SECTION 11
HEAVY METALS

This fact sheet addresses heavy metals from historical mining practices in the Coeur d'Alene Lake Basin, and how *you* can make a difference with *Best Management Practices (BMPs)*. BMPs are actions you can take to protect our natural resources. **The ultimate goal of this information is to protect public health and natural resources.**

1. Read the facts and information in the following pages.
2. Fill out the Risk Assessment Worksheets in order to analyze your property's specific needs.
3. Fill out the Action Worksheet, then **take action!**

Historic Mining

The Basin's waters have been and continue to be essential to the success of the region's mining, timber, agriculture, and hydropower industries. In particular, mining activities along the South Fork of the Coeur d'Alene River and its tributaries have a significant influence on basin watershed conditions and on the welfare of its inhabitants.

From the 1880s to the early 1980s, the "Silver Valley" was the nation's largest producer of silver, lead, zinc, and other metals. The mining and ore-processing methods used to extract this wealth produced large quantities of waste material containing toxic or environmentally hazardous substances such as cadmium, lead, and zinc. Much of this mining related waste was directly discharged and washed into the South Fork of the Coeur d'Alene River and its tributaries. The beds, banks and floodplains of the Coeur d'Alene River, Coeur d'Alene Lake, and (to a lesser extent) the Spokane River, contain vast quantities of metal-contaminated sediments that continue to be transported downstream and dispersed by hydrologic processes and floods in the Basin. An estimated 75 million metric tons of trace-element rich sediments from mining-related activities have been deposited into the lake since the late 19th century (Horowitz et al. 1995, Figure 11-2).

Water quality in the lake has generally improved since the mid-1970s, with the passing of the Clean Water Act. As the era of large scale upstream mining -related activities tapered off, environmental cleanup activities got underway in the Silver Valley, and environmental regulations were implemented throughout the Basin. While there have been advancements in mining practices and requirements, significant challenges remain for addressing metal contamination that continues to persist and be transported throughout the Basin.

Figure 11-1 *Historic mining activities in Burke, ID along Canyon Creek in the early 1900s.*

