

# Rocky Mountain Research Station Science You Can Use *(in 5 minutes)*

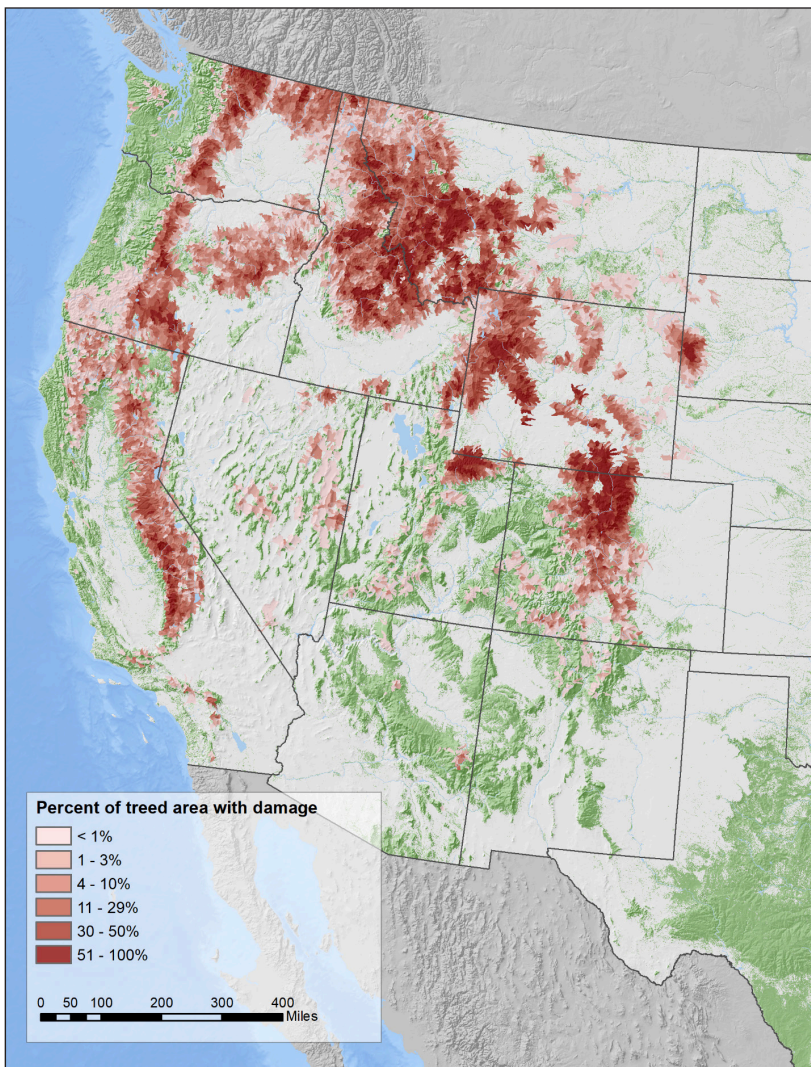


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## Taking the Long View: Mountain Pine Beetles as Agents of Change

### A Story of Changing Forests

John Denver, one of the most famous musicians ever associated with Colorado, once said, “Things go up and down. If you can survive the down, it will come back.” Taking



Red areas indicate locations affected by mountain pine beetles from 2000 through 2018 (image: USDA Forest Service).

this long-term view is what José Negrón, a research entomologist with the Rocky Mountain Research Station, has done in a recent research summary published by the *Journal of Forestry* in March 2019. The article is titled, “[Mountain Pine Beetle in Colorado: A Story of Changing Forests.](#)”

Mountain pine beetles (MPB) are a constant presence in the Rocky Mountain Region, with a long history of periodic outbreaks. The latest beetle epidemic, which lasted from the late 1990s until about 2012, was particularly impactful in Colorado, where an estimated 800 million lodgepole and ponderosa pine trees were killed. However, as Negrón explains, “It’s generally seen as negative, but as part of this research summary we wanted to show that there have also been positive aspects of the epidemic.”

While the habitats of some species are negatively affected by MPB epidemics, others are positively influenced, such as:

- on colder high elevation sites, habitat for some fish species could be enhanced with warmer temperatures;
- large woody debris in the streams could improve cover and possibly create pool habitat for fish and amphibians; and
- increased riparian woody and herbaceous plants may provide food for wildlife, nesting habitat for songbirds, and increased insect diversity.



Negrón's co-author Bob Cain agrees. Bob works in the Forest Health Protection program for State and Private Forestry and Tribal Relations with the Forest Service's Region 2 office. He observes, "The story's still evolving. I think that ongoing research will show the long-term implications on important factors such as water quality, impact on fuels, and products that you can harvest from beetle-killed wood, even a decade after trees were killed."

## Evaluating Direct and Indirect Effects

Dan McCollum, a research economist with the Rocky Mountain Research Station, recently co-authored a related article titled "[Bark Beetle Infestation of Western U.S. Forests: A Context for Assessing and Evaluating Impacts](#)." Published in the March 2019 issue of *Journal of Forestry*, the article uses bark beetles as an example to describe an "overall impact" evaluation approach for complex disturbance events. According to the article, effective evaluations consider the interactions and feedbacks between ecological factors and socioeconomic



*A new research synthesis describes recent findings related to mountain pine beetles, including details related to regeneration, shown here in Grand County, Colorado (photo: B. Cain, USDA Forest Service).*

factors, as well as between direct and indirect disturbance effects. A direct effect would be the death of a tree, while an indirect effect relates to carbon storage: While carbon sequestration initially decreases due to dead wood decomposition, it increases as forest regrowth occurs because younger trees are generally more productive than old trees. McCollum explains, "Applying the approach is mostly a matter of recognizing that one must go beyond looking at the direct effects of a disturbance or management action to really understand the impact."

## FURTHER READING

Negrón, J.F.; Cain, B. 2018. Mountain Pine Beetle in Colorado: A Story of Changing Forests. *J.For.* 117(2):144–151 <https://www.fs.usda.gov/treearch/pubs/57417>

McCollum, D.W.; Lundquist, J.E. 2019. Bark Beetle Infestation of Western US Forests: A Context for Assessing and Evaluating Impacts. *J.For.* 117(2):171–177 <https://www.fs.usda.gov/treearch/pubs/58136>

## LEAD SCIENTISTS

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