

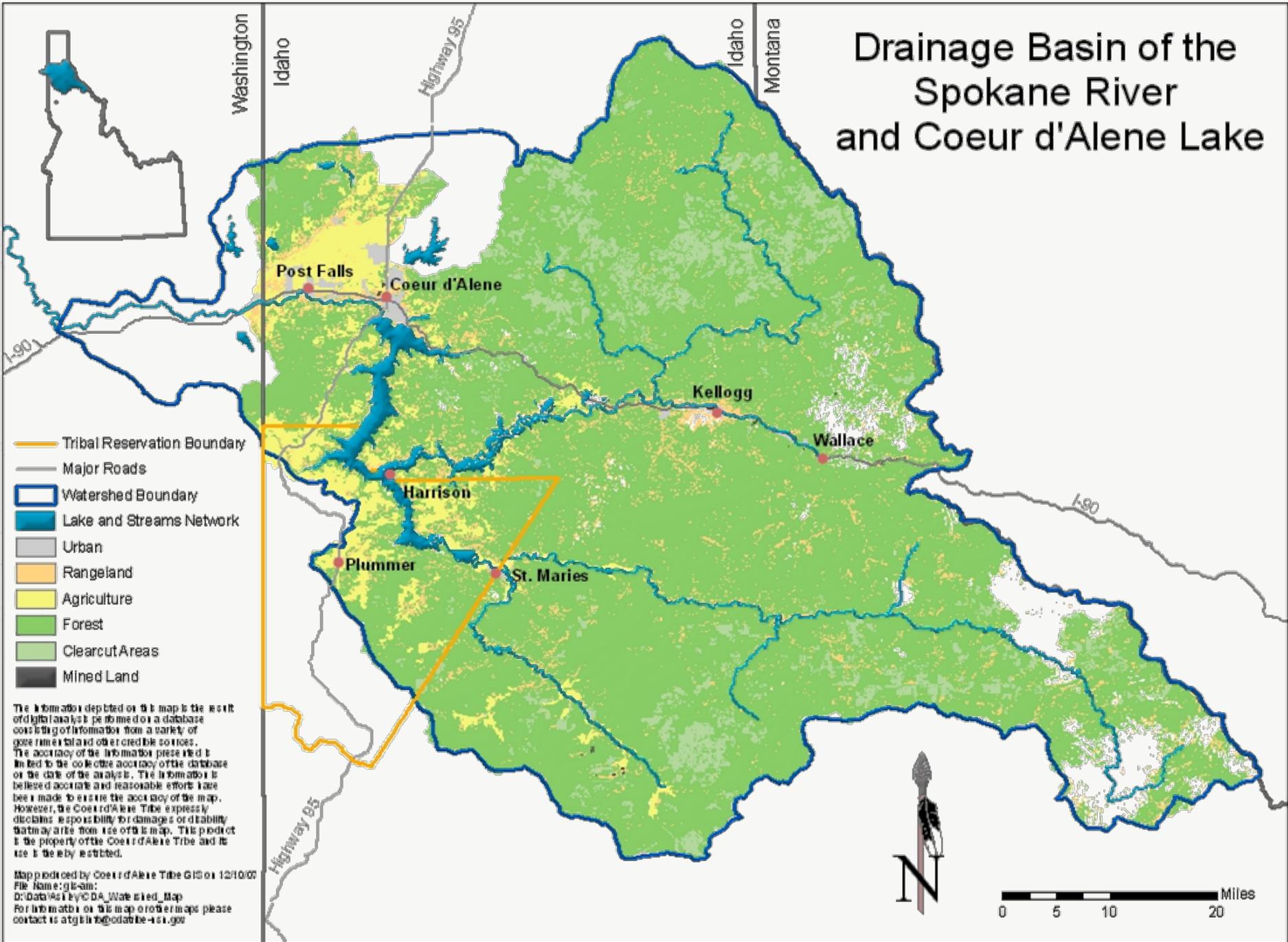


Coeur d'Alene Lake Management

- Coeur d'Alene Basin Overview
- Coeur d'Alene Lake Water Quality
- Coeur d'Alene Lake Management Plan