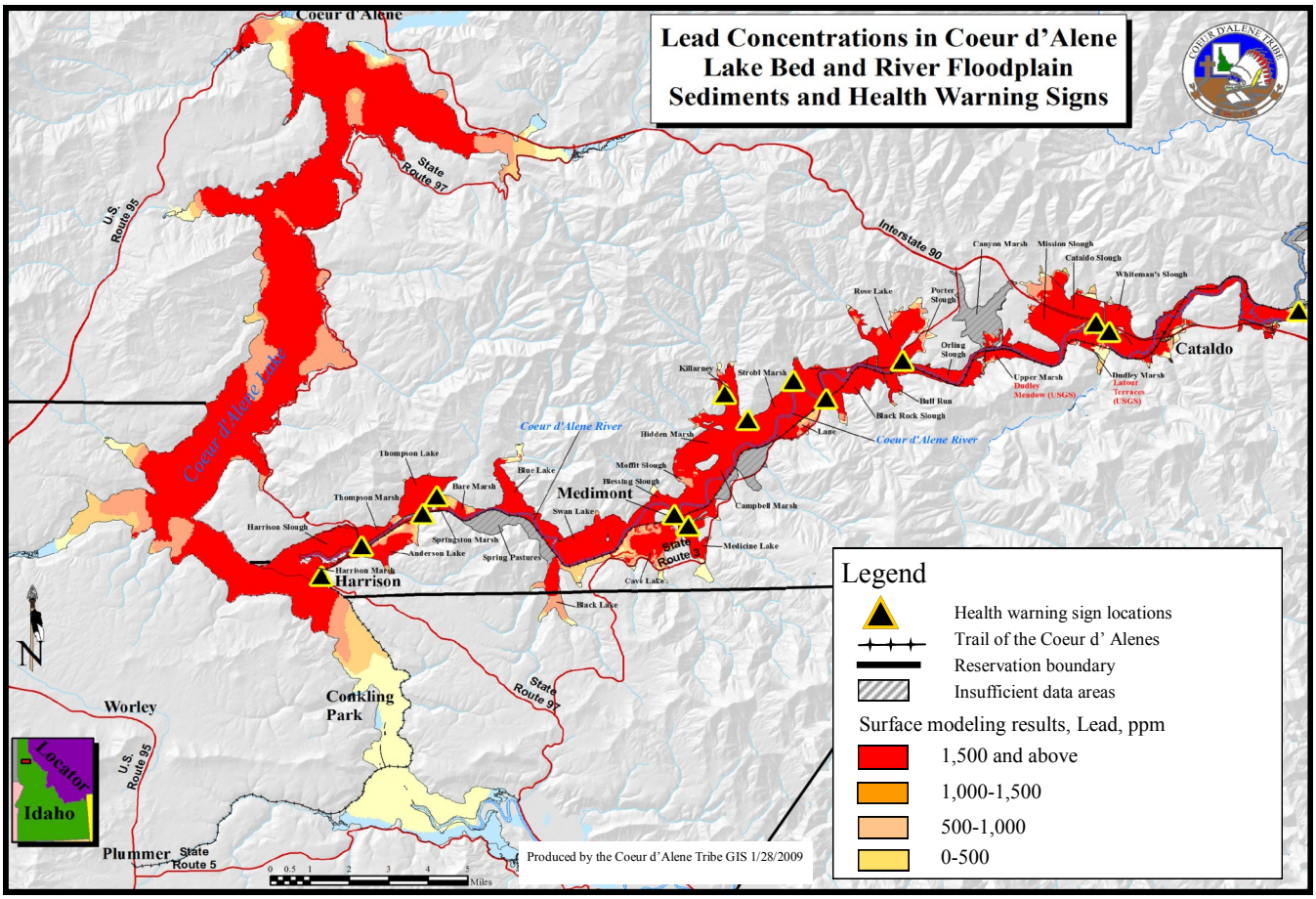


Figure 11-2 *Lead concentrations in sediments.*

Nutrient Effects on Heavy Metals

The primary environmental concern in Coeur d'Alene Lake is the potential for release of metal contaminants contained in lake bottom sediments into the water column. To prevent this from occurring, oxygen levels must be maintained in the bottom waters. Oxygen is controlled by the amount of decomposing organic matter (plant and animal), which is controlled by the amount of nutrients coming into the lake. Increased loads of nutrients (phosphorus and nitrogen) into the lake increase algae and rooted aquatic plant growth through a process known as *eutrophication*. When this organic material decomposes, *dissolved oxygen* is consumed in the water. Depletion of dissolved oxygen (*anoxia)* in lake bottom waters, will promote geochemical reactions that can release mining-related hazardous metals from the lakebed sediment.

The basic strategy to prevent the release of metals from the lake bed into the water column is to limit basin-wide nutrient inputs to the lake. Acceleration of the eutrophication process occurs due to human activity and land use such as, wastewater discharge, agricultural runoff, unpaved roads, streambank erosion, excess fertilizer and shoreline development.

The goal is to protect and improve lake water quality by limiting basin-wide nutrient inputs that impair lake water quality conditions, which in turn influence the solubility of mining-related metals contamination contained in lake sediments.

2009 Coeur d'Alene Lake Management Plan, Coeur d'Alene Tribe and Idaho DEQ

Drinking Water

Many homes in the Coeur d'Alene Basin pull their drinking water directly from surface water. Even with a sophisticated filtration system, some contaminants may make their way to the tap. Unlike iron, which may leave rust deposits, many metals are invisible, so it is important to have your water tested regularly. Contact the Panhandle Health Department in your area for more information (Resources page 11-7). It's also important to note that metal concentrations are usually highest during flood conditions, so it's best to avoid drinking surface water during these periods. For detailed information on how to protect your drinking water supply please read Section 3.

The following tables outline the current EPA standards for some metals in public drinking water systems.

Primary Standards

Contaminant	MCLG (mg/L)	MCL (mg/L)
Arsenic	0	0.010
Cadmium	0.005	0.005
Lead	0	TT Action Level = 0.015
Mercury (inorganic)	0.002	0.002

Secondary Standards

Contaminant	Secondary Standard
Iron	0.3 mg/L
Manganese	0.05 mg/L
Zinc	5 mg/L

Drinking Water Glossary

Primary Standards are legally enforceable standards that apply to public water systems. Primary standards protect public health by limiting the levels of contaminants in drinking water.

