Toxic Floods of the Coeur d'Alene

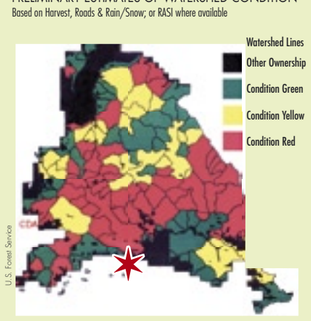
A confluence of two rivers & a confluence of two histories: logging and mining

When the two federal plans for the Coeur d'Alene watershed—EPA's Superfund cleanup plan and the U.S. Forest Service's forest plan for the Coeur d'Alene National Forest—are blind to each other

NORTH FORK, COEUR D'ALENE RIVER

FLOODS FROM A FOREST UNRAVELLING

Massive clear cuts and logging road networks make this the most damaged National Forest in the United States



"Here is a graphic and dramatic illustration of the result of the Forest Service's flawed and illegal policies. This map depicts the state of watershed health in the Idaho Panhandle National Forests (IPNF), and is part of an evaluation of watershed conditions across all of Region I (northern Idaho & Montana).

The red indicates watersheds that the Forest Service calls 'management constrained.' If you want to be more blunt and truthful, these watersheds are trashed. The yellow indicates drainages which preliminary indications suggest have some of the parameters of instability and these watersheds require further study. The green displays watersheds that still have integrity. Most of these watersheds are in roadless condition, and/or have been only lightly logged.

Perhaps the most dramatic illustration of watershed abuse in the entire National Forest System has taken place in the North Fork of the Coeur d'Alene River drainage, which encompasses the Fernan and Wallace Ranger Districts on the IPNF. Excessive road building has created areas that have road densities of up to 20 miles per square mile of forest.

Massive clearcut logging and mining have yielded stream instability and toxic heavy metal pollution. Floodwaters from the North Fork are disgorged onto a floodplain, contaminated with heavy metals, pushing toxic metals and nutrients into Lake Coeur d'Alene. In spite of this, Forest Service officers continue to propose large timber sales. These sales call for the same clearcut-like logging that has destabilized the Coeur d'Alene watershed and caused the extirpation of the bull trout and the loss of viability of the native westslope cutthroat trout, Idaho's state fish."

Barry Rosenberg, The Lands Council, excerpt from testimony before the U.S. House Natural Resources Subcommittees on National Parks, Forests, and Public Lands, and Oversight and Investigations. February 1, 1994.

These side-by-side photos show the extent of the damage to this National Forest over about 60 years. The Coeur d'Alene National Forest–once a trophy hunting and fishing area–is now severely damaged. In 2005 the nation marks the hundredth anniversary of the transfer of the National Forests to the U.S. Forest Service.

Trygve Steen

1935 Coeur d'Alene National Forest, few clearcuts and almost no logging roads.

1997 extensive clearcutting, logging

Now the watershed is unraveling, and the geologic forces at work are Forest Service clearcuts and logging roads. The damaged forests can not hold onto the water, releasing floods. The Forest Service refuses to acknowledge the 100 million tons of toxic waste sitting at the bottom of the watershed. The resulting "toxic floods" carry lead and other heavy metals into Lake Coeur d'Alene and the Spokane River, polluting Washington State waters.

Bedload gravel, Little North Fork Coeur d'Alene River. Clearcuts and roads increase water yields and hydraulic energies that eat away at the bottom and sides of streams. The resulting bedload moves downstream. Once deposited, the bedload causes streams to fill in and widen, redirecting the flowing water into the stream banks. The result is further damage. More bedload is produced.

Much like falling dominos, clearcuts and roads at the top of the watershed in the headwater streams cause damage through entire hydrologic systems. The watershed of the Spokane-Coeur d'Alene is unraveling, just as hydrologists within the U.S. Forest Service warned starting nearly 40 years ago.

Clearcut filled with snow, Coeur d'Alene National Forest. Much of the Coeur d'Alene National Forest is located in elevations called "rain-on-snow belts". The sudden release of water occurs when warm winter weather events melt accumulated snow. Water yields are increased by removal of forest canopies ("even-aged" management) and logging roads that disrupt water tables and channelize water from rapidly melting snow.

