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Beetles Take a Devastating Toll on Western Forests

By JIM ROBBINS

PLAINS, Mont. - A pair of dead brown pine trees stand like skeletons in the Lolo National Forest here, victims of a tiny, voracious insect called the mountain pine beetle. And although the nearby trees look healthy, their days are numbered, too; beneath them, little piles of brown boring dust testify that beetles are inside them, munching away.

It is a growing problem around the West. Unusually warm temperatures have extended the life and range of this and other bark beetles over the last several years. Trees have been weakened by several years of severe drought. Decades of zero tolerance for forest fires (a policy that is changing) left many forests far too dense with trees, a fertile environment for hungry beetles. All of it has led to an explosion of insect-killed trees in conifer forests.

From Alaska to Arizona and South Dakota to California, several kinds of bark beetles are killing large swaths of ponderosa, piñon and lodgepole pines and other trees. Much of the kill is taking place in publicly owned forests, but many private landowners who built homes in the forest are also watching as the trees around them die.

"The outbreak we're seeing in Arizona and New Mexico is unprecedented," said Dr. Karen Clancy, a research entomologist with the United States Forest Service in Flagstaff, Ariz., who is studying bark beetle damage to the ponderosa and piñon pines. "In some piñon pine forests the mortality rate is 100 percent." Over all, 2 to 3 percent of the forest is affected in those states.

Some experts worry that the widespread damage may be part of a vast ecological shift in response to warming temperatures. "As the climate is changing, these ecosystems are rearranging themselves," said Dr. Craig Allen, a research ecologist with the United States Geological Survey in New Mexico. "Massive forest die-back is one way these systems will reassemble."

In a similar drought in the 1950's, two-thirds of the trees were killed and seedlings grew to take their place. But with mortality near 100 percent, there are no new piñons coming up; they may be leaving the ecosystem. "This is an indication of big, fast changes in forests that's predicted by climate change models," Dr. Allen said.

In Montana and Idaho, the outbreak is the largest since the late 1970's and early 80's. Last year the beetle claimed almost 600,000 acres of pine, compared with 900,000 in 1983; this year's toll is still climbing.

The outbreaks occur in highly variable patterns depending on temperature, elevation and moisture. On the Kenai Peninsula in Alaska, where climate warming has been especially dramatic, nearly four million contiguous acres of white spruce trees have been killed by spruce bark beetles. In British Columbia, the beetle has killed more than 10 million acres of trees, doubling in each of the last four

years.

"We're seeing it places it's never been seen," said Dr. Allan Carroll, a research scientist with the Canadian Forest Service in Victoria, British Columbia.

The bug has crossed the Continental Divide; at one time, winter temperatures east of the divide were too cold for it, but no longer. Beetles die after a few days of 40 below zero. The beetles are only 100 miles away from the boreal forest, the band of trees that extends across northern Canada. If they get into that forest, they could work their way to southern Canada and the northeastern United States.

Dead and dying trees are a serious fire hazard. "You get a greater likelihood of a crown fire," said Greg DeNitto, a forest health specialist in the United States Forest Service. "And when trees fall you get an increased fuel load on the ground. It can be devastating."

Prevention is the only effective way to combat the outbreak, experts say. Landowners should thin live trees around their home, and if possible water them. Both measures ease stress on the trees.

Once a tree is occupied by beetles, it cannot be saved, but unaffected trees near an outbreak can sometimes be protected with insecticide. Local, state and federal agencies across the West, along with private landowners in afflicted areas, are spraying some trees near campgrounds, parks and neighborhoods in the middle of the outbreaks. That is far too costly across large tracts of forest, where the disease is being allowed to run its course.

There are several types of pine bark beetles, and all have a similar life history. For two weeks or so in July, they fly, looking to lay their eggs under the bark of a tree. After the larvae hatch, they devour a sugar-rich layer under the bark, depriving the tree of nutrients - in effect, strangling it.

A tree's only defense is a sticky pitch it emits when the beetle