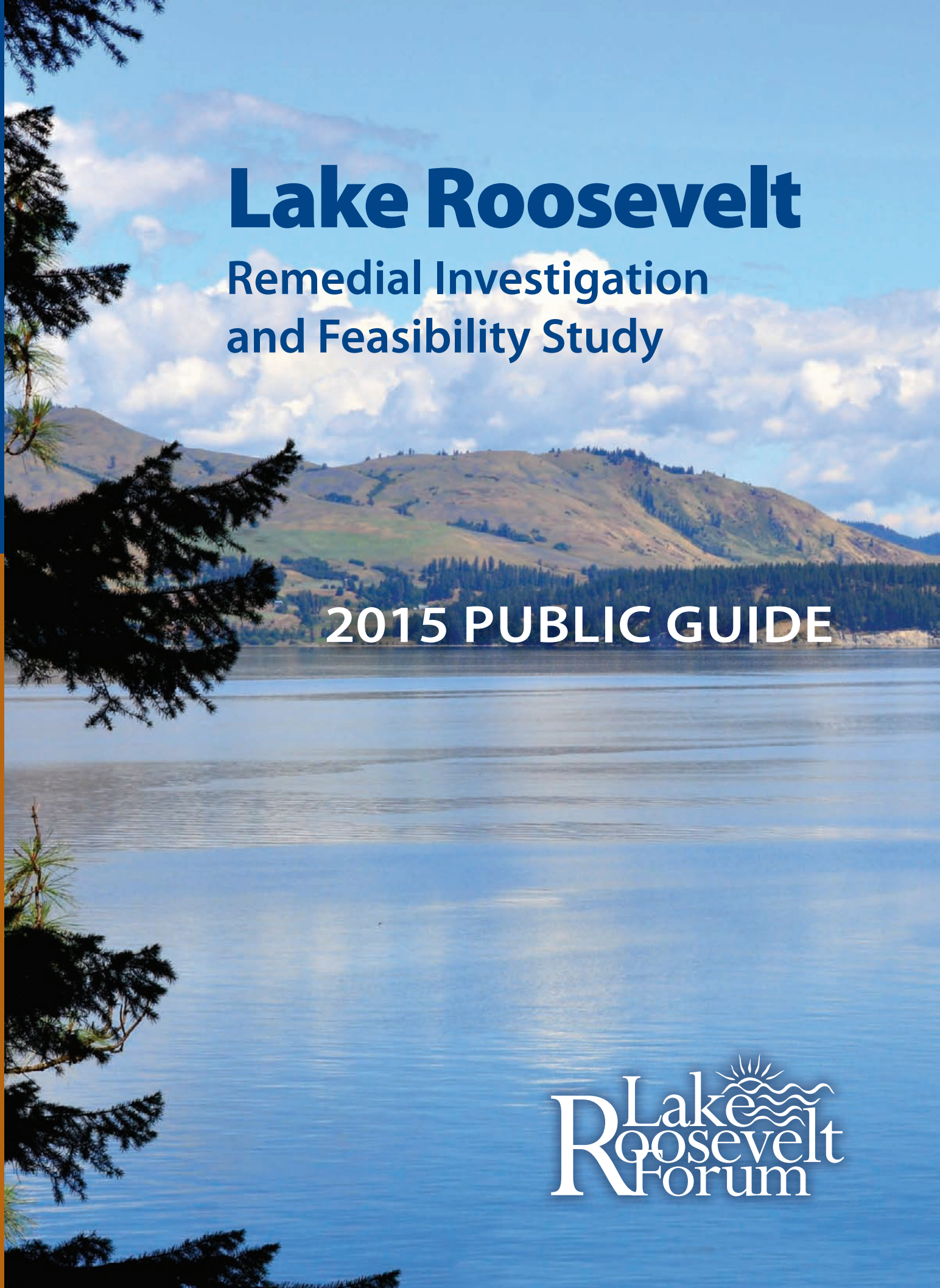

Lake Roosevelt

Remedial Investigation and Feasibility Study

2015 PUBLIC GUIDE

Lake Roosevelt Forum

Background

Contaminants in Lake Roosevelt, Upper Columbia River and the Upper Columbia River Valley

Under the terms of a 2006 settlement agreement between the Environmental Protection Agency (EPA) and Teck American Incorporated (Teck), a pollution investigation is being performed to establish the nature, extent and possible human health and ecological risks of contaminants found in the upper Columbia River, which includes Lake Roosevelt and the upper Columbia River Valley. The Environmental Protection Agency (EPA) refers to the investigation as the Upper Columbia River (UCR) Site Remedial Investigation and Feasibility Study (RI/FS). Teck has reported spending more than seventy million dollars over the past nine years to fund this work.

As the history time line shows, the legacy of contaminants entering the Columbia River and Lake Roosevelt dates back over a century. EPA has traced most of it to the Trail smelter, sited along the Columbia nine miles north of the U.S./Canada border. Waste from the smelter carried metals and other contaminants downstream into Lake Roosevelt.

Originally, the Trail Smelter processed copper and gold. The smelter capacity increased steadily and quickly transformed into a leader of lead and zinc smelting. Current integrated operations focus on smelting of zinc and lead for use in vehicles, batteries and numerous products. EPA estimates Teck discharged wastewater and up to 23 million tons of contaminated granulated fumed slag into the Columbia River.

In 1995, the Trail Smelter ceased discharging granulated waste slag into the Columbia River in B.C., Canada. In 1997, the smelter implemented the Trail Modernization Program which, along with prior efforts, significantly improved the quality of wastewater being discharged into the river and the facility's overall environmental performance.

Smoke stack emissions discharged into the air are another primary source of contamination at the UCR Site. Dating back to the 1920s, emissions were a source of concern in the upper Columbia River Valley. The two countries agreed to arbitration through an international joint commission and later a Tribunal to resolve Trail Smelter emission damaging to vegetation. The EPA, through the RI/FS, has now begun studying the nature and extent of metals contamination to uplands caused by historic smelter air emissions.

Assessing Human Health and Ecological Risks

The UCR RI/FS is being conducted consistent with the United States Superfund law (technically called the Comprehensive Environmental Response, Compensation and Liability Act, or CERCLA).

The RI/FS includes both human health and the ecological risk assessments to determine whether pollution at the UCR Site is likely to cause unacceptable risk to people or the environment. The human health risk assessment estimates how much pollution people are exposed to from the site and what the potential for harm (risk) may be. The ecological risk assessment evaluates the likelihood that harmful environmental effects may occur from pollution. Together, the risk assessments determine the potential need for cleanup.

If EPA determines there is unacceptable risk, then a range of alternatives will be evaluated to perform clean up. EPA can then direct site cleanup and compel responsible parties to fund these efforts.

Sites like the UCR Site (which stretches over 150 river miles and has over 600 miles of shoreline) are called mega-sites because of their size and complexity. As a result, like other mega-sites the UCR Site RI/FS is taking several years to conduct. During this period, EPA can consider and take "time critical action" to address findings considered to be an imminent threat to human health or the environment. Based on residential soil sampling results in the upper Columbia Valley, EPA has initiated a time critical removal action.

Sharing What We Know

This public guide update shares with you what is currently known and progress made since the Forum publication of the 2011 RI/FS Public Guide; information about additional RI/FS studies and activities; background information to help understand what's being studied and why; and early cleanup actions being considered or taken.

In addition, the web version of this Public Guide (www.lrf.org/publicguide2015) includes several links to related studies and information. The 2011 Public Guide can still be referenced at www.lrf.org/publicguide2011.