Overview

Drainage Basin of the Spokane River and Coeur d'Alene Lake

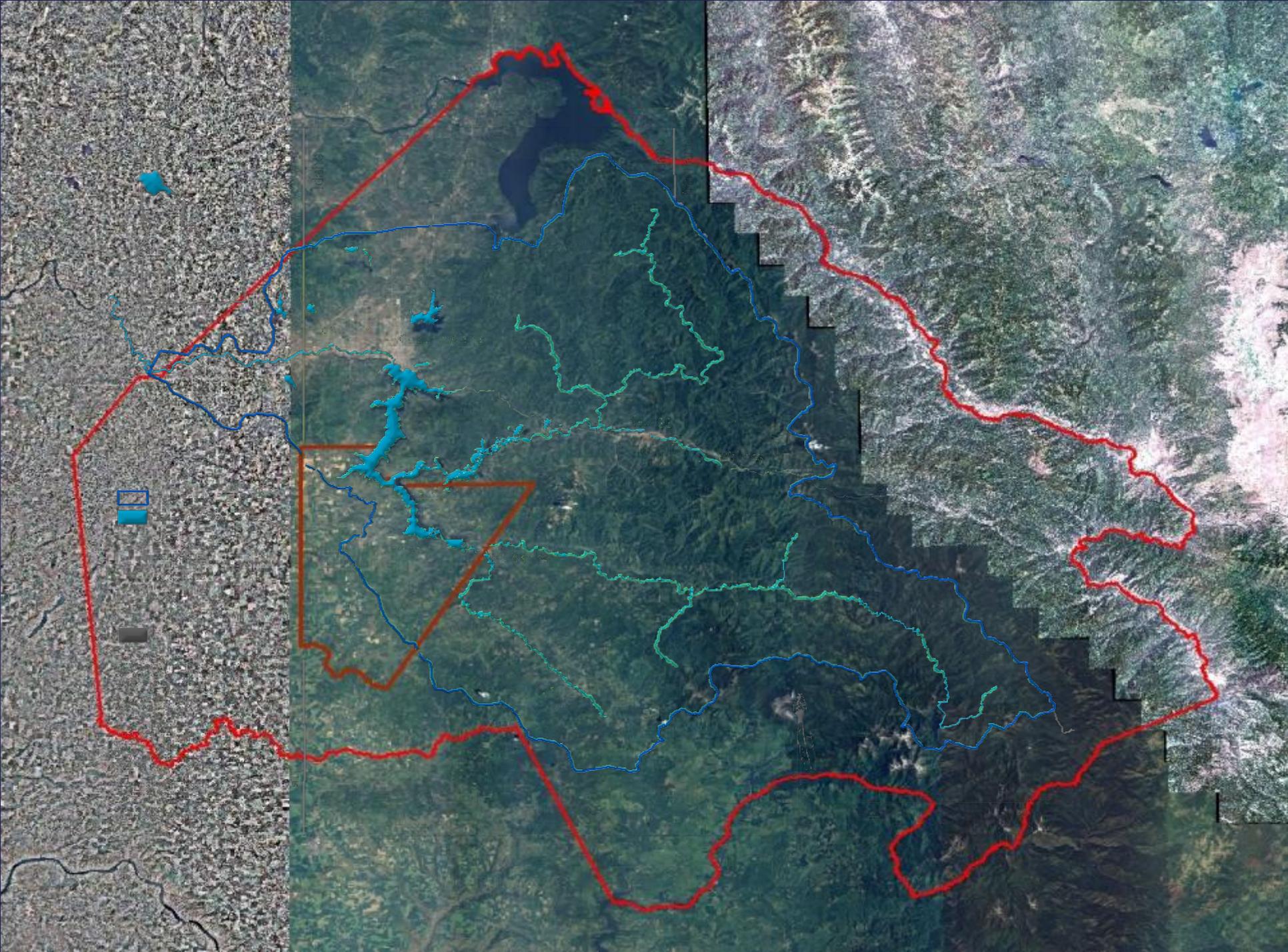


- Tribal Reservation Boundary
- Major Roads
- Watershed Boundary
- Lake and Streams Network
- Urban
- Rangeland
- Agriculture
- Forest
- Clearcut Areas
- Mined Land

