

Mountain mining damages streams

Study shows that stripping mountains for coal has a much greater impact than urban growth.

PITTSBURGH, PENNSYLVANIA

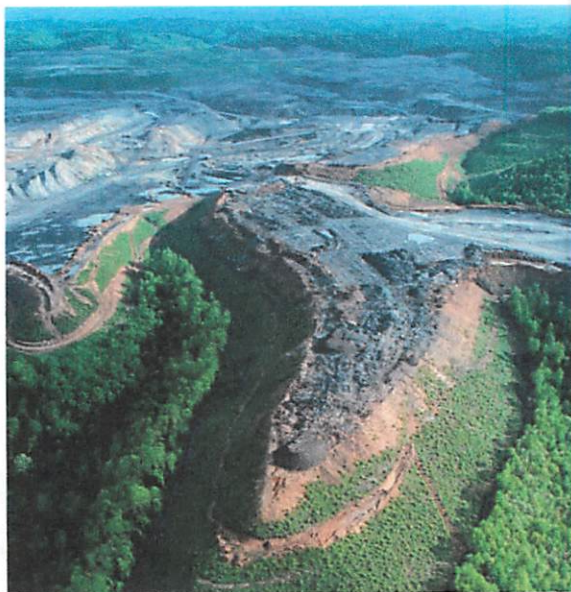
The controversial practice of stripping off the tops of mountains to mine coal, long suspected of polluting streams, is guilty as charged, scientists say.

On 3 August, researchers at the Ecological Society of America conference in Pittsburgh, Pennsylvania, presented what they say is the first conclusive evidence of a direct link between this type of mining and environmental damage. Their research has teased apart the effects of mountain-top mining and urbanization on local water quality in West Virginia, and found that even relatively small mining operations can cause serious harm to ecosystems.

"Even at very low levels of mining we found a dramatic impact on water quality and stream composition," Emily Bernhardt, a biologist at Duke University in Durham, North Carolina, and one of the study's lead researchers, told *Nature*. The scientists have called on the US Environmental Protection Agency (EPA) to tighten the water pollution limits faced by mining companies.

Mountain-top mining is widespread in eastern Kentucky, West Virginia and southwestern Virginia. To expose seams of coal, mining companies strip away forests and break up rock with explosives. The rubble is dumped in the valleys, often burying streams. The loss of vegetation and topsoil can cause flooding, and the water emerging from the debris contains toxic solutes including selenium, metals and sulphates, says Bernhardt.

The EPA recommends that mining activity should not increase the electrical conductivity of stream water (a measure of its ionic concentration) beyond 500 microsiemens per centimetre ($\mu\text{S cm}^{-1}$). Yet a previous study¹ demonstrated significant changes in the size and composition of macro-invertebrate communities — such as mayflies and caddis flies — at lower conductivity levels. A second study² found that increases in the concentration of metals in stream water, and decreases in stream invertebrate biodiversity, were correlated with increased sulphate concentrations, an indicator of mining. But neither study established a direct link between mining and the environmental changes.



West Virginia's mountains contain valuable low-sulphur coal.

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Bernhardt and her colleagues overlaid images taken by satellites and aircraft of mining activity in West Virginia's Appalachian Mountains onto topographic maps of the area, allowing them to estimate the amount of mining taking place in mountain watersheds between 1996 and 2009. The research team also had access to data on water quality and invertebrate biodiversity for 478 sites in the area, collected over the same period by the West Virginia Department of Environmental Protection.

Mining had occurred at 208 of those sites, where the average water conductivity was $650 \mu\text{S cm}^{-1}$. In the most intensively mined areas, where 92% of the watershed had been mined at some point, conductivity levels rose to $1,100 \mu\text{S cm}^{-1}$. Bernhardt says that even in areas where just 2.5% of the watershed had been mined, some 30% of streams still had conductivity levels greater than the EPA's recommendation. The team also noted "sharp declines" in some stream invertebrates in areas where as little as 1% of the watershed had been mined.

William Schlesinger, a biogeochemist at the Cary Institute of Ecosystem Studies in Millbrook, New York, says the results are "significant" as "they directly link changes in the

stream water chemistry to the area of the watersheds that has been disturbed by mining activities".

The study also addresses the mining industry's contention that water-quality standards should not be tightened because stream conductivity changes often reflect urbanization and other changes in land use. Earlier this year, the National Mining Association (NMA), based in Washington DC, said in a statement: "No evidence has been presented that uniquely correlates higher conductivity levels with coal mining or valley fills."

