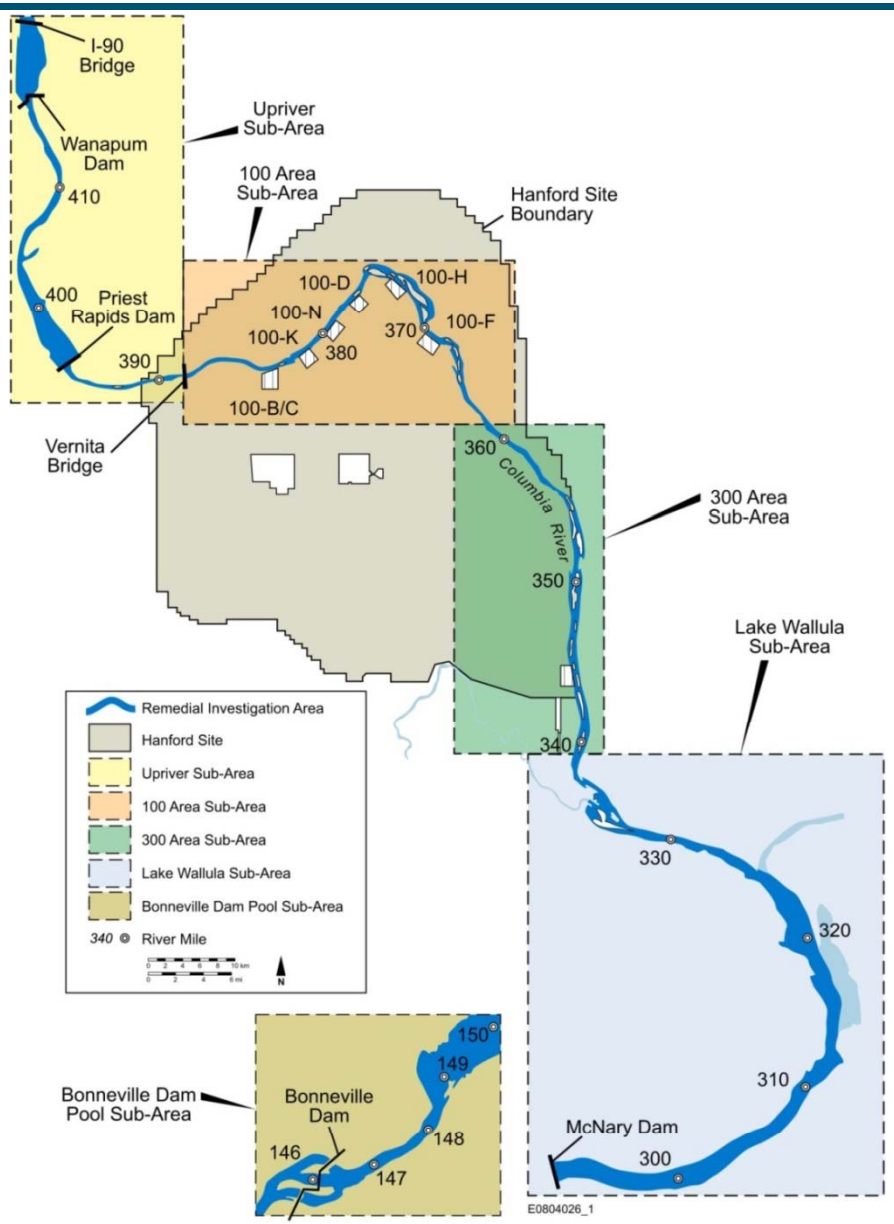
- Scope
  - Screening level ecological risk assessment
  - Refinement of earlier preliminary evaluation
  - Fish evaluation
- Provides data for River Corridor RI/FS documents
- Provides recommendations for RI/FS to consider
  - Monitoring
  - Evaluation of specific contaminants
  - Fate and transport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