



Natural Resources Council of Maine

The Threat of Open-pit Mining in Maine NRCM Background Paper

Maine is vacationland, the way life should be. The images from the Western U.S., of huge open-pit mines and orange rivers downstream from them, simply do not fit with most people's perceptions of this state. But things may change if large mining companies get their way.

For the first time in decades, out-of-state mining companies are seriously considering mining copper, zinc, and other metals in Maine.

Background: In 2012, the Maine Legislature passed a bill to weaken Maine's current mining regulations at the request of J.D. Irving Limited, a huge Canadian conglomerate and the largest landowner in Maine. Most of the discussion of open-pit mining here has focused on J.D. Irving's Bald Mountain site in central Aroostook County, but there are many other places in Maine where open-pit mining could occur. Figure 1 (See Attachment A for figures) shows a Maine Geological Survey map of volcanic and sedimentary rock deposits. Very large deposits of this type (shown in yellow) are spread throughout the state, often near some of Maine's most precious natural areas. There are deposits on both sides of Moosehead Lake, throughout the North Woods, and next to Cobscook Bay. Volcanic and sedimentary rock often hold massive sulfide deposits, which in turn can contain metals such as copper and zinc. Massive sulfide deposits are what open-pit mining companies will be looking for in Maine.

Problems with Sulfide Mining: There is a huge problem with mining massive sulfide deposits. The waste rock (rock that contains no valuable ore), and the tailings (which are the leftover materials after ore has been removed from ore-bearing rock) react with air and water to form sulfuric acid. This acid then gets into ground and surface waters where it can cause terrible damage to water quality and aquatic creatures. This is called Acid Mine Drainage (AMD). AMD can have devastating consequences (see Figure 2). At the Iron Mountain Mine near Redding, California, AMD has caused extensive fish kills in the nearby rivers and streams. Here's how the Environmental Protection Agency (EPA) described AMD impacts at this site:

Prior to EPA's cleanup of the site, most of the acidic effluent from Iron Mountain flowed or seeped out of the mines into adjacent streams and eventually into Keswick Reservoir, a run-of-river reservoir on the Sacramento River. Consequently, the creeks draining Iron Mountain are essentially devoid of aquatic life downstream (though not upstream) of the mines...

State records document more than 20 fish-kill events in the Sacramento River downstream of IMM since 1963. Acid mine drainage from Iron Mountain killed 100,000 or more fish on separate occasions in 1955, 1963, and 1964; and at least 47,000 trout died during a one-week period in 1967.¹

¹USEPA. 2006. Abandoned Mine Lands Case Study: Iron Mountain Mine. Pp. 5-6. Accessed at <http://www.epa.gov/aml/tech/imm.pdf>

Cleanup costs at the Iron Mountain site have totaled more than \$200 million to date², and EPA has constructed an elaborate treatment system (Figures 3 and 4) and sludge disposal system (Figure 5) to neutralize AMD from the site. This cleanup system has been effective in reducing discharges for the moment. However, EPA also notes that:

Unless researchers eventually figure out an effective and reliable way to prevent the formation of acid mine drainage at Iron Mountain, the lime-neutralization/HDS water treatment plant will have to continue operating for a *very* long time. USGS scientists estimate that at current erosion rates, Iron Mountain will continue to produce acid mine drainage for 2,500 to 3,000 years, until the estimated 12 million tons of sulfide deposits remaining within the mountain have weathered away...despite years of investigation and consideration of many possible alternatives (e.g., strip mining Iron Mountain in its entirety, mining out the remaining sulfide ore, or sealing the mine portals and flooding Iron Mountain with water or an inert gas), it remains unclear whether there is a good, permanent solution to the problem.³

During the legislative debate in the spring 2012 session, Irving's lobbyists promised they would treat the contaminated water from an open-pit mine at Bald Mountain, but will they treat it for hundreds or even thousands of years? That's how long sulfide deposits can continue to produce AMD. Do Mainers really want large treatment plants in the middle of the North Woods for the next thousand years (see Figures 3 through 7)? Will mining companies pay to operate such treatment plants for centuries?