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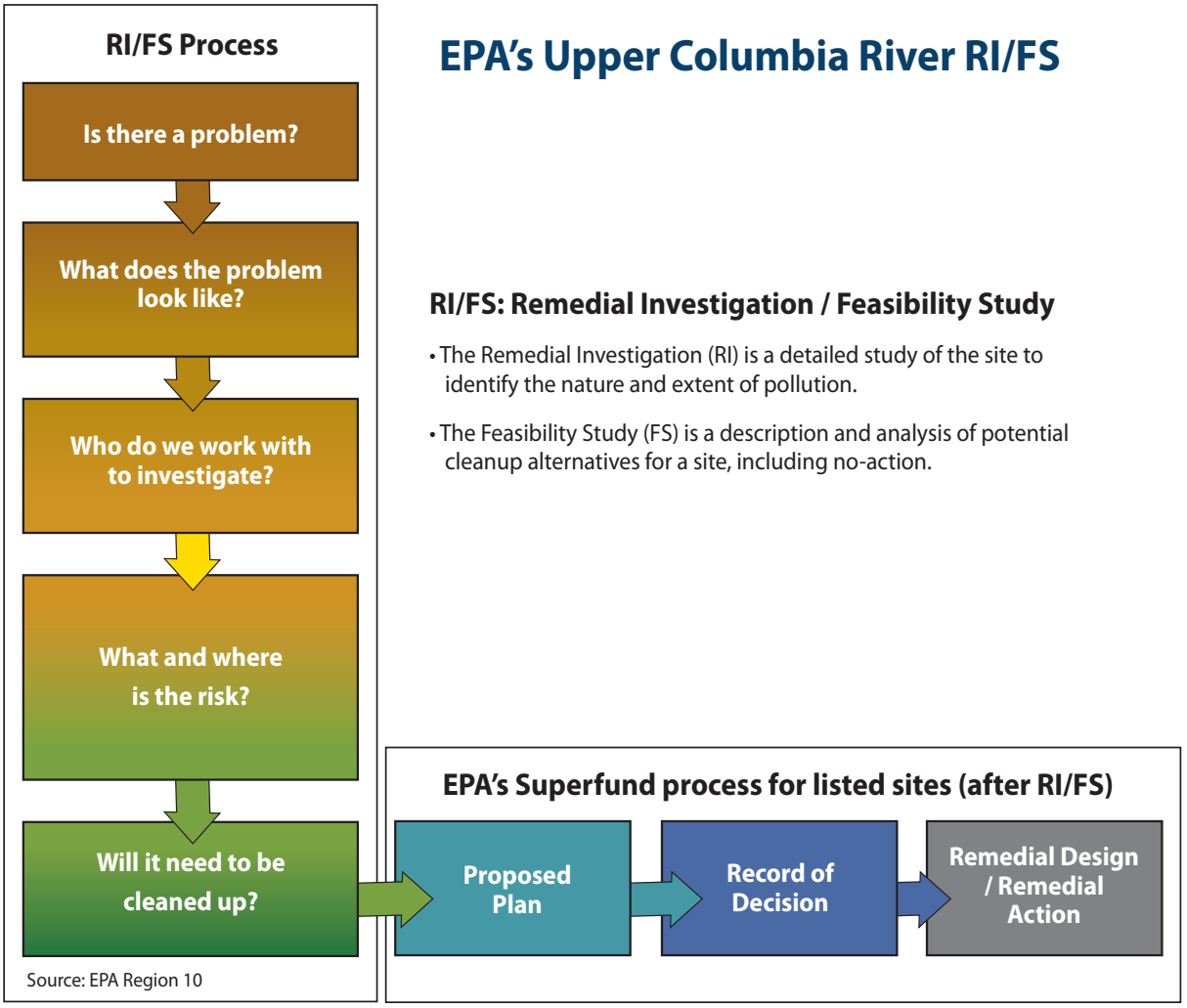


EPA's Upper Columbia River RI/FS

RI/FS: Remedial Investigation / Feasibility Study

- The Remedial Investigation (RI) is a detailed study of the site to identify the nature and extent of pollution.
- The Feasibility Study (FS) is a description and analysis of potential cleanup alternatives for a site, including no-action.

History

LeRoi Smelter, Northport, WA

1896 Trail, Canada facility built as a copper and gold smelter.

1900-1968 Mining, milling, and smelter activities active in both Canada and the United States, all of which discharge metals into the Upper Columbia and its tributaries.

1901-1916 Trail, Canada facility added lead smelting in 1901, and zinc production in 1916.

1922 Smelters permanently close at Northport, Grand Forks, Greenwood, and Boundary Falls.

1935-1941 A joint U.S. and Canada tribunal investigating effects of smoke emissions in the upper Columbia Valley reaches settlement for actions injuring vegetation.

1931 A new Canadian fertilizer plant built to reduce sulphur dioxide emissions becomes a primary source of phosphate discharges into the Columbia.

1942 Grand Coulee Dam gates close, raising the waters behind the dam 380 feet. Water f ows and bank erosion change, affecting depositional patterns of sediment contamination.

1959 Celgar Pulp Mill begins operation.

1990-1993 WA Department of Ecology (Ecology) monitors dioxin, furan and trace metal concentrations in suspended particulate matter and fish tissues. The Celgar pulp mill is considered the primary historical source for dioxin and furan contaminants. Celgar plant modernization designed to end discharges of dioxins and furans into the Columbia begins.

1992 The USGS conducts a sediment study of Lake Roosevelt describing the transport of metals, the presence of trace metals in bed sediment, and the toxicity of the sediment to benthic invertebrates.

1993 Ecology initiates studies resulting in Lake Roosevelt being placed on the federal Clean Water Act Section 303(d) list of impaired water bodies.

1994 Canadian fertilizer plant ceases discharge of phosphate into the Columbia.

1994 The USGS conducts a fish tissue study to determine the level of mercury and other metals in walleye, smallmouth bass, and rainbow trout. Based on findings, a fact sheet from the Washington State Department of Health (WDOH) advises the public to limit consumption of walleye.

1995 Discharges of slag from Trail smelter cease.

1997 Teck implements Trail Modernization Program to further improve quality of ef uent (wastewater) being discharged.

1998 In Canada, wide area human and ecological risk assessment initiated from Castlegar to the U.S. border.

1998 USGS conducts a follow-up fish tissue study and finds that concentration levels of metals had either not changed or decreased. Ecology identifies temperature, total dissolved gas, mercury, PCBs and pH as parameters for Lake Roosevelt inclusion on the Clean Water Act 303(d) list of impaired water bodies.

1999 Colville Confederated Tribes petition EPA to conduct an assessment of environmental contamination in Lake Roosevelt under federal Superfund program.

2001 – 2003 EPA collects samples of river sediments. EPA recommends a Remedial Investigation Feasibility Study (RI/FS) to assess environmental and human health risks.

2002 – 2006 USGS collects data to determine concentrations of trace metals in wind-blown dust.

2003 After negotiations between EPA and Teck Cominco reach an impasse, EPA issues Unilateral Administrative Order under U.S. Superfund law to fund and conduct aspects of the RI/FS. Teck Cominco contests the order and EPA moves forward with the RI/FS using U.S. government funding.

2004 Canadian government issues a "Diplomatic Note" to the U.S. State Department regarding EPA enforcement order. United States and Canadian governments begin discussions regarding site.

2004 Colville Confederated Tribes and Washington State ask U.S. District Court to force Teck Cominco to comply with EPA order issued in 2003.

2004 Ecology updates Clean Water Act 303(d) impairment list for Lake Roosevelt to include temperature, total dissolved gas, and mercury.

2005 EPA conducts a time critical removal action at the Le Roi and Northport smelter sites separate from UCR Site activities. EPA replaced soils at several residential properties and capped contaminated soils directly on the smelter site.

2005 EPA RI/FS studies begin by initiating sediment sampling and fish tissue studies.

2006 EPA reaches an agreement with Teck Cominco to conduct an RI/FS that Teck Cominco will fund. Teck required to develop EPA approved RI/FS ecological work plan before studies can continue.

2006 Ninth circuit upholds a district court ruling that Superfund (CERCLA) law does apply to Teck's Trail smelter.

2008 Lake Roosevelt fish advisory updated.

2009 RI/FS ecological and human health work plans approved by EPA. Teck Cominco (now called Teck) begins RI/FS studies.

2009 2,327 fish were collected and composited into 507 samples. They were tested for metals, dioxins/furans, PCBs, PAHs, pesticides, flame retardants (PBDEs) and other organic compounds.

2009 – 2010 Columbia River and Lake Roosevelt surface water tested for inorganic compounds such as lead and arsenic, and organic compounds such as PCBs and pesticides. Samples meet EPA water quality standards protective of people and aquatic life.

2009 – 2011 43 beaches sampled for metals contamination. All but three beaches sampled are considered safe for recreational use. One of these, Bossburg Flats, is closed by the National Park Servic due to high lead levels.

2010 Teck reaches voluntary agreement with Washington Department of Ecology (outside of the RI/FS) to remove and replace with clean fill 9,100 tons of sediment containing granulated slag from Black Sand Beach.

2011 EPA finds that soil concentrations of lead and other metals around the Young America Mill site and tailings impoundment are well above screening levels for human health risk.

2012 EPA funds and conducts time critical cleanup action to address human health risks related to Young America Mill site.

2012 Lake Roosevelt fish consumption advisory updated.

2012 Recreational Use Survey of visitors completed to support RI/FS human health risk assessment.

2012 Colville Confederated Tribal Use Survey completed to support RI/FS human health risk assessment.

2013 Phase 2 river sediment sampling from Canada to Grand Coulee Dam conducted for ecological risk assessment.

2013 Independent of the RI/FS, the Washington Department of Ecology conducts initial upland surface soil sampling near the Canadian border and finds elevated metals concentrations.

2014 EPA residential soil sampling conducted north of Northport to U.S. Canada border to support human health risk assessment.

2014 Non-residential area-wide upland soil sampling conducted along upper Columbia River Valley from China Bend area northward to U.S. Canada border to support ecological risk assessment.

2015 Sampling from Bossburg Flats Beach to south of Evans Campground to determine possible contribution of Young America Mine and Mill to elevated levels of metals.

Sediment sampling

Pathways

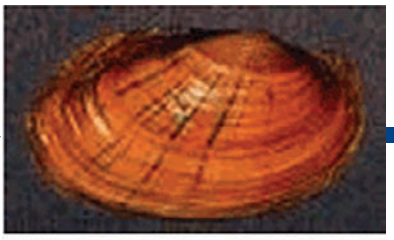
Evaluating Exposure and Risk

CONTAMINANT SOURCES

Smelting operations in Trail, Canada are the primary source of metals contamination. Other contaminant sources include pulp and paper production in Canada. To a lesser degree other mining operations, atmospheric deposition, and unidentified sources may be sources.

WATER

Contaminants from ef uent (wastewater) and slag can move downstream and be trapped in sediment on the bottom, banks and beaches. They can also attach to fine particles that travel through the water column.



