

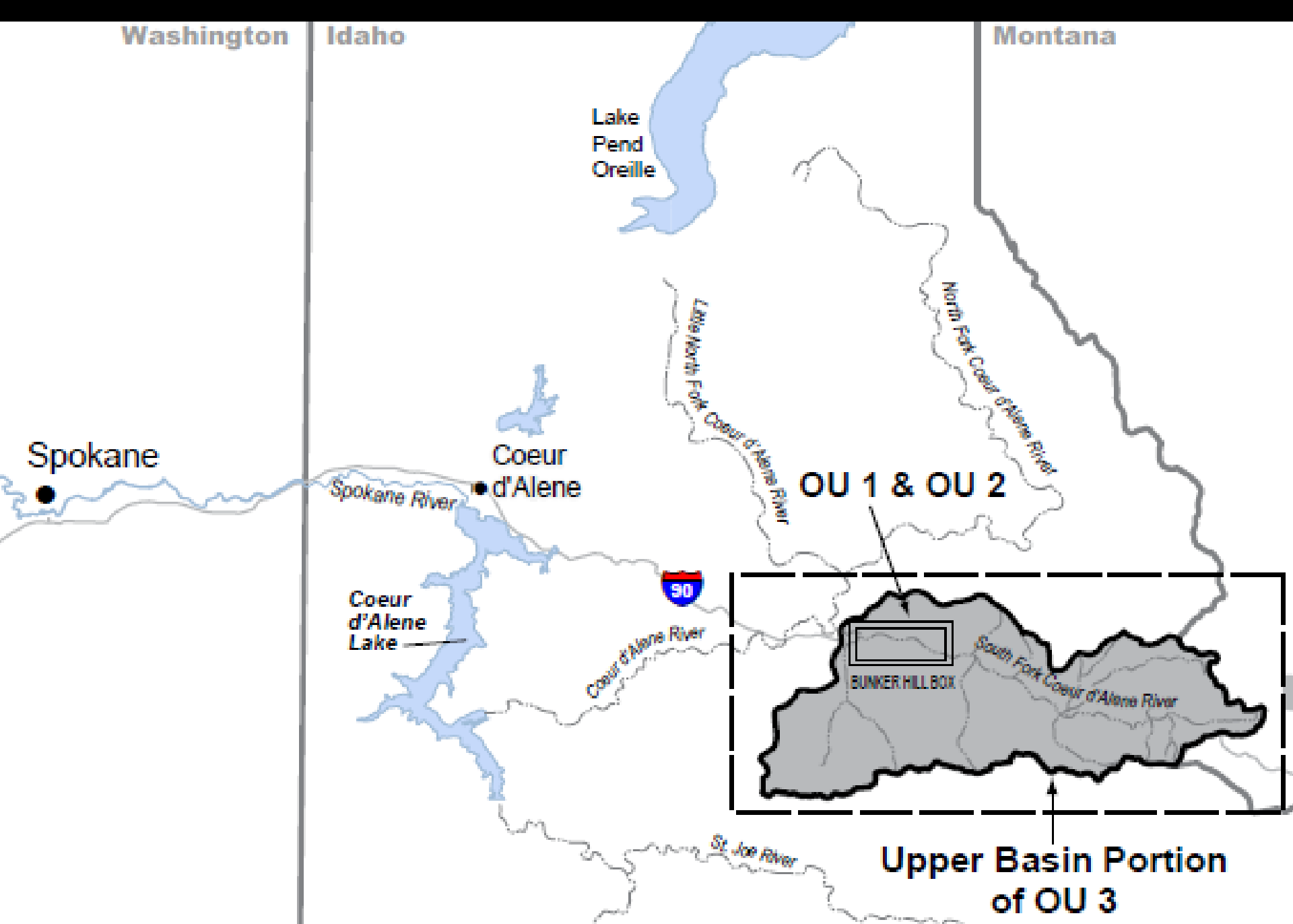
Clean-Up and Habitat Restoration at the Silver Crescent Mine and Mill near Kellogg, ID

