



TOM BAUER

BREAKTHROUGH at Milltown Dam

After nearly a century, it appears likely this aging structure and its accumulated contaminants will finally be removed

BY TOM DICKSON

TO UNDERSTAND FULLY how the dam at Milltown disrupts fish populations, consider the tale of Pollywog. David Schmetterling, a Montana FWP fisheries biologist, captured the 14-inch cutthroat trout in the spring of 2001 below Milltown Dam, located 10 miles upstream of Missoula at the confluence of the Blackfoot and Clark Fork Rivers. Schmetterling fitted the fish with a radio transmitter, transported it upstream, and then released it into the Blackfoot River. Using a receiver, he began following the trout's route over the next few weeks to Gold Creek, a tributary near Potomac,

15 miles upstream, where the fish spawned.

Also following the trout's journey were students of Seeley Lake Elementary School, who had adopted the trout as part of a program sponsored by FWP, the U.S. Fish and Wildlife Service, and Blackfoot Challenge, a local conservation group. Each week Schmetterling entered the cutthroat's loca-



PAUL F. UPDIKE

CUTTHROAT EXISTENCE: Life for cutthroat trout and other native fish is brutal both below and above Milltown Dam, built in 1908 to supply electricity for two nearby sawmills.

CONTROVERSIAL CONFLUENCE: This view upstream from Milltown Dam, after a 2002 reservoir drawdown, shows the channels of the Blackfoot (left) and Clark Fork (right) Rivers, which have been blocked since 1908.

tion into his computer. The school kids followed the trout, which they named Pollywog, on a map via the Internet.

After spawning, the fish headed downstream until it reached Milltown Reservoir, an impoundment created by the dam. And there it stayed until July 14, when an angler phoned Schmetterling to report he'd caught a northern pike with an antennae sticking out of its mouth.

"I hadn't put any transmitters in pike, so I asked him to read me the number on the transmitter," says Schmetterling. "I looked it up. It was Pollywog."

Schmetterling says the fate of that single, luckless trout illustrates why he and other state and federal biologists believe Milltown Dam must be removed.

"First of all, I caught it below the dam, where it was trying to swim upstream and couldn't," he says. "Then, after spawning, it tried to get back downstream past the dam and again, it couldn't. And finally, there was the pike. That trout didn't stand a chance."

BUILT TO MILL MINE BEAMS

Fish weren't a great concern of copper tycoon William A. Clark, who built the hydropower dam in 1908 to supply electricity for two sawmills on the Blackfoot River at nearby Bonner. Beams milled at the facilities were used to line shafts of copper mines located 150 miles up the Clark Fork River.

Mining had been underway at Anaconda and Butte since the 1870s, after Marcus Daly and others discovered what turned out to be one of the purest deposits of copper sulfide ever found in North America. A copper boom ensued, and soon the Clark Fork and tributaries such as Silver Bow Creek were filled with copper-laden spoil from the mining and milling of deep copper sulfide ores by Daly's Anaconda Copper Company.

Not long after Milltown Dam was completed, disaster struck. A record flood on the Clark Fork, in June 1908, washed tons of the mining sediment downstream, where it settled into the reservoir behind

the dam. And there it sat, and continues to sit. In subsequent years, additional mining and smelting (burning copper ore to extract the valuable metal) waste has been carried downstream by floods and runoff, where much of it has settled in the shallow impoundment. According to the Environmental Protection Agency, the reservoir now holds 6.6 million cubic yards of sediments, much of it containing high concentrations of arsenic as well as lead, zinc, copper, and other metals.

Its historic storage of toxins notwithstanding, for much of the 20th century Milltown Dam attracted no more public interest than a highway bridge. Anglers fished below the structure, where fish trying to swim upstream concentrated, and occasionally picnickers would sit along the shores of the small reservoir. In 1929 the dam was purchased by Montana Power Company, which maintained it for the next seven decades as a small-time power generator.

Not until the 1980s did Milltown Dam and the sediments in the mile-long reservoir become an issue. In 1981, high levels of arsenic were found in the Milltown drinking water supply. Two years later, EPA officials concluded that as water from the reservoir seeped down through the sediment, it was leaching arsenic into the underground aquifer connected to local water faucets. That year Milltown Dam was listed as Montana's first Superfund site.