BIOACCUMULATION

Sediment contaminants can directly impact or accumulate in the tissues of worms, clams, insect larvae and other organisms (called the benthic community) that inhabit the lake bottom.

AIR

Smoke stack emissions are considered a source of elevated levels of lead and arsenic in the upper Columbia Valley.

DIRECT CONTACT

Help protect children on beaches from contaminants by washing hands, face, feet and toys before eating and/or leaving the beach. For air emissions affecting lands in the upper Columbia Valley, precautionary measures are described on page 18.

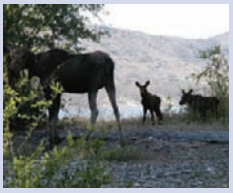
BIOMAGNIFICATION AND FOOD CHAIN

Organic contaminant concentrations (like PCBs) and mercury can biomagnify (increase) in the tissues of species as they move higher in the food chain, e.g.– stonef y, to fish, to wildlife or humans.

FISH CONSUMPTION

Fish can accumulate contaminants in their tissue and organs, and these toxic chemicals can move up the food chain to humans, birds, and other species consuming fish.

ADDITIONAL CONSIDERATIONS

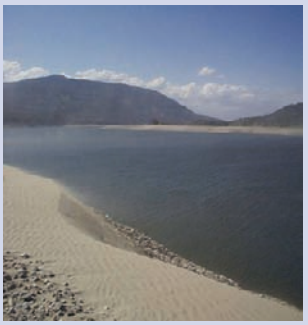


BIODIVERSITY

Species that can not tolerate elevated levels of contaminants may die or suffer other adverse effects such as loss of reproductive functions. This can reduce the variety of species in the environment.

AIR

Contaminated sediments from beaches can be exposed and blown into the atmosphere via windstorms. Human inhalation of dust during these conditions is a potential human risk pathway.



SEDIMENT MOVEMENT

Sediment movement and accumulation is a natural, ongoing process. Flowing water, for instance, can erode, deposit and resuspend sediments. Over time this can change the distribution pattern of contaminated sediments, re-exposing more biota (plant and animal life) to potential toxic chemicals. This process can also result in uncontaminated sediments (e.g.—from bank erosion) covering contaminated sediments in a way that reduces the exposure of potential toxic chemicals to biota.

Human Health

Beach Exposure

A 2009 Health Consultation from the Washington Department of Health, based on EPA sampling of 15 beaches in 2005, concluded there is "no apparent public health hazard."

From 2009—2011, EPA expanded on this work by working with tribes, state and federal agencies to test 33 additional shoreline beaches, many of which are associated with campgrounds or used by local residents. The beach sampling list notes which beaches were sampled and when, including six that were tested more than once.

For 40 of the 43 beaches, EPA's findings are similar to those for 2005. Additional findings include:

- High lead levels at Bossburg Flats. In January, 2012 the National Park Service closed access to this beach as a precautionary measure until further sampling and analysis of this historic ferry crossing and town site is complete. Nearby mine, mill and historic ferry landing activities are considered potential local sources in addition to the area-wide wastes from the Trail Smelter.
- Evans Campground showed lead levels slightly above human health screening levels.
- The "Swimming Hole" beach near Sheep Creek may have arsenic levels slightly above human health screening levels.

Additional sampling at Bossburg Flats and Evans Campground beaches were completed in spring 2015 and analysis is underway.

Black Sand Beach during removal

Beach sampling

In 2010, Teck entered into a voluntary agreement outside of the RI/FS with the Washington Department of Ecology to clean up Black Sand Beach, which is located upstream of Northport. Teck removed and replaced about 9,100 tons (approximately 6,500 cubic yards) of metals-contaminated sediment and brought in clean sand to rebuild it. The sediment removed was hauled to Trail, British Columbia.

Surface Water

All water samples met EPA aquatic water quality standards protective of people and aquatic life, providing assurance that Lake Roosevelt is safe for swimming and other recreational activities.

Extending from the Canadian border to Grand Coulee Dam, surface water samples were taken from shore to shore in six locations and at different depths. Samples were also taken at three different times of year to determine whether differences in lake levels and water f ow impact contaminant concentrations. In total, over 67,500 analyses were performed for the surface water sampling program.

Disturbed water sampling

Some disturbed water samples did not meet drinking water standards for aluminum, iron, lead and manganese. Disturbed water samples simulate a recreational situation, like a child running and playing in the water, where someone kicks up mud and other beach sediment. Specifically, these samples collected suspended sediment in shallow water near the shoreline. In these instances, however, results were still within limits protective of people and aquatic life. Regardless of whether water samples meet drinking standards, people should not drink untreated river water because bacteria, viruses or parasites may be present.

Young America Mine and Mill

In June, 2011 the Washington Department of Ecology identified the Young America Mill site to EPA as a potential hazardous waste site. Nestled into a nearly vertical limestone cliff, the mine was approximately 15 miles north of Kettle Falls. What remained of the nearby former mill site included buildings in disrepair and a tailings impoundment. The mill processed ore from the nearby mines and ceased operation around 1953.

Further investigation by EPA found concentrations of lead and other metals around the mill site and tailings impoundment to be well above screening levels for risk. The lands involved are a combination of federal and private properties that included housing lots.

To address human health risks from contaminated dust and dirt that could be inhaled or ingested, EPA conducted a removal action in October and November of 2012. Cleanup actions included destroying and burying what remained of the old mill buildings, recapping contaminated soils with a liner and "clean" soil on top, and other remedial actions. EPA funded the cleanup at a cost of over $500,000.

Bossburg Flats

At about the same time EPA began investigating Young America Mill, separate UCR RI/FS investigation confirmed high levels of lead on a beach about a half mile downstream. The contaminated beach is where the town of Bossburg once thrived. Now considered a ghost town, Bossburg had as many as 800 residents dating back to 1892. The town prospered and declined in relation to the production of lead and silver from mines in the area. At one time there was also a Bossburg saw mill and a ferry system to transport people and materials across the river.

In January 2012, The National Park Service closed access to this beach as a precautionary measure until further sampling and analysis is complete. Sampling of the Bossburg Flat Beach area and the Evans Campground Beach area occurred in spring 2015 and analysis has begun. Results will help investigators better understand the origins and extent of contamination in these areas.

2005, 2009, 2010 and 2011 beaches sampled for potential public exposure to contaminants

AA Campground – Sampled in 2005 and 2011
Barnaby Island Campground – Sampled in 2010
Black Sand Beach – Sampled in 2005 and 2009
Bossburg Flat – Sampled in 2011
Bradbury Beach – Sampled in 2011
China Bend – Sampled in 2010
Columbia – Sampled in 2005
Colville Flats – Sampled in 2011
Colville River – Sampled in 2011
Crescent Bay – Sampled in 2011
Dalles Orchard – Sampled in 2005 and 2010
Enterprise – Sampled in 2011
Evans Campground – Sampled in 2011
Flat Creek – Sampled in 2011
French Rocks – Sampled in 2005
Haag Cove – Sampled in 2005
Hunters – Sampled in 2011
Jones Bay – Sampled in 2011
Kamloops Island – Sampled in 2011
Keller Ferry – Sampled in 2005
Kettle Falls Marina – Sampled in 2005 and 2011
Lincoln – Sampled in 2005
Lyons Island – Sampled in 2011
Marcus Island – Sampled in 2005
McGuire's – Sampled in 2011
Mitchell Point – Sampled in 2011
Mouth of Hawk Creek – Sampled in 2011
Naborlee – Sampled in 2011
Nez Perce Creek – Sampled in 2011
North Gifford – Sampled in 2005
North Gorge – Sampled in 2005
Northport Beach – Sampled in 2005 and 2010
Onion Creek - Rejected due to rock in 2009
Rogers Barr, Sampled in 2005
Seven Bays – Sampled in 2011
Snag Cove - Rejected due to rock in 2009
Spring Canyon – Sampled in 2005 and 2011
Summer Island – Sampled in 2010
Swawilla Basin – Sampled in 2011
Swimming Hole Beach – Sampled in 2011
Upper Columbia R.V. Park – Sampled in 2009
Welty Bay – Sampled in 2011
Whitestone Campground – Sampled in 2011
Wilmont Creek – Sampled in 2011

Human Health

Are the Fish Safe to Eat?

The Washington Department of Health (Health) fish consumption advisory program provides guidance for safely consuming fish in Lake Roosevelt. **See fish advisory on pages 12 and 13.**

In the fall of 2009 over 2,300 fish were sampled as part of the RI/FS. Sampling included all size classes (small, medium and large) and a wide range of species (see Fish Species Sampled). Sampling occurred throughout the upper Columbia and Lake Roosevelt (see Study Areas for Fish, Surface Water and Beach Sampling).