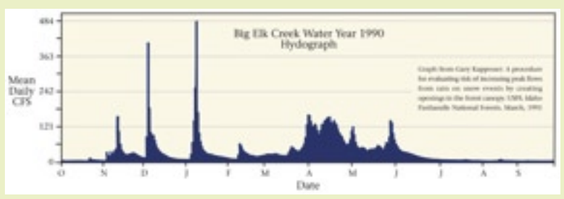
"By removing more timber and increasing the risk for damage [the U.S. Forest Service is] also risking the rehabilitation efforts and risking the taxpayers funds. I recommend that the North Fork of the Coeur d'Alene River be placed under a moratorium from timber harvest, and that rehabilitation be completed along with at least 10 if not 20 years' regrowth on the vegetation before any timber removal."

J. Allen Isaacson, former Supervisory Hydrologist for the Idaho Panhandle National Forests, referring to the Barney Rubble's Cabin and Skookum timber sales, letter to The Lands Council's Forest Watch, September 1993, attachment C, appeal of the Supplemental EA's for both sales.

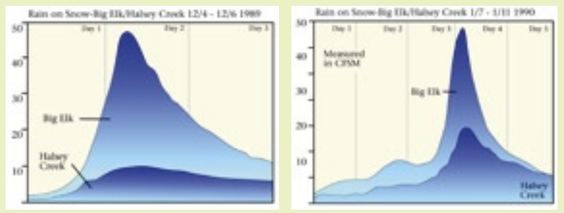
A procedure for evaluating risk of increasing peak flows from rain on snow events by creating openings in the forest canopy

Gary Kappesser, Forest Hydrologist ✣ Idaho Panhandle National Forests ✣ March, 1991

"Some of the largest and most damaging flood events in north Idaho have occurred in November through February from 'rain on snow' events. Warm Pacific maritime air masses moving into the area provide the moisture and energy to rapidly melt existing snowpacks. Latent heat of condensation is liberated as the water vapor in the warm moist air condenses at the snow surface. Rate of heat liberation is a function of wind velocity at the snow surface to provide a continuing source of water vapor. Large openings in the forest canopy created by timber harvest can result in significantly increased wind velocities at the snow surface. This will produce an altered hydrologic response with higher flood peaks, shorter times to rise, and shorter recession. The result may be destabilized stream channels with increased bedload transport. The risk of increasing peak flows through timber harvest may be evaluated in terms of significant causal factors. These include elevation ranges, size of opening created in the canopy, percent crown cover removed, and a combination of aspect and slope."



Compare the 3 short bursts of intense runoff during the winter with the sustained high runoff during the spring melt, "rain on snow" exceeds spring runoff by a magnitude of 4. "Rain on snow" storm events caused the high water yields during the winter. Stream energy is much, much higher during the "rain on snow" peak flow because the relationship of stream flow (shown here) with stream energy is logarithmic.

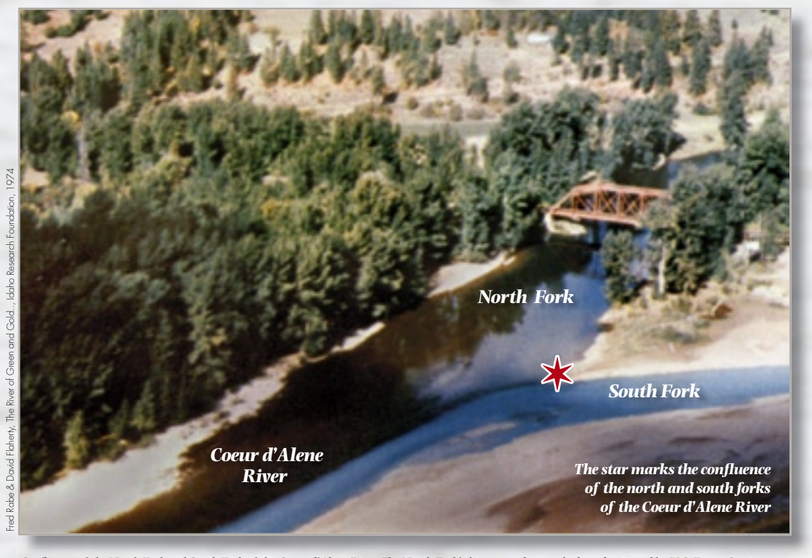


Compare the stream flows from an extensively clearcut stream (Big Elk Creek about 50 percent clearcut equivalent acres) with a stream logged previously and now with forest canopy regrown and hydrologically recovered (Halsey Creek). For comparative purposes, stream flows are expressed in units of "CFSM" or cubic feet per square mile.