According to the EPA, liability for cleaning up the contaminated sediment behind



FATEFUL FLOOD: In June 1908, just six months after Milltown Dam was finished, 33 consecutive days of rain sent a record flood down the Clark Fork River, bringing with it contaminated copper mine waste from Butte and Anaconda. Several million cubic yards of sediment settled behind the dam, where it has remained since. Among the toxins buried in the reservoir are high levels of trout-killing copper, shown here (right) on the banks of the Clark Fork near Galen.

the dam fell to Atlantic Richfield Company, which had purchased Anaconda Copper Company in 1977. Over the past 20 years, the EPA and Montana's Department of Environmental Quality have undertaken several feasibility studies that looked at various cleanup alternatives ranging in price from \$3 million to \$300 million.

After years of debate and study, dam removal and sediment cleanup appear imminent. In 2001 Missoula County officials voted to support removing the dam for reasons including public safety and aquifer contamination. In January 2003, Governor Judy Martz announced she was "placing the full support of my office behind removal of the Milltown Dam at Bonner."

The governor later cited her concern for public health and safety, taxpayer liability if the aging dam were to collapse, and the federally threatened bull trout.

Tom Dickson is editor of Montana Outdoors.

EPA SAYS DAM MUST GO

Even bigger news came in mid-April, when the EPA issued its proposed plan for cleaning up the groundwater below Milltown. The dam and the sediments that have the highest concentration of contaminants should be removed, agency officials said, to ensure the "permanent, long-term protection" of public health and the environment. The estimated cost: \$95 million.

Russ Forba, the EPA's Milltown site project manager, says the most important factor leading to the removal option is that the dam collects polluted sediment that will have to be cleaned out to prevent arsenic and other toxins from seeping into the aquifer. In addition, the EPA notes that the dam is structurally unsound, stores no water for irrigation, doesn't control flooding, and produces relatively little energy. Forba adds that the agency also considers the importance of restoring a free-flowing river system and its trout populations, and the support by both the county and the state for dam removal.

"Governor Martz's statement was very important," Forba says. "It's almost impossible for the EPA to move a project this big without the state's concurrence."

The EPA's proposed plan will be subject to public review until June 20. Later in 2003,

A TALE OF TWO RIVERS: Both the Blackfoot and the Clark Fork have potential to be great trout rivers, say biologists. Currently, however, both hold just a fraction of the trout that could live there were Milltown Dam removed and the watersheds restored. The Clark Fork trout population, for example, could increase five-fold following a restoration.



MONTANA OUTDOORS



JOHN LAMBING



TOM BAUER

A GLASS OF EVIDENCE: In 1981 Ed Zuleger, a sanitarian for the Missoula City-County Health Department, collected Milltown tap-water samples that turned out to have dangerously high levels of arsenic. Hydrogeologists and chemists later determined that the source was the contaminated sediment in Milltown Reservoir. The EPA estimates that, if left alone, the sediment would continue to pollute water supplies for the next 2,000 years.

the agency will make its final decision.

“By federal law, we can then require the responsible parties to implement our decisions,” says Forba.

Not everyone is calling for dam and sediment removal. Some local residents want the historic structure and reservoir to stay, and Bonner residents wince at the thought of losing nearly \$100,000 each year in property tax revenue. Also, the corporation liable for the cleanup is questioning whether sediment removal might not actually worsen problems downstream.

“We have concerns about how dredging would stir up sediment and heavy metals,” says Sandy Stash, Atlantic Richfield’s Montana-based vice president. “We think people need to weigh the risks of leaving the sediment in place versus the risks of a massive dredging operation.”

BIOLOGICAL BARRIER

State and federal biologists, however, contend that the best option for native bull trout and westslope cutthroat trout would be for the dam and sediment to go.

“Removing the dam would allow trout to move freely up- and downstream for the first time since 1908,” says Mark Wilson, supervisor for the U.S. Fish and Wildlife Service in Montana. “As it now stands, it’s

what we call a ‘biological barrier.’”