Impacts Near Bald Mountain: A lot is at stake if Bald Mountain in Central Aroostook County becomes an open-pit mine. Mining pollution there would likely drain into the Fish River and the Fish River Chain of Lakes, which provide some of the best brook trout fishing in the country. Here's what Aroostook County Tourism has to say about the area:

Shady brooks, spring-fed ponds, and crystal clear streams are the perfect home for brook trout. And there's nothing like the feeling of gently laying out 30 feet of line right on the edge of the deep pool where you know they're waiting. Aroostook is one of the last strongholds in the Northeastern United States for the native brook trout, and the Fish River Chain of Lakes is the last remaining cold water fishery in the State of Maine free of any invasive warm water or exotic species of fish⁴.

As Jeff Reardon, New England Conservation Director for Trout Unlimited put it, "If you look at Bald Mountain through brook-trout-colored glasses, [the deposits] could not be in a worse place."⁵

Maine is one of the last strongholds of the eastern brook trout. Figure 8 shows a map of eastern brook trout populations throughout their historic range. Almost all of the remaining healthy populations are in Maine. One of the largest areas where brook trout have healthy populations is Central Aroostook County, not far from Bald Mountain. Many people in this area make their living from guiding for the

<http://www.epa.gov/aml/tech/imm.pdf>

² ITRC Mining Waste Team. Iron Mountain Mine Case Study. Accessed at http://www.itrcweb.org/miningwaste-guidance/cs19_iron_mine.htm

³ USEPA. 2006. Abandoned Mine Lands Case Study: Iron Mountain Mine. Pp. 5-6. Accessed at <http://www.epa.gov/aml/tech/imm.pdf>. Pp. 8-10

⁴ Accessed at http://www.visitaroostook.com/things_to_do/outdoor_recreation_sports_adventure/fishing/brook_trout/

⁵ Jeff Clark. 2011. Battle over Bald Mountain. *Downeast*. July. Accessed at <http://www.downeast.com/magazine/2012/july/battle-over-bald-mountain>

fishermen who come to chase these brook trout or from fishermen and tourists who stay at local inns and camps.

Brook trout are the most prized game fish in Maine, and fishing is an important industry here. According to the U.S. Fish and Wildlife Service, fishing brought \$257 million to the Maine economy in 2006, the latest year for which data were available. Putting in a massive mine that could devastate one of the best places to fish for the state's most prized game fish is very shortsighted. Mining jobs will come and go quickly, but Maine's fishing-related economy is sustainable and can contribute to Maine's economy indefinitely, if we are wise stewards of the resource.

Mining companies often cut and run: Mining companies have a track record of shutting down their operations and leaving taxpayers with the clean-up costs. This is what happened with the two largest sulfide mines in Maine: the Callahan mine in Brooksville (Figure 9) and the Kerr-American mine in Blue Hill (Figure 10). The Callahan mine in Brooksville was open for only four years, closing in 1972. The mining company left the taxpayers with an estimated clean-up bill of \$23 million, and the largest parts of the clean-up have not even occurred yet 40 years later⁶. There are still contaminated soil and sediment that are a risk for people and harmful to fish and wildlife. The Navy recently did studies in nearby Goose Pond that found that sediments there were 100% lethal to sand-dwelling worms and sea urchins. PCBs are spread widely throughout the site, and the EPA has asked that people stay away to avoid exposure to these cancer-causing chemicals⁷.

At the Kerramerican mine, the original owners of the site did an inadequate job of cleaning up when they ceased operations in 1977. In the mid-1990s, investigations showed that the site was leaking 10-12,000 pounds of zinc per year. Zinc is very toxic to fish and aquatic life. They also found that portions of the soil cap on the tailings impoundment were not properly vegetated⁸. It took until 2006 for the owners and DEP to reach agreement on cleaning up the site and another two years of work to recap the area. Currently, the site is being monitored to make sure the cap is working properly, **35 years after mining operations ended at the site!**

Ralph Chapman, State Representative for the Blue Hill area, stated the following in legislative testimony about the Kerramerican mine, which operated from 1972 to 1977:

In 1964, with great fanfare, the Black Hawk mining operation was estimated to be able to run for ten to twenty years, employ 200 to 300 workers, and produce many millions of tons of ore. After exploratory work was completed, the estimate was 4.5 million tons...the mine produced only one million tons using 100 employees for five years.⁹

The story of mining companies damaging the environment, cutting their workers, and leaving town has played out many times in many places.

