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Some See Beetle Attacks on Western Forests as a Natural Event

By JIM ROBBINS

MISSOULA, Mont. — When Ken Salazar — then a senator from Colorado, now secretary of the interior — called the attack on millions of acres of pine forests by the bark beetle the Katrina of the West, he was expressing the common view of the explosive growth of the beetles as an unmitigated disaster.

But not everybody sees it that way. Some environmentalists and scientists support the beetles. While they acknowledge the severity of the problems the beetles are causing, they argue that the insects, which kill only mature trees larger than five inches in diameter, are a natural phenomenon, like forest fires, and play a vital ecological role.

“It’s not the end of the forests, and they are not destroyed,” said Diana L. Six, a professor of forest entomology and pathology at the University of Montana here, who has studied the beetle for 16 years, as she walked in a beetle-infected forest near here recently .

“Lodge pole pine evolved to go out with a stand-replacing event, such as fire or beetles, then regenerate really quickly,” she said. “When they hit 80 or 90 years of age all of a sudden the beetles become a player — the trees are big enough for the beetles to attack. They reset the clock on the stand.”

Dr. Gregg DeNitto, a forest health specialist with the Forest Service here, said the beetles were not “an exotic like the emerald ash bore.”

“This is a native insect in a native host, and these are normal biological processes that have happened for millennia,” Dr. DeNitto said.

Nothing can or should be done to halt the spread of the beetle, experts say. After they kill the mature trees, the soil becomes more fertile as nitrogen levels increase, sometimes tripling. The growth rate of surviving trees increases when the infestation ends. After dead trees fall over or burn, grass grows and provides elk habitat, and slightly more diverse forests rise up.

Beetles help by breaking down fallen trees, as well. “They digest the wood and are valuable in terms of nutrient recycling,” said Dr. Ken Raffa, an entomologist at the University of Wisconsin who studies the beetles. “And they introduce micro-organisms that further break down the wood.”

Still, it is a grim time for people who work, play and live in the woods. Mountain pine beetles affect nearly 6.5 million acres, an expanse more than 50 percent greater in 2008 than in 2007. If all types of bark beetles are

included, the figure is 8 million acres — a level of destruction not seen in 150 years — and the number is expected to grow this year.

The Forest Service's chief forester, Rick Cables, who oversees the Rocky Mountain Region, told Congress in June that fire in vast acreages of downed timber could burn so hot in places it would bake the soil, causing extreme erosion and runoff, and pollute water supplies to millions of people in the Southwest.

"People in Phoenix and Las Vegas depend on the water, and I have to balance that with an ecosystem trying to reset itself," Mr. Cables said. Prescribed fire or mechanical thinning of dead trees are being considered to reduce the risk of fire in beetle-killed stands in some watersheds.

There is virtually no research on fires in an outbreak this large. "We've never seen this many trees dead on the landscape," said Dr. Barbara J. Bentz, a Forest Service entomologist. "We don't know what the ramifications are."

Both Dr. DeNitto and Dr. Six allow that the current outbreak is not entirely natural. Human intervention in the form of fire suppression and large-scale clear cuts mean that many forests are simultaneously vulnerable.

Under natural conditions a forest is a patchwork of different-age trees, which means the beetles also create a patchwork of dead trees. "If they come up against a young patch, they'll quit," Dr. Six said. "If it's old, they keep on going. But we've lost that mosaic, so they keep on going."

The major human-caused element of the current outbreak, though, is a warmer climate, which has opened new territory to the beetles. And this has caused some experts to view the beetle infestations as unnaturally severe. "The absolute minimum temperatures are 6 to 10 degrees higher now," said Dr. Steve Running, an ecologist at the University of Montana who is a member of the Intergovernmental Panel on Climate Change and is studying the effect of warming on Western ecosystems.

In the 1950s, minimum temperatures were 42 to 47 degrees below zero. The last decade, the minimum was 35 below, with fewer days at minimum. The rise in minimums is important, Dr. Running said, "because at the lower temperatures it only took a couple of nights for the larvae to freeze to death."

The growing season in the West has also grown longer by two weeks, Dr. Running said, while the precipitation has stayed the same, which translates to a drought. Trees stressed by drought cannot effectively fend off the beetles.

Dr. Six argues that this outbreak is so extreme in duration, intensity and scope that the beetles are behaving like an exotic species in some places and may damage a critical Western ecosystem based around the white bark pine.

High altitudes, where the insects' life span was very limited, are warming, and the beetles there have gone from a two-year life cycle to one year. There are so many more beetles that in combination with a disease called blister rust, they will probably wipe out white bark pines in many areas.

Dr. Six says she remains amazed at the beetles' adaptation. "It's impressive something could evolve such a complicated and effective way of living in the woods," she said. "It's awesome."

When the beetles hatch, they mass for an attack on the next tree by sending out a chemical signal that tells other beetles it is time for an assault. They need to have sufficient numbers to overwhelm the tree, and need to do it within three or four days, or the tree will win. If the beetles lay eggs and they hatch, they eat a nutrient-carrying membrane and kill the tree.

The tree is not that nutritious, though, so the beetles bring carry-out. “They carry fungus from tree to tree in pockets and inoculate the trees with it,” Dr. Six said.

There are so many insects now that some behaviors have changed. They often go after trees that are smaller and younger than trees they have attacked in the past, or after healthy trees. Beetles used to hatch during two weeks in July, Dr. Six said, and “now they hatch beginning in May and go until October.”

“The whole ecosystem is changing,” she said. “I’ve never seen anything like it.”

While more than 6 million acres in the United States have been affected by mountain pine beetles, the number is 34 million acres in British Columbia. “It’s a continental-scale phenomenon,” said Dan Tinker, a professor of forest and fire ecology at the University of Wyoming, referring to the total of the beetle kills. “We’re all taken aback right now.”

There is no forseeable end to the outbreak, Dr. Six said. “If it’s climate-driven,” she said, “we have to reverse climate change.”

This article has been revised to reflect the following correction:

Correction: July 9, 2009
An article on Tuesday about the ecological role of beetles that are attacking pine forests in the West misstated part of the name of the climate organization that Steve Running, an ecologist, is affiliated with. Dr. Running is a member of the Intergovernmental Panel on Climate Change, not the Internal Panel on Climate Change.