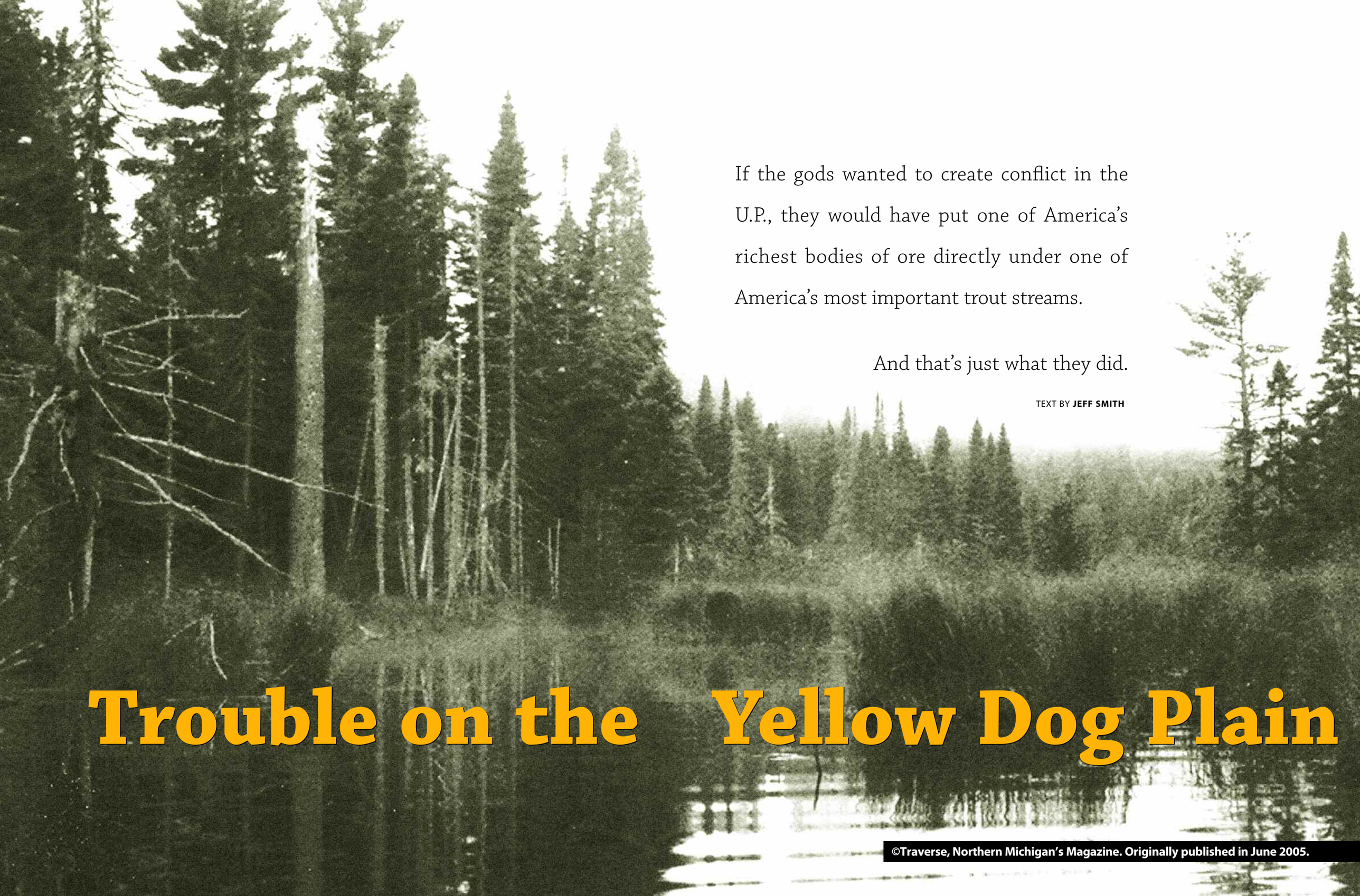


If the gods wanted to create conflict in the U.P., they would have put one of America's richest bodies of ore directly under one of America's most important trout streams.

And that's just what they did.

