Defenders of Wildlife

Climate Change and the Canada Lynx

About the Lynx

The lynx is a medium-sized cat, 2.5 to 3 feet long and weighing 10 to 23 pounds, characterized by its long ear tufts and short (bobbed) tail with a black tip. It has unusually large paws that act as snow shoes in very deep snow and its thick fur and long legs make it appear larger than it really is.

Photo: U.S. Fish and Wildlife Service
http://www.fws.gov/northeast/lynximag.html

Historically, lynx lived in four geographically distinct areas within the continental United States. These areas included the Northeast, the Great Lakes states, the northern Rocky Mountains/Cascades and the southern Rocky Mountains. Listed as a threatened species since 2000, roughly 1,000 lynx remain today in the lower 48, scattered across Maine, Minnesota, Montana, Wyoming, Washington, Idaho and possibly in Michigan. A recent reintroduction program has reestablished a population in Colorado.

Lynx are specialized hunters—about 95% of their diet consists of a single prey item, the snowshoe hare. While they sometimes eat mice, voles, grouse, ptarmigan, and red squirrel, lynx can survive only where there are adequate hare populations.

Generally solitary animals, lynx usually hunt and travel alone and are slightly more active at night than by day. Lynx live exclusively in areas of boreal or subalpine forest, composed mainly of spruce and fir trees. A key factor in lynx habitat is access to a matrix of different forest age classes, including young forests with thick vegetation for hunting snowshoe hares, and older forests with lots of downed trees and other good cover for their dens.

Lynx are also found almost exclusively in areas that receive at least four months of continuous snow cover. In deep snow, their large, snowshoe-like paws give them an advantage over coyotes and bobcats. Bobcats and coyotes can utilize a wide variety of prey items and habitat types, therefore they can outcompete lynx in many areas. It is thought that long periods of snow cover help to prevent these more generalist predators from gaining a toehold in areas of high snowshoe hare abundance.

Photo: Erwin and Peggy Bauer/U.S. Fish and Wildlife Service
http://www.fws.gov/northeast/lynximag.html

Climate Change Impacts in Lynx Habitat

Rising temperatures

According to the U.S. Global Change Research Program's 2009 report "Global Climate Change Impacts in the United States," temperatures in the Northwest region have already risen by about 1.5oF in the past 100 years, and are projected to rise between 3oF under the lowest

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emission scenarios and by up to 10oF under the highest emission scenarios. In the Northeastern U.S., where the lynx maintains a toehold in Maine, average temperatures have already risen by about 2oF, with winter temperatures increasing nearly 4oF. They are projected to rise a further 2.5 to 4oF by the middle of the century.

Photo: U.S. Fish and Wildlife Service
http://www.maine.gov/ifw/wildlife/species/endangered_species/canada_lynx/canada_lynx_picture.jpg

Precipitation Shifts

As wintertime temperatures warm, precipitation patterns are shifting from snow to rain, and snowpack is declining.

Threats to the Lynx

These climate changes will have a direct impact on two critical features of lynx habitat: the presence of boreal forest, and the extent of winter snow cover. As mentioned above, long periods of snow cover with light, fluffy snow seem to help exclude bobcats and coyotes from lynx strongholds. Both a shortening of the snow over season, and a shift to denser, wetter, snow, could favor their competitors. Lynx mortality from predation by mountain lions also increases during snow-free periods.

In Maine, it is projected that under a high-emissions scenario, duration of winter snowpack will cut in half. Boreal forests, the mixture of spruce and fir trees that the lynx depend on, could vanish completely from Maine by the end of the century, replaced by maple-beech-birch forests in northern Maine and oak-hickory forests along the coast.