The information depicted on this map is the result of digital analysis performed on a database consisting of information from a variety of geographic data and other credible sources. The accuracy of the information presented is limited to the quality of the accuracy of the database or the date of the analysis. The information is believed accurate and reasonable efforts have been made to ensure the accuracy of the map. However, the Coeur d'Alene Tribe expressly disclaims responsibility for damages or liability that may arise from use of this map. This product is the property of the Coeur d'Alene Tribe and its use is hereby restricted.

Map produced by Coeur d'Alene Tribe GIS on 12/10/07
 File Name: gis-2m
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 For information on this map or other maps please contact us at gis@coadale-nsi.gov





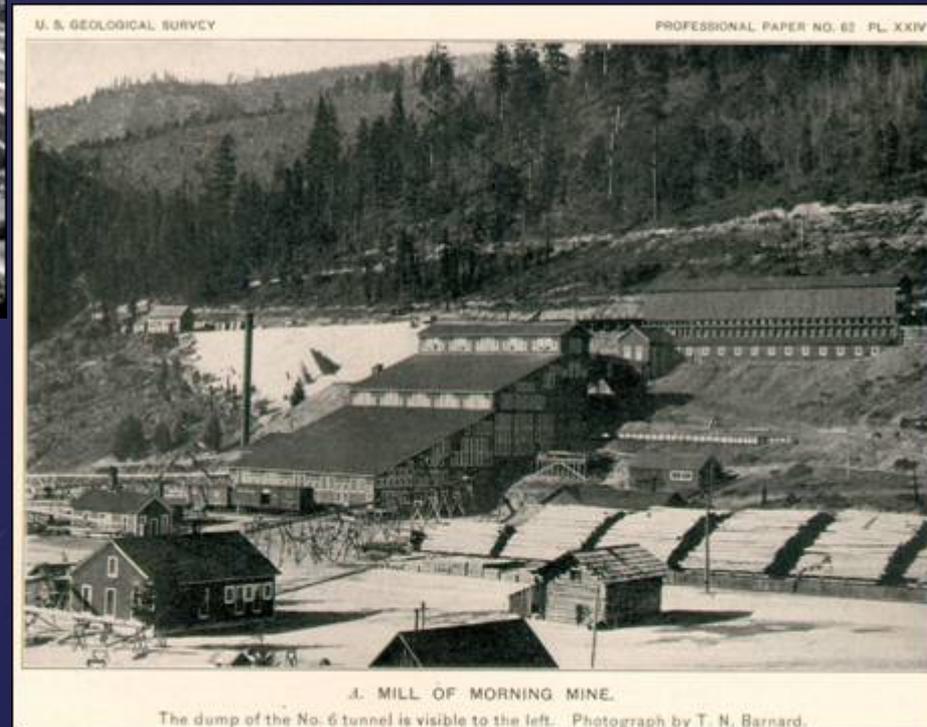
Silver Valley/Bunker Hill Mining District & Complex – a Superfund Site since 1983



Down the Coeur d'Alene River...