A sign of things to come in the Coeur d'Alene Basin

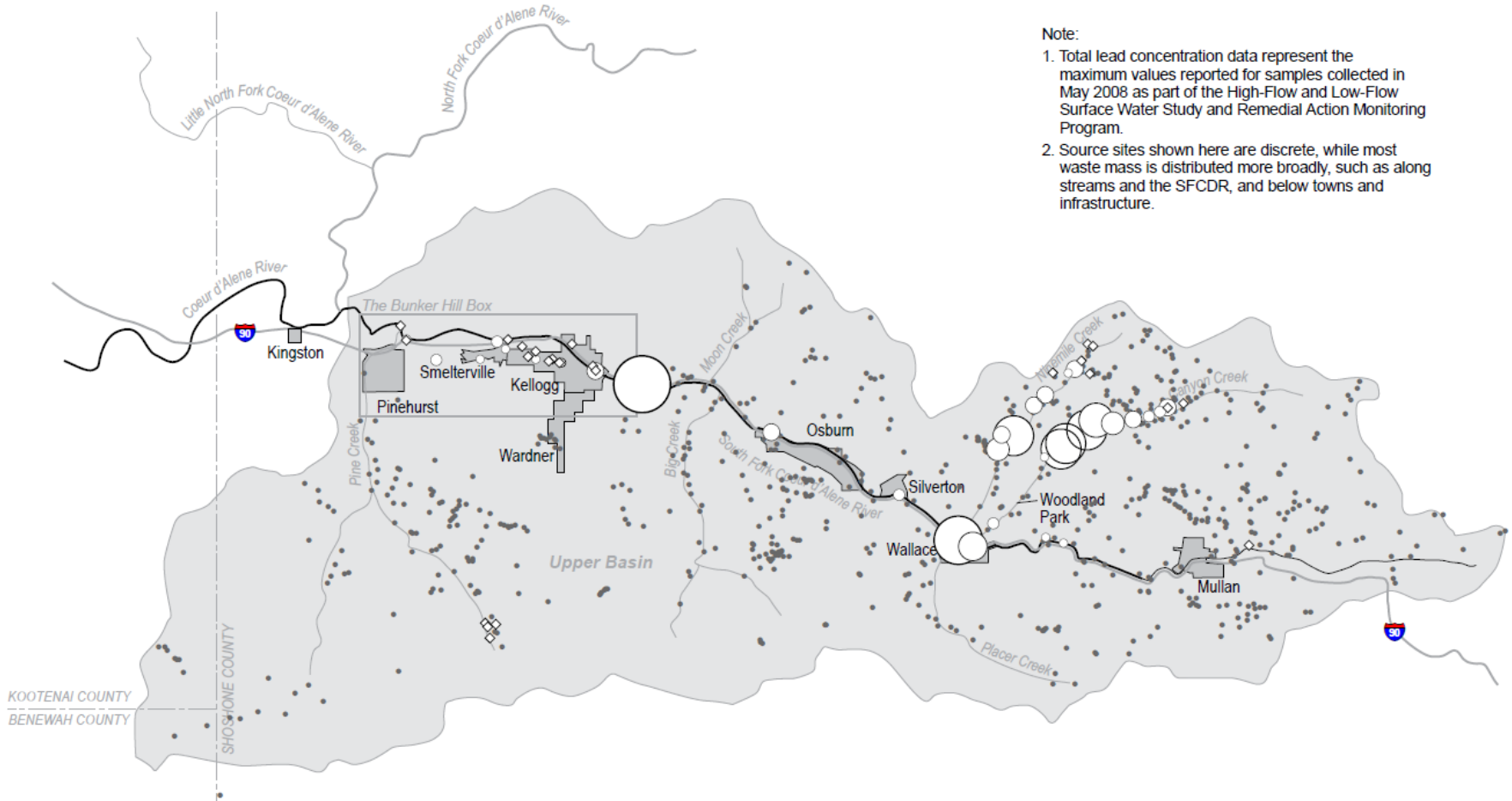
Jeff K. Johnson
Interagency Restoration Coordinator
Coeur d'Alene Basin Natural Resource Trustees







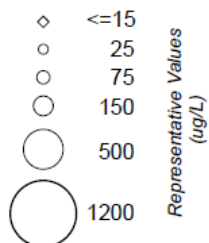




Note:

1. Total lead concentration data represent the maximum values reported for samples collected in May 2008 as part of the High-Flow and Low-Flow Surface Water Study and Remedial Action Monitoring Program.
2. Source sites shown here are discrete, while most waste mass is distributed more broadly, such as along streams and the SFCDR, and below towns and infrastructure.