In the West, the Cascade Mountains have already seen a 25% decrease in snowpack as measured on April 1, and are projected to undergo a further 40% decrease over the next 40 years. Furthermore, climate change is altering forest dynamics across North America. Warmer air temperatures and precipitation changes have had a drying effect on forests, making them more fire prone. Over the past 30 years, the average size of wildfires has more than doubled, and the fire season has lengthened. Climate change has also helped fuel an explosion in outbreaks of forest pests: warmer temperatures hasten the growth and reduce wintertime die-off of spruce beetles and other pests. From 1996 to 2008, Colorado lost 374,000 acres of spruce trees and Wyoming lost 340,000 acres to spruce beetles, which can now be found as far north as Alaska. Sudden losses of large forest areas are bad news for lynx, because they need forests with a mix of different-age trees.

Securing a Future for the Canada Lynx

By taking immediate steps to reduce greenhouse gas emissions, we can address the root cause of climate change and hopefully minimize the severity of the threat to the lynx. And by embracing the following conservation measures, we can help this species navigate the looming threats posed by climate change.

Photo: Courtesy of Barbara Jordan
http://www.blm.gov/or/esa/index.htm

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Halt unnecessary mortality. Hunting and trapping were a major factor in the decline of the lynx. Though it is now protected under the Endangered Species Act, illegal killing does still take place: in 2006, two lynx were illegally killed in Colorado. Defenders is working to correct misperceptions that the species poses a threat to livestock. Collision with vehicles is also a source of mortality for lynx. Federal land management agencies should identify land corridors necessary to maintain connectivity of lynx habitat, map key linkage areas, and identify where highway crossings may be needed to provide habitat connectivity and reduce lynx mortality.

Photo: Maine Department of Inland Fisheries and Wildlife
http://www.maine.gov/ifw/wildlife/species/endangered_species/mammal_list.htm

Protect lynx habitat in "climate refugia." Climate refugia are those places where the changes in precipitation and temperature will be felt less strongly than others. Analysis by Gonzalez et al. (2007) indicates that a portion of the Bridger-Teton National Forest in northwestern Wyoming may retain snowpack better than any other lynx habitat in the U.S. Northern Rockies region: "Potential conservation priority areas for lynx include areas in the Bridger- Teton National Forest (Wyoming) and Superior National Forest (Minnesota), which lie in potential refugia." As a result of legal action from Defenders, the U.S. Fish and Wildlife Service in 2009 significantly expanded its designated critical habitat to include these very important national forests. In these refugia areas, it will be particularly important to ensure that management of forest harvest, snowmobile use, road construction and other decisions are undertaken with lynx protection as a primary goal.

Manage for bunnies. As a specialized predator, the fate of the lynx is closely hitched to its main prey, the snowshoe hare. Simply put, lynx do well where there are lots of hares, and where hares are scarce, lynx will be too. Snowshoe hares need vegetation on the forest floor that provide them with food and cover, including brush and branches high enough to protrude above the snow in winter. Protecting this vegetative cover in our forests from threats like logging or thinning is vital to maintaining snowshoe hares, which are lunch for the lynx.

References

Gonzalez, P., R.P. Neilson, K.S. McKelvey, J.M. Lenihan and R. J. Drapek. 2007. Potential Impacts of Climate Change on Habitat and Conservation Priority Areas for Lynx canadensis (Canada Lynx). Report to: Watershed, Fish, Wildlife, Air, and Rare Plants Staff; National Forest System;
Forest Service; U.S. Department of Agriculture; Washington, DC and NatureServe, Arlington, VA. 19 pages. Available at:
http://www.rmrs.nau.edu/publications/Gonzalezetal/Gonzalezetal.pdf
[Accessed 20 May 2010].

Squires, J.R., L.F. Ruggiero, J.A.. Kolbe, and N.J. DeCesare. Undated. USDA Forest Service Rocky Mountain Research Station Lynx Research Program Update.
http://www.rmrs.nau.edu/wildlife/forest_carnivores/lynx/research/index.php [Accessed 26 May 2010].

Streeter, S. 2010. Climate change, water shortages, conspire to create 21st century dust bowl.
http://www.nytimes.com/gwire/2009/05/14/14greenwire-climate-change-water-shortages-conspire-to-cre-12208.html