Though biologists now know the dam harms fish populations, that wasn’t well understood as recently as 1998, when Schmetterling began doing his research. The listing of bull trout as a federally threatened species that year had increased the likelihood that Montana Power Company would have to provide fish passage. The biologist was hired to learn how the dam actually affects bull trout.

Over several months in 1998, Schmetterling and a crew of technicians captured 40,000 fish below the dam. The biologist estimates that number represented about 20 percent of the total, which means each year roughly 200,000 fish trying to migrate upstream are stopped by the concrete wall.

“The good news is that, after almost 100 years, fish still want to move upstream,” he says. “The bad news is that they can’t.”

Of the 11 species blocked by the dam, the most abundant is the native largescale sucker, but the structure also halts the spawning runs of trout: bull, westslope cutthroat, brown, and rainbow.

Schmetterling also found that the dam blocks downstream movement. After trout spawn in tributaries of the Blackfoot or Clark Fork, up to 100 miles upstream, many then try to get back downstream of the dam.

“They want to go down, to exploit the various habitats there,” he says.

But unless water is high and flowing over the dam, the fish remain trapped in the shallow reservoir. Many end up in the stomachs of northern pike.

The pike first showed up in Milltown Reservoir in 1998, likely having come down the Blackfoot via the Clearwater River from the Clearwater Chain of Lakes, where they had been illegally introduced in the 1980s. The nonnative fish thrive in the reservoir’s still, shallow water and spawn successfully on flooded land vegetation that lines the banks.

Pike numbers took off quickly and exhausted the existing prey base, mostly a native minnow species. The hungry fish then turned their appetites elsewhere. In 2000 biologists found that pike had begun eating trout swimming downstream into the reservoir. For the toothy predator, it was like having dinner delivered by conveyor belt.

If predation and the migration barrier weren’t enough to threaten the river system’s trout and other native fish populations, Milltown Dam also increases the threat of copper poisoning. That became clearly evident in 1996, when a combination of weather events in February caused



NORMAN AND MAURINE JACOBSON

A TASTE FOR TROUT: Nonnative northern pike (right), which first appeared in Milltown Reservoir in 1998, quickly turned their appetites from minnows to trout. The warmwater species thrives in the shallow, still waters of Milltown Reservoir. Above: In 2002, FWP biologists netted and tagged pike before the reservoir was lowered to strand and kill young pike in back channels. Additional drawdowns are planned to keep pike numbers as low as possible.



JAN FINGER/REDPINE

massive ice floes to move down the Blackfoot and Clark Fork Rivers. Milltown Dam operators, worried the house-sized floes would damage the hydropower facility, lowered the reservoir water level by 8 feet in one afternoon. As the water dropped, the moving ice floes began digging into the river bottom and banks.

“Imagine a thousand bulldozers coming down the riverbed,” says Sam Milodragovich, a biologist with NorthWestern Energy, which acquired the dam after purchasing Montana Power Company in 2001.

The flood of water, now filled with loosened sediment and accompanying toxins, rushed over the dam for several hours until dam operators were sure the structure

would not be damaged. It wasn't. The trout and other fish downstream, however, were not so fortunate.

Concentrations of copper there skyrocketed 2,000 percent over state standards of 18 parts per billion, to 400 parts per billion. The toxic metal killed trout, other fish species, and the insects fish eat. FWP surveys found that the number of catchable brown trout was cut by half in the Clark Fork below the dam, and the rainbow trout population dropped by 62 percent. Harder hit were juvenile rainbows and browns, which declined by 71 percent and 86 percent respectively.

Bill Olsen, a U.S. Fish and Wildlife Service environmental contaminants specialist, says

that if a flood were to blow out the aging dam—a distinct possibility considering that the Federal Energy Regulatory Commission has categorized Milltown as a “high hazard dam”—and flush the contaminated reservoir sediment, “the results to fish populations downstream would be catastrophic.”

IN THE MEANTIME

Fortunately for those who value river health, it appears likely that the dam will eventually be removed along with the most harmful sediments. But that won't be for a while. According to Forba, the EPA official, the dam would be removed no sooner than 2011. In the meantime, Schmetterling says, “it would be irresponsible for us to ignore

MILLTOWN DAM TIMELINE

1867: Marcus Daly and others discover valuable copper deposits near Anaconda. Massive mining operations begin.