Secondary Standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply.

MCLG: Maximum Contaminant Level Goal—The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.

MCL: Maximum Contaminant Level—The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.

TT Action Level: Treatment Technique Action Level—Lead is regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps.

Health Effects of Metals

Metals found in the sediments can cause concern for human health if they become airborne (e.g., dust). Metals-contaminated sediments become even more of a concern when they are released into the water column and become available for ingestion by humans, fish, and wildlife. Most of these metals you cannot see or smell.

Lead

Lead can affect almost every organ and system in your body.

- Targets the nervous system
- May cause joint weakness, high blood pressure, and anemia
- Can severely damage the brain and kidneys
- May cause death in extreme cases

Pregnant women, fetuses, and children are especially vulnerable.

- May cause miscarriage, premature birth, and low birth weight
- Infants and children may have decreased mental ability, learning disabilities, and reduced growth

Zinc

Harmful effects generally begin at levels 10-15 times higher than the amount needed for good health. Large doses taken by mouth even for a short time can cause stomach cramps, nausea, and vomiting. Taken longer, it can cause anemia and decrease the levels of your good cholesterol.

Inhaling large amounts of zinc (as dusts or fumes) can cause a specific short-term disease called metal fume fever.

Mercury

Exposure to high levels of mercury can permanently damage the brain, kidneys, and developing fetus.

- Long term exposure can decrease brain function, incite tremors, and change vision or hearing.
- Short-term exposure to may cause lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

Fetuses and very young children are especially vulnerable.

- May pass through the mother's body to the fetus causing brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak
- May pass to a nursing infant through breast milk
- Children may develop problems of their nervous and digestive systems and kidney damage

Cadmium

Breathing high levels of cadmium can severely damage the lungs. Eating food or drinking water with very high levels severely irritates the stomach, leading to vomiting and diarrhea.

Long-term exposure to lower levels of cadmium in air, food, or water leads to a buildup of cadmium in the kidneys, and kidney disease can occur. Other long-term effects are lung damage and fragile bones.

Protect Your Health

KEEP CLEAN! Wash your hands and face before you eat anything. Wash toys, bottles and pacifiers if they have been in contact with soil or dust. Remove loose soil from your clothing, camping equipment and pets before leaving the area. Wash all items when you return home.

EAT CLEAN! Drink, cook and wash only with water from home or other approved source. Do not use river water. Always eat at a table or clean surface off the ground. Clean fish thoroughly and only eat fish fillets.

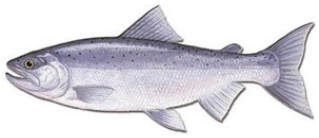
PLAY CLEAN! Children should play in grassy areas and avoid loose soil, dust and muddy areas. No mud pies.

Healthy Choices-Healthy Kids!

Riley Raccoon Cares

A big thanks to Panhandle Health District and Kellogg IDEQ for this message

Fish Consumption Advisory for Coeur d'Alene Lake and Coeur d'Alene River



Kokanee

Bullhead

Pregnant women, women who are nursing or planning to become pregnant:

Kokanee	
All CDA lakes and CDA River	10 gutted whole fish meals or 10 fillet meals per month
***Bullhead**	
Northern lake	4 gutted whole fish meals or 24 fillet meals per month
Central lake and CDA River	2 gutted whole fish meals or 13 fillet meals per month
Southern lake	3 gutted whole fish meals or 15 fillet meals per month

Children under 15 years of age:

Kokanee	
All CDA lakes and CDA River	6 gutted whole fish meals or 6 fillet meals per month
***Bullhead**	
Northern lake	3 gutted whole fish meals or 14 fillet meals per month
Central lake and CDA River	NO gutted whole fish meals or 7 fillet meals per month
Southern lake	8 gutted whole fish meals or 9 fillet meals per month

General public (people not in the first two groups):

Kokanee	
All CDA lakes and CDA River	12 gutted whole fish meals or 20 fillet meals per month
***Bullhead**	
Northern lake	20 gutted whole fish meals or 69 fillet meals per month
Central lake and CDA River	8 gutted whole fish meals or 14 fillet meals per month
Southern lake	33 gutted whole fish meals or 61 fillet meals per month

*All people are advised to eat Bullhead fillets rather than gutted or whole fish. People with increased blood lead levels or living in an area with high concentrations of lead in their yard soil or house dust should eat less whole Bullhead than suggested in this advisory. **This is especially true for children and pregnant women**.