⁶ Ralph Chapman. 2012. Testimony before the Environment and Natural Resources Committee of the Maine Legislature on LD 1853, An Act To Improve Environmental Oversight and Streamline Permitting for Mining in Maine. March 30.

⁷ Faith DeAmbrose. 2012. Former Mine Site Possibly to be Offered to Brooksville. August 2. Accessed at: <http://weeklyphacket.com/news/2012/aug/2/former-mine-site-possibly-to-be-offered-to-brooksv/>

⁸ Ralph Chapman. 2012. Testimony before the Environment and Natural Resources Committee of the Maine Legislature on LD 1853, An Act To Improve Environmental Oversight and Streamline Permitting for Mining in Maine. March 30.

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At the Summitville Mine in Colorado in 1992, the owner declared bankruptcy and left U.S. taxpayers to pay for most of the cleanup, about \$200 million. The Canadian owner, Galactic Resources, only succeeded in mining \$130 million worth of metals from the site, which was not even enough to pay the cleanup cost¹⁰.

The Pegasus Gold Corporation, another Canadian Company, behaved similarly at the Beal Mountain and Zortman-Landusky mines in Montana. At Beal Mountain, a mine located mostly on U.S. Forest Service land, the company had only posted a \$6 million bond for cleanup and reclamation. Clean-up work is ongoing at the site 20 years after it closed in 1992, and the government has spent at least \$14 million to date¹¹. At the Zortman-Landusky mine, Pegasus left an even more expensive mess to clean up. There, \$40 million in reclamation bonds that Pegasus left behind has already been spent, and the state and federal government have spent \$12 million. Wastewater treatment costs \$1.5 million annually, which is twice the money available from the company's wastewater bond. The federal government has had to pay most of the rest of the treatment costs¹². The Montana Department of Environmental Quality (DEQ) also has stated that water treatment will have to continue into "the distant future" and even then, water quality standards will likely not be met in the 12 streams this mine site has contaminated¹³.

Economic Benefits of Mining Often Overstated: Although mining jobs may pay well for a finite period, the business is risky and highly cyclical. Sometimes mines never pay. A New Mexico economic study has shown that:

In New Mexico in 2000, mineral extraction jobs paid \$50,000 per year whereas the average wage and salary job paid \$28,000. Given these high wages, one would expect communities that rely heavily on mineral extraction to be unusually prosperous. That, in general, is not the case. Across the United States, mining communities, instead, are noted for high levels of unemployment, slow rates of growth of income and employment, high poverty rates, and stagnant or declining populations. In fact, our historic mining regions have become synonymous with persistent poverty, not prosperity¹⁴.

When a New Brunswick mine announced it would close and 900 people would lose their jobs, the mine manager summed up the eventual fate of all mining communities: "Unfortunately, it's a finite resource. We're not able to regrow the ore body. So once we've extracted it, it's gone."¹⁵

¹⁰ Earthworks and Oxfam America. 2004 Dirty Metals. P. 29. Accessed at http://www.earthworksaction.org/library/detail/dirty_metals

¹¹ George Plavin. 2012. Rehab at Abandoned Beal Mountain Mine Taking Shape. The Montana Standard. January 26. Accessed at http://mtstandard.com/news/local/rehab-at-abandoned-beal-mountain-mine-taking-shape/article_2fc4dcda-47de-11e1-a6d3-001871e3ce6c.html

¹² Montana Department of Environmental Quality (DEQ) website. Accessed at <http://deq.mt.gov/Recovery/remediation/ZortmanLandusky/default.mcp>.

