Upper Columbia River RI/FS

June 8, 2015

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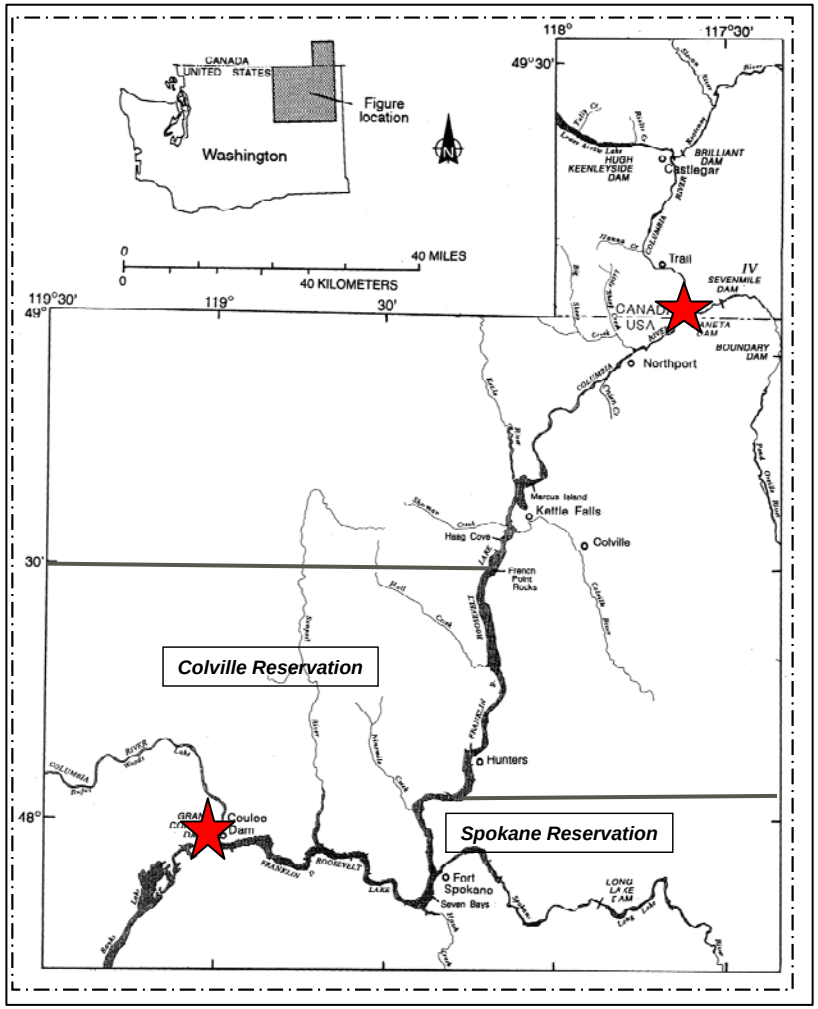
Site Location

Located wholly within the State of Washington and extends from the International border to Grand Coulee Dam (includes Franklin D. Roosevelt Lake)

Approximately 150 river miles



Remedial Investigation/Feasibility Study

Teck American signed a Settlement Agreement with the EPA in 2006 to conduct the RI/FS. The study is linked to historic discharges from the Trail facility and the purpose is to:

- Investigate conditions at the site to determine if there are unacceptable risks to human health or the environment
- Collect information to perform the baseline risk assessments (human health and ecological)
- Develop and evaluate potential remedial alternatives

Important Questions to Answer

Can I play on the beaches?

Can I swim in the water?

Can I eat the fish?

RI/FS – Status

SOW TASK / DELIVERABLE DESCRIPTION	STATUS
Risk-Management Based Action Objectives	**Completed - Approved**
Problem Formulation - RI/FS Work Plan	**Completed - Approved**
Screening Level Ecological Risk Assessment	**Completed - Approved**
BERA Work Plan	**Completed - Approved**
Sampling Designs and Data Collection (Field Programs)	
Beach Sediment	**Completed - Approved**
Fish Tissue	**Completed - Approved**
Surface Water	**Completed - Approved**
White Sturgeon – Surface Water Toxicity Tests	**Completed**
White Sturgeon – Sediment Toxicity Tests	**Completed**