Fish Sampling Team

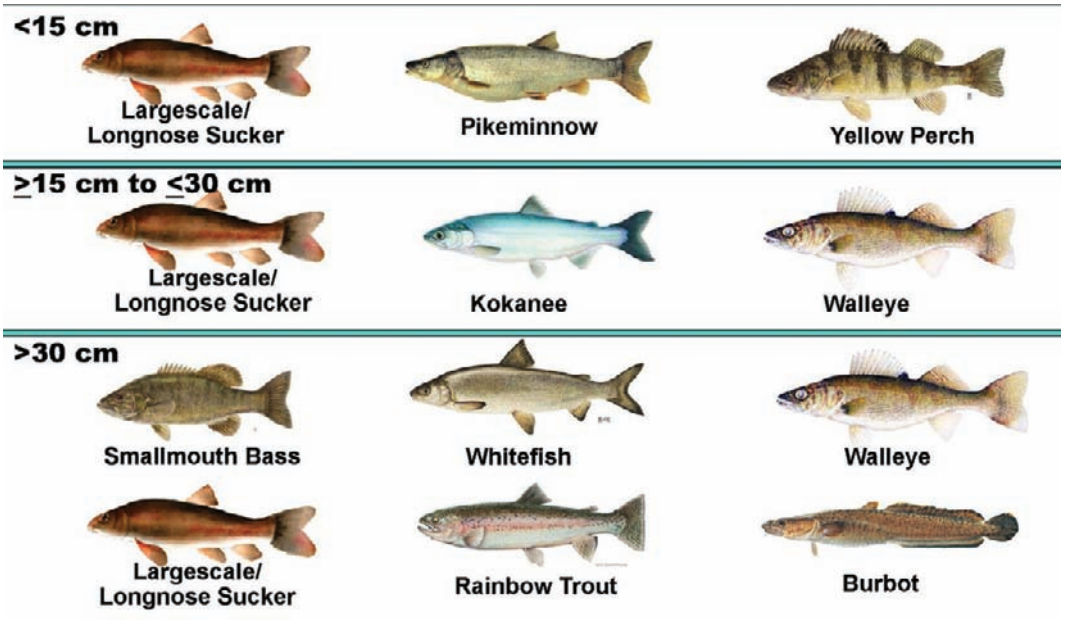
Samples were tested for an array of inorganic and organic compounds. Examples of inorganic compounds include mercury and heavy metals such as arsenic, cadmium, copper, lead and zinc. Examples of organic compounds (which are human-made) include PCBs, dioxins/furans, PBDEs, and pesticides.

Health used this information to update the Lake Roosevelt Fish Advisory in 2012. In 2014 and 2015, Health worked collaboratively with area tribes, government agencies and stakeholders to update the fish advisory graphics being used on signs, f yers and brochures.

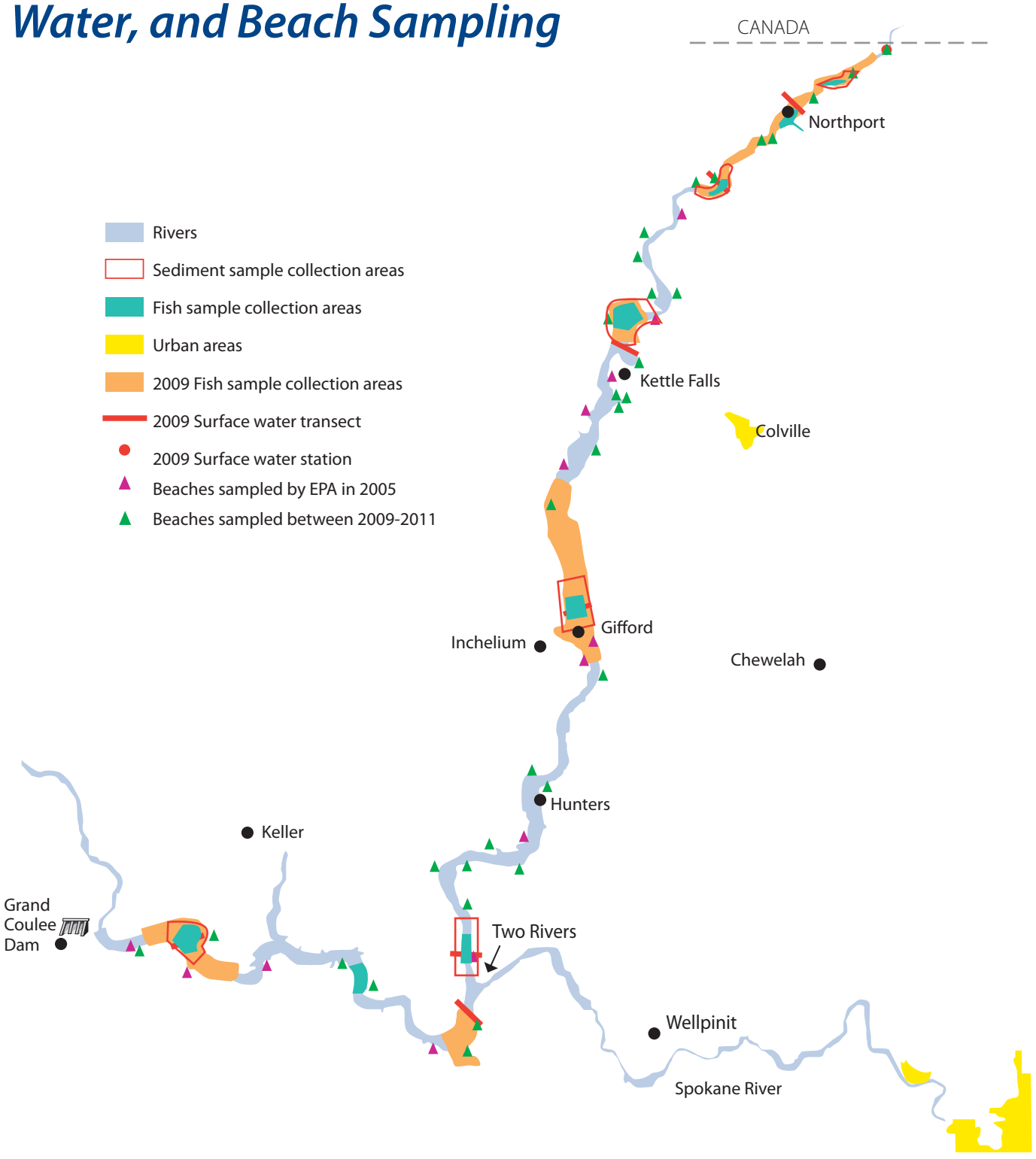
As shown in the updated Fish Advisory graphic, the news is good for people who enjoy the particularly popular kokanee and rainbow trout sport fishery. Further, advice regarding consumption of smallmouth bass and walleye improved from two meals (8 ounces of uncooked fish) per month to four meals per month (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. Lastly, mercury consumption advice is identical to the statewide mercury advisory.

Fish Species Sampled



Study Areas for Fish, Surface Water, and Beach Sampling



Fish Advisory

Upper Columbia River/Lake Roosevelt

Fish are nutr
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Babies and c
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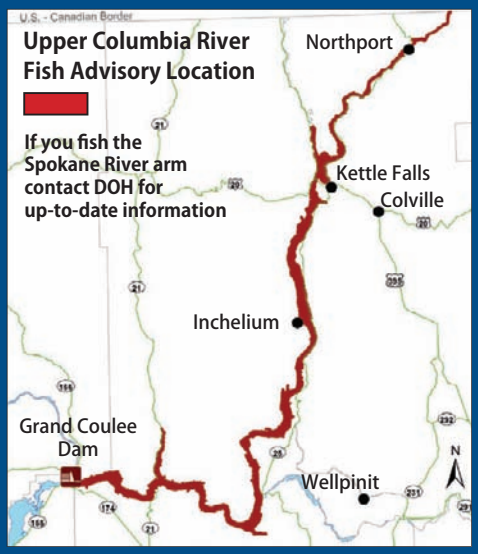
should follo



How much can I eat?

Women 18 - 45
especially if pregnant

Children 1 - 17

Women 46 and older
and not pregnant

Men 18 and older

HEALTHY CHOICE


Kokanee


Lake Whitefish


Rainbow Trout

2- 3 servings per week

Kokanee
Lake Whitefish
Rainbow Trout

7 servings per week

Kokanee
Lake Whitefish
Rainbow Trout

L


Burbot


Mountain Whitefi


Walleye

1 servin

4 serving
of any c
of the

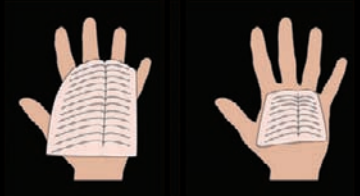
3 serving

12 servin
of any c
of the

OR

OR

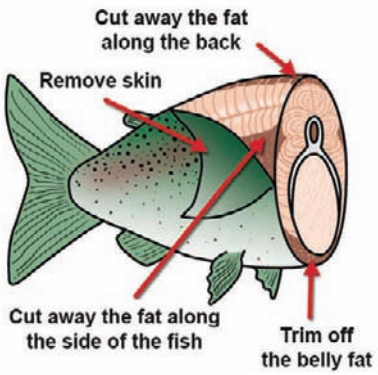
What is a serving?



For Adults **For Children**

A serving is about the size and thickness of your hand. Give children smaller servings.

Preparing Fish the Healthy Way



Fish are part of a healt

Following these tips w
contaminants you eat
Mercury cannot be re

- Before cooking re
- Eat younger and s
- Eat a variety of fis

ritious, but certain fish in the Upper Columbia River contain contaminants
d PCBs) that can harm your health.

children are most at-risk.
o are or might become pregnant, nursing mothers, and children
w all of this advisory.

