

Studies confirm effect of wolves, elk on tree recovery in Yellowstone National Park

05/05/2016

CORVALLIS, Ore. – An analysis of 24 studies over a 15-year period has confirmed that wolves and their influence on elk represent a major reason for the recovery of trees that had previously been declining for decades in Yellowstone National Park.

Despite long-term trends of increased temperatures and reduced precipitation, trees such as cottonwood, willow, aspen and other woody species have been showing signs of accelerated growth in many areas since wolves were restored to the park in 1995. Beavers and riparian songbirds are also showing signs of coming back to areas where they had been missing or in decline since the 1930s.

Still, it will likely take many years for established shrubs and trees to reach a size sufficient to produce the abundance of berries and seeds that support a diverse ecosystem.

Those are among the conclusions reported today in the journal *Biological Conservation* by Robert Beschta and William Ripple, two professors in the Oregon State University College of Forestry. They analyzed the results of 24 studies of streamside vegetation published since 2001 and reviewed long-term trends in temperature, precipitation, snowpack and stream discharge.

“When I first started studying this in 2001,” said Beschta, “I was skeptical that elk, a native ungulate, could stop nearly all cottonwood recruitment. But it was the elk that had damaged plant communities during the period when wolves were absent, and the reductions in elk browsing, since wolves have returned, are allowing them to begin recovering.”

In subsequent studies, Beschta and Ripple, as well as other researchers, measured the diameter of cottonwoods and aspen in the park’s northern range. They found young trees almost completely missing.

“For decades, nothing had been growing into the smaller age classes of trees because of intensive elk browsing,” Beschta said.

In their latest assessment, Beschta and Ripple reviewed 11 published studies of willow, six of aspen and five of cottonwood as well as one each of service berry and thinleaf alder. All but two of the studies showed increases in height, diameter, canopy cover or recruitment for these species. The area of land covered by willow, for example, doubled between 1991 and 2006. By 2003, young aspen trees in many areas were starting to grow measurably higher.

More than half of the reviewed studies also measured browsing effects on plants, caused principally by elk. Those studies concluded that tree recovery had begun mostly because of a decrease in browsing.

“Climate may influence whether trees recover more quickly in some areas than in others to some degree, but the real issue for plants growing in Yellowstone is, how often are they browsed by ungulates?” Beschta added.

Elk numbers in Yellowstone have declined by more than two-thirds since 1995, from a high of nearly 20,000 to less than 5,000 today. The numbers and impacts of deer and pronghorn are relatively small, but in the past decade, bison herds have grown, and they tend to reside in valley bottoms much of the year. Bison grazing has prevented cottonwoods, willow and other plants from successfully recovering in parts of the Lamar Valley, he said.

Over the past 20 years, mean temperatures and precipitation in the northern range have changed in comparison to the long-term mean going back to 1895, when recordkeeping began. As measured at the Mammoth weather station in Yellowstone, annual mean temperatures today are more than 2 degrees Fahrenheit warmer than in 1895 and annual precipitation almost 3 inches lower.

“Research results following wolf reintroduction are generally supportive of the concept that the contemporary carnivore guild has, via a trophic cascade, mediated the effects of elk herbivory on riparian plant communities,” the authors wrote. “The ongoing reduction in elk herbivory has thus been helping to recover and sustain these plant communities in northern Yellowstone, thereby improving important food-web and habitat support for numerous terrestrial and aquatic organisms.”