TEXT BY **JEFF SMITH**

Trouble on the Yellow Dog Plain

YELLOW DOG WATERSHED PRESERVE

The Salmon Trout River rises as a sleepy stream and runs about eight river-miles before reaching the spawning beds of the rare coaster brook trout.

The first day of spring

lies just seven days away here in Big Bay, 30 miles north of Marquette, but if there are signs of the new season, it would take a local to discern them. Piles of snow still rise to the eaves of houses. Road signs barely emerge above plow drifts. Squadrons of snowmobilers still veer in to Cram's General Store, gassing up, grabbing jerky and beverages, and roaring away, leaving the blue haze and smell of two-stroke engine exhaust hovering above the snowy street. And snowflakes the size of quarters still fall, drifting down from low gray clouds blowing in off Lake Superior nearby. Spring just seven days away? Seven weeks is more like it.

Many of us in America would say the people who live here have chosen to do without, and doing without bare ground from November until May is just the beginning. They do without high paying jobs. They do without big houses. They do without much of the stuff that fills basements and garages and closets and yards in suburbs across the nation. They do without a mall nearby.

Some here live off the grid, building homes in the Huron Mountains and on the Yellow Dog Plain outside of town. Here, the power lines end, leaving 1,500 square miles of land without electrical service. People haul in generators, light with propane, use outhouses. Some park cars at the road and hop onto snowmobiles or clip into skis to go another two or three miles to their homes.

But the people who live here think of it as living "with," not "without." They live with stars strewn across the night sky, with the howl of wolves on still summer evenings, with green forest that spreads across the Huron Mountains, and with rivers that run clean.

Sometimes though, people who work hard to do without material goods can be put upon by those of us who work hard to do with material goods, and such is the drama that is playing out in this northern outpost. In the forestland nearby, a subsidiary of one of the world's largest mining companies, London-based Rio Tinto, has discovered a rich deposit of ore and intends to excavate a mine on the Yellow Dog Plain, a 20,000-acre flat of trees and streams set amid the Huron Mountains. The ore will go to make steel for cars, nickel-cadmium batteries, copper wire, gold-plated this, platinum-plated that. The 120 to 140 people who work the mine will be paid about $40,000 a year plus benefits, good money for up here.

But the defiance expressed in a sign nailed to the side of Big Bay Outfitters, and other businesses and houses around Big Bay, expresses the dread most people here share: "Say no to sulfide mining!" Sulfide refers to the mineral nature of the ore body. The name also provides a clue as to why most locals are so passionately opposed to the mine.

Sulfide minerals are metals combined with sulfur, and when the rock is exposed to moisture and oxygen, it can produce what's called acid mine drainage, a mix of sulfuric acid and minerals that for centuries has caused environmental damage at mines throughout the world. Until recent decades, mining companies did nothing to control acid drainage, and it turned mine sites into lifeless wastelands, rendered groundwater undrinkable, killed fish and plants in streams. Acid drainage still leaches from sulfide mines dug in Europe 2,000 years ago.

Locals fear that the imprint of heavy industry will hobble the spirit of a land they love. For generations, people here have headed to the Yellow Dog Plain and the Huron Mountains for both work and play. They log and trap here. They hunt, fish, camp and pick berries. If the mine moves ahead, 30 semitruck loads of ore a day—60 trips counting each way as one—will weave through the Northern forests, the rumble of rock crushers will mix with bird song, industrial lights will glow from behind hills where before there had been only the light of stars.

But opposition is based on more than just lifestyle concerns. The mine's environmental risk is too great, mine opponents say, because the ore body lies directly under a wetland that forms the headwaters of the Salmon Trout River, which is the last river on the Michigan mainland where the once-plentiful coaster brook trout still spawns.

Europeans crossed the Atlantic in the mid-1800's just to reel in the big and beautiful coaster. The fish was easy to catch and is a giant compared to the common brook trout. A typical brookie may weigh a half-pound to a pound, but the largest recorded coaster is a 14.5-pound monster from the Nipigon River in Canada.

Prior to 1890, fishermen found coasters for 1,000 miles along the Lake Superior coast, and biologists figure that they spawned in about 120 tributaries. But these days, coaster spawning is confirmed in just seven Canadian tributaries and three U.S. tributaries—including the Salmon Trout River.