Total Lead Concentration



SFCDR = South Fork Coeur d'Alene River
ug/L = micrograms per liter

• Source Site

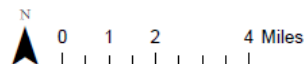


Figure 8
Upper Basin Total Lead Concentrations
in Surface Water, May 2008
Upper Basin Proposed Plan

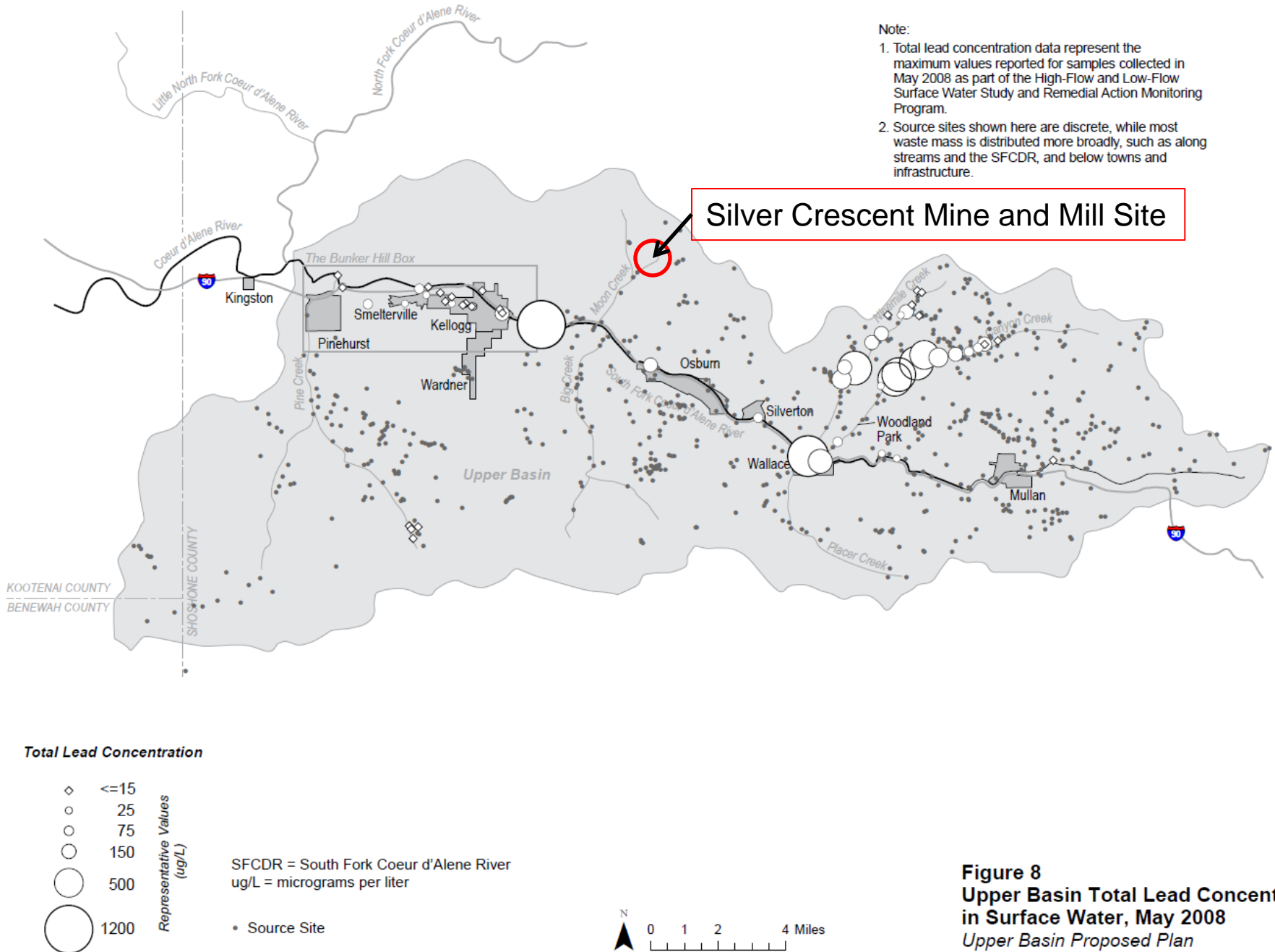


Figure 8
Upper Basin Total Lead Concentrations
in Surface Water, May 2008
Upper Basin Proposed Plan