IMIT

Longnose Sucker

ish

Smallmouth Bass

g per week

gs per month
ombination
ese 5 fish

gs per week

gs per month
ombination
ese 5 fish

CAUTION

Largescale Sucker

Largemouth Bass

2 servings per month

OR

Largescale Sucker
Largemouth Bass

5 servings per month

OR

Largescale Sucker
Largemouth Bass

How to Use this Table

Women under age 46 and children under age 18 should eat from either the green or yellow column.

Examples:

If a child eats 1 serving of kokanee and 1 serving of rainbow trout, no other fish should be eaten that week.

If an 18-year-old man eats 3 servings of walleye in a week, no other fish should be eaten that week.

DO NOT EAT

Northern Pikeminnow

thy diet.

will reduce the amount of chemical
t (like PCBs) that collect in the fat of fish.
duced; it builds up in fish meat (the fillet).

emove the skin, fat, and internal organs.
smaller fish (within legal limits).
sh.

Washington State Department of Health

Questions?

Department of Health
Toll Free: 1-877-485-7316
Visit: www.doh.wa.gov/fish

DOH 334-329 June 2015

Available in other formats for people with disabilities
1-800-525-0127 (TDD/TTY call 711).

Human Health

Recreational Use Survey

The recreational use survey will help determine if any human health risks may exist from exposure to contaminants.

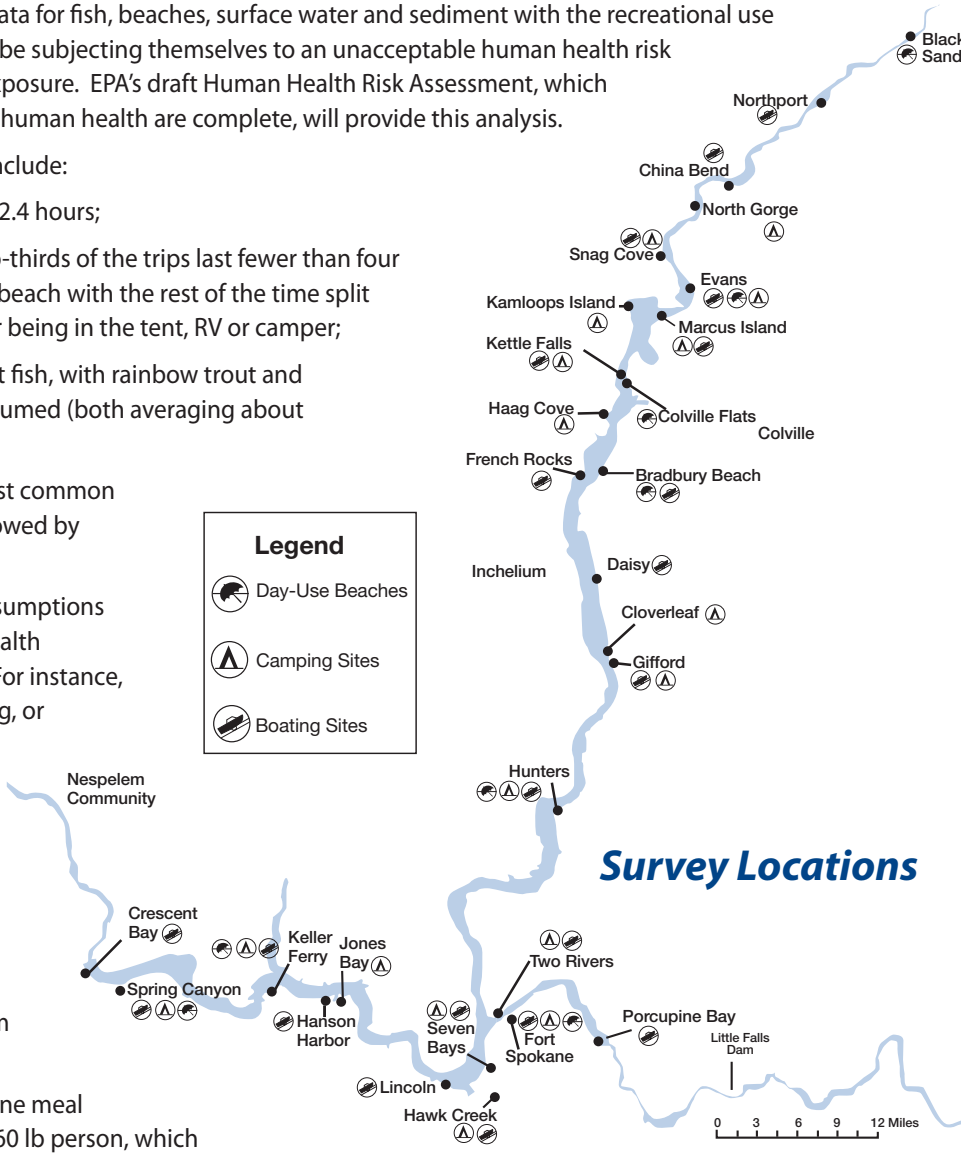
From fall 2010 through fall 2011, over 3,500 residents and visitors to Lake Roosevelt were surveyed to determine how they spend their recreational time. For instance, what types of fish do people catch, where are they caught and how often are they consumed? And what beaches are visited, when are they visited, and what types of activities are pursued?

Risk assessors will combine the sampling data for fish, beaches, surface water and sediment with the recreational use survey data to assess whether visitors may be subjecting themselves to an unacceptable human health risk to metals and, if so, how to address such exposure. EPA's draft Human Health Risk Assessment, which will not be released until studies related to human health are complete, will provide this analysis.

Some highlights about recreational visits include:

- The average length of a beach day trip is 2.4 hours;
- For those using campgrounds, about two-thirds of the trips last fewer than four days. About half the time is spent on the beach with the rest of the time split between swimming, boating activities, or being in the tent, RV or camper;
- About 30 percent of visitors catch and eat fish, with rainbow trout and walleye being the most popular fish consumed (both averaging about 2.5 meals per year);
- Boating trips last about 15 hours; the most common activity is spending time on a beach, followed by wading and swimming.

These survey results are consistent with assumptions used by the Washington Department of Health (Health) for their human health guidance. For instance, Health concluded "that touching, breathing, or accidentally eating sediment exposed in a two-days per-week for four months or 35-days-per-year (area residents) scenario is not expected to harm people's health." Health also concluded "that touching, breathing, or accidentally eating sediment exposed in a 14-day per-year (2 weeks per year) vacationer scenario is not expected to harm people's health."



Further, Health's fish advisory is based on one meal equaling 8 ounces of uncooked fish for a 160 lb person, which is within the typical meal size found in the survey. The fish advisory provides those consuming fish guidance protective of human health.

Tribal Consumption and Resource Use Survey

For similar reasons, EPA worked with the Colville Confederated Tribes to conduct a consumption and resource use survey to consider exposure risks for those living on and around the Colville Reservation. Here, the focus was more extensive, including use and exposure to plants, animals, soil, sediment and water. Tribal practices such as subsistence fishing were critical to this survey. Like the recreational use survey, results for the tribal consumption and resource use survey will be used in the human health risk assessment.

Airborne Wind-Blown Dust along the Reservoir - Air Inhalation

A 2010 report prepared for the Department of the Interior by Industrial Economics, Incorporated (IEc) found that human inhalation of airborne sediment particles containing lead and other heavy metals are within EPA acceptable risk standards for cancer and non-cancer health effects resulting from both acute and chronic exposures.

From 2002 through 2006, the United States Geological Survey (USGS) collected air samples from Inchelium, Seven Bays, Kettle Falls (2002) and Marcus (2003-2006). Wind-blown dust events created by exposed, dried sediments has been a long-standing concern by some members of the community. USGS reported that overall concentrations of particulate matter recorded at these monitoring stations did not exceed Federal standards (e.g., the National Ambient Air Quality Standards). In addition, analysis by USGS found that concentrations of metals in the air did not exceed California EPA air quality standards for arsenic and cadmium. Federal and state standards are not available for other metals.

The Department of the Interior also requested IEc to further evaluate the USGS data. The report focused on potential exposures and risks to non-tribal people, e.g. - - residents, park employees, and visitors. IEc found the risks from inhalation of windblown sediment to be below EPA standards and benchmarks for all contaminants and scenarios evaluated.

Related Activities

Legal Actions

As previously summarized in the 2011 Public Guide, ongoing legal actions continue in United States federal court involving the Colville Confederated Tribes, the State of Washington, and Teck Resources. These actions address concerns beyond Teck's 2006 Settlement Agreement with EPA to conduct the UCR RI/FS. Specifically, their legal actions seek to assure Teck meets legal obligations for performing investigations, appropriate cleanups, and addressing natural resource injury claims under all aspects of United States environmental laws. More details can be found in the 2011 Public Guide or by contacting parties participating in the litigation.

Natural Resource Trustees

The Upper Columbia Natural Resource Trustee Council was established to manage natural resources at the UCR Site on behalf of the public. This includes, but is not limited to, land, vegetation, water, birds, fish, other species of concern, associated uses, and tribal resources. The Trustee Council continues to conduct natural resource injury assessment work that is separate and independent of the EPA RI/FS activities. Their focus is investigating injury to natural resources caused by Trail Smelter pollution along the upper Columbia River. More details can be found in the 2011 Public Guide and by contacting the Trustee Council.