1929: Montana Power Company buys Milltown Dam from Clark's estate.

1850

1860

1870

1880

1890

1900

1910

1920

1930

1908: In January, Milltown Dam is completed and the reservoir fills. The hydropower facility, built by William A. Clark, provides electricity for two nearby sawmills.

1908: In June, a massive flood fills the new reservoir with tons of sediment and tailings from mills owned by Daly's Anaconda Copper Company upstream in Butte and Anaconda.





TOM BAUER

BEAR MARKET FOR BULL TROUT: Numbers of bull trout, like this specimen captured by FWP biologist Ron Pierce on the Blackfoot River, have dwindled since Milltown Dam was built. Biologists say dam removal could open access to spawning water and help allow the population to rally.

reconnect populations isolated by Milltown Dam.”

In the long term, says Pat Saffel, FWP regional fisheries supervisor at Missoula, restoring the two rivers will require more than just removing the dam.

For example, another highly polluted Superfund site extends from Milltown Reservoir to Butte along the Clark Fork River and Silver Bow Creek. There the EPA, state and other federal agencies, Atlantic Richfield, and community officials and citizens are looking at a range of alternatives to reduce the toxicity and volume of arsenic, copper, and other

toxins in soil and sediments in and along the river.

In tributaries to the Clark Fork and Blackfoot Rivers, planning and work are also underway to restore spawning habitat, reduce sediments washing into the water, and prevent trout from getting trapped in irrigation ditches.

Currently, say state officials, the Clark Fork holds only 20 percent of its potential fish population. State and federal biologists say the end result of restoration will mean more trout and other native fish species throughout the two river systems.

“In the fisheries management business, we get excited about removing a culvert,” Saffel says. “It’s rare to work on restoration

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—MARK WILSON,
U.S. Fish and Wildlife Service

at such a large geographic scale as this.”

The value of dam and contaminated sediment removal extends even beyond better fishing and a reconnected river system. Citizens and community leaders are talking about possible whitewater boating, hiking trails, picnic grounds, and other recreational and economic benefits from the restoration.

One idea envisions travelers on nearby I-90 taking the Bonner exit to see the restored Blackfoot River, immortalized by Norman Maclean in his classic novel, *A River Runs Through It*.

“Let me put it this way,” says Wilson. “I’ve worked for the U.S. Fish and Wildlife Service for 26 years, and I’ve never before seen a project that has the potential to do so much for bull trout and other fish species, and that has so many tremendous benefits for the people living in the affected drainages.” 🐻

the problems of fish passage and the pike.”

Over the past two years, FWP has been working with NorthWestern and the fishing group PikeMasters to temporarily lower water levels so that yearling pike are stranded and die in back channels of Milltown Reservoir. Similar drawdowns are planned for the future.

Also, the USFWS and FWP are recommending that NorthWestern build a temporary structure to allow fish passage until the dam is removed.

In the meantime, Schmetterling and his crew will continue trapping bull and cutthroat trout below the dam and hauling them upstream. “It’s labor intensive,” he says, “but in the short term it’s a way to

1950 **1960** **1970** **1980** **1990** **2000** **2003**

- 1981:** High levels of arsenic are found in Milltown’s drinking water.
- 1977:** Atlantic Richfield Company buys Anaconda Copper Company.
- 1983:** The EPA declares Milltown Dam as Montana’s first Superfund site; liability falls to Atlantic Richfield.
- 1998:** Bull trout are listed as a federally threatened species. Northern pike appear in Milltown Dam.
- 1996:** In February, ice floes dredge from the Clark Fork River tons of contaminated sediment, which washes downstream, killing more than half the fish below the dam.
- 2001:** Missoula County officials vote for dam and sediment removal.
- 2003:** In her State of the State address, Governor Martz announces her support for dam removal.
- 2003:** In April, the EPA issues its proposed plan on Milltown Dam. Agency officials say removing the dam and the most polluted sediments will protect public health and the environment.