Loss of predators in Northern Hemisphere affecting ecosystem health

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A grizzly bear in Yellowstone National Park. (Photo courtesy of Oregon State University)

A survey done on the loss in the Northern Hemisphere of large predators, particularly wolves, concludes that current populations of moose, deer, and other large herbivores far exceed their historic levels and are contributing to disrupted ecosystems.

The research, published today by scientists from Oregon State University, examined 42 studies done over the past 50 years.

It found that the loss of major predators in forest ecosystems has allowed game animal populations to greatly increase, crippling the growth of young trees and reducing biodiversity. This also contributes to deforestation and results in less carbon sequestration, a potential concern

with climate change.

"These issues do not just affect the United States and a few national parks," said William Ripple, an OSU professor of forestry and lead author of the study. "The data from Canada, Alaska, the Yukon, Northern Europe and Asia are all showing similar results. There's consistent evidence that large predators help keep populations of large herbivores in check, with positive effects on ecosystem health."

Densities of large mammalian herbivores were six times greater in areas without wolves, compared to those in which wolves were present, the researchers concluded. They also found that combinations of predators, such as wolves and bears, can create an important synergy for moderating the size of large herbivore populations.

"Wolves can provide food that bears scavenge, helping to maintain a healthy bear population," said Robert Beschta, a professor emeritus at OSU and co-author of the study. "The bears then often prey on young moose, deer or elk – in Yellowstone more young elk calves are killed by bears than by wolves, coyotes and cougars combined."

In Europe, the coexistence of wolves with lynx also resulted in lower deer densities than when wolves existed alone.

In recent years, OSU researchers have helped lead efforts to understand how major predators help to reduce herbivore population levels, improve ecosystem function and even change how herbivores behave when they feel threatened by predation – an important aspect they call the "ecology of fear."

"In systems where large predators remain, they appear to have a major role in sustaining the diversity and productivity of native plant communities, thus maintaining healthy ecosystems," said Beschta.

"When the role of major predators is more fully appreciated, it may allow managers to reconsider some of their assumptions about the management of wildlife."

In Idaho and Montana, hundreds of wolves are now being killed in an attempt to reduce ranching conflicts and increase game herd levels.

The new analysis makes clear that the potential beneficial ecosystem effects of large predators is far more pervasive, over much larger areas, than has often been appreciated.

It points out how large predators can help maintain native plant communities by keeping large herbivore densities in check, allow small trees to survive and grow, reduce stream bank erosion, and contribute to the health of forests, streams, fisheries and other wildlife.

It also concludes that human hunting, due to its limited duration and impact, is not effective in preventing hyper-abundant densities of large herbivores. This is partly "because hunting by humans is often not functionally equivalent to predation by large, wide-ranging carnivores such as wolves," the researchers wrote in their report.

"More studies are necessary to understand how many wolves are needed in managed ecosystems," Ripple said. "It is likely that wolves need to be maintained at sufficient densities before we see their resulting effects on ecosystems."

The research was published online today in the *European Journal of Wildlife Research*, a professional journal.

"The preservation or recovery of large predators may represent an important conservation need for helping to maintain the resiliency of northern forest ecosystems," the researchers concluded, "especially in

the face of a rapidly changing climate."

Provided by Oregon State University

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