

November 18, 2008

## Bark Beetles Kill Millions of Acres of Trees in West

By **JIM ROBBINS**

HELENA, Mont. — On the side of a mountain on the outskirts of Montana's capital city, loggers are racing against a beetle grub the size of a grain of rice.

From New Mexico to British Columbia, the region's signature pine forests are succumbing to a huge infestation of mountain pine beetles that are turning a blanket of green forest into a blanket of rust red. Montana has lost a million acres of trees to the beetles, and in northern Colorado and southern Wyoming the situation is worse.

"We're seeing exponential growth of the infestation," said Clint Kyhl, director of a Forest Service incident management team in Laramie, Wyo., that was set up to deal with the threat of fire from dead forests. Increased construction of homes in forest areas over the last 20 years makes the problem worse.

In Wyoming and Colorado in 2006 there were a million acres of dead trees. Last year it was 1.5 million. This year it is expected to total over two million. In the Canadian provinces of British Columbia and Alberta, the problem is most severe. It is the largest known insect infestation in the history of North America, officials said. British Columbia has lost 33 million acres of lodgepole pine forest, and a freak wind event last year blew mountain pine beetles, a species of bark beetle, over the Continental Divide to Alberta. Experts fear that the beetles could travel all the way to the Great Lakes.

In the next three to five years, Mr. Kyhl said, virtually all of Colorado's lodgepole pine trees over five inches in diameter will be lost, about five million acres. "Already in many places, every lodgepole over five inches is dead as far as the eye can see," he said.

Foresters say the historic outbreak has several causes. Because fires have been suppressed for so long, all forests are roughly the same age, and the trees are big enough to be susceptible to beetles. A decade of drought has weakened the trees. And hard winters have softened, which allows the beetles to flourish and expand their range.

Hoping to keep their forests from completely dying, to earn money by selling dead and infected trees and to mitigate fire risks, landowners are scrambling to cut the pines. If enough are cut — up to 75 percent — it might leave some behind that, with less competition for water, can survive. Still, for many landowners, cutting most of the forest where they have built their homes is painful. "I've literally had people in my office crying," said Gary Ellingson, a forestry consultant for Northwest Management.

The black, hard-shelled beetle, the size of a fingertip, drills through pine bark and digs a gallery in the wood where it lays its eggs. When the larvae hatch under the bark, they eat the sweet, rich cambium layer that provides nutrients to the tree. They also inject a fungus to stop the tree from moving sap, which could drown

the larvae. That fungus stains the wood blue.

“The Latin name is *Dendroctonus*, which means tree killer,” said Gregg DeNitto, a Forest Service entomologist in Missoula, Mont. “They are very effective.”

To fend off the bugs, trees emit white resin, which looks like candle wax, into the beetle’s drill hole. Sometimes the tree wins and entombs the beetle. Often, though, the attacker puts out a pheromone-based call for reinforcements and more of the beetles swarm the tree. In a drought the tree has trouble producing enough resin, and is overwhelmed.

There are some defenses. Owners nail to a tree an “aggregator pheromone” in a small packet, which mimics the chemical scent given off by beetles when a tree is full of insects. It can work when beetles are not too numerous, but at some point the beetles are not deterred.

Large, old, high-value trees, ones that shade campgrounds or yards, can be sprayed with an insecticide. But the trees need to be sprayed from the base to the height at which it is less than 4 inches around. Each tree costs about \$10 to \$15 if hundreds are sprayed.

Lodgepole pines are largely confined to high altitudes. But the beetles have moved into ponderosa pine forests on Colorado’s front range, Mr. Kyhl said, which means it could kill forests around homes in the densely populated region.

The beetles will only be truly checked, experts say, if temperatures that used to reach 30 and 40 below for weeks return to the Rockies, temperatures that have not been seen in decades.

The death of the forests worries the tourism industry. Many ski areas have cut down their forests because of the hazard of falling trees and have revegetated the land.

At Vail Ski Resort, for example, which has been particularly hard hit, workers have removed thousands of dead trees and planted new ones.

The dead trees that blanket the mountains are shifting ecosystems as well. In Yellowstone, for example, the beetles are killing the white-barked pine trees, which grow nuts rich in fat that are critical to grizzly bears in the fall. Biologists in Canada say streams will flash-flood because live trees will no longer catch snow and allow it to slowly melt, and it could injure salmon and destroy habitat. On the other hand, woodpeckers and other insect eaters will thrive.

Wildfire is the biggest threat. Some towns like Steamboat Springs and Vail, Colo., are surrounded by dead forests, and the Forest Service and logging companies are clear-cutting “defensible space” so firefighters have a place to fight fires.

After the trees die, the risk of crown fires that move through the canopy is the threat. After four or five years, as the dead trees fall to the ground, the threat of catastrophic fire is most severe. Fires in the piles of logs severely damage soils, prevent regrowth and cause mudslides.

Rainfall on damaged ground could also lead to widespread mudslides and silt buildup in rivers and

reservoirs, which many mountain communities depend on for water. Strontia Springs Reservoir, a main water source for Denver, required a \$20 million cleanup after a large fire resulted in severe erosion.

The other major problem is large numbers of falling trees. In Colorado and Wyoming, officials have closed 38 campgrounds for fear trees could fall on campers. They have reopened all but 14.

But there is a lot more to do. "We know they are going to fall," Mr. Kyhl said. "And they are going to fall in the next 10 to 15 years. There's campgrounds, thousands of miles of road, picnic areas, power lines and trails. How do we keep the facilities open for people to use?"

The agency is faced with clearing a strip of 75 to 100 feet of dead trees along highways so they are not closed by blow downs.

Then there is a question of what do with the wood. Sawmills have diminished in the West in recent years, and there are not enough mills to take all of the timber.

In Colorado, entrepreneurs have been scrambling to find ways to use it. Two pellet plants have been built, which turn the trees into sawdust and then pack them into a clean-burning pellet used in wood stoves.

Some trees are being shredded for use in biomass boilers, and carpenters are using the pine stained blue from the fungus for furniture.

In Alberta, a newsprint mill is testing a system to use the millions of dead acres of pines. Because of the fungal stain the trees aren't bright enough for paper, but a computerized process adjusts the amount of bleach.

Still, the volume of timber used is small compared with the vast acreage of dead trees.

The West that depends on tourism, meanwhile, wonders what their customers will think about the dramatic change in scenery. Four million visitors a year come for sightseeing and recreation to Grand County in Colorado, where much of the forest is now dead. "What happens," said Ray Jennings, director of emergency management for Grand County, "if this becomes an ugly place to be?"

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