

**Coeur d'Alene Lake Management Plan**

Prepared by:

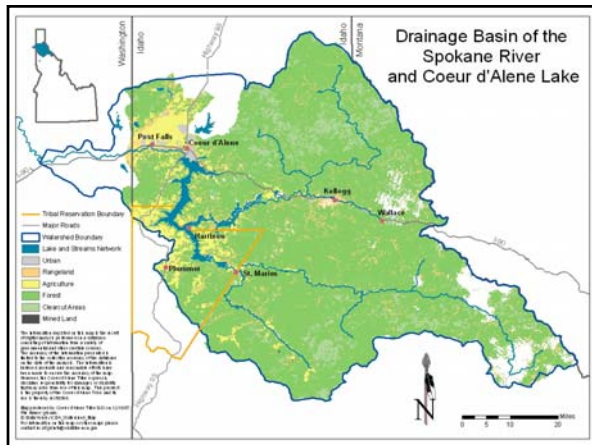
State of Idaho  
Department of Environmental  
Quality  
and the  
Coeur d'Alene Tribe



**Coeur d'Alene Lake Management Plan**  
Idaho DEQ and Coeur d'Alene Tribe  
Finalized March 2009

**Stated 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."*



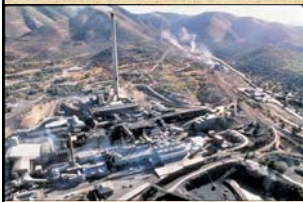

**Coeur d'Alene Lake**

|                       |                   |
|-----------------------|-------------------|
| Surface area =        | 31,875 acres      |
| Lake volume =         | 2.3 million ac-ft |
| Max depth =           | 64 m              |
| Mean depth =          | 22 m              |
| Mean retention time = | 0.5 years         |
| Watershed area =      | 2.4 million acres |
| Shoreline length =    | 150 miles         |



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

A century of millions of tons of mine tailings, slurries, and sediments enriched with metals transported down the Coeur d'Alene River and settling in the bottom of Coeur d'Alene Lake

## Coeur d'Alene Lake Management Plan

### Background

- ▶ Bottom sediments of Coeur d'Alene Lake have high concentrations of trace metals (e.g. lead, zinc, cadmium).
- ▶ In 2001 the U.S. Supreme Court affirmed that the United States, as trustee, and Cd'A Tribe as beneficiary, hold title to the bed and banks of most of the lower one-third of the lake and lower St. Joe River.
- ▶ The EPA 2002 Record of Decision (ROD) deferred a CERCLA clean-up remedy for the lake, and instead advised a LMP to be developed by DEQ, Tribe, and stakeholders.

### Additional Background:

- ▶ Idaho DEQ and the Cd'A Tribe have water quality authorities and jurisdictions under the federal CWA.
- ▶ Land-use management is done by the basin stakeholders.
- ▶ Since 2002, DEQ and the Tribe, along with an array of governmental agencies and community stakeholders, have been trying to finalize an updated LMP. A final LMP published March 2009; signed by Coeur d'Alene Tribal Chairman Chief Allan and Governor Otter, and forwarded to EPA.

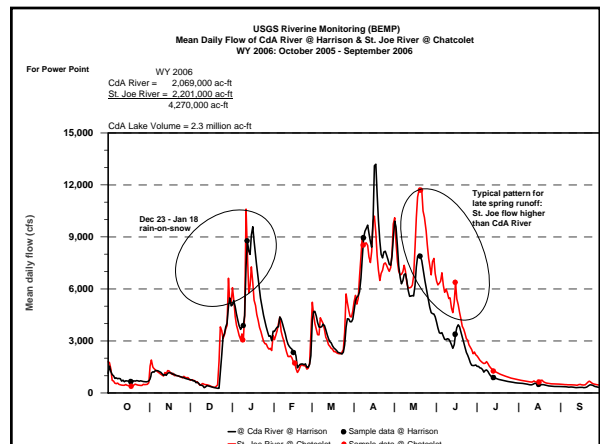
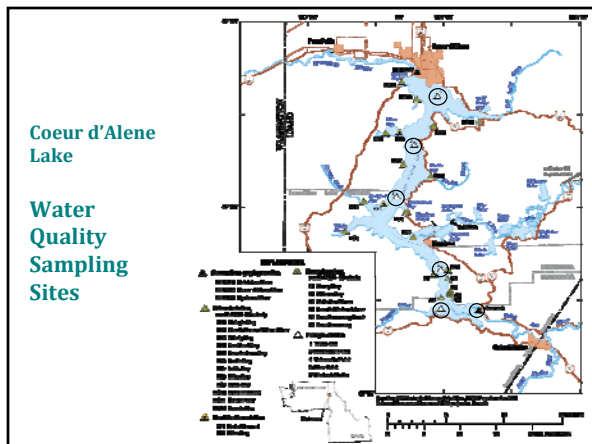
## Coeur d'Alene Lake Management Plan