¹³ Montana DEQ. 2012. Landusky Metals Total Maximum Daily Loads and Framework Water Quality Improvement Plan. March. Pp. 5.55, 8-14.

¹⁴ Thomas Michael Power. "The Economic Anomaly of Mining," in Chapter Three of *Mining in New Mexico: The Environment, Water, Economics, and Sustainable Development*, L. Greer Price, et al., editors. New Mexico Bureau of Geology and Mineral Resources, New Mexico Institute of Mining and Technology, 2005. P. 96. Accessed at http://geoinfo.nmt.edu/publications/decisionmakers/2005/DM_2005_Ch3.pdf

¹⁵ CBC news. 2012. Bathurst mine to close in 201. <http://www.cbc.ca/news/canada/new-brunswick/story/2012/03/28/nb-bathurst-mine-xstrata-closing.html>. March 29.

Maine is not alone: Mining companies have shown renewed interest in mining sulfide ores in at least Alaska, Minnesota, Michigan, and Wisconsin as well. Fundamentally, this is due to the world's voracious demand for metal. American mines produced 1.4 billion metric tons of crude ore in 2010. That's about 4 metric tons of ore per year for every American or 24 pounds of new metal ore per person per day. Of course, mining also generates a huge amount of waste, producing 1.1 billion metric tons of waste in 2010. By comparison, the total amount of municipal solid waste generated in the U.S. was only about 225 million metric tons in 2010. Open-pit mining produced about 99% of mined metal ore in the US in 2010 when compared to sub-surface mining, and it also produces about 10 times more waste per ton of ore than subsurface mining¹⁶.

Thomas Michael Power, Research Professor and Professor Emeritus in the Economics Department at the University of Montana, wrote of this new mining boom:

During metal mining boom times such as the present... new deposits look attractive. We should be cautious, however, about the environmental and social cost we are willing to pay to accommodate the new mining because as has always been true in the past, this mining boom will lead to a bust and we will again face cleaning up the near permanent toxic mess that metal mining has always left in its wake.

This is not a new day for metal mining. It is just the most recent disruptive and potentially destructive phase of an ongoing cycle of boom and bust.¹⁷

Maine people and decision makers would be wise to heed this warning. The last time Maine faced strong interest in mining in the late 1980s and early 1990s, the state wisely took its time developing protective regulations. The Department of Environmental Protection (DEP) drafted these regulations over the course of 18 months, and staff visited mining sites in the Western U.S. to view the environmental consequences of open-pit mines. Unfortunately, the current DEP does not seem likely to do the same.

What Lies Ahead: The new state mining law directs DEP to rewrite and weaken the existing protective rules for metal mining. DEP is "outsourcing" development of the draft rules to a contractor, and it is not clear whether Maine people will have an opportunity to provide comments on the draft rules until they have been largely completed. According to DEP's rulemaking timeline, a public hearing would not be held until July, 2013 at the earliest. Final rules would go to the Legislature for adoption in January, 2014¹⁸.

This is not the sort of public process needed to ensure that Maine's interests are not trampled by out-of-state mining companies. The best way to stop this from happening is for people to get involved. We urge you to stay informed and contact your elected officials, the governor's office, and the DEP Commissioner, and let them know that you want them to protect Maine's environment from the potentially devastating impacts of open-pit mining. Additional resources are listed below, and you can

¹⁶ USGS. 2012. 2010 Minerals Yearbook. Mining and Quarrying Trends. Accessed at <http://minerals.usgs.gov/minerals/pubs/commodity/m&q/myb1-2010-mquar.pdf>.

¹⁷ Thomas Michael Power. 2008. A New Mining Boom Grips the Nation. April 3. Accessed at http://yubanet.com/regional/Regional-Op-Ed-Thomas-Michael-Power-A-New-Mining-Boom-Grips-the-Nation_printer.php

¹⁸ Maine DEP. 2012. RFP #201206344. Request for Proposals ("RFP") to Assist with Revision of Metallic Mineral Mining Rules.

also contact Nick Bennett, NRCM's staff scientist, with questions about this issue. Nick can be reached at nbennett@nrcm.org.