Biologists have been struggling to increase the coaster population for five years in Michigan, mostly by planting fingerlings in U.P. rivers. But so far, the efforts have produced virtually no results, which makes the health of the Salmon Trout River that much more important.

Rio Tinto, or more specifically, its wholly owned U.S. subsidiary, Kennecott Minerals, which is managing the project, says that new mining technologies are nothing like the old. The company says its footprint will be small, and that engineering controls and new materials will eliminate the risk of acid mine drainage and any other environmental concerns. The company Web site backs it up with this: "A promise made is a promise kept."

The easy roll of the Huron Mountains rates as one of the Midwest's most lovely displays of nature, there's no denying. But today the hills are mere shadows of their former selves, topping out at about 1,900 feet, just 1,300 feet above the surface of Lake Superior. Back in the day, though—about 1.1 billion years ago—this area stood large and proud on the global geologic stage. "Back then you would have seen volcanoes and magma all over the place," says Dr. Ted Bornhorst, a geology professor at Michigan Technological University. And it's back then when the seeds of this story were sown.

The geologic spectacle was the result of a giant crack in the earth's crust that allowed magma from the earth's mantle to surge to the surface. Today, in some places the magma lies 16 miles thick. The fissure, called the Midcontinental Rift, extended for hundreds of miles, arcing north through Wisconsin, following for a bit what is now the southern shore of Lake Superior before curving south again and continuing down through the Lower Peninsula. By the time early man appeared, glaciers and weather had worn down the mountains to the mounds we see today.

Prehistoric people probably didn't know about plate tectonics, but the land's mineral riches were so blatant, even a caveman could see them. Holes discovered on the Keweenaw Peninsula, about 100 miles west of Big Bay, are the remnants of copper mines perhaps 8,000 years old. In the 1800's, Europeans followed suit, mining what is the largest accumulation of native copper ever discovered on the planet.

Other metallic wonders exist near the area as well. In Negaunee and Ishpeming, 60 miles southwest of Big Bay, companies began mining iron in 1845 and haven't quit. The value of iron ore unearthed here makes it one of the richest mining strikes in American history, dwarfing the value of gold discovered in the California gold rush.

Until recent decades, mining companies did nothing to control acid drainage, and it turned mine sites into lifeless wastelands, rendered groundwater undrinkable, killed fish and plants in streams.

TODD ZAWISTOWSKI

What Kennecott Exploration discovered in August 2002 is that superlative ore bodies near the Midcontinental Rift hadn't all been found. When geologists put magnifying glasses to the core samples drilled from the Yellow Dog Plain, they were staring at pieces of the purest, most profitable body of nickel ore ever discovered in the United States.

A hot nickel market is adding momentum to the project. China, India and the United States all need steel badly these days, and nickel is an integral component. The demand has tripled nickel prices on the London Minerals Exchange in the past few years. Understandably, Kennecott and its parent very much want the Yellow Dog mine—which the company calls the Eagle Project—to succeed. Company managers have high hopes for the other mineral rights they've leased and purchased in the U.P. as well—462,000 acres' worth, equal to more than 700 square miles.

When there's no snow on the ground, the Triple A highway is a strip of dust, gravel and potholes that ambles southwest from Big Bay, cutting across the Yellow Dog Plain before twisting and turning through the Huron Mountains on its way to L'Anse. But come winter, the Triple A is snowmobiles only, a groomed trail for sledders looking to see the backcountry in white. Locals Michelle Halley and Cynthia Pryor typically avoid snowmobiles, but this day on the cusp of spring finds each helmeted, suited up, and with a thumb on the throttle of a Ski Doo motoring along the Triple A. Halley graduated from Marquette high school and eventually returned as a Marquette-based attorney for the National Wildlife Federation. Pryor is president of the Yellow Dog Watershed Preserve; she's also an off-the-gridder who skis a mile in to her home. For two years the two have led the fight against the mine, committing hundreds of hours of researching sulfide mining, organizing locals and lobbying for new laws. Today they are visiting Kennecott's proposed mine site.

Ten miles down the trail they pull off to the side, trade snowmobiles for snowshoes and stand in the white expanse. To be honest, the Yellow Dog Plain is not untamed wilderness. Timber companies have cut it hard over the years, leaving a checkerboard of plantings. Here, the cuts are recent, and in the snow, the site has a tundra feel. Still, it's a beautiful place, with tall jack pines lining the river, and the Huron Mountains rising to frame the plain. "In summer, this is covered in blueberries," Pryor says. She sweeps her arm to take it all in.