Table continues

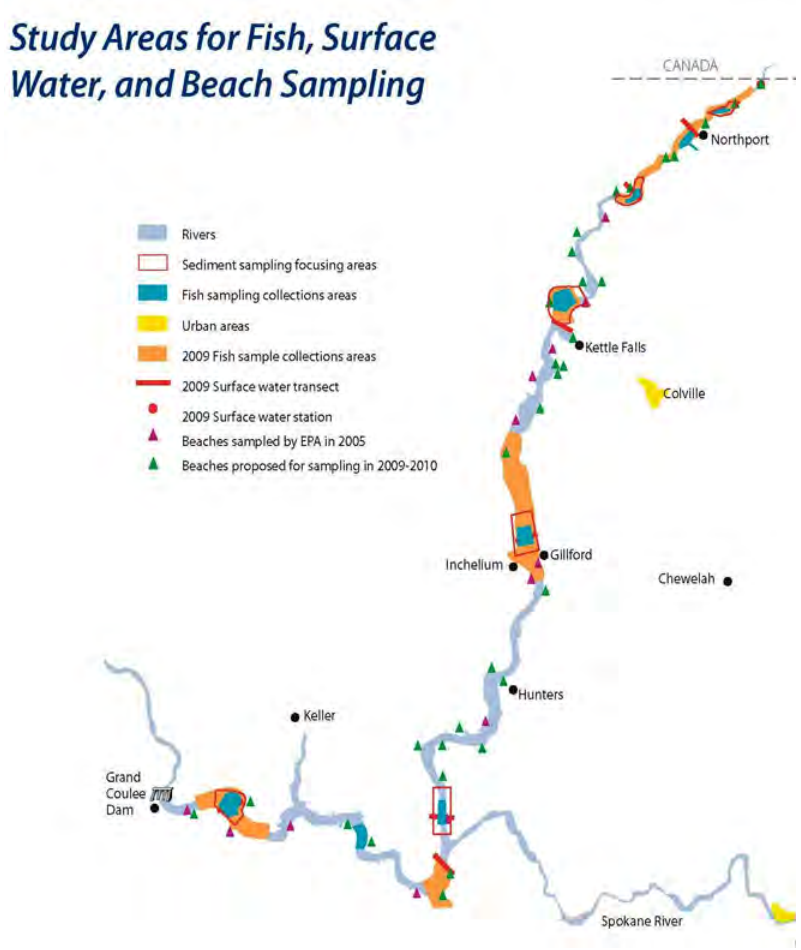
RI/FS – Status continued

TASK / DELIVERABLE DESCRIPTION	STATUS
Sampling Designs and Data Collection (Field Programs)	
Plankton Tissue	**Deferred by EPA**
Sediment / Pore Water	**Field Program and Bioassays Completed** Data Summary Report (DSR) Fall 2015
Residential Soils (EPA Lead)	**2014 Field Program Completed**
Upland Soils	**Field Program Completed** Draft DSR Delivered April 2015
Bossburg Refined Sediment and Soils	**Field Program Completed** DSR Fall 2015
Macro-invertebrate (Mussels) Tissue	2015 - 2016

- To-date Teck has spent over $70 million
- We remain committed to completion of the study to determine if there are unacceptable risk to human health or the environment.
- Results to-date are encouraging

Fish Sampling Program Overview

- Over 2,300 fish caught between Sept./Oct. 09
- Six areas spanning the entire site were targeted
- Three size class within each area were sampled
  - Small (<6 in.)
  - Medium (6-12 in.)
  - Large (>12 in.)



Fish Types

Wide range of feeding guilds and species sampled:

- Walleye (2005)
- Whitefish (2005)
- Rainbow trout (2005)
- Burbot (2005)
- Suckers (2005)
- Kokanee
- Bass

Processing & Analysis

Tissue samples (fillets and whole body) analyzed for a wide range of metals and organics:

- Metals and metalloids (60 total)
- Organics
  - Pesticides (including DDT and metabolites)
  - Dioxins/furans
  - PCBs (209 congeners)
  - PBDEs (20 congeners)
  - PAHs
  - SVOCs

Fish Sampling Results Positive

Washington Department of Health updated the Lake Roosevelt Fish Advisory in 2012 based on the robust data set

- Kokanee is okay to eat 3 meals per week. Lake Whitefish or Rainbow Trout is okay to eat 2 meals per week. **No advisory** for men and women beyond child-bearing age.
- The **statewide** advisory for bass is **2 meals per month**; **UCR/Lake Roosevelt** advisory is **4 meals per month**.
- Advice regarding consumption of walleye **improved from two meals** (8 ounces of uncooked fish) per month **to four meals per month** (i.e., one meal per week).
- The news is also good for those concerned with PCBs and other organic compounds. Levels of concern were only found in one species, largescale sucker.