Sediment sampling

Upper Columbia Valley

Residential Soil Sampling

A fall, 2012 study by the Washington Department of Ecology reported undisturbed soil samples with elevated levels of lead, arsenic and cadmium within two miles of the U.S./Canada border. As some of the contaminant concentrations found would be a human health concern if located near a residence, the U.S. Environmental Protection Agency (EPA) determined further investigation was needed. EPA considers the presence of these metals to be associated with Trail Smelter smoke stack emissions.

Ingestion is the main pathway that affects human health. This occurs mainly through people swallowing small amounts of soil and dust, usually after the soil is on their hands and transferred to food. Lead is particularly dangerous to children because their growing bodies absorb more lead than adults do and their brains and nervous systems are more sensitive to the damaging effects of lead. Babies and young children can also be more highly exposed to lead because they often put their hands and other objects that can have lead from dust or soil on them into their mouths.

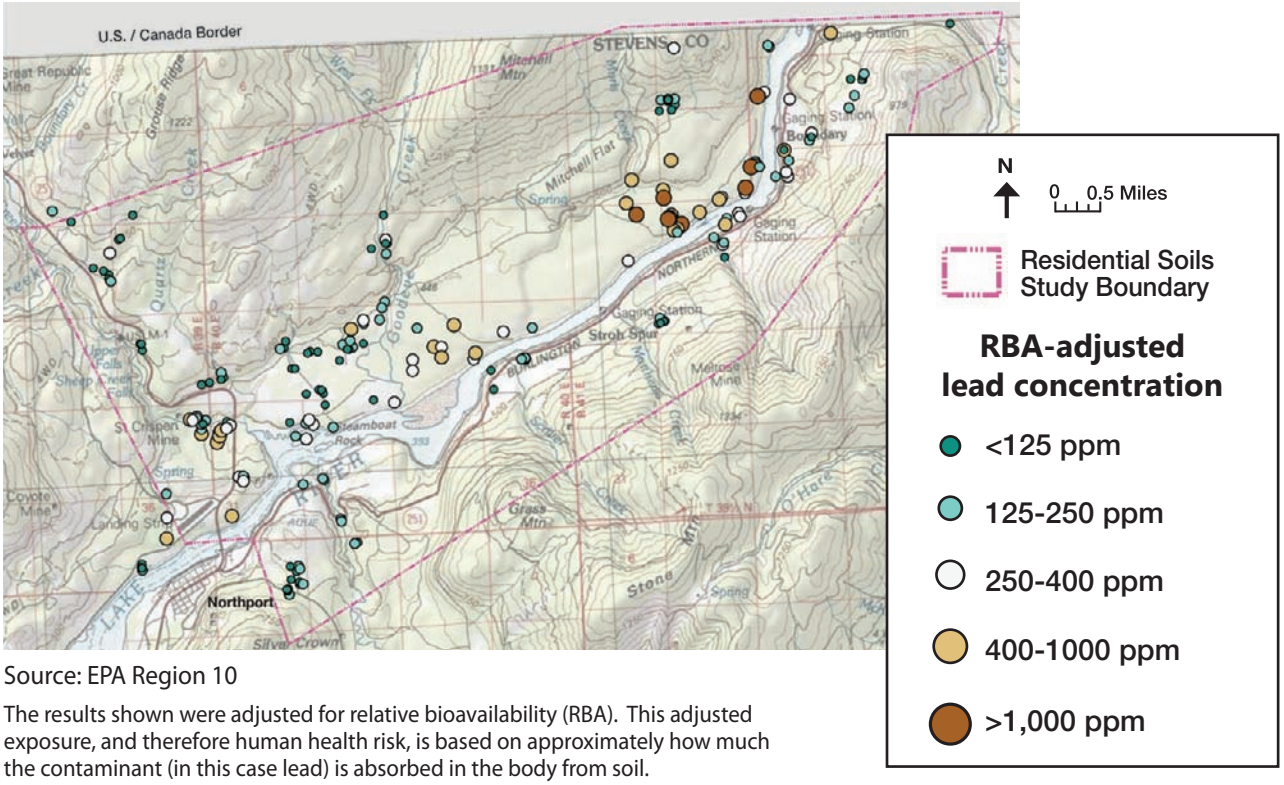
The map shows the EPA 2014 soil sampling area for lead and arsenic. EPA sent letters to property owners in this area inviting them to participate, and 74 chose to participate.

The map also shows results for lead levels. EPA uses a "screening level" of 400 parts per million (ppm) to determine whether further investigation is needed to be protective of human health. As noted in a letter to property owners from EPA, "We generally consider results below these screening levels to be safe for everyone living on the property, including children and pregnant women." The Washington Department of Ecology uses a screening level of 250 ppm.

Results above 400 ppm require further investigation. As shown in the bar chart, 17% of the residential decision units were above EPA's screening level of 400. Decision units are property areas, like the maintained part of a yard or garden, where residents would most likely be exposed to potentially contaminated soil. Of the 74 properties sampled, 42 properties had at least one decision unit above the Washington State screening level and 24 had one or more decision units above the EPA screening level.

EPA provided each participating property owner a letter and map of their property with sampling results for each decision unit.

Residential Soil Sampling: Lead Concentrations



Source: EPA Region 10

The results shown were adjusted for relative bioavailability (RBA). This adjusted exposure, and therefore human health risk, is based on approximately how much the contaminant (in this case lead) is absorbed in the body from soil.

Northport Area: Time Critical Removal Action

Under the federal Superfund law (CERCLA), EPA has the ability to authorize "Time Critical Removal Action" to address threats to human health from contaminants released into the environment. In April, 2015 EPA announced it would use this ability to conduct cleanup of residential properties with sample results exceeding 700 ppm for lead. Of the 74 properties sampled, 14 are eligible for Time Critical Removal Action (including properties falling just below the 700 ppm threshold).

EPA said that "Conducting the Time Critical Removal Action for residential properties at the Site is intended to address the immediate threat to human health from lead exposure, and will contribute to the long term cleanup of the Site through the remedial action program." For agreeable property owners, soils will be cleaned up to less than 250 ppm, which is also consistent with Washington Department of Ecology's toxics cleanup program.

EPA's selection of the 700 ppm EPA threshold for lead was based on a literature review and thresholds set as part of the Bunker Hill site cleanup in north Idaho. The Washington Department of Ecology, Spokane Tribe of Indians and Colville Confederated Tribes advocated for use of a threshold below 700 ppm for time critical removal action. The U.S. Department of the Interior was supportive of EPA's decision.

EPA is creating a Removal Action Memorandum detailing the bases for its decision and specific time critical removal actions to be taken. To ensure timely action, CERCLA empowers EPA to implement their decision without further hearing.

EPA is also evaluating an expansion of the existing area for residential soil sampling, and an opportunity for further sampling within the existing area for residents who did not participate in 2014.

The UCR RI/FS process will continue to assess human health risks and potential cleanup actions for soils not addressed in the time critical action. No further cleanup action, however, is anticipated on properties below 700 ppm before EPA completes a human health risk assessment and a record of decision is issued, a process that may take several years to complete.

Soil Removal and Cleanup

Led by a Federal On-Scene Coordinator, EPA began formulating plans for the time critical residential soil cleanup in the spring of 2015. These voluntary residential actions may begin as early as summer, 2015.

For each qualifying and participating property owner, a plan will be created based on the sampling results and how the property is used, e.g.—gardening and play areas. The next step will be to meet with property owners to review and revise the plan, including addressing particular concerns, e.g.—protection of objects, plants, etc.

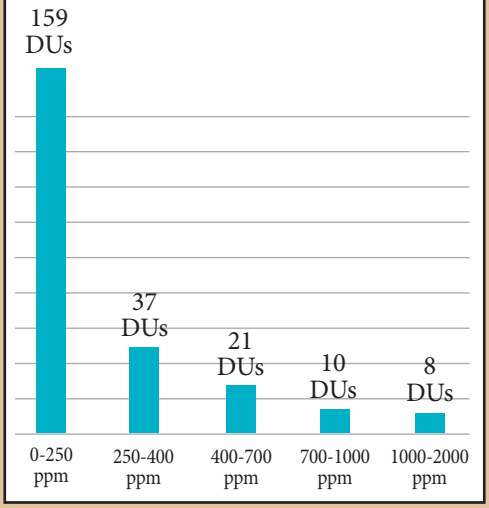
Cleanup actions may include removal of contaminated soil to an off-site location and replacement with clean fill representative of soil in the area. Safety precautions such as dust suppression will be taken.

Property Sampling and Decision Units

For each property, "decision units" were selected for sampling based on interviews with residents. Decision units were selected using property areas, like the maintained part of a yard or garden, where residents will most likely be exposed to potential soil contamination. For the 74 properties participating, 247 decision units were sampled. Two types of sampling were used. "Incremental composite" samples took soil from 30 locations in a decision unit and combined them into one composite sample. "Discrete" samples are those not combined with any other soils. Discrete samples were taken at a greater depth (up to six inches) to compare levels of metals at a different depth. In total, 561 incremental composite and 413 discrete samples were taken.