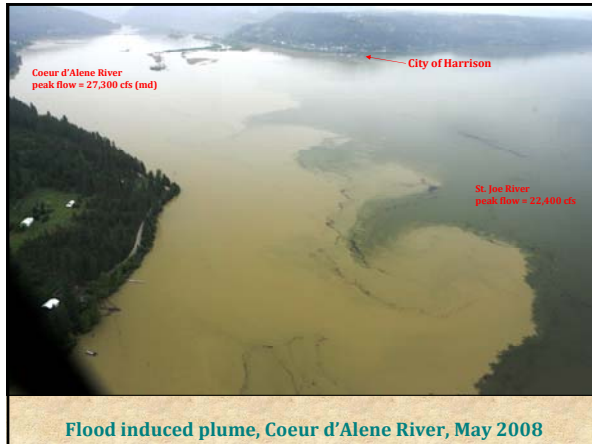
### Beginning Objectives

1. Improve Scientific Understanding of Lake Conditions.
2. Establish and Strengthen Partnerships.
3. Develop and Implement a 3-Year Nutrient Source Inventory.
4. Increase Public Awareness of Lake Conditions.
5. Establish Funding Mechanisms to Support the LMP Goal, Objectives, and Strategies.

**Table A1. Monitoring and research studies conducted in Coeur d'Alene Lake since 1975 (this is not a complete list). See References for full citations.**

|   |  |
|---|--|
| <p>1975:<br/>EPA National Eutrophication Survey – 3 sampling visits, April, July, &amp; September (U.S. EPA, 1977)</p> <p>1987:<br/>USGS sampling trips (Woods, 1989)</p> <p>1989:<br/>USGS extensive sampling of metal concentrations in lakebed sediments (Horowitz <i>et al.</i> 1993, 1995)</p> <p>1991 and 1992:<br/>USGS baseline study of limnological conditions (Woods and Beckwith, 1997)</p> <p>1994:<br/>USGS bioassays of dissolved zinc inhibition of phytoplankton (Woods and Beckwith, 1997)</p> <p>1998 - 2001:<br/>USGS study of benthic flux of metals and nutrients from sediments (Kuwabara <i>et al.</i>, 2000 and Kuwabara <i>et al.</i> 2003)</p> | <p>August 2001, June 2004, June 2005:<br/>USGS – research of zinc effects on phytoplankton productivity (Kuwabara, <i>et al.</i> 2006)</p> <p>2002 – 2005:<br/>Studies and reports produced for Avista FERC Relicensing - Spokane River Hydrologic Project</p> <p>October 2003 – August 2006:<br/>USGS &amp; Coeur d'Alene Tribe – further baseline studies of limnological conditions (Wood and Beckwith, 2008)</p> <p>2004 – 2006:<br/>USGS, University of Western Australia – Centre for Water Research, and Coeur d'Alene Tribe – development of ELCON-CAEDYM computer model specific for Cd'A Lake (Dallimore <i>et al.</i>, 2007 and Hipsey <i>et al.</i> 2007)</p> <p>March 2003 – ongoing:<br/>EPA - Basin Environmental Monitoring Program including two inflow river stations and one lake outflow station</p> |
|---|--|