In 202 of the sites Bernhardt and her colleagues studied, however, there was no mining activity, but some urban development. Water at these sites had an average conductivity of $228 \mu\text{S cm}^{-1}$ — much lower than the average at mined sites. In 30 other sites, no mining or urban development had taken place, and these control sites had an average conductivity of $105 \mu\text{S cm}^{-1}$.

Bernhardt says she was "shocked" by the differences. But she declined to say at what level she thinks the EPA should set the threshold, saying only that "it appears you get effects at much lower levels of conductivity than previously thought". Luke Popovich, the NMA's vice-president for external communications, declined to comment on the study without seeing its data, but notes that the conductivity limit set by the EPA is "difficult or impossible for mining operations to meet. In our view, this begs the larger question of whether conductivity as employed here can tell us much at all about the impacts of mining on biodiversity."

"Conductivity should not be used as an exclusive tool for isolating impacts from mining activity from the many other sources or factors that may impact water quality," he adds.

In a statement to *Nature*, the EPA says it believes that the study's results are "generally consistent" with its own research, which is "currently being reviewed" by its science advisory board. "EPA will continue to rely on the best available science as it reviews proposals for new surface coal mining projects under the Clean Water Act," it adds.

Natasha Gilbert

1. Pond, G. J. et al. *J. N. Am. Benthol. Soc.* **27**, 717-737 (2008).

2. Palmer, M. A. et al. *Science* **372**, 148-149 (2010).

DRILLING: Cities plan to talk with leaseholder

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"Of course we're disappointed those leases were issued," said Palisade Mayor Doug Edwards. "But now is the time to sit down and negotiate."

Palisade and Grand Junction have been fearful that drilling — and the accompanying pumping of toxic fluids into the ground to release oil and gas — may lead to contamination of water sources based in underground aquifers and above-ground springs.

"We're not going to stop them," said Grand Junction Mayor Jim Doody. "So we have to go in with a handshake and just start talking."

The prospect of drilling in the watersheds has raised an outcry in the neighboring Western Slope towns since a proposal to lease the lands was announced last year. Grand Junction attempted to obtain the lease on its own watershed but was outbid by Genesis Gas & Oil of Kansas City, Mo.

The two municipalities then formally protested the lease sale, and it has been under consideration by BLM state director Sally Wisely since then.

"We have taken the time to ensure a thorough review of all aspects of this sensitive issue," Wisely said in an announcement about the lease decision.

The announcement came one day after a grassroots citizens'

group, the Western Colorado Congress, turned in signatures to place a watershed-protection ordinance on the Grand Junction ballot in November. The ordinance would not be retroactive, and would have no bearing on this drilling.

Western Colorado Congress board member Bill Grant said his group is "very disappointed" the lease will go forward.

Officials at Genesis did not return a phone call asking for comment.

Sen. Wayne Allard, R-Colo, praised the plan to temporarily suspend the drilling.

"My hope is that this delay will allow the communities of Palisade and Grand Junction to work out a plan with the lessee that protects their watersheds," he said in a written statement.

Sen. Ken Salazar, D-Colo, said he was disappointed the BLM did not heed his request to forgo drilling in municipal watersheds but was encouraged that Genesis agreed to work with the municipalities.

"As this process goes forward, I will continue to work with Palisade and Grand Junction to protect their watersheds, and monitor closely the actions of the BLM and the lessee," Salazar said in a written comment.

Staff writer Nancy Lofholm can be reached at 970-256-1957 or nlofholm@denverpost.com.

BLM OKs watershed drilling

Palisade and Grand Junction, worried about their drinking water, gain some concessions.

By Nancy Lofholm
Denver Post Staff Writer

DP
4 Aug 06
3B

Grand Junction — Despite protests from elected officials and residents, oil and gas drilling will be allowed on the Grand Mesa slopes that are the source of drinking water for Palisade and Grand Junction.

The Bureau of Land Management's long-awaited — and locally dreaded — decision to go ahead with drilling leases in the watersheds does hold some concessions for the towns.

No drilling will occur until after a "timeout" of up to a year. During that time, the energy company that plans to drill on the mesa and the municipalities can work out an agreement geared to ensuring water sources are safe. The leaseholder also has agreed to avoid any surface disturbances — but doesn't address underground directional drilling — in the 960 acres containing the springs that supply Palisade's water.

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Western Colorado returned in signatures watershed-protection on the Grand Junction in November. The order would not be retroactive and would have no bearing on drilling.