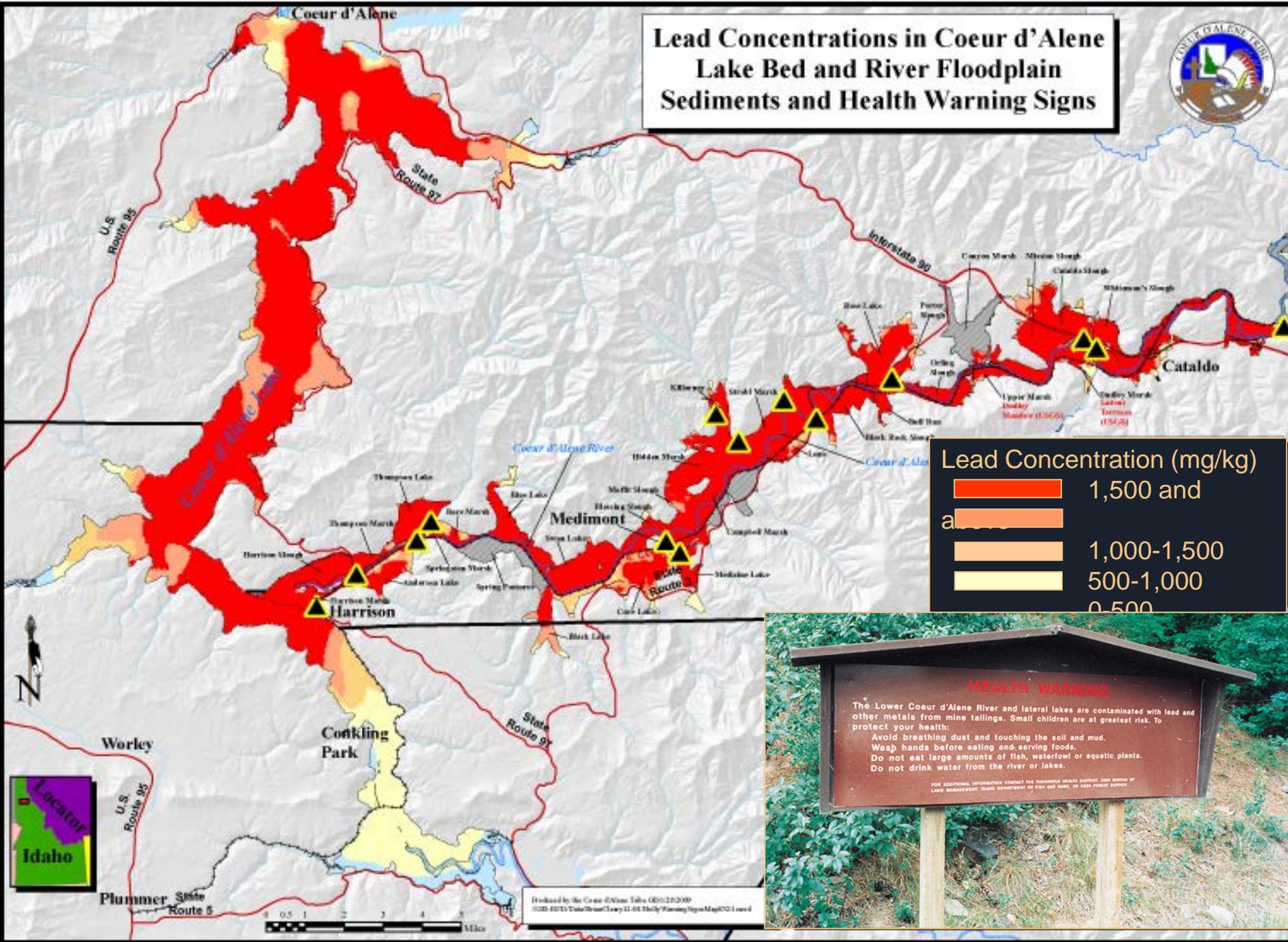
To Coeur d'Alene Lake

A century of millions of tons of mine
tailings, slurries, and sediments
enriched with metals...