Recurrance Interval*	
CSFM	YEARS
6.21	1.01
8.23	1.05
9.59	1.11
11.52	1.25
16.25	2.00
22.72	5.00
26.97	10.00
32.31	25.00
36.25	50.00
40.17	100.00
44.09	200.00

Water flows on Halsey Creek (forest canopy intact) occurred with a likelihood of an annual event (recurrence interval of 1) on December 5, 1989, and 12-15 years on January 10. Peak flows for Elk Creek (clearcut) occurred with a frequency of once every 200 years on December 5, 1989, and once every 200+ years on January 10, 1990. Indeed, the peak event of 70 CFSM is significantly off the charts, and perhaps in the range of a flood event occurring every 500 - 1000 years.

** Data from Shoshone Creek on the North Fork of the Coeur d'Alene River near Pritchard, Idaho, appended to Gary Kappesser: A procedure for evaluating risk of increasing peak flows from rain on snow events by creating openings in the forest canopy, USFS. Idaho Panhandle National Forests, March, 1991. CFSM = Cubic Feet per Square Mile.*



Fred Rabe & David Flaherty, The River of Green and Gold - Idaho Research Foundation, 1974

Confluence of the North Fork and South Fork of the Coeur d'Alene River. The North Fork's history and watershed are dominated by U.S. Forest Service logging with resultant floods. The South Fork's history and watershed are dominated by mining, with the resultant toxins. The co-mingling of waters is a metaphor for the coming together of two histories – logging and mining – that are the genesis of the toxic floods of the Coeur d'Alene River.

KILLING FIELDS

100 million tons of toxic media covering 14,000 acres of wetlands

Coeur d'Alene Tribe photo archive

Lead is a pathogen for swans as it is for humans. Lead paralyzes the swan's ability to swallow, and its slowly starves to death in the midst of plenty. Biologists call these wetlands upstream of Lake Coeur d'Alene the "killing fields".

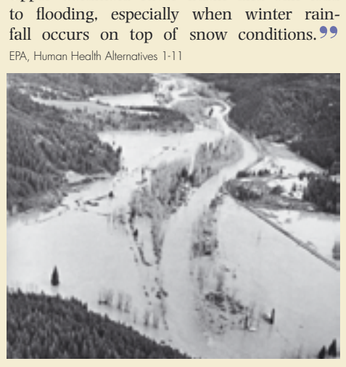
"Specifically, the Feasibility Study includes the basin except for the North Fork of the Coeur d'Alene River."

EPA, Coeur d'Alene Basin Remedial Investigation/Feasibility Study, Overview, p.v., October 2001

"Little sediment is transported through Coeur d'Alene Lake except during flood events." EPA, Overview, p 2-17

"These weather patterns make the Basin one of the highest precipitation areas of the Upper Columbia River Basin and can lead to flooding, especially when winter rainfall occurs on top of snow conditions."

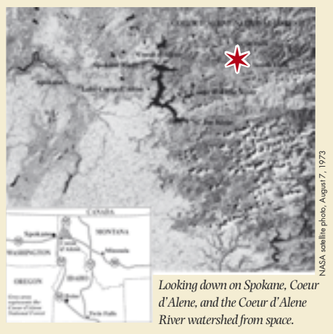
EPA, Human Health Alternatives 1-11



Flood, Coeur d'Alene River, 1974. Flood waters carry millions of pounds of lead into Lake Coeur d'Alene, and on into eastern Washington waters.

Reprinted from: Fred Rabe & David Flaherty, The River of Green and Gold

"The impacted floodplain sediments, in particular, also act as 'secondary' metal sources that impact the other media. Directly or indirectly, the impacted floodplain sediments are the major source of metals in basin waters, the major source of metal exposure risks to ecological receptors and a major source to humans, and a major source of potential future recontamination of downstream areas that are cleaned up. The estimated mass and extent of impacted site media–primarily sediments–exceeds 100 million tons dispersed over thousands of acres." EPA Overview, p. vi



NASA satellite photo, August 7, 1973

Looking down on Spokane, Coeur d'Alene, and the Coeur d'Alene River watershed from space.

Sandy Easton Papers, University of Idaho Library

The dredge pipe was one solution to the problem of mine-waste pollution in the Coeur d'Alene River and Lake. It was located at Mission Flats, downstream from the mining district.