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Wyoming sues EPA on water-quality rule

Some fear Montana plan lowers standards

By Ben Neary
The Associated Press

D.P.
123906/40

Cheyenne — Seeking to protect natural-gas production, Wyoming filed a federal lawsuit Monday against the U.S. Environmental Protection Agency seeking to force the agency to reject Montana water-quality regulations.

Wyoming Gov. Dave Freudenthal said Monday that the Montana rules would impose a water-quality standard on the Powder River, Little Powder River and Tongue River below the naturally occurring water quality for much of the year.

Freudenthal said the rules are "unacceptable to Wyoming and are a direct threat to Wyoming's CBM industry."

Gas producers pump water from the ground during the production of coal-bed methane, and much of that is allowed to flow into rivers and streambeds.

Freudenthal said he's hopeful that the EPA will follow through on earlier indications that it would help resolve the dispute between the two states. He said Wyoming remains committed to finding a solution that allows continued gas production while maintaining existing water quality in the river drainages involved.

But he said Montana's proposed rules "do not even come close to achieving that result."

Richard Opper, director of the Montana Department of Environmental Quality, said Monday that he hadn't seen Wyoming's court filing and couldn't comment on it.

"Obviously, Montana looks at this issue a little differently than our neighbors to

the south," Opper said. "We'd like to work this out in venues other than the court, but it doesn't look like that is going to happen now." Opper said Montana's intention is to protect irrigation and other long-standing uses of the Powder River.

"The non-degradation standard that our board passed in 2006 is designed to protect an increment of high-quality water in the river," Opper said.

He noted that the Tongue River becomes saltier as it goes downstream to the north. "Our concern is that meeting the water-quality standards at the border may not be good enough to protect beneficial uses downstream," he said.

Freudenthal in April wrote to the EPA asking the agency to reject the Montana regulations. But Wyoming Attorney General Pat Crank said Monday that the EPA failed either to reject or approve Montana's proposed regulations within specified periods after it received them.

The state's lawsuit, assigned to U.S. District Judge William Downes in Casper, asks the federal court to review the EPA's failure to disapprove the Montana regulations on time.

"If EPA were to adopt these standards that we feel are not scientifically based or necessary, they could have an effect on our (pollution discharge) permits that we issue here in Wyoming, to discharge water during coal-bed methane operations," Crank said.

"We feel it's a Wyoming issue, and important to Wyoming, and we would like to have a judge in Wyoming decide the question," Crank said.

Garfield County votes to use gas fine to study groundwater

The Associated Press

GLENWOOD SPRINGS — Garfield County commissioners want to use the \$371,000 fine levied against an energy company to study the impacts of gas drilling in the area.

Encana Oil & Gas received the record fine in August after a gas well leaked into a creek near Silt.

Commissioners voted Monday to use the money for a two-part study of drilling in the land south of the Colorado River. The aim of the study is to assess whether gas from the Williams Formation, where Encana drills, could contaminate groundwater or if the gas found in groundwater there occurs naturally.

The Colorado Oil and Gas

Conservation Commission handed down the fine and will have the final say on how the money is spent. Garfield County officials will present their study proposal to the commission on Nov. 29.

The study could be limited by how much information the industry is willing to share, said county oil and gas auditor Doug Denison.

"They are willing to share data except what gives them a competitive advantage," he

The aim of the study is to assess whether gas from the Williams Formation, where Encana drills, could contaminate groundwater ...

said.

Commissioners agreed to let Encana keep the \$371,000 and pay the bills for the study as they come in.

If the study is approved, commissioners would like to start the project by May and complete it by November.

MINING-CLAIM CLASHES HEAD ABOVE GROUND

By Electa Draper
Denver Post Staff Writer

8/4/06
1B

Creede — By the time the last silver mine closed here in 1985, the profitable Creede Mining District had produced more than 50 million troy ounces of silver and 100,000 tons of lead.

And old patented mining claims — land slivers generally 10.33 acres in size — crisscrossed the mountains here — as they did around Georgetown, Leadville, Aspen, Crested Butte, Silverton, Ouray, Telluride, Ophir and the rest of Colorado's mineral belt.

It is one legacy of mining. The underground tunnels that made

Colorado rich created chaotic land ownership patterns on the surface.

These early claims predate most other land-tenure systems. And they generate disputes when modern landowners try to inhabit them, says Doug Robotham, executive director of the Colorado chapter of the Trust for Public Land.

"It creates total havoc for all sorts of different reasons. Just imagine the different scenarios," Robotham says.