Attachment A – Figures

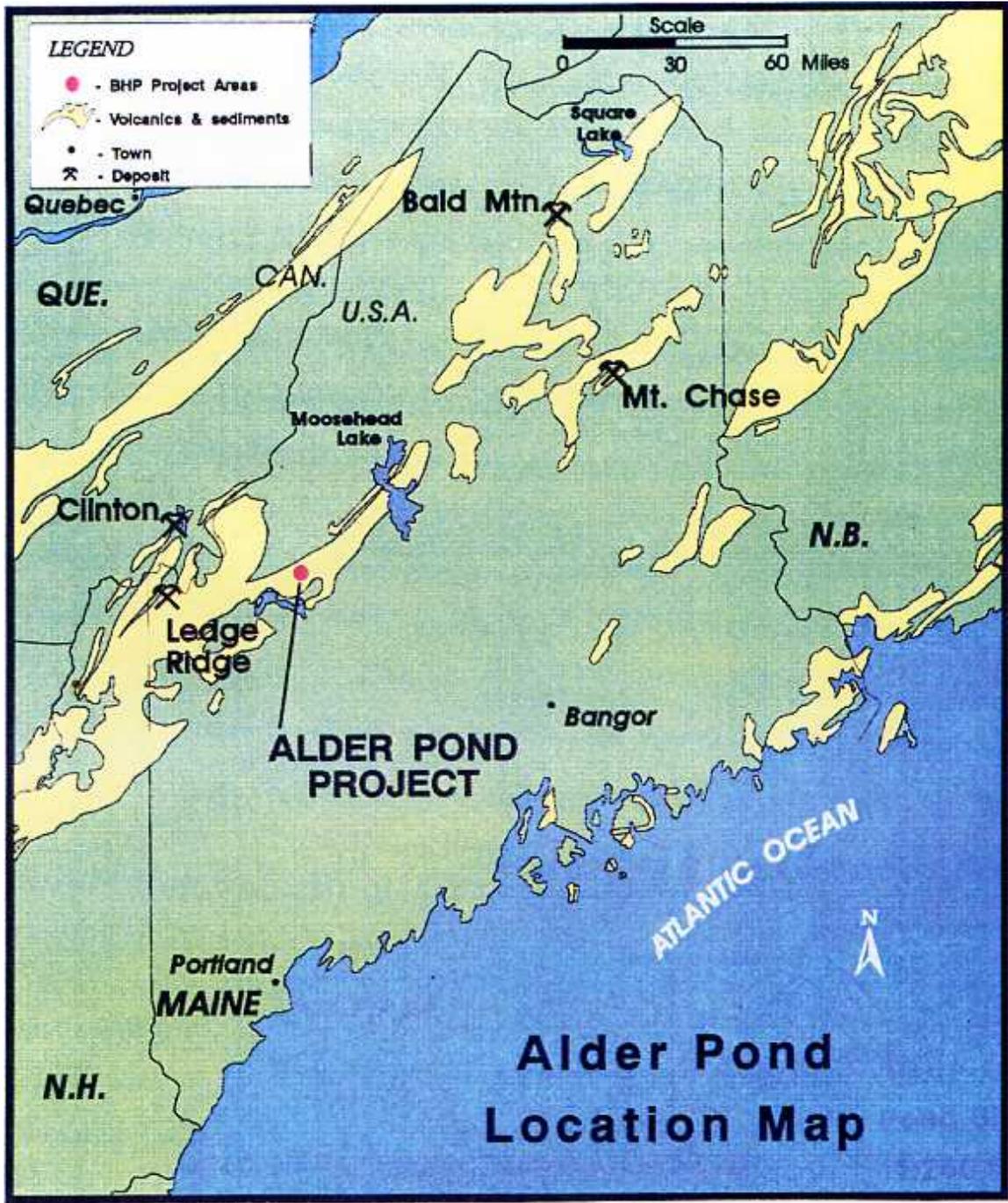


Figure 1: This Maine Geological Survey map depicts areas with volcanic and sedimentary rock, places where copper, zinc, silver, gold and other metals are likely to occur. Very large deposits of this type (shown in yellow) are spread throughout the state. Volcanic and sedimentary deposits often hold massive sulfide deposits, which are what open pit mining companies will be looking for in Maine. These deposits are located near some of Maine’s most precious natural areas, including on both sides of Moosehead Lake, throughout the North Woods, and next to Cobscook Bay.