Nicholas A. Casner, "Toxic River: Politics and Coeur d'Alene Mining Pollution in the 1930's", Idaho Yesterdays, a publication of the Idaho State Historical Society, Fall, 1991; Volume 35, Number 3S.

"High blood lead levels in the lower basin have been associated with homes that were flooded in 1996, and recreational activities outside the home (TerraGraphics and URSG 2001)."

EPA, Overview 3-4

"Recontamination—Periodic flooding can recontaminate previously remediated areas where storm, snow melt, or flood waters have caused erosion and subsequent redeposition of contaminated sediments. This is a particular concern for community recontamination in smaller basin communities. Many of these communities do not have surface water control systems (e.g., curbs, gutters, and ditches) that effectively control runoff during snowmelt and storm events. For residents living in or near flood plains, uncontrolled surface water runoff, especially during flood events, has a high likelihood of recontaminating properties where remediation has previously been conducted."

EPA, Overview. p. ix

"Flooding would recontaminate remediated yards by depositing contaminated sediment derived from upstream mining activities. Reviews of flood maps prepared by the U. S. Department of Housing and Urban Development (HUD) and the Federal Emergency Management Agency (FEMA) identified communities with significant flooding problems. Other communities with flooding problems were identified by obtaining anecdotal information from local residents. The estimated percentage of residences with flooding problems is provided by investigation area and community in Table 4-3."

EPA, Human Health Assessment, 4-6

Toxic swirl where the Coeur d'Alene River flows into Lake Coeur d'Alene. In a single day of the February 1996 flood, the USGS calculated that 1.4 million pounds of lead flowed into the lake. The lake is an inefficient trap for metals, and releases mine wastes downstream, polluting the Spokane River and Washington waters.

"Researchers have confirmed their suspicion that a muddy springtime plume cruising across Lake Coeur d'Alene carries Silver Valley mining pollution to Spokane. The 30-foot-deep plume carried one-third of the lead it picked up from the Coeur d'Alene River into the Spokane River, according to the U.S. Geological Survey."

Zaz Hollander, "Study pinpoints source of lead in river: Lake CdA plume regularly dumps pollutants into the Spokane, data show. Spokesman Review, October 15, 2000

SOUTH FORK, COEUR D'ALENE RIVER

TOXIC MINE WASTES

Over 60 million tons of toxic mine waste

"Mining within the Coeur d'Alene Basin began more than 100 years ago. The basin has been one of the leading silver, lead, and zinc-producing areas in the world, with production of approximately 1.2 billion ounces of silver, 8 million tons of lead, and 3.2 million tons of zinc (Long 1998). The region surrounding the South Fork has produced over 97 percent of the ore mined in the basin (SAIC 1993). The Bureau of Land Management (BLM) has identified nearly 900 mining or milling-related features in the region surrounding the South Fork (BLM 1999)." EPA Coeur d'Alene Basin Feasibility Study Report, Overview 1-5, October 2001

"An estimated 62 million tons of tailings were discharged to streams from the beginning of ore processing in 1884 until discharge to streams was discontinued in 1968. The tailings contained an estimated 880,000 tons of lead and more than 720,000 tons of zinc (Long 1998)." EPA, Overview 1-6

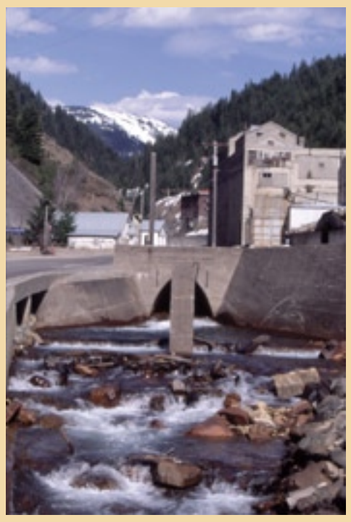
"By the 1950s, mine tailings piped from the river covered 2,000 acres of the Cataldo Mission Flats to an average depth of 25 to 30 feet. Sediment dredging, pumping 7,000 gallons of water per minute, and excavating some 500 tons of contaminated river sediments per day continued until 1968. Approximately 72 million tons of this sediment contaminated with mine tailings have been discharged into the Coeur d'Alene River (Krieger 1990, Weston 1989)."

EPA: Human Health Alternatives 1-8, October 2001

Hecla Mine on Canyon Creek, tributary to the South Fork of the Coeur d'Alene River. Canyon Creek above Hecla Mine is a pristine forest stream; below, sterile with mine wastes.