He ticks off a few: road battles from Teller to La Plata counties, trail closures from Gunnison to San Miguel counties, barred fourteeners, despoiled views,

mismatched developments and the occasional surprise mining operation popping up next door.

Somewhere between the Happy Thought and Last Chance mines north of Creede, neighborly relations have taken a turn for the worse over a disputed road and conflicting dreams of a post-mining West.

Missouri-born truck driver Jack Morris bought the Last Chance mine in 1997 from the

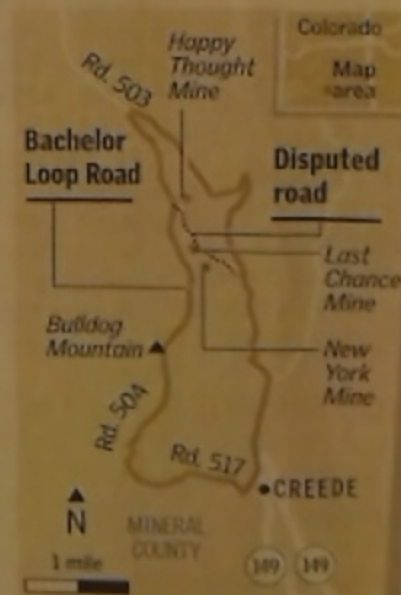
> See **CLAIMS** on 4B

Mine dispute

The owners of the Happy Thought and Last Chance mines near Creede are in a road and land dispute that threatens to drag in Mineral County officials.



The view from a guest cabin at the Last Chance Mine, home to one of the state's richest finds. The Morrises charge nothing for guests to stay at the cabins but do accept donations.



Cindy Enright | The Denver Post

CLAIMS: Growing access dis

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granddaughter of its original owner with a pledge to let the public share in the history of one of the state's richest finds.

In 2002, Morris and his wife, Kim, opened the partially restored mine complex as a historic attraction where rock hounds could collect specimens from the famed Amethyst Vein, which "Rock & Gem" magazine says may be "the most distinctive and beautiful" ore ever run through a mill.

Morris charges by the specimen or \$2 a pound for guests who want to take material from the mine dump. For guest cabins, he charges nothing but accepts donations. The mine, elevation around 10,300 feet, is only open summer weekends. Morris says it typically attracts 15 to 20 people a day, who take a short jaunt on a dirt drive off Bachelor Loop Road to reach the Last Chance.

"The Bachelor Loop is one of the largest tourist draws in the area," says Mineral County Chamber of Commerce spokeswoman Brenda Maze. "The Last Chance adds to the authenticity of the Bachelor Loop."

But this summer, Morris has been preoccupied by a dispute with two nearby landowners, whom he says are trying to shut down the mine tour.

Denver attorney Paul Franke and Bob Wunderlich, a former miner, part-year resident and owner of the Happy Thought Mine, have regularly challenged Morris' operation in county meetings.

"But they hit something hard when they rolled up against me," Morris says.

Franke, a part-time resident the last few years, contested the county's listing of the road used by all three landowners as a public right of way. He has contended that the public should not be allowed access, Mineral County Commissioner



The Last Chance Mine, above, is owned the mine complex as a historic attraction owned by Bob Wunderlich, who has reg

Zeke Ward says. Now the county is considering a review process by which it could add or delete public ways.

"On many occasions, (Franke) has said he could file so many lawsuits he could bankrupt the county, or he's said he could cost the county a lot of money," Ward says.

Wunderlich has questioned whether Morris' mineral sales violated zoning regulations. County officials concluded that mineral sales are allowed in the alpine zone, which provides for residential use and for traditional mining practices.

Franke recently asked the sheriff to remove a sign at the cutoff directing people to the Last Chance. The commission-

Disputes usually resolved in court



Michael S. Lewis | Special to The Denver Post

by Jack Morris, who partially restored the road. The view is north toward property regularly challenged Morris' operation.

Wunderlich and Franke decided the sign was not illegal.

Franke declined to comment for this story. Wunderlich couldn't be reached.

The latest neighborhood tussle is over three trenches — 3 feet wide by 2 feet deep — that Wunderlich told commissioners he had cut across the road to the Last Chance to prevent flooding. Morris said the ditches kept people without four-wheel-drive away from the mine. The county allowed him to return the road to its original condition. Morris is suing Wunderlich for the cost, \$881.

"Mr. Wunderlich and Mr. Franke would like to enjoy their properties in different ways than Mr. Morris," Ward says. "And it's going to happen with

more and more people all the time."

Miners cared about what was going on below ground and which way the veins of ore ran. They didn't necessarily care who crossed the surface of their claims to go hunting or fishing in the woods, Ward says. Contemporary landowners do.