20 Acre Site

Early Jig Mill Area

Waste Rock Dumps

Flotation Mill Area

Tailings Impoundments

Moon Creek Residential
Area: 1.5 miles downstream

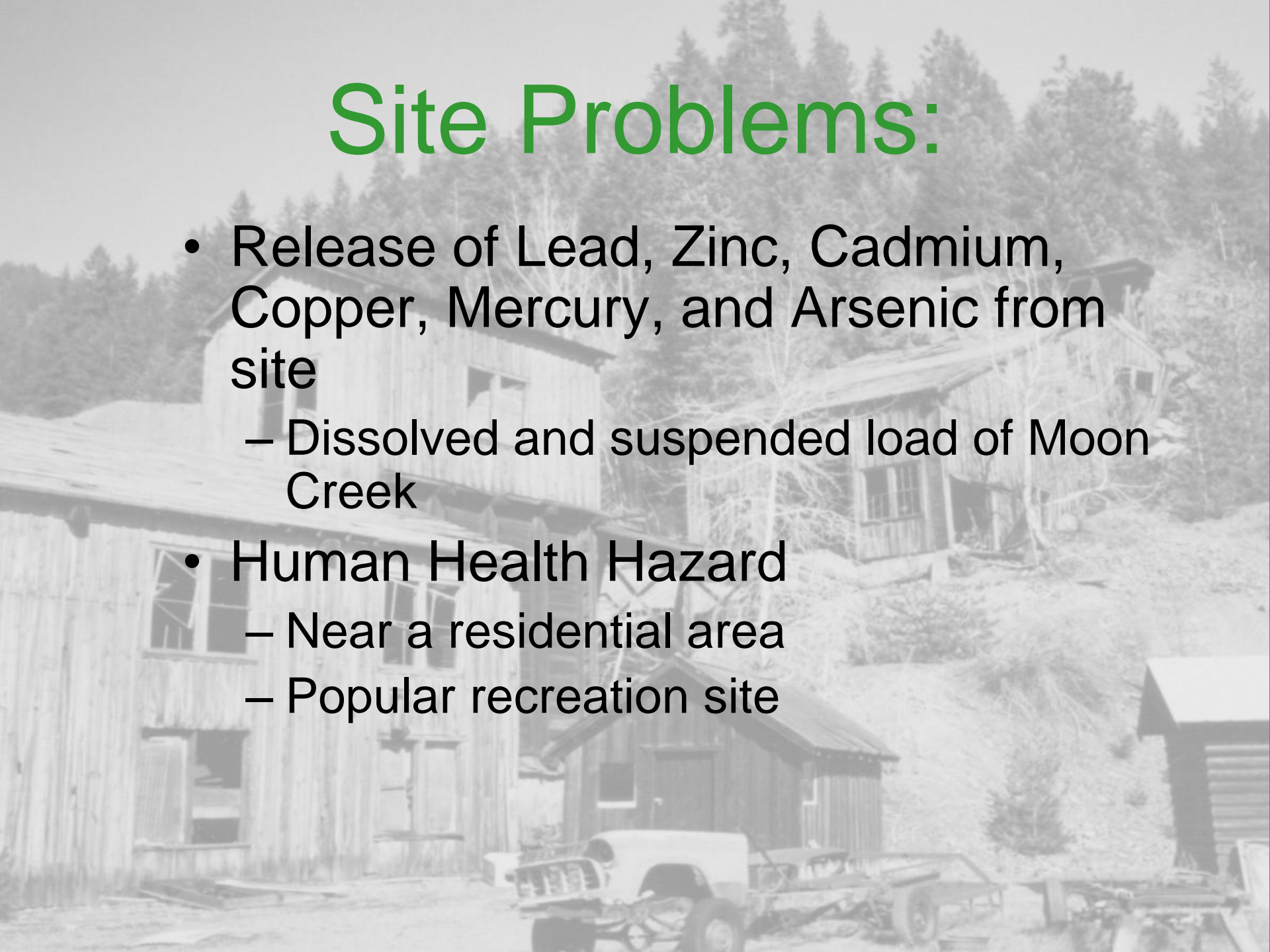






Site Problems:

- Release of Lead, Zinc, Cadmium, Copper, Mercury, and Arsenic from site
 - Dissolved and suspended load of Moon Creek
- Human Health Hazard
 - Near a residential area
 - Popular recreation site



History of Action at the Site:

- **1993 – 1996 Site Investigation**
- **1995 – 1996 PRP Search**
- **1998 – 2000 Removal Action**
- **2001 – Monitoring**
- **2004 - Restoration Planning and Data Collection**
- **2006 - 2008 Habitat Restoration**





BEFORE



AFTER

8/21/2001 5:09pm



Removal Completed in 2000

Final Repository

Volume = 130,000 cubic yards

**Total Removal Cost:
1.9 Million (USFS)**

Site Reclaimed

- **Successful Removal Action**
- **Human Health Hazards abated**
- **No Releases, Clean Water / Sed.**
- **Stable site – few maint. issues**
- **5 years of monitoring**



Challenges:

- **Fish Habitat Quality and Quantity**
- **Adapt Stream for Habitat Restoration W / Repository**
- **Revegetation – Wildlife Habitat**
- **Reestablishment of Riparian and Wetland Areas**
- **Weeds**

Habitat Restoration Demonstration Project

Partners:

- USFS
- Basin Environmental Improvement Project Commission
- Silver Mountain Ski Area
- Coeur d'Alene Basin Natural Resource Trustees

Primary Contractor:

On-Site Construction (Rathdrum, ID)

Restoration Goals

- **Reduction in Erosion – protection of repository**
- **Increased Fish Habitat Quality and Quantity – improved spawning and overwintering conditions**
- **Thorough Native Revegetation**
- **Reestablishment of Riparian Area and Wetlands**
- **Improved Amphibian Habitat**
- **Improved Elk Forage**

Restoration Demonstration

- **Vegetative Restoration**
 - Stabilize stream banks
 - Weed treatment
 - Provide shade for stream
 - Provide browse for big game
 - Provide nesting opportunities for migratory birds
 - Add aesthetic value to site



Application Rate / Acre

- 24 lbs. Seed
- 850 lbs. Fertilizer
- 1750 lbs. Mulch
- 50 lbs. Tackifier



Hydraulic Planting

- 5,300 Willow

- 2,600 Cottonwood

- 2,600 Red-Osier Dogwood



Manual Planting

- 2,685 Emergents

- 4,352 Shrubs

- 1,713 Trees



Restoration Demonstration

- **Wetland Creation / Enhancement**
- **Wildlife Habitat Structures**
 - Provide hiding cover for small mammals and amphibians
 - Provide micro-sites for vegetative recovery
 - Add stability to landscape
 - Add aesthetic value to site