Beach Sediment Program Overview

- Comprehensive site-wide sampling program
- 43 beaches were sampled (2009-2011)
- Surface composite and cores samples
- Samples were analyzed for metals, pH, total organic carbon and radionuclides
- Bio-accessibility assays for Pb and As

Beach Sediments General Results

- All but 3 beaches are safe for recreational use (see map★)
  - Swimming Hole
  - Bossburg Flats
  - Evans Campground
- Swimming Hole has levels of arsenic slightly above screening levels
- Bossburg and Evans under further investigation
  - Elevated levels of lead from Young America Mine, Mill and historic ferry landing activities

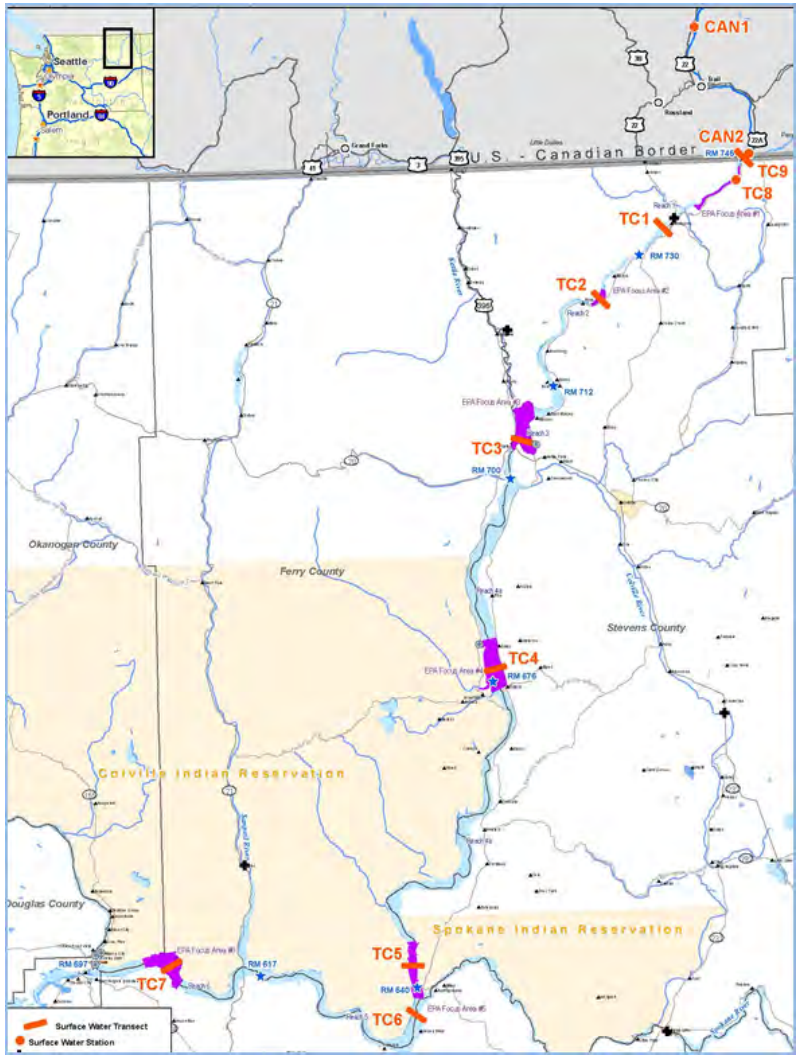
Surface Water Program Overview

- Ten transects along the upper Columbia River
- Three separate rounds of sampling:

  Sept. / Oct. 2009

  March / April 2010

  May / June 2010
- 2500 samples collected per round



Surface Water Analysis

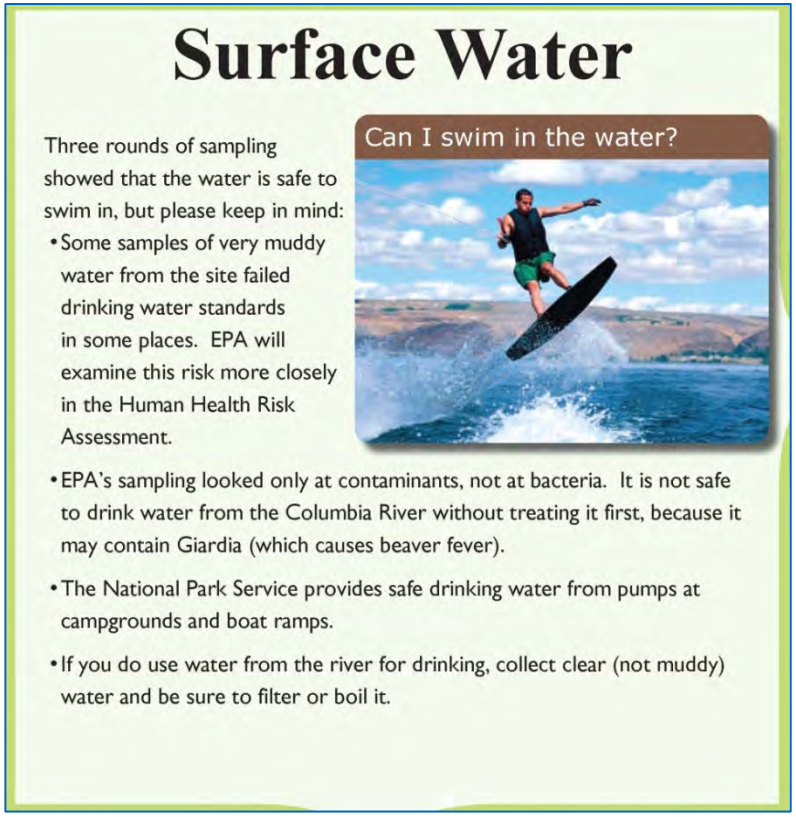
Each sample was analyzed for over 400 chemicals

- Metals - total and dissolved fractions
- Organics
  - Pesticides
  - PCBs (209 congeners)
  - Polybrominated Diphenyl Ethers (PBDEs)
  - Polycyclic Aromatic Hydrocarbons (PAHs)
  - Volatile & Semivolatile Organic Compounds
- Radionuclides
- Stable isotopes

Surface Water General Results

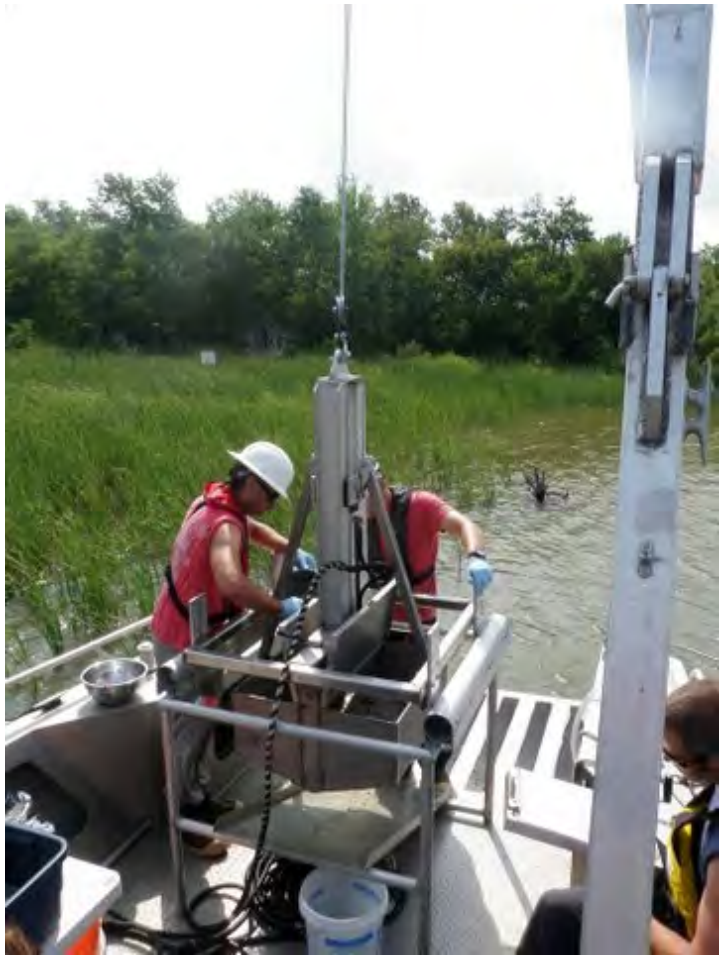
At the April 2012 Lake Roosevelt Forum, EPA addressed the question "**Can I swim in the water?**"

- Yes it is safe for recreational use
- Generally meets drinking water standards
- Standard caution to protect against bacteria if used for drinking water



Phase 2 Sediment Study Program Overview

- Sampling conducted September – October 2013
- Sediment samples collected at 136 stations
- Field porewater samples collected
- Field sediment and porewater chemistry complete