Lead Concentrations in Coeur d'Alene Lake Bed and River Floodplain Sediments and Health Warning Signs



Produced by the Coeur d'Alene Tribe (05/12/2009)
©2011 US Forest Service/USDA
11-04 Health Warning Signs Map/0211 used



CERCLA

Comprehensive Environmental Response & Compensation Act

- “Superfund”
- Clean-up authority for EPA, BLM, USFS (Federal Trustees)
- Mandates remediation where there has been injury to human health and the environment

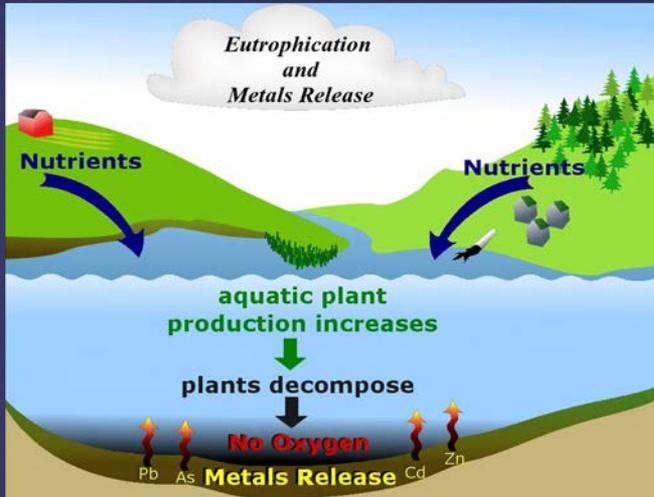


- Over 75 million metric tons of lead, zinc, cadmium, and arsenic contaminated sediments in Coeur d'Alene Lake
 - Runoff from Cd'A River continues to transport this sediment
 - Runoff from other tributaries contributes sediment and nutrients
- Lake Management Program developed and implemented as an alternative to U.S. EPA action under CERCLA

Coeur d'Alene Lake Water Quality

- **Water Quality Authority under the Clean Water Act:
Idaho DEQ
Coeur d'Alene Tribe**
- **Land-use management:
Other State and Federal Agencies
Cities
Counties**
- **March 2009:
Final LMP published**

Coeur d'Alene Lake Management Plan



➤ **Goal**

- “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.”

➤ **Approach involves:**

- *science*
- *education and outreach*
- *nutrient reduction planning and projects*
- *regional collaboration*

Coeur d’Alene Lake Management Plan

Science: Monitoring and Modeling

- Core Monitoring: 8 events each year
 - Physical
 - Chemical
 - Biological Parameters
- Special Studies
 - Aquatic Macrophytes
 - Benthic Macroinvertebrates
 - Zooplankton Studies
- ELCOM-CAEDYM Model



Partnerships



Work together to address current pressures:

- Development
- Recreation
- Tourism

- Agencies
- Counties
- Municipalities
- Watershed Advisory Groups
- Educational Institutions



Critical partners in lake management efforts!

- Identify nutrient sources
- Identify improvement opportunities
- Prioritize potential projects
- Vital component of both the nutrient management and partnership objectives