The women march south across the field, the snow base dense this late in the season, making walking easy. The swish of snowpants and the crunch of snow are the only sounds. Here and there stakes with pink ribbons flutter in the breeze. Each of those is a monitoring well or a core sample site—places where the company has drilled to study the groundwater or the rock, according to Halley. After a few hundred yards, the two stop. "Right about here is the edge of the ore body," Halley says. Then she points to a bedrock outcropping about three stories high that lies a half mile to the north. To avoid disrupting the river, Kennecott will enter into that rock and burrow underground to here, where they will intercept the ore. All of the buildings and storage will be near the entrance.

Heading down a steep ravine, the two reach what constitutes the heart of their opposition, the headwaters of the Salmon Trout River. It's a small piece of water at this point, maybe 10 feet wide and frozen over. Tracks of two or three coyotes run down the middle of the stream. A jumble of prints where the women now stand reveals where the coyotes had stopped to play or investigate. The marshy feel of the place is evident despite the three feet of snow. An occasional bulrush rises above the white. The curvy trace of the riverbed winds through the snow banks and cuts an open space through the forest.

Pryor kneels to draw in the snow. She etches the bed of the Salmon Trout, which starts about a half-mile from here. Then she traces the ore body, and shows how it lies directly under the river. Lending credence to her simple map are more stakes with pink ribbons fluttering in the forest nearby.

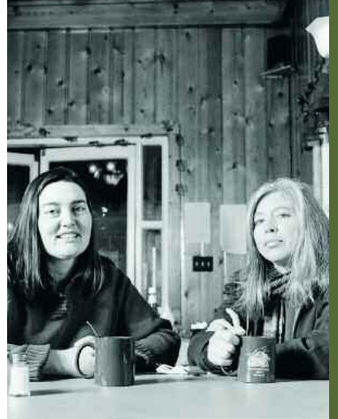
Halley turns her gaze from Pryor's map and her eyes follow the coyote tracks back upstream. "We aren't saying Kennecott will do any polluting on purpose," she says. "But it could still happen." She fears that drainage could come from water entering the mine as mining occurs. Rain and snow—chief culprits in acid formation—could percolate through piles of rock that will be outside for a couple of years before being backfilled into the mine cavity. The thousands of gallons of water used in crushing rock for shipping offers more potential for contamination. Or there could be subsidence, meaning the mine cavity could slump down, interrupting the flow of water to this delicate waterway called the Salmon Trout.

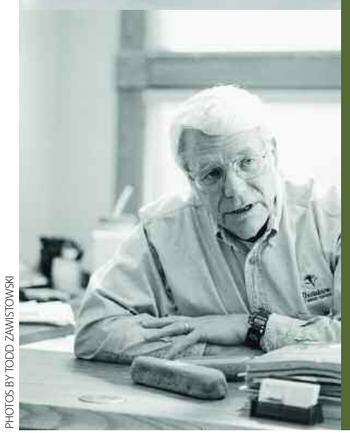
In their fight to protect the Yellow Dog Plain and the Salmon Trout River, Halley and Pryor have an ally in a group called the Wolf Pack. It's a low-profile band of about 60 businesspeople and technologists who believe that Michigan can protect the environment and grow economically at the same time. Each year the Wolf Pack, which formed in 2001, selects one or two issues to become involved with, and this year the members chose the mine proposed on the Yellow Dog Plain. The group studied the economics and environmental risks of the project and put together a road show to present their findings, which are largely opposed to the mine.

"This operation as proposed is far above any bar that would represent any reasonable environmental standard." —Dr. Theodore Bornhorst, Michigan Technological University

Ray Pittman, retired director of Powertrain Operations Ford of Europe, is a Wolf Pack member. "Several of us in the group have been involved with engineering and industrial processes their entire careers," he says. "We know that no process can be executed over time without defects. There's no such thing."

With some measure of failure as a given, what concerns the group about the Yellow Dog proposal is the vulnerability of the site. "The Salmon Trout is a small stream. It will not be resilient to mistakes and accidents. And if for some reason you had an accident and ruined the Salmon Trout, you could destroy the coaster brook trout."