Accessed at: <http://www.state.me.us/doc/nrimc/mgs/explore/mining/sites/nov05-1.htm>

Figure 2: Acid Mine Drainage

Accessed at: http://microbewiki.kenyon.edu/index.php/Acid_mine_drainage



Figure 3: Iron Mountain Mine water treatment plant

Accessed at: <http://news.blogs.cnn.com/2010/08/31/concrete-eating-acid-at-former-california-mine/>



Figure 4: Iron Mountain Mine Water Treatment Plant

Accessed at: <http://www.epa.gov/aml/tech/imm.pdf>, P.6



Figure 5: Iron Mountain Mine Sludge Conditioning Tank
Accessed at: <http://www.epa.gov/aml/tech/imm.pdf>, P.7



Figure 6: Bingham Mine water treatment plant

Accessed at: http://www.itrcweb.org/miningwaste-guidance/cs48_kennecott_south.htm

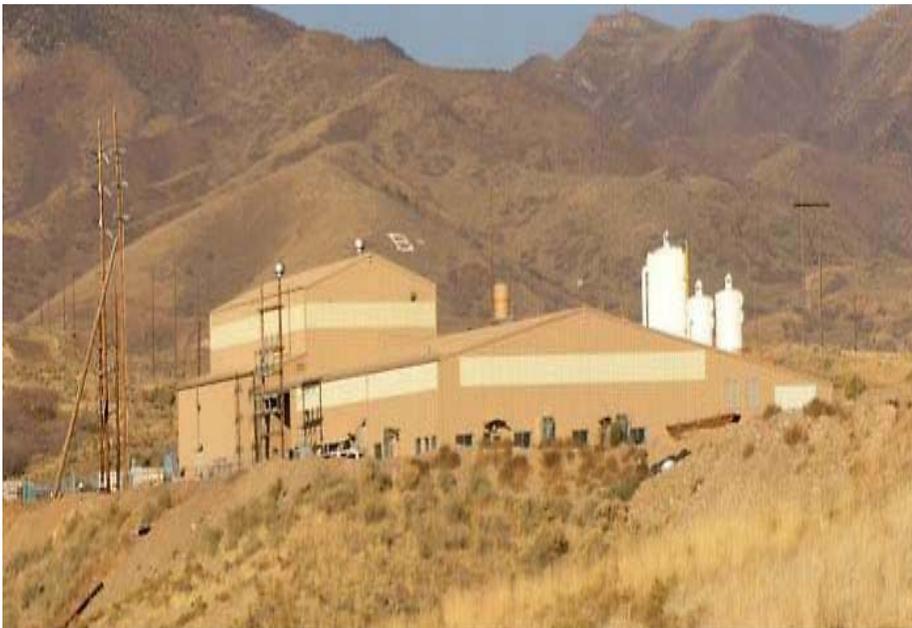


Figure 7: Bingham mine reverse osmosis membranes inside treatment plant

Accessed at: http://www.itrcweb.org/miningwaste-guidance/cs48_kennecott_south.htm