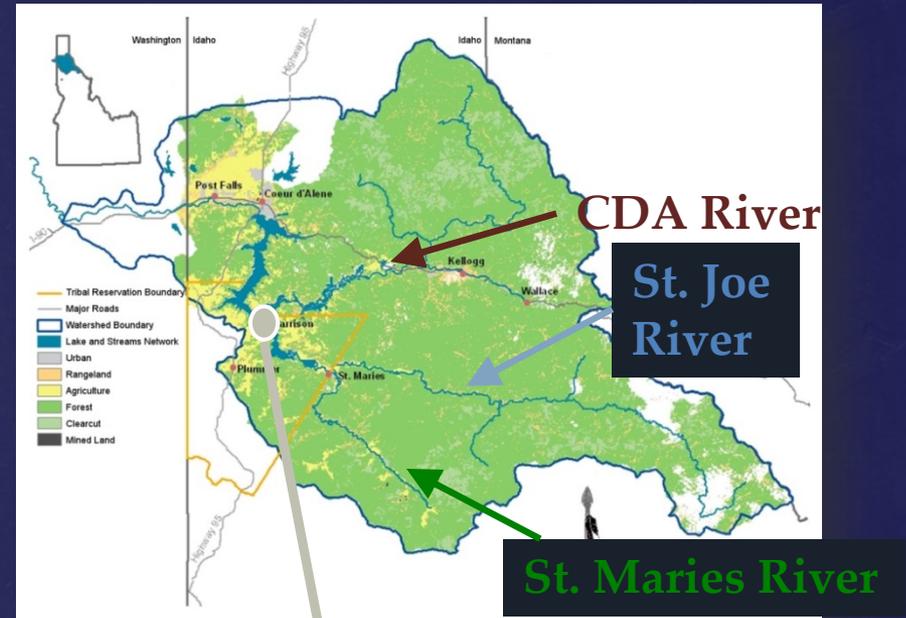
Watershed Advisory Groups

- Inventory Nutrient Sources
- Monitor nutrient loading
- Identify and prioritize nutrient reduction projects

Nutrient Reduction Action Plan

Influences on the Lake's Metabolism

- Most metals and nutrients enter the lake via St. Joe, St. Maries and Cd'A Rivers
 - Lake functions as a sink for metals and nutrients
 - Extent of retention within the lake varies with:
 - *time* (seasonal, inter-annual)
 - *chemical constituent*
- Smaller inputs from
 - Atmospheric deposition
 - Smaller creeks, streams
 - Near-shore development
 - Transport from sediments to overlying water (*benthic flux*)



Variable River Flow and Loading

Four Trends in Nutrient, Metal Loading

Constituent	Time Period	Average Load Out (tons/yr)	Average % retained
Total Phosphorous ~40-60%	1975	198	--
	CY 1991	103	49%
	CY 1992	43	35%
	WY 2004-06	117	62%
	WY 2009-13	--	--
Total Nitrogen ~10-20%	1975	2,748	--
	CY 1991	2,325	17%
	CY 1992	1,050	19%
	WY 2004-06	468	13%
	WY 2009-13	--	--
Total Lead ~85-95%	CY 1991	575	87%
	CY 1992	89	83%
	WY 2004-06	139	95%
	WY 2009-13	400	95%
Total Zinc ~25-45%	CY 1991	1,097	35%
	CY 1992	532	33%
	WY 2004-06	519	45%
	WY 2009-13	460	25%
Total Cadmium ~40-60%	CY 1991	3.8	36%
	CY 1992	4.6	39%
	WY 2004-06	3.2	62%
	WY 2009-13	--	--

From 1970's – 1990's, N & P loading appears to have **decreased** by 40% -- 60%

Between any two consecutive years, loading for a given constituent can vary by a factor of 2 – 6

Multi-year trends in loading can go in different directions (e.g, ~2005 -- ~2011 Zn decreases, Lead increases)

Lake's ability to retain constituents is generally consistent across years (does vary by constituent)

Percentages are proportion of inflows retained in Cd'A Lake, mass is US short tons

Nutrient Reduction



Bank Erosion Monitoring



Shadowy St. Joe Bank Project with Avista Utilities



Nutrient Reduction

Stormwater Pilot Projects



Erosion and Sediment Control



Community Awareness



Our Gem
Coeur d'Alene Lake
Collaborative



Coeur d'Alene Lake Management Plan

Lake-A-Syst

A Landowner's Guide to Protecting Water Quality





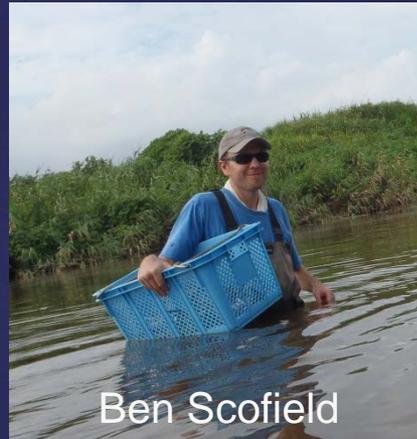
Scott Fields and Michael George



Glen Pettit



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