PHOTOS BY TODD ZAWISTOWSKI

The U.P.'s Great Divide

Talk of drilling on the Yellow Dog Plain in the summer of 2002 caught the interest of Michelle Halley (far left), attorney with the National Wildlife Federation in Marquette, and Cynthia Pryor (left), president of the Yellow Dog Watershed Preserve. The two teamed up and led the fight for new mine legislation, which became effective December 2004.

With Kennecott holding rights to 460,000 acres of mineral rights in the U.P., Dick Huey, local real estate agent, worries about what will happen to land values if mining proliferates.

The mine will be safe, thanks to state-of-the-art engineering and modern materials, like synthetic liners that will keep water away from sulfide rock, says Jon Cherry, project manager for Kennecott Minerals (top right).

"We set the bar high," says Mike Gokey, formerly executive director of the regional economic council, which passed a resolution supporting the mine if it can meet new regulations. "If they can't meet the standard, I'll be there in lockstep with opponents telling the mine to go away."

If the mine does proceed? "It must be held to the highest achievable standards," Pittman says.

People opposed to the mine on the Yellow Dog Plain are quick to bring up sulfide mining's dreadful environmental legacy. Acid from 2,000-year-old mines is just one of the most common citations. But just as we wouldn't judge, say, heart surgery today based on 1890 surgical technology, it's not entirely fair to judge the Yellow Dog proposal based solely on past practices. When Jon Cherry, Kennecott's project manager here in Marquette, says this mine is nothing like mines from the days of yore, he's telling the truth.

The Kennecott office just outside Marquette proper still smells of new construction and has a just-moved-in spareness, apt, since it opened only last summer. On the wall of the conference room hangs a map that shows the mine site in topographic detail. A circle indicates the 2-acre rock outcropping where the company will bore into the ground. Lines squiggle across the Yellow Dog Plain—every one a stream. The pink ribbons that Halley and Pryor saw are marked as either a blue dot or a red dot. "Those blue dots are drill holes, and the red dots are groundwater monitoring sites," Cherry says. "One of those blue dots was the discovery hole."

A drill produces something called a core sample, which is a solid cylinder of rock about 2.5 inches in diameter. Picture that cylinder extending for 15 miles, and you'll understand how much core sample Kennecott has drilled so far on the Yellow Dog plain. "From all these holes we poked in the ground, we know a great deal about what is there," Cherry says.

Of course, the company mostly wanted to know about the size and nature of the ore body. Clicking through a Powerpoint presentation, Cherry stops on a 3-D diagram that shows the ore body shaped something like a wasp nest. Geologists figure it's 6 acres, runs from 200 feet to 1,200 feet deep, and consists of 3.7 percent nickel, 3.1 percent copper, has lesser amounts of cobalt, and trace quantities of platinum, paladium and gold.

But all that drilling also gave Kennecott enough information to know that it can mine here without disrupting the Salmon Trout River, according to Cherry. To make the argument, he pulls out a pint-sized sample jar filled with clay the color of deep-hued terra cotta. "This beautiful lacustrine clay deposit is out there. It's just like modeling clay, very low permeability," Cherry says.

The clay is lovely, but for Kennecott, the true beauty has more to do with its geologic function: it is key to protecting the Salmon Trout River from mining, Cherry says. Picture the clay like a giant liner spread underground, the clay thickness varying between 20 feet and 50 feet, and its top surface depth running from about 10 feet to 50 feet. When rain falls and snow melts, water filters down through the soil until it reaches the clay. Water can't go through clay this fine, so it flows underground along the top of the layer, eventually finding an outlet where the Salmon Trout River begins.

By entering the earth at the outcropping of bedrock, the

YELLOW DOG WATERSHED PRESERVE

"We know that no process can be executed over time without defects. There's no such thing," says Ray Pittman, Wolf Pack spokesman.

mine will avoid piercing the clay layer, never opening a breach that would interrupt the existing flow of water. If acid drainage were to develop in the mine, the clay will prevent the contamination from reaching the Salmon Trout—assuming all goes according to plan. "The hydrology out there is not complex," Cherry says. "It's very straightforward."