Restoration Demonstration

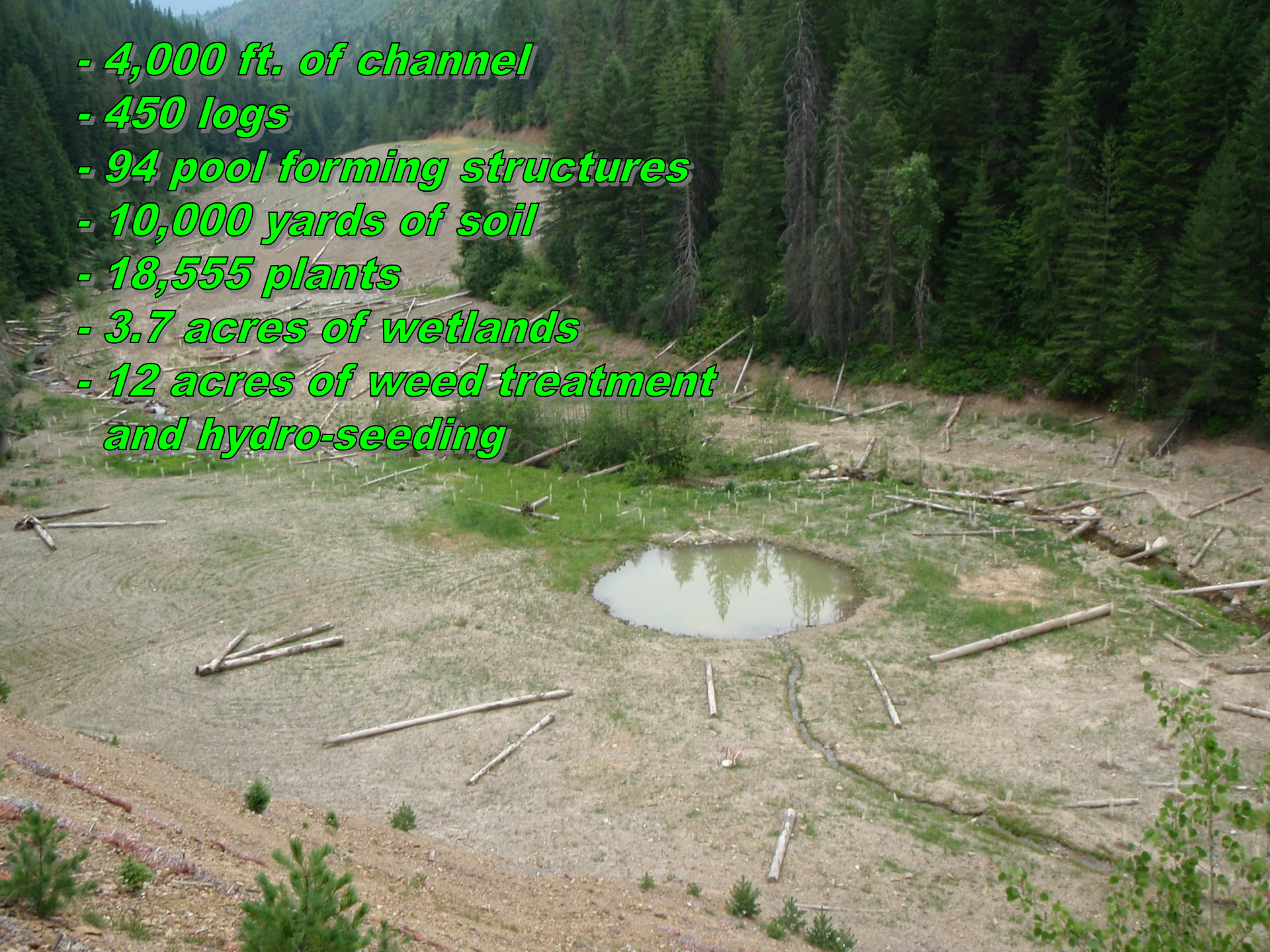
- **Fish Habitat Structures**

- Provide pool habitat for fish
- Provide for stable stream channel
- Protect the repository





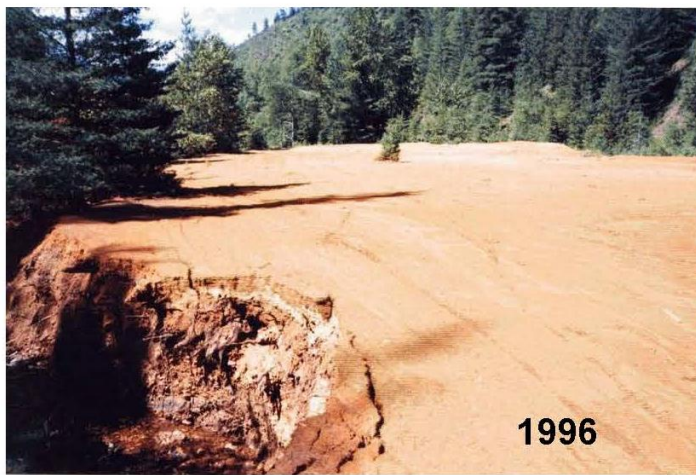
- 4,000 ft. of channel
- 450 logs
- 94 pool forming structures
- 10,000 yards of soil
- 18,555 plants
- 3.7 acres of wetlands
- 12 acres of weed treatment
and hydro-seeding







Silver Crescent Site Lower End Before and After



1996



2008
Final Restoration
Just Completed



Monitoring (5 years)

- **Electrofishing Transects**
- **Habitat Surveys**
- **Water Quality**
- **Photo Points – Vegetation**
- **Cross Section / Long Profile**
- **Final Report in 2012**

Demonstration Project Budget:

| | |
|---------------------------|------------------|
| Design / Contract / Admin | \$ 65,000 |
| Construction / Reveg. | \$440,000 |
| Monitoring / Reports | \$ 65,500 |
| <hr/> | |
| Project Cost Total | \$570,500 |

Partners:

| | |
|-------------------------------------|-----------|
| <i>Basin Commission</i> | \$315,730 |
| <i>Cd'A Basin NRDA Trustees</i> | \$ 95,000 |
| <i>Silver Mountain Corp.</i> | \$ 85,974 |
| <i>(Remainder USFS approx. 75K)</i> | |