Figure 8: Maine is the Last Stronghold for Brook Trout in the Northeast

Accessed at: <http://easternbrooktrout.org/docs/brookiereportfinal.pdf>, P. 4

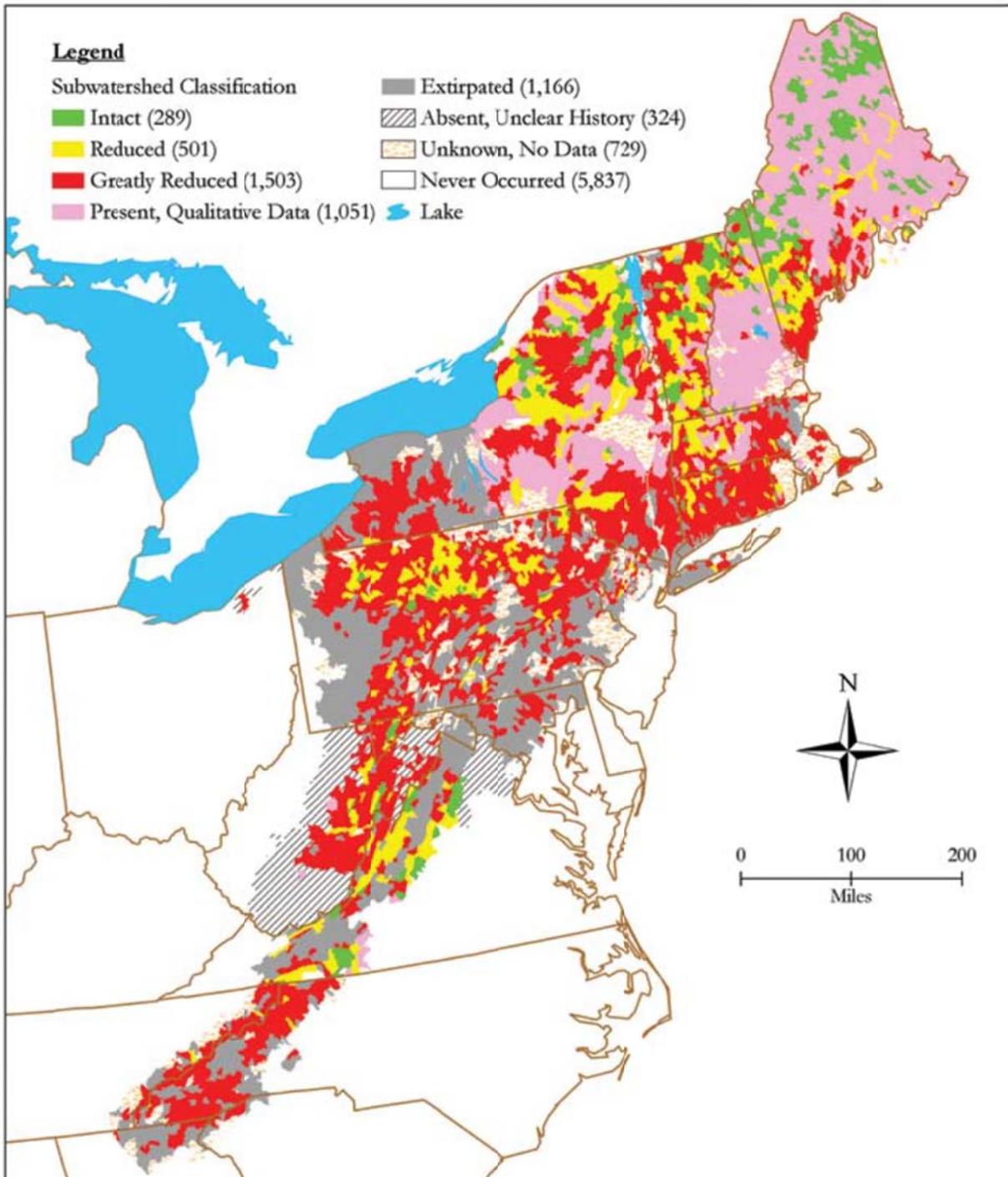


Figure 9: Callahan Mine, Brooksville, ME

Accessed at: <http://www.maine.gov/doc/nrimc/mgs/explore/mining/virtual/slides.htm>, Slide 14



Figure 10: Kerr-American Mine, Blue Hill, ME

Accessed at: <http://www.maine.gov/doc/nrimc/mgs/explore/mining/virtual/slides.htm>, Slide 18