Liz Kalmado, Spokesman-Review, May 27 1996

Blowing up the 715-foot-tall smoke stack at the Bunker Hill lead smelter, May 26, 1996. The once-denuded mountainsides are beginning to recover.



Chris Anderson-Aurora, US News and World Report May 4, 1998

LAKE COEUR D'ALENE

One of the most beautiful lakes in the world transformed into a mine tailings pond

The Lands Council, photo archives

"On the surface, Lake Coeur d'Alene looks like the perfect postcard, its cool waters shimmering beneath a rolling green carpet of trees. But beneath the water lies a graphic portrait of environmental devastation, according to a four-year study that will be released today. Government scientists found an estimated 75 million tons of toxic mining waste coating the lake bottom. The result is a 25 mile-long dead zone where no organisms can survive.The U.S. Geological Survey would not release its findings until today, but several sources in the Coeur d'Alene Basin Interagency Group said the final report from The U.S. Geological Survey supports preliminary data released in April 1992:

✣ Heavy metals such as lead, cadmium, arsenic and mercury are encased in sediment. But continued increases in nutrients, such as fertilizers and runoff, and decreases in oxygen a total process called eutrophication – could unleash the toxic metals into the water column. That would threaten fish & other aquatic life.

✣ Zinc already has oozed into the water column and exceeds federal standards.

✣ Age-dating studies trace the birth of the toxic, muddy layer to a century ago. Hard-rock mining began in the region in the 1880s.

✣ The mining waste lying beneath Lake Coeur d'Alene includes an estimated $200 million worth of silver. But the environmental consequences and cost of extracting the mineral would far exceed its value. Conventional extraction methods such as a suction dredge could cost $1 billion.

✣ 90 % of the heavy metals that leach into the lake today originate in the chain lakes region south of Cataldo. Waste washed downstream over the last century and accumulated on the floodplain. That means most of the government cleanup efforts upstream of Cataldo are missing the source.

'It's probably the most contaminated lake in the United States and ranks among the most contaminated in the world,' said Howard Funke, an attorney for the Coeur d'Alene Tribe."

J. Todd Foster, "Toxic waste covers bottom of Lake CdA" Spokesman-Review, December 8, 1993

SPOKANE RIVER

The global community came to the banks of this river for Expo '74 to celebrate the first environmental world's fair

Trout Fishing, Spokane's West Central Neighborhood. The Spokane River is one of America's unique urban trout fisheries. Trout depend on cold, clean water from the Aquifer. Depleting the Aquifer threatens to destroy Spokane's prized fishery. Toxic metal pollution is less of a problem further from the Idaho border, allowing for one fish meal per month. Anglers increasingly advocate the fishery be designated "catch and release" to protect human health and the fishery.

We believe –

✣ That the universe is a grand design in which man and nature are one.

✣ That planet earth, a small part of the universe, is the residence of mortal man whose needs and aspirations are limited by the finite resources of planet earth and man's own finite existence.

✣ That man is the custodian of his environment as the environment is the custodian of man.

✣ That man, in his growing wisdom, will renounce the age-old boast of conquering nature, lest nature conquer man.

✣ That the skies and the seas and the bountiful earth from which man draws his sustenance are the preserves of all mankind and that in the brotherhood they derive from nature, the nations of the earth will join together in the preservation of the fragile natural heritage of our planet.

We believe –

✣ In the restoration of the reverence of nature which once filled our own land where the American Indian roamed in respectful concert with his environment.

We believe –

✣ That the human spirit itself must set its own limitations to achieve a beauty and order and the diversity that will fill the hearts of the children of the world with a new and happier vision of their destiny.

✣That from this City of Spokane there goes forth today to the world the message and challenge that the time of great environmental awakening is at hand.

All this we believe."

Delivered by Danny Kaye, May 4, 2004, before 85,000 people gathered at Spokane Falls. William T. Youngs, The Fair and the Falls: Spokane's Expo '74, EWU Press, 1996

This human health advisory sign is posted along the banks of the Spokane River just downstream from the Idaho-Washington state line.

Swimmers enjoying the beaches of the Spokane River.

Poster funded by Teaching American History Grant, Eastern Washington University; Kathleen Huttenmaier, Director ✣ For the course The Environment & the Northwest, Mike Green, Instructor ✣ Poster developed by John Osborn, MD, for the National Academy of Sciences, April, 2004