



PHOTOGRAPHY BY JIM BRANDENBURG

Endangered Species Threatened by Proposed Sulfide-Ore Copper Mining in Boundary Waters Watershed

The Boundary Waters Canoe Area Wilderness Is an Ecologically Significant National Treasure

- The 1.1 million-acre Boundary Waters is the only large-scale protected sub-boreal forest in the Lower 48.
- The Boundary Waters shares 50 miles of the international border with Quetico Provincial Park, and they form a 2.2 million-acre expanse of pristine water and unspoiled forests, creating unbroken habitat for fish, wildlife and plant species.
- The Boundary Waters Wilderness offers 1200 miles of canoe and kayak routes, 237.5 miles of overnight hiking trails, 2,000 designated campsites and unlimited opportunities for quality fishing, wildlife watching and other wildlife-dependent activities.
- The Superior National Forest, of which the Boundary Waters is a part, holds 20% of the US National Forest System's fresh water.

Three Boundary Waters Species Already Listed Under the ESA; More on the Way?

- Under the Endangered Species Act (ESA), the US Fish and Wildlife Service has the authority and responsibility to conserve the nation's fish, wildlife and plant species; it has done so by listing certain imperiled wildlife species present in the Boundary Waters ecosystem.
- For species listed as threatened or endangered under the ESA, increased protections apply to the species and its critical habitat, and a long-term recovery plan is required.
- The Boundary Waters and Superior National Forest are considered critical habitat (as of September 2014) for the threatened **Canada lynx**, which requires spruce-fir boreal forest with dense understory; the available habitat outside of the Boundary Waters would be reduced and fragmented by proposed sulfide-ore copper mines.
- The **northern long-eared bat** (listed as threatened, January 2015) is found in the forest in which sulfide-ore copper mines have been proposed on the edge of the Boundary Waters, and forest clearing necessary to build surface infrastructure could reduce habitat for hibernacula and roost trees.
- Listed again as threatened as of December 2014, Minnesota's **gray wolf** population also stands to be negatively impacted by increased road traffic, disrupted travel corridors, reduced interior habitat and light and noise pollution.
- Mining operations would add additional stress on **moose**, an iconic Boundary Waters species already under significant threat from climate change and recently petitioned to be listed under the ESA; additional habitat loss, travel corridor interruption and road kill fatalities will add stress to the significantly declining population.
- Accumulation of toxic heavy metals in the aquatic ecosystem also poses a threat to moose, which rely on a heavy diet of aquatic vegetation during the summer months.



Sulfide-Ore Copper Mining Threatens to Pollute the Boundary Waters and its Watershed

- Sulfide-ore copper mining is proposed just upstream from the Boundary Waters, and some mineral exploration has occurred within a half mile of the Boundary Waters.
- Exposing sulfide minerals in ore, waste rock and mine pit walls to air and water generates acid mine drainage (AMD), which contains sulfuric acid, heavy metals (such as copper, zinc and mercury) and sulfates.
- Spills and seepage from surface storage of waste rock, underground mine pits, tailings pipelines or other facilities would release AMD to the interconnected streams, lakes, wetlands and groundwater flowing to the Boundary Waters.
- High acidity can alter gill membranes, prevent fish from breathing, and alter reproductive success.
- Copper, mercury and other metals in AMD are toxic to fish and the insects they eat.
- Sulfates increase the rate of mercury methylation in aquatic environments, leading to more frequent and more serious fish consumption advisories for high mercury content and increased mercury accumulation in waterfowl (such as **loons**) and birds of prey that rely on a fish-based diet (such as **bald eagles** and **osprey**).
- Significant fish kills can result from sudden releases of AMD to streams and lakes. For example, a 1989 thunderstorm caused enough acidification and elevated copper concentrations within 20 minutes to kill over 5,000 salmonids in Montana's Clark Fork River, a river with twice the annual flow as the South Kawishiwi River.
- Mines in the headwaters of streams, such as the proposed mining near the Boundary Waters, have been shown to be sources of regional stress on fish health at a whole watershed or landscape scale.

Sulfide-Ore Copper Mining Threatens Terrestrial Wildlife Species and Their Habitats

- Mine infrastructure includes industrial processing plants, roads, pipelines and high-voltage transmission lines that would destroy important habitat for plant and wildlife species.
- Mine infrastructure and additional road traffic would lead to forest fragmentation, which disrupts wildlife travel corridors and accelerates the spread of weedy invasive species, which change the forest character.
- Impacts from forest fragmentation would extend into the Boundary Waters and affect the forest and wildlife within it.
- Noise, dust and light pollution from 24-hour-a-day, 365-day-a-year mining operations would affect animal behavior—especially the ability to watch for predators—both inside and outside of the Boundary Waters.

We Have a Chance to Save the Boundary Waters and its Sensitive Species, but We Must Act Now

- The Boundary Waters cannot be considered an island: it is inextricably linked to its watershed and the surrounding Superior National Forest.
- It is impossible to destroy forests and pollute waters outside of the Boundary Waters and within its watershed without causing negative impact within the Boundary Waters.
- Since it is much easier to conserve a stable population than to recover a declining population, the federal government and US Fish and Wildlife Service must act to protect the integrity of the Boundary Waters ecosystem that provides such important habitat to three threatened species and others with uncertain futures.
- The Boundary Waters—as the largest protected sub-boreal forest in the Lower 48—deserves to be permanently protected from sulfide-ore copper mining in its watershed.