Incremental samples were generally one inch deep. In cases like gardens and livestock areas where the land was tilled, deeper samples were taken to mimic how the soil was disturbed over time. In gardens, samples were typically twelve inches in depth, while animal areas were three inches deep.

How many "decision units" had soil samples with these levels of lead?



Precautionary Measures

Metals in Polluted Soil

People interacting with property that may be polluted by metals such as arsenic and lead are encouraged to take precautionary measures to protect their health. These metals can enter the body when eaten or breathed, with young children being the most vulnerable. For those with young children, a simple blood-lead test is being offered by Northeast Tri County Health to screen for lead poisoning.

EPA and the Northeast Tri County Health District advised residents to take the following precautionary measures:

Inside Your Home*

- Remove or leave shoes outside your home to avoid tracking in polluted soil.
- Wash hands and face thoroughly after working or playing in the soil, especially before cooking and eating.
- Use soap and water to wash – avoid "waterless" soaps.
- Damp mop and wipe surfaces often to control dust.
- Wash toddler toys and pacifiers often.
- Scrub vegetables and fruits with soap and water.
- After working in areas you know or believe have lead pollution in the soil, wash dirty clothes separately from other clothes.
- Repair painted surfaces in homes. Homes built before 1980 may also contain lead-based paint. Older paint f akes may also be a source of lead.
- Eat a balanced diet. Iron and calcium help keep lead from becoming a problem in the body.

Outside Your Home

- Keep children from playing in dirt you know is polluted with metals.
- Cover bare patches of dirt with bark, sod, decking or other materials, or fence off areas if you know they're polluted with metals.
- Dampen dusty soils before gardening or digging so you don't breathe in the dust.
- Wear gardening gloves.
- Do not eat or drink in metals polluted areas.
- Grow your fruit and vegetables in raised beds with clean soil, or mix plenty of compost and other amendments in your garden soil to decrease the amount of pollution in the soil. Avoid railroad ties or pressure treated lumber, they can contain chemicals that pollute soil.
- Do not plant food crops under the roof overhang of your home, where pollution may accumulate.
- Be aware that pets can track polluted dirt into the house on their fur and paws.

* This precautionary information for inside and outside your home was provided by the Northeast Tri County Health District. For more information, please contact them at 509-684-2262, or www.netchd.org.

Upper Columbia Valley

Ecology

Beyond human health risks, investigators must determine whether chemicals of interest pose ecological risks to the environment. For this RI/FS, chemicals of interest include inorganic compounds (e.g.—lead, arsenic, cadmium, copper and mercury) and organic compounds (e.g.—PCBs and dioxins/furans).

With the focus being releases from smelter activities, pathways for chemicals entering the environment were identified. "Fate and transport" is the term used to consider the physical and chemical interactions that may create exposure and potential ecological risks to plants and wildlife.

In some cases like beach exposures, scientists can use studies to support both human and ecological risk assessments. This section summarizes study activity primarily focused on determining ecological risk. As data are collected and analyzed, EPA (in consultation with participating parties) must determine whether data gaps still exist and whether additional investigation is needed.

Sediment Sampling

A key question within the UCR site is whether up to 23 million tons of contaminated granulated fumed slag discharged into the Columbia River presents an unacceptable risk to the ecological health of the UCR Site. The movement of this material is a dynamic, on-going process as river f ows cause erosion, repeatedly suspending sediment in the water column, and then redepositing the sediment at the bottom of the river/lake and shoreline.

To assess ecological risk, additional sediment sampling was conducted in the fall of 2013. Approximately 1,500 gallons of sediment were collected from 136 sites for chemistry analysis; and sediment from 69 of these sites were selected for toxicity testing. Investigators are primarily interested in completing studies to assess whether there are unacceptable risks to benthic invertebrates (sediment dwelling bugs) from exposure to metals and other chemicals in sediments.

Results are projected to be available in 2015.

Sediment sampling

Ecology

Upland Soil Sampling

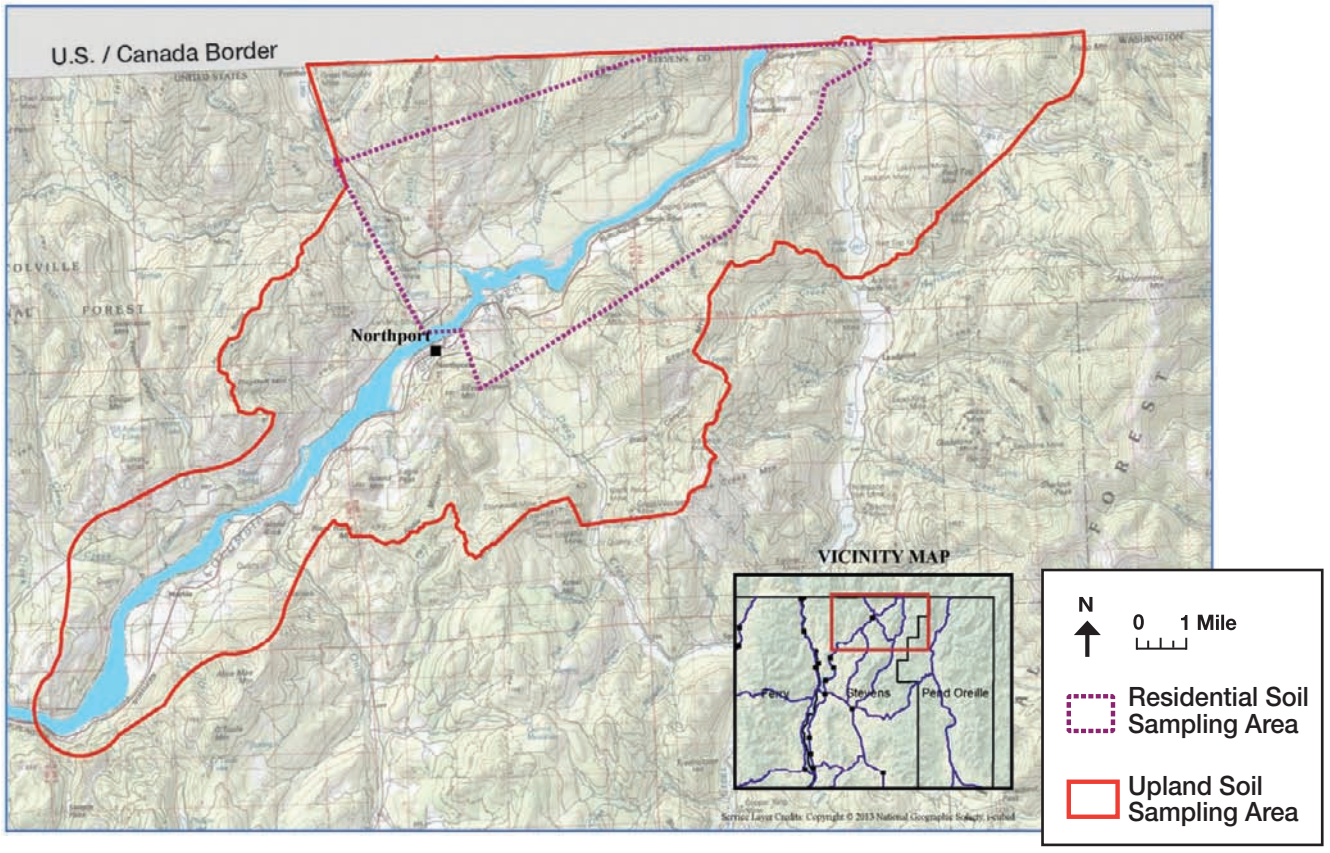
In 2014 the UCR Site RI/FS conducted upland soil sampling in a 100 square mile area from the U.S. / Canada border south to approximately China Bend.

The study assessed concentrations of metals in the soil, the nature and extent of possible contamination, and whether metals found in soils present an unacceptable ecological risk. As with residential soil sampling, EPA considers aerial deposition (smoke stack emissions that become air and windborne before coming to rest in the area shown) from the Trail Smelter a source of metals contamination in this area.