"The people who have grown up in Creede and lived here all their lives have had access to the mountains over patented mining claims," he says. "But now, you have new people buying old property for different reasons. The majority of mining claims sold in the last 20 years have been purchased for surface rights only for recreational use or to build second homes."

Generally speaking, each claim is allowed a residence.

"It's like a subdivision. But it's a subdivision that wasn't planned. It was created under the 1872 Mining Act," Ward says. "It's a planning and zoning nightmare."

Colorado Counties Inc. legislative director Chip Taylor says there are so many mine-related access disputes across the state that it's difficult to track them. When Taylor was a Ouray County administrator in the late 1990s, he says, crazily-shaped claims created countless governance problems, as people sought to build homes on steep slopes and substandard lots where delivery of any county services would be difficult, to say the least.

Different counties cope in different ways. But whatever they and the state devise to bring order to development, these disputes usually get resolved in court, Robotham says.

"For every dispute that gets resolved," he says, "there's 100 more waiting to happen."

Staff writer Electa Draper can be reached at 970-385-0917 or edraper@denverpost.com.

Is state a sacrifice area?

Is Colorado considered a national sacrifice area by the federal government?

Or is there just a general dismissive attitude regarding the West? We're not even halfway into 2006 and already the administration's made major proposals that could disastrously and permanently affect our Centennial State.

Most recent is the U.S. Army's May 3 announcement that it wants to expand Fort Carson's Piñon Canyon Maneuver Site between Trinidad and La Junta so that cannon and tank training with live ammunition can be implemented. Fort Carson is 132,000 acres, and Piñon Canyon 235,000 acres. The Army is perusing an "area of interest" of more than 1 million acres, including the town of Hoehne, with a 343-student school, two U.S. highways, and part of the Comanche National Grassland, home of the nation's largest display of dinosaur tracks and an important wildlife habitat, and a segment of the historic Santa Fe Trail.

If a May 13 meeting in Pueblo with U.S. Sen. Ken Salazar, a deputy secretary of the Army, and 500 ranchers, farmers, outfitters and small business owners is any indication, there may be an acute shortage of willing sellers. A list of 142 area families who say they wouldn't sell was provided. One speaker testified that Las Animas County could lose up to \$23 million each year in the deal.

To enlarge the site, the Army will need approval from the Department of Defense and money from Congress. Salazar said the Army wouldn't be allowed to condemn the land through eminent domain, but anyone who's watched the government do whatever it wants shouldn't be assured.

For perspective: Colorado is 66.6 million acres, of which 57 percent is privately owned; the federal government has 37.2 percent, which includes national forests and parks and Bureau of Land Management holdings as well as four military bases; and the state government has 4.8 percent.

Which leads to other threats to the Colorado we know and love. In February, President Bush announced the administration would sell more than 300,000 acres of national forests and BLM lands, which could bring more than a billion



**JOANNE
DITMER**
*Denver Post
Columnist*

D.P. 26 May 06
7B

for tax cuts for the rich.

Opposition to the plan was one thing Democrats and Republicans in Congress could agree on, and a majority declared that a massive selling off of public lands was a bad idea.

Currently a statewide task force is evaluating Colorado's 11 national forests and two grasslands totaling 14 million acres, of which just 4 million acres are roadless. The feds have turned the question of which roadless areas should be protected to the states, to make recommendations to the governor. At public hearings, the response has been almost unanimous to not permit new roads in these areas; last week, the Colorado Division of Wildlife came out strongly to protect these roadless areas. Whether the governor will heed these recommendations is anyone's guess.

There's a more optimistic scene from the National Park Service, which manages 84.5 million acres in parks, monuments, battlefields, historic sites, seashores, lakeshores and scenic trails. The fiscal 2007 budget proposes an increase of \$23 million in operational costs.

Meanwhile, over in northwestern Colorado, while BLM land managers are completing an environmental study of what oil and gas drilling, if any, should be permitted on the 54,000-acre Roan Plateau, energy companies are drilling on its 19,000 acres of private lands and cutting roads to the top.

The Colorado Department of Natural Resources, conservationists and local municipalities believe the 35,000 acres of federal lands on the Roan should be protected from surface drilling, but the drillers are confident enough to build roads to the top. It appears they know no one will deny them.

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It's a gloomy picture.

Joanne DITMER's column on environmental and urban issues for *The Post* began in 1962 and now appears once a month.

Photo by Tony Freeman/StockPhoto.com