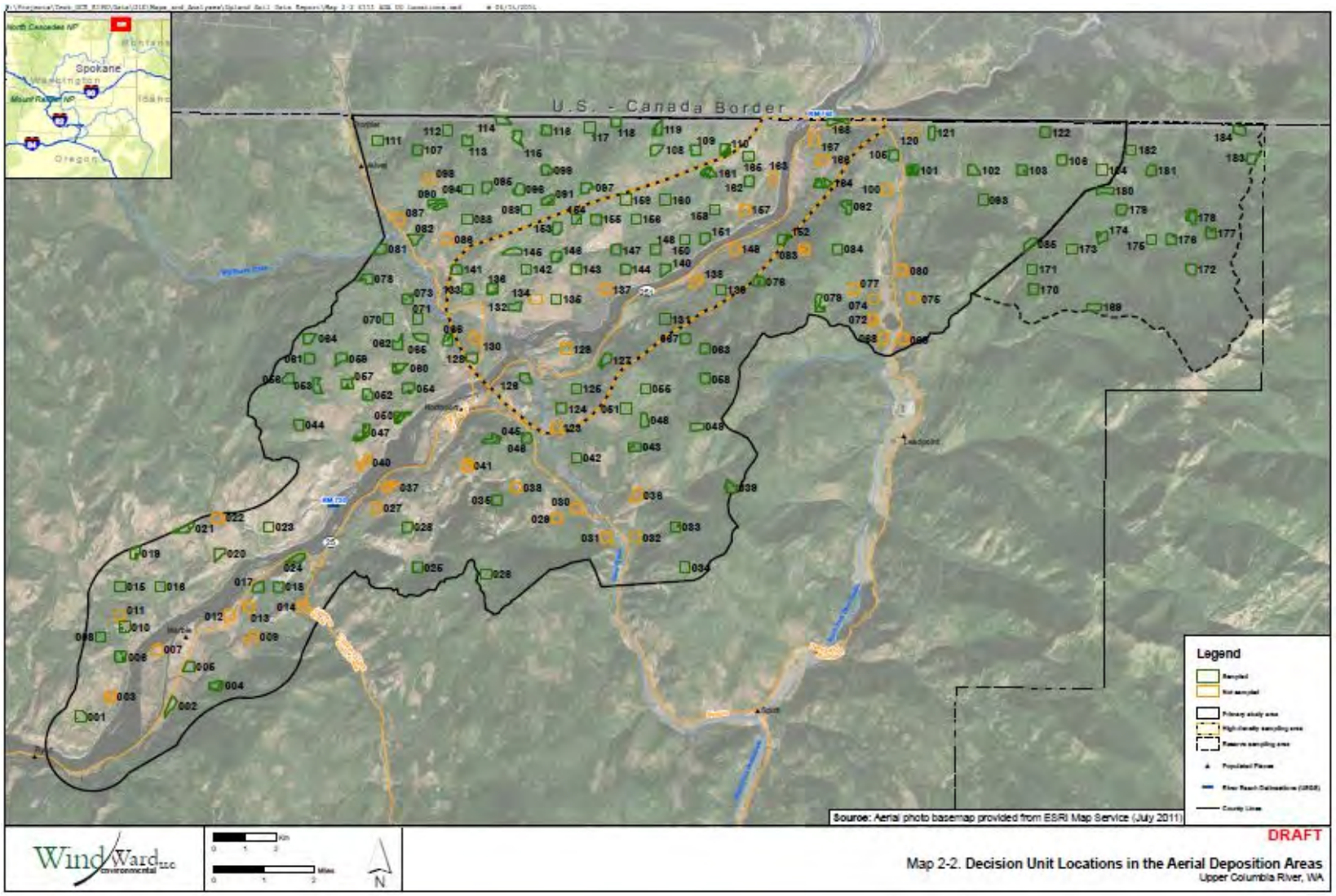
Phase 2 Sediment Study Program Overview

- Short-term bioassays conducted on 69 sediment samples
  - 28-day whole-sediment toxicity tests with the amphipod, *H. azteca*
  - 10-day whole-sediment toxicity tests with the midge, *C. dilutus*
  - Long-term bioassays completed May 2015 (same organisms; 27 samples)
  - Data summary report to EPA in fall 2015
  - Results will be released when EPA completes its review