Statewide Mercury Advisory For Bass

A statewide advisory has been issued for all lakes, rivers, reservoirs and other water bodies in Idaho for **BASS** due to mercury contamination. To be safe it is recommended that:

- Women who are pregnant, planning to become pregnant, nursing and children under age 15 should not eat more than 2 meals a **MONTH** of Bass.
- The general population (women not of child bearing age, those older than age 15) should not eat more than 8 meals a **MONTH** of Bass.
- All people **SHOULD NOT** eat any other fish during the month if you eat these amounts of Bass caught in Idaho.

Other Fish

Kokanee and Bullhead are similar to many fish in the lake that were not tested. It is possible that these fish have high levels of lead, arsenic and mercury, and guidelines to the right should be followed for these fish:

- Bluegill, Crappie and Perch less than 8 inches, Pumpkinseed, Rainbow Trout, Brook Trout, Cutthroat Trout & Tench, follow Kokanee guidelines.
- Channel Catfish and Suckers, follow Bullhead guidelines.

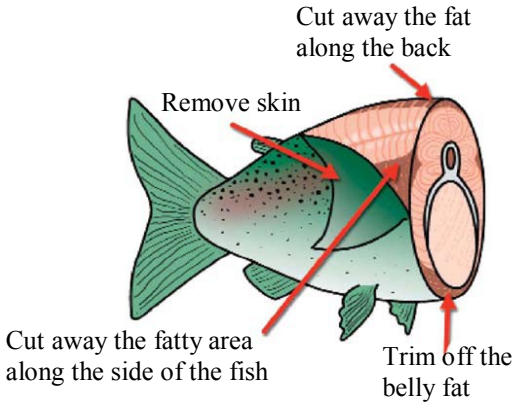


Figure 11-3 *Reduce your risk, trim your fish.*

For complete Fish Consumption Guide, see IDH&W web site on Resource Directory page 11-7.

Institutional Controls Program

Within the Superfund boundary, including the Coeur d'Alene River, your property may lie within the Institutional Controls Program (ICP) boundary. This boundary was identified by the State of Idaho and Panhandle Health District as the areas where contamination is present or the potential for exposure exists. If your property falls within this boundary, a permit is required for any work done within its limits.

What is ICP?

The Institutional Controls Program (ICP) is a locally enforced set of rules and regulations designed to ensure the integrity of clean soil and other protective barriers placed over contaminants that exist throughout the Bunker Hill Superfund site.

The purpose of ICP is to protect public health and assist with local land transactions within the Superfund site.

The ICP also provides:

- Education
- Sampling assistance
- Clean soils for small projects
- Pickup of soil removed from small projects
- A permanent disposal site for contaminated soils

For more information, contact Panhandle Health District-Kellogg ICP Office in Shoshone County or go to www.basincommission.com

Even if you are located outside of a contamination area, your living patterns could affect those upstream and downstream of your property. How you handle nutrients and other wastes will impact potential metals release or other forms of contamination exposure.

Figure 10-2
Yard remediated through the Basin Property Contamination Program

Protection/Prevention

Unfortunately, mine waste contamination has already occurred, and how we deal with the contamination now is our only defense to exposure. Fortunately, there are many things homeowners can do to prevent interaction with contaminated sediments.

Protect Yourself and Your Property

Some areas of your property may be contaminated. Please have your property tested for contamination. If you learn you have contaminated property there are a number of solutions for your safety. A commonly accepted practice is to place barriers on top of the contaminated sediment. Barriers can include a hard pavement (concrete, asphalt), gravel capping, or vegetation. If a barrier is constructed, proper maintenance and care is required. Homeowners can also remove the contaminated sediments and haul them to an EPA approved repository through the ICP Program. Contact Panhandle Health District for more information on these locations. Homeowners should also be aware of potential flooding which could contaminate one's property. Homeowners are encouraged to coordinate with DEQ, the Tribe, and PHD-ICP staff in order to appropriately design and construct any changes to their property.