As for sulfuric acid drainage from piles of waste rock, Kennecott is also approaching that with care. Rock excavated from the tunnel will be stored on a double-lined pad. Another liner will cover the pile. The system will largely prevent water from contacting the rock, and any water that does get in will be collected by a leachate collection system and then be treated prior to discharge. As the ore body is excavated, this waste rock will be crushed to the size of aggregate, mixed with cement and placed back into the mine cavity for structural support. The lime in the cement will neutralize acid that might form later on. Cherry pauses the show again, this time on a spelled-out chemical reaction that has several S's, each one representing a sulfur molecule. The company has calculated the amount of sulfur in the rock and how much lime would be needed to neutralize all of it. "This is a simple chemical reaction—we understand it backwards and forwards," Cherry says.

The company will also minimize the impact of its machinery on the area. It will place as much equipment as possible underground to keep the noise down. Sound insulation will be used on equipment that remains up top. And in the scheme of things, the project won't last very long. Construction will take two years, mining will last six to eight years, and site closure will take another two years. After that, all buildings will be removed, no waste rock or tailings will remain on the surface, the hole will be filled with cemented rock, and after a few growing seasons, you'll never know there had been a mine there—if everything goes according to plan.

Bornhorst, who is not on the Kennecott payroll, concedes that he's impressed. "I understand the environmental concerns. And I understand there is potential for mines that aren't environmentally good. But as I stand back and look at it, this operation as proposed, is far above any bar that would represent any reasonable environmental standard."

Indeed, the plan sounds so perfect, there in Kennecott's conference room.

So which is it? The environmental disaster-in-waiting envisioned by Halley and Pryor when standing at the vulnerable headwaters of the Salmon Trout River? Or the flawless application of 21st-century engineering and technology that will allow us to have our nature and our nickel too, as portrayed by Cherry?

The two worlds meet a few days after the snowmobile ride, when Halley and Pryor drive 200 miles to debate with about 25 others in a community center in St. Ignace. The group is here to create new Michigan rules to regulate sulfide mining. The rulemaking results from a discovery that Halley, Pryor and other opponents made when they first caught wind of the Kennecott proposal: Michigan had no meaningful laws to manage sulfide mines, despite their complexity and dangers. Opponents convinced the governor to back new legislation, developed in a consensus approach along with mining representatives. The legislation was rushed through and became effective in December 2004.

Some accused the governor and environmental groups of selling out, greasing the skids for the mine. "Not so," Halley says. "Until we had that legislation, there was nothing to stop one or manage it once it was operating." But as they say with legislation, the devil is in the details, and those details will exist in the regulations being tussled with today in this room adjacent to the St. Ignace ice rink.

Jon Cherry is here, as are some Kennecott lawyers and lobbyists. Also here, Dr. Bornhorst, members of other environmental groups, a lawyer for the Keweenaw Bay Indian Community, and Hal Fitch, the head of Michigan's geology unit—he runs the meeting. One attendee, Chauncy Moran, is a 60-something guy with shoulder-length hair and long beard who calls himself Riverwalker. Some say he has spent more time on the streams and rivers around Big Bay than anybody alive.

The agenda deals at times with mind-numbing minutiae, at others with emotionally charged issues that have long sparked conflict between environmentalists and industrialists.

A retired chemistry professor from Northern Michigan University says that a certain bacteria can increase the amount of leaching by orders of magnitude. "Is that being taken into account?" she asks.

A guy from the Sierra Club says he wants regular inspections. But what does that mean? Once a week, once a year? Fitch says the department doesn't do inspections on other types of mines with great frequency and they don't get complaints, so he doesn't want to go overboard. The Sierra Club guy is incredulous: "That's the whole point, if you don't inspect, how can there be complaints?" Joe Maki, a Marquette inspector with the DEQ says anytime there would be a "meteorological event" (like a big storm) they would head to the site.

When it comes to liners, what kinds of liners? Pryor wants to specify materials, thickness and construction methods. The industry wants flexibility, the ability to be environmentally protective any way that works. The approach allows for innovation, they say.