Upland Soil Sampling Program Overview

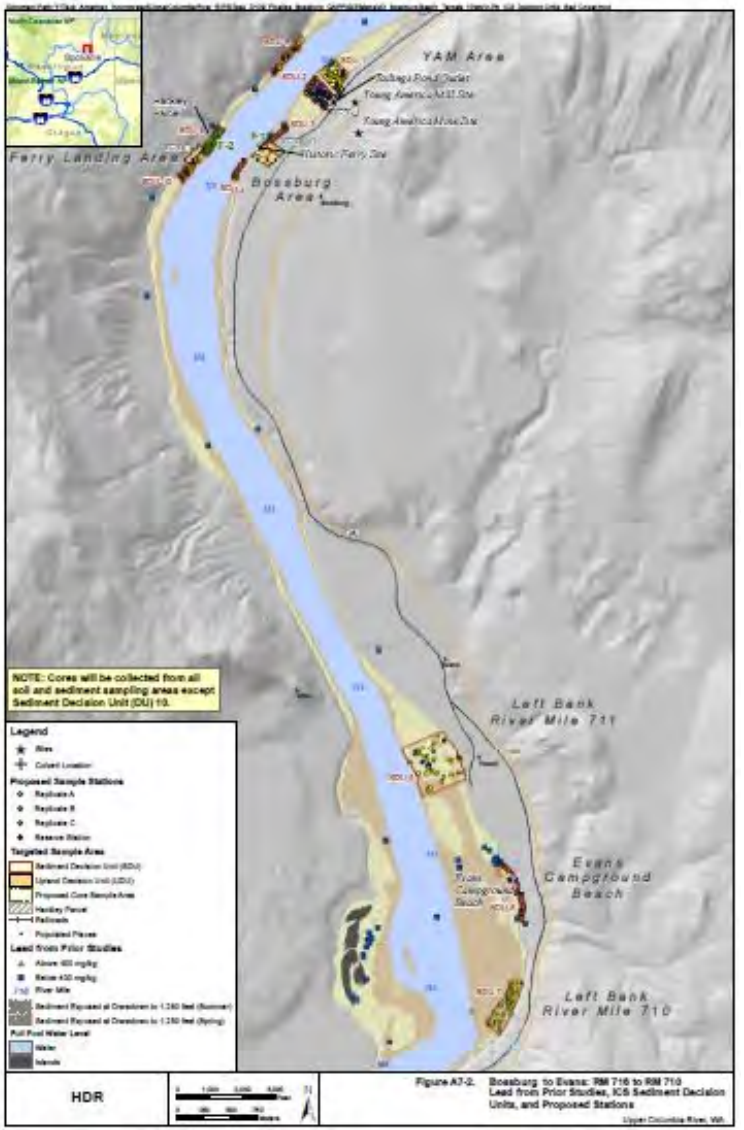
- Sampling conducted September – October 2014
- Incremental composite soil samples collected at 171 decision units
  - Aerial deposition area (115 square miles)
  - Relict floodplain deposition area
  - Windblown sediment deposition area
- Sampling depth 0-3 inches
- Analyzed for TAL metals, conventional parameters, and *in vitro* bioaccessibility assays
- Results communicated to landowners by TAI and to the public by EPA - April 2015
- EPA currently reviewing data summary report for release

Upland Soil Sampling Program Overview



Bossburg Refined Sediment and Soil Study

- Sampling conducted April – May 2015
- 10 sediment decision units
- 6 upland soil decision units
- Incremental composite samples, cores and XRF
- TAL metals, conventional parameters, and *in vitro* bioaccessibility assays
- Analysis underway no results yet



EPA Human Health Risk Assessment

- Data from all RI/FS sampling programs will be used
- Tribal Use Consumption and Resource Use Survey (Final Survey Report June 22, 2012)
- Recreational Consumption and Resource Use Survey (Final Survey Report May 10, 2013)
- Residential Soil Study (field sampling conducted in 2014)
  - Results communicated to public April 2015
  - EPA is working to provide Time-Critical Removal Actions to properties with the highest lead levels (14 properties)
  - Ultimately, the Record of Decision will determine if additional cleanup is necessary

What's next?

- Finalize data summary reports (2016-2017)
  - White Sturgeon sediment toxicity study
  - Upland Soil Study
  - Residential Soil Study
  - Bossburg Refined Sediment and Soil Study
- Conduct Macroinvertebrate Tissue Study (2017)
- Additional studies as needed based on results
- Human Health Risk Assessment (EPA)
- Baseline Ecological Risk Assessment (TAI)

UCR RI/FS Information

- All EPA approved data and technical reports are publically available at the following websites
  - Reports – http://www.ucr-rifs.com
  - Data – http://teck-ucr.exponent.com