Quick Safety Tips

- Use protective measures when moving dirt on your property. Take contaminated clothing and shoes off before entering your vehicle or your home. A simple water "decontamination" procedure will remove any particles still on your shoes. Wash clothing separately to remove any fine dust.
- During construction or any earth movement, have proper ventilation in your home to prevent fine sediment dust blowing in through windows.
- Watch children to make sure they wash their hands after playing outside and before eating or drinking.
- Always wash your hands after handling any sediment and remember the saying, "Suds after Mud."

Resource Directory

Panhandle Health District
www.phd1.idaho.gov

Benewah County:
137 N. 8th St.
St. Maries, ID 83861
208-245-4665

Kootenai County:
8500 N. Atlas Rd.
Hayden, ID 83835
208-415-5100

Shoshone County:
114 Riverside
Kellogg, ID 83837
208-786-7474
Institutional Control Program
208-783-0707

Department of Environmental Quality
www.deq.idaho.gov

2110 Ironwood Pkwy.
Coeur d'Alene, ID 83814
208-769-1422

Coeur d'Alene Tribe
www.cdatribe-nsn.gov

Lake Management Department-
Hazardous Waste Management Program
424 Sherman Ave., STE 306
Coeur d'Alene, ID 83814
208-667-5772

USEPA Region 10
www.epa.gov/aboutepa/region10.html

1200 Sixth Ave., Suite 900
Seattle, WA 98101
800-424-4372

Coeur d'Alene Field Office
1910 Northwest Blvd., Suite 208
Coeur d'Alene , ID 83814

Department of Health and Welfare
Fish Advisory Program
www.healthandwelfare.idaho.gov

Basin Environmental Improvement Project Commission (BEIPC)—The Basin Commission
www.basincommission.com

RISK ASSESSMENT WORKSHEETS

Heavy Metals

The assessment table below will help you identify potential environmental risks related to your lawn and garden maintenance practices. For each question indicate your risk level in the right-hand column. Some choices may not correspond exactly to your situation. Choose the response that best fits. When finished turn to the **Action Worksheet** on page 11-9, and record your medium and high-risk practices. Your goal is to lower your risks. Use the BMP recommendations in the Section 11: Heavy Metals, to help you decide how to best reduce pollution.

	LOW RISK	MEDIUM RISK	HIGH RISK	YOUR RISK
Knowledge of heavy metals contamination in the CDA Basin.	I am well aware of the contamination due to mining activities in the area and take steps regularly to protect water quality.	I have determined that my property falls within the ICP boundary, but I have not taken any other precautions.	I was not aware that heavy metals contamination was present in the CDA Basin.	☐ Low ☐ Medium ☐ High
Nutrient effects on heavy metals.	I understand the eutrophication process and how it relates to the release of heavy metals in lake bottom sediments. I prevent nutrient loading on my property.	I was not aware that heavy metals can be released when plants break down. Our property falls within the ICP boundary.	Our property has a lawn directly on the lake and is fertilized regularly. The shoreline is also eroding.	☐ Low ☐ Medium ☐ High
Fish consumption	I check the Idaho Health and Welfare website annually to determine safe fish consumption rates.	I was not aware that excess fish consumption in the CDA Basin was a potential concern. I rarely consume fish.	I fish on a regular basis, but was not aware there was a fish consumption advisory. I eat fish from the CDA Basin daily.	☐ Low ☐ Medium ☐ High
Institutional Control Program (ICP).	I have checked to see if my property falls within the ICP boundary. I utilized the ICP to remediate contamination on my property.	I knew the program existed and that my property qualified, but I haven't taken the time to find out more.	I had never heard of the ICP program.	☐ Low ☐ Medium ☐ High

ACTION WORKSHEET

Heavy Metals

Write all high and medium risks below.	**What can you do to reduce the risks?**	**Set a target date for action.**
Sample: I live within the ICP boundary but have taken no action to remediate potential contamination.	Call ICP to find out more about the program. Test soil for contamination. Cap soil with vegetation if determined that is the most effective.	Today.