A key issue is fear of takings lawsuits. If the state sets rules so stringent that no mine could ever get a permit, Kennecott could claim the rules are effectively a ban on mining masquerading as regulations, and the company could try to sue the state for taking away the value of its property. A similar situation cost Michigan $94 million in 1995 when an oil company was prevented from drilling on a fragile site in the Nordhouse Dunes.

When a Kennecott lobbyist raises the issue of takings yet again, Halley steps in. "With all due respect, Gene, you are bringing up takings where it is entirely inappropriate." Her language is professional, but her anger seems barely controlled.

Another Kennecott guy brings up the Nordhouse Dunes. "There's no guarantee another case would go the same way," Halley says.

He counters: "I was on staff in the senate then. They debated that for five days, and I know they remember it well."

The state clearly has the authority to reject an environmentally dangerous mine. But what angers environmentalists is they feel Kennecott is raising the specter of takings to scare regulatory staff into backing away from legitimately protective rules.

Several more meetings will happen before the rules are final—the legislation set the deadline at December 31, 2005. Kennecott intends to file its permit application this summer, prior to rules being complete.

The debate over mining on the Yellow Dog Plain can be summed up as the real world versus the perfect world. The difference between what is drawn on a computer and what happens in an area with more than 200 inches of snowfall and crazy weather careening in off one of the world's most tempestuous lakes.

Opponents and Kennecott both like to point to a recently closed mine in Flambeau, Wisconsin, as an example of mining in the real world. The company says it operated without receiving an environmental violation, and even Halley concedes that it now looks like a nature trail. But opponents say that during the mine life, about five years, the company reported 57 holes they had to repair in liners used to control runoff. They also say that a small amount of acid mine drainage recently has been detected near a rail spur where loading occurred. The Flambeau River is large and can probably adequately dilute this level of pollution, says John Coleman, an environmental officer who works with Indian tribes in Wisconsin, Michigan and Minnesota. By contrast, the Salmon Trout is a creek.

Early April brought a surprise to the Yellow Dog Plain: a dramatic opening to spring. The sky cleared, the sun shone bright. Temperatures soared into the 60's, and the snow pack vanished with startling speed. Every stream filled. Every river surged.

In mid-April, a culvert that Kennecott had constructed to allow bigger trucks to access the mine site failed during the melt and washed out. Ninety-eight tons of sand dumped into the Salmon Trout River—just the kind of thing that can smother coaster brook trout spawning beds.

Bornhorst says culverts wash out all the time in the backwoods and that the event should not call into question the company's mining expertise. But to opponents, the washout represents their worst fear—the human element, the mistakes, the oopses that happen regardless of earnest intent and honest effort.

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What lies ahead for the mine?

At this point, Kennecott Minerals, which proposes to build the mine on the Yellow Dog Plain, expects to file a permit by the end of summer. From there, the Department of Environmental Quality will begin its review, which will include at least two public meetings about the plan and allow for written comments. Making the situation somewhat odd is that new mining regulations won't be final until the end of 2005, but expect opponents to press for equivalent protections in the Kennecott permit.

The company hopes to begin building the mine by mid-2006. Opponents hope to keep it at bay, and they are likely to use a full array of legal and regulatory tools to do so. Early on, expect opponents to insist on an independent hydrological study of the area and a full-scale economic impact study.

A look at a mine proposed in Crandon, Wisconsin, might offer some lessons; opponents kept the Crandon mine tied up for 20 years. Finally a Wisconsin Indian tribe bought the mine and stopped the process.

Could the Keweenaw Bay Indian Community be a factor here? "The tribe is keeping its own counsel on this," says Michelle Halley, attorney for the National Wildlife Federation. Tribal officials did not respond to an invitation to comment on this story.

Many opponents want Michigan to follow Wisconsin's lead, which passed a moratorium on new sulfide mines until two conditions can be met. One: A sulfide mine anywhere in the world can demonstrate that it operated for 10 years without environmental problems. Two: A sulfide mine anywhere can demonstrate that it has been closed for 10 years without environmental problems. (Two separate mines can serve to meet the criteria.) The Michigan legislature is not likely to consider a moratorium, so it would have to come through public referendum.

LEARN MORE

www.ydeaglescry.com
Web site published by the Eagle Alliance, which opposes the mine. Extensive list of links providing additional background information.

www.kennecottminerals.com
Web site for Kennecott Minerals; click on Eagle Project.