

Clearing Things Up

Scientists have a good idea why Clark Canyon Reservoir is sending murky water into one of Montana's premier trout rivers. Now what? **By Paul Driscoll**

In the summer of 2014, a 15-mile stretch of the upper Beaverhead River grew mysteriously murky. Nationally known for producing big and abundant brown and rainbow trout, the water in this stretch—from the river's source at the base of Clark Canyon Reservoir to Barretts Siding, about halfway to Dillon—turned grayish green. The turbidity lasted only a few weeks, but returned for longer periods during late summer in 2015 and 2016.

Because trout have a harder time feeding in the murky water, the fish have become skinnier and less desirable to catch. "Lengths are staying the same, but weights are declining," Dillon-based Montana Fish, Wildlife & Parks fisheries biologist Matt Jaeger says.

Trout anglers, accustomed to fat trout and clear water, looked elsewhere to fish. Guided floats on the Beaverhead declined 75 percent, according to Jaeger. He estimates that the turbidity cost outfitters, cafes, and other tourism-related businesses in Beaverhead County roughly \$5 million in 2015. "It's been a major problem," Tim Tollett, owner of Frontier Anglers in Dillon and a longtime Beaverhead guide, says. "We're losing 150 to 200 booked trips per year."

Montana Department of Environmental

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Quality scientists think they have identified the problem (though underlying causes remain less certain). The question now is what, if anything, state agencies and Beaverhead County outfitters, irrigators, tourism-related businesses, and other stakeholders can do about the problem.

INVESTIGATING THE SITUATION

Clark Canyon Dam is an earthen structure built in the mid-1960s just downstream from the confluence of the Red Rock River and Horse Prairie Creek, which form the Beaverhead River. The reservoir was constructed to provide water for irrigators downstream. It also created a world-class trout fishery along its tailwater below the dam.

Though Clark Canyon Reservoir had previously sent some murky water downstream in the fall, that hadn't ever occurred in summer or lasted more than a few days. Ordinarily, as with most reservoirs, sediment settles to the bottom as the water becomes stratified during summer. As anyone who has swum in a lake knows, warmer, oxygenated water—which is lighter—rises to the top and forms a layer over the heavier, colder water below. Because the water from Clark Canyon is released from the base of the dam, the Beaverhead has traditionally remained cold and clear even in the hottest summer weather.

Responding to community concerns over the cloudy water, DEQ and FWP dispatched teams in 2015 and 2016 to monitor and measure turbidity, nutrients, dissolved and suspended solids, dissolved oxygen, and phytoplankton in the reservoir, the Beaverhead and Red Rock Rivers, and Horse Prairie Creek. The Bureau of Reclamation, which owns and operates the dam, studied the reservoir bed level. FWP crews also looked at fish populations.

One theory tested was whether carp and suckers were stirring up sediment as they rooted around for food. But Jaeger says his surveys found so few bottom feeders that fish could not be responsible for the vast amount



WHERE IT ALL BEGINS Clark Canyon Dam forms Clark Canyon Reservoir south of Dillon (above). Where the dam releases water at its base (arrow) is the start of the Beaverhead River, known for its excellent rainbow and brown trout fishing (right).

of sediment mixing. Others theorized that alterations in land use in the surrounding watershed may be sending excess nutrients or pollutants into the reservoir. According to Eric Urban, chief of the DEQ Water Quality Planning Bureau, monitoring and data analysis shows that the total amount of nutrients has remained unchanged. The Bureau of Reclamation reports that the reservoir's sediment depth, dam operations, and water releases also have not changed in recent years.

WATER LAYERS ARE MIXING

Urban says DEQ scientists have determined that the reservoir is "de-stratifying." In other words, the two ordinarily stable water layers are mixing and somehow stirring up sediment that ordinarily stays on the reservoir bottom. On some days last summer, scientists found a 10- to 20-foot layer of turbid water at the bottom of the reservoir. "The fine sediment delivered to or produced in Clark Canyon Reservoir since its formation is being re-suspended," Urban says.

Fortunately, the degraded water quality seems not to have harmed aquatic life. Jaeger says trout numbers in the Beaverhead remain strong, and DEQ surveys found that the size of aquatic insect communities remains comparable to what surveys found before 2014.

Southwestern Montana snowpack was higher than average in late winter of 2017. If that remains the case into late spring and early summer, water levels on Clark Canyon could increase and water temperatures



GATHERING OF WATERS A DEQ scientist holds a sampling device used to collect water at various depths on Clark Canyon Reservoir.

could stay closer to historical levels. That could decrease chances of destratification.

In March, the Beaverhead Watershed Committee formed a team of irrigators, outfitters, and other tourism-related business owners to figure out the best course of action. "I think DEQ has done a great job of diagnosing the problem," Jaeger says. "The challenge now is for agencies and the people most affected by this situation to decide what they want to do about it."

Among options being discussed are keeping the reservoir at a higher water level (a lower pool leads to conditions that favor destratification), and releasing water from higher in the Clark Canyon Reservoir water column. Even if an engineering solution such as changing the water outlet were feasible, says Jaeger, it would be expensive. "If people can identify and agree upon a viable solution, the final challenge to restoring clear water to the Beaverhead will be finding a way to fund it." 🐾



Where Sacajawea found her brother

The site of Clark Canyon Reservoir has historical significance dating back more than two centuries. In August 1805, the men of the Corps of Discovery who accompanied Captain William Clark lugged heavily laden canoes upstream on what we know today as the Beaverhead River above Barretts Siding.

Expedition member Patrick Gass noted the Beaverhead's twisty, alder-laden route, still a feature today: "...the river meanders... through the bushes and is not more than 20 yards wide, and about a foot and a half deep. The water is very cold, and severe and disagreeable to the men, who are frequently obliged to wade and drag the canoes."

Sergeant John Ordway wrote more cheerily of the river's excellent fishery (composed of westslope cutthroat trout and Arctic grayling): "...the River crooked Shallow and rapid. Some deep holes where we caught a number of Trout."

Traveling several days ahead, Captain Meriwether Lewis followed Horse Prairie Creek to the confluence of the Beaverhead. It was near this juncture that he first encountered a Shoshone Indian tribe, the chief of which turned out to be Sacajawea's brother, Cameahwait. The Indian leader assisted the expedition by providing guides and horses. Clark cached his big-river canoes for the return journey in a place that today is inundated by Clark Canyon Reservoir. Because of the fortuitous meeting with Cameahwait, Lewis named the spot Camp Fortunate.



Artist's depiction of Sacajawea reuniting with her brother, Shoshone chief Cameahwait.