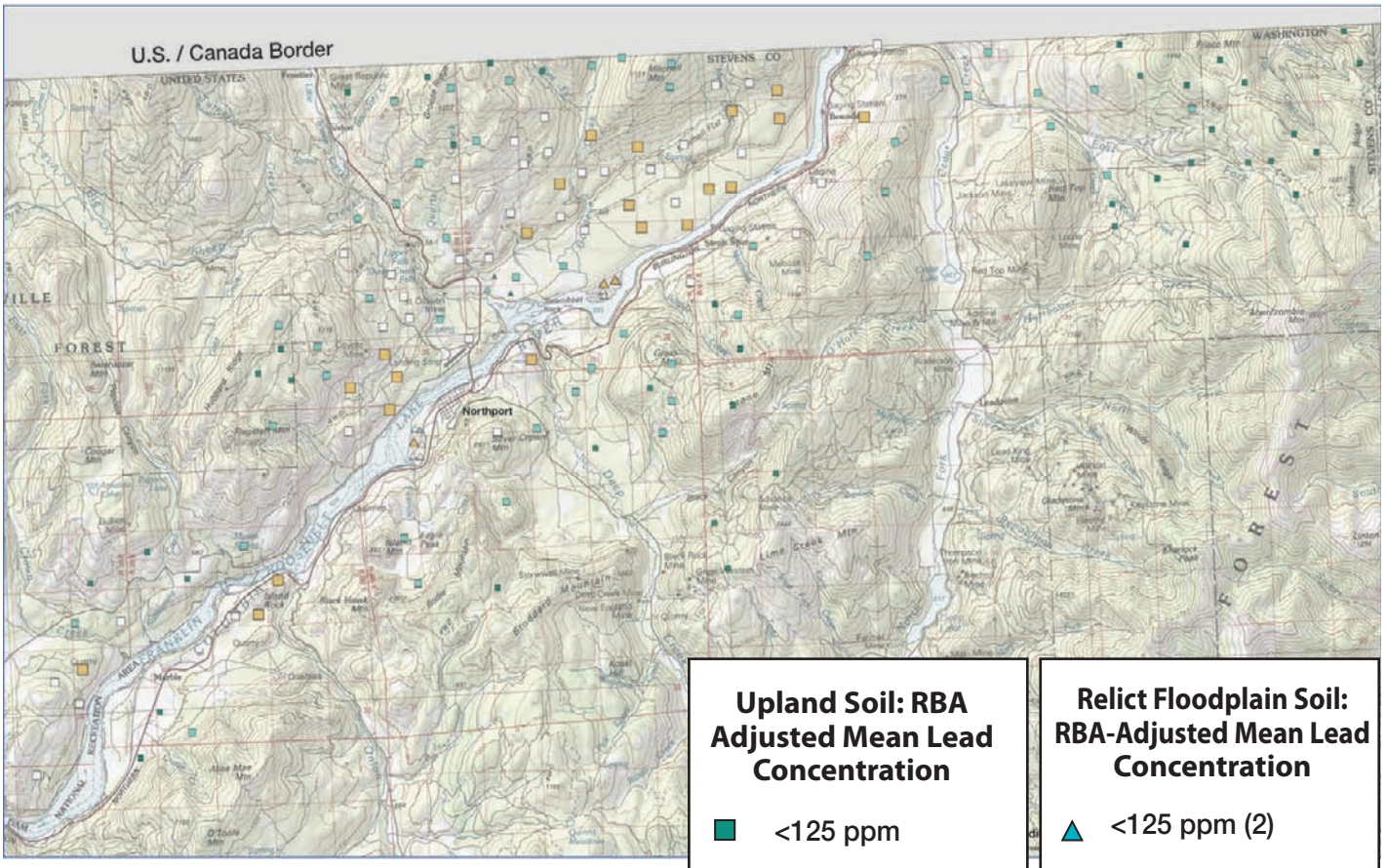
As shown on the map, the area selected for upland soil sampling is larger than that for residential soil sampling. In contrast to residential soil sampling, the soil sampling was three rather than one inch in depth.

The Upland Soil and Relict Floodplains Soil Sampling map shows lead concentration results. In general terms, concentrations of lead in the more widespread upland soil sampling program were less than residential samples, which were based on different objectives and sampling design.

Upland and Residential Soil Sampling Areas



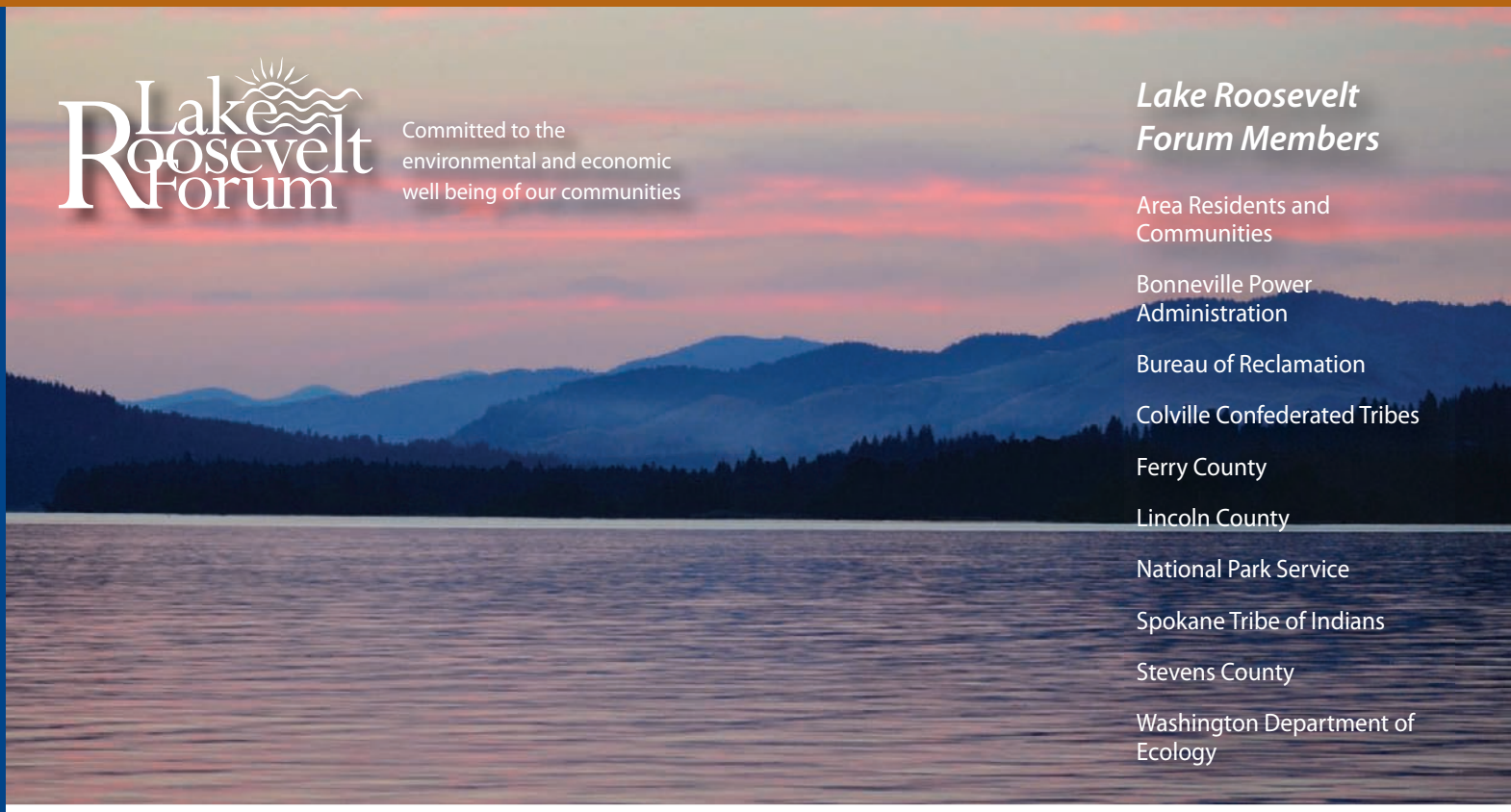
Upland and Relict Floodplain Soil Sampling: Lead Concentrations



Source: EPA Region 10

The results shown were adjusted for relative bioavailability (RBA). This adjusted exposure, and therefore ecological risk, is based on approximately how much the contaminant (in this case lead) is absorbed from soil.

Upland soil sampling



Lake Roosevelt Forum

Committed to the environmental and economic well being of our communities

Lake Roosevelt Forum Members

Area Residents and Communities

Bonneville Power Administration

Bureau of Reclamation

Colville Confederated Tribes

Ferry County

Lincoln County

National Park Service

Spokane Tribe of Indians

Stevens County

Washington Department of Ecology

Stay Informed

The UCR RI/FS investigation is very complex, spans hundreds of square miles, and is occurring over many years. In 2006, the United States reached an agreement with Teck Cominco Metals Ltd. (now called Teck Metals Ltd.) to conduct the RI/FS. Studying the issues of concern, however, began many years before and helps inform current activities.

Under this agreement, EPA oversees all Teck funded RI/FS activities to ensure that they meet regulatory standards. EPA decisions are made with input by the UCR "Participating Parties." These include the Colville Confederated Tribes, the Spokane Tribe of Indians, the State of Washington (represented by the Washington Department of Ecology), and the U.S. Department of Interior. Interior agencies include the Bureau of Reclamation, the National Park Service, Bureau of Indian Affairs, the U.S. Fish and Wildlife Service, and the U.S. Geological Survey. Although not listed in the agreement, the Washington State Department of Health is also consulted.

Here are web sites that provide on-going information, including links to studies and related resources.

Lake Roosevelt Forum

Updates, sign-up for electronic newsletter, and general information: www.lrf.org

Copies of print newsletters: www.lrf.org/about-the-forum/newsletters

Electronic version of the Public Guide, including direct links to resources: www.lrf.org/2015publicguide

Environmental Protection Agency (EPA): http://yosemite.epa.gov/r10/cleanup.nsf/sites/upperc

Washington Department of Ecology: https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=12125

Teck: www.ucr-rifs.com

United States Geological Survey: http://wa.water.usgs.gov/projects/roosevelt/

Washington Department of Health: www.doh.wa.gov/fish

Citizens for a Clean Columbia: www.cleancolumbia.org

EPA also maintains document repositories at Northport Town Hall, the Colville Public Library, Inchelium Tribal Resource Center, Nespelem Office of Environmental Trust, Grand Coulee Library, Wellpinit, and the Spokane Library.

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