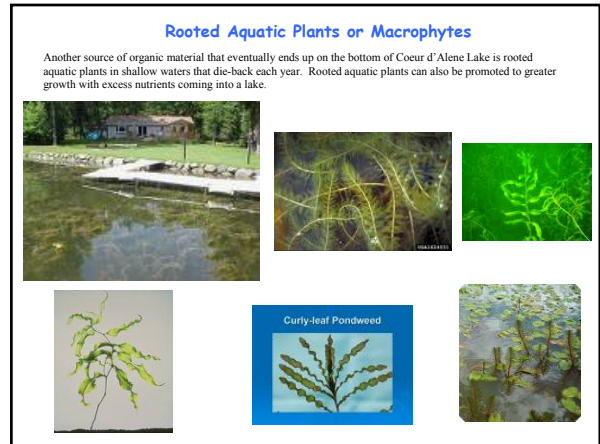
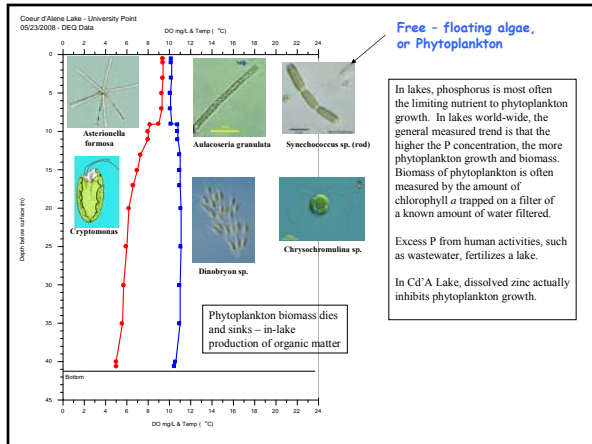
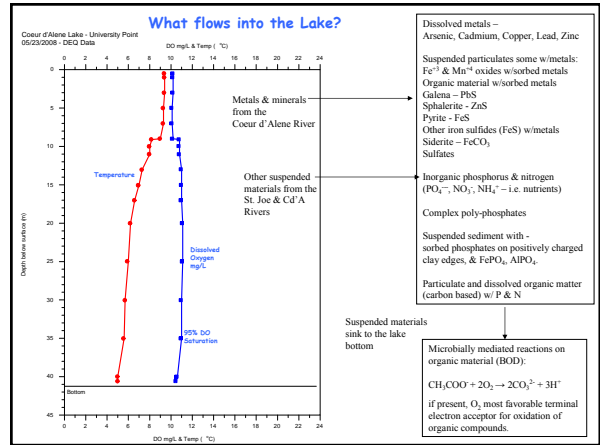
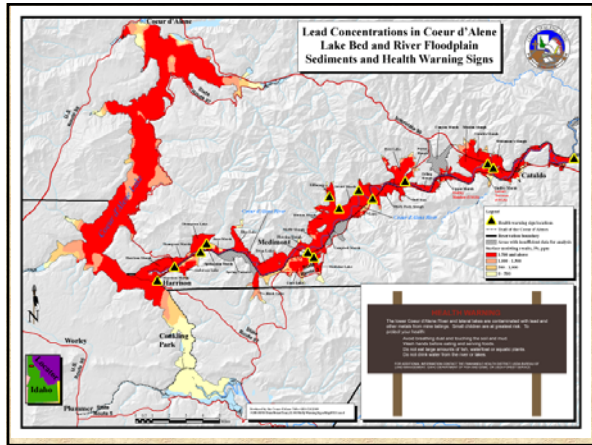


**Table 25.** Statistical summary of selected trace elements in surficial and subsurface lakebed sediments in enriched and unenriched areas, Coeur d'Alene Lake (Horowitz *et al.* 1993, 1995 and Woods and Beckwith, 1997).

[mg/kg, milligrams per kilogram; S, surficial sample; C, subsurface core sample]

| Trace Element | Sample Type | Concentration for enriched area (mg/kg) |         |       |              | Median for unenriched areas <sup>1</sup> |
|---------------|-------------|---|---------|-------|--------------|--|
|               |             | Minimum                                 | Maximum | Mean  | Median       |  |
| Arsenic       | S           | 2.4                                     | 660     | 151   | 120          | 4.7                                      |
|               | C           | 3.5                                     | 845     | 103   | 30           | 12                                       |
| Cadmium       | S           | -0.5                                    | 157     | 62    | 56           | 2.8                                      |
|               | C           | -0.1                                    | 137     | 25    | 26           | 0.3                                      |
| Copper        | S           | 9                                       | 215     | 72    | 70           | 25                                       |
|               | C           | 20                                      | 650     | 91    | 60           | 30                                       |
| Lead          | S           | 14                                      | 7,700   | 1,900 | <b>1,800</b> | <b>24</b>                                |
|               | C           | 12                                      | 27,500  | 3,200 | <b>1,250</b> | <b>33</b>                                |
| Mercury       | S           | 0.02                                    | 4.9     | 1.8   | 1.6          | 0.05                                     |
|               | C           | <0.01                                   | 9.9     | 1.9   | 0.95         | 0.06                                     |
| Zinc          | S           | 63                                      | 9,100   | 3,600 | <b>3,500</b> | <b>110</b>                               |
|               | C           | 59                                      | 14,000  | 2,400 | <b>2,100</b> | <b>118</b>                               |

<sup>1</sup>Unenriched area median concentration for sample type S based on 17 samples from southern area of Coeur d'Alene Lake and lower reach of St. Joe River. Unenriched area median concentration type C based on 189 sample aliquots from cores beneath enriched area.

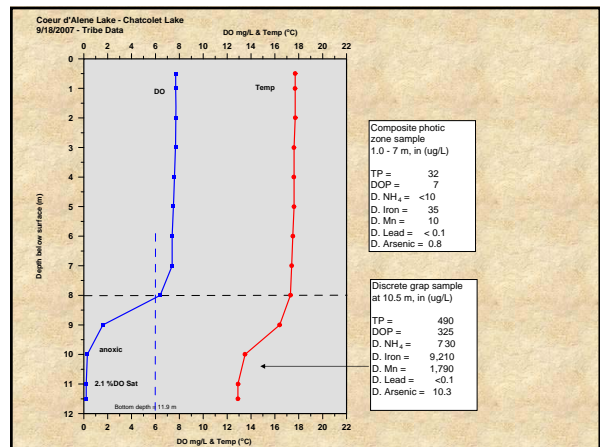
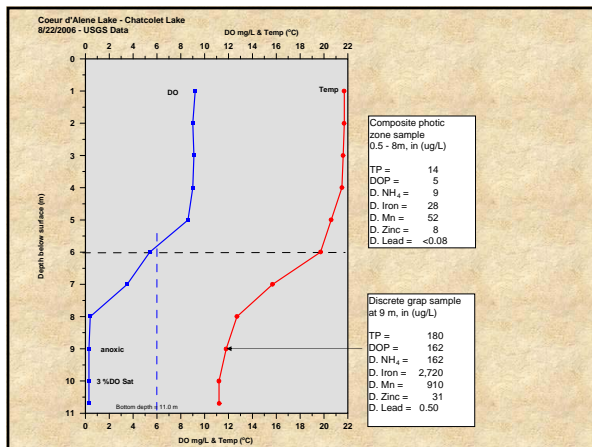
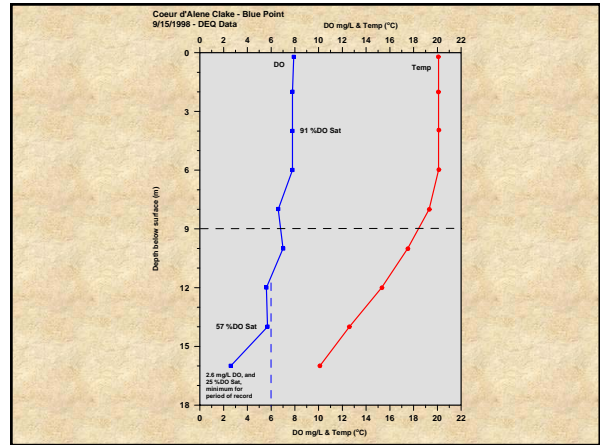
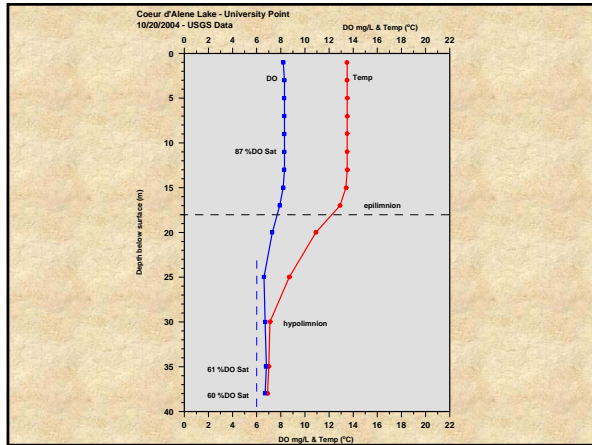
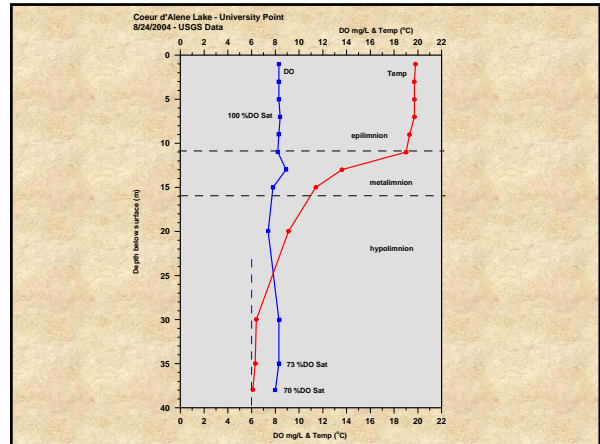


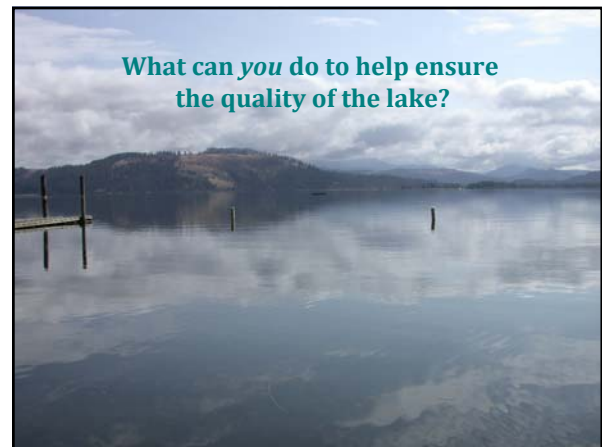
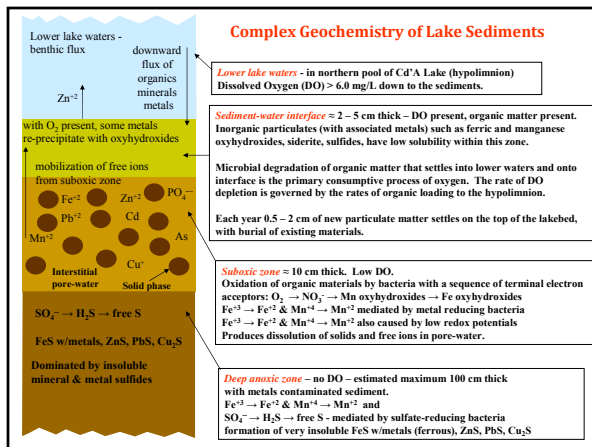
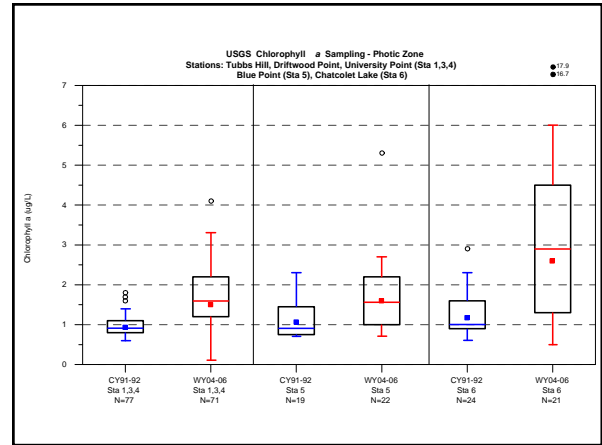
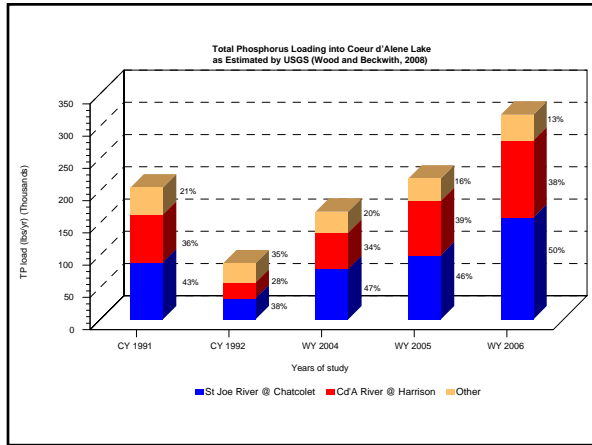
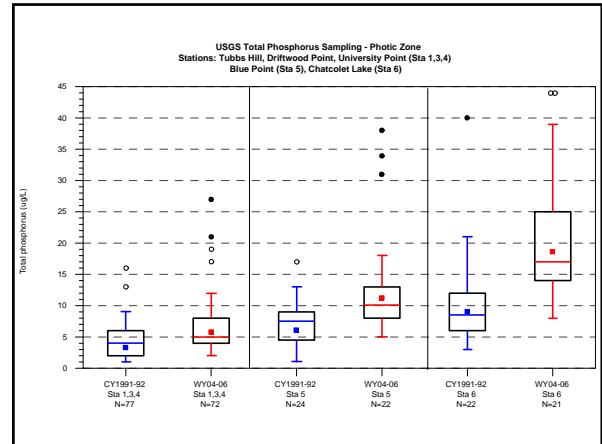
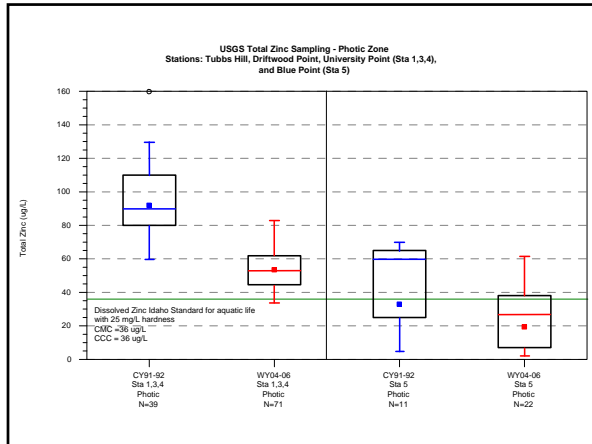


### Some Key Scientific Questions for Cd'A Lake



1. Is there a nutrient load into the lake above current levels that could lead to anoxia in the lower-most portion of northern waters, and increase the level of anoxia in southern waters? Would this result in the release of heavy metals within the sediments into the water column (i.e. would the geochemistry change from current conditions)?
2. What happens if dissolved zinc becomes reduced below the level of toxicity?





### Leave native vegetation along shorelines



### Maintain buffers during construction



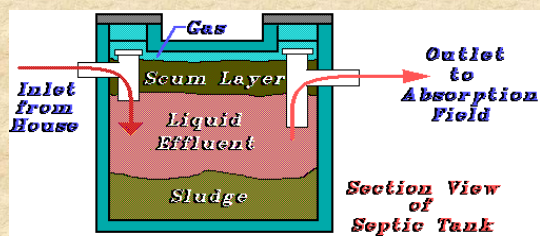
### Maintain exclusionary fencing



### Apply fertilizers and pesticides responsibly



### Maintain septic systems & drain fields



### Remove vegetation from props



## What the Tribe and DEQ are doing today:

- Water Quality monitoring within the Lake
- Developing a Needs Assessment for Ed/Outreach Program
- Updating Lake\*A\*Syst materials
- Designing the 3-Year Nutrient Source Inventory (St. Maries/St. Joe watersheds)

To view the LMP visit the following websites:

Coeur d'Alene Tribe:

<http://www.cdatribe-nsn.gov/Departments/PublicNotices>

DEQ:

<http://www.deq.idaho.gov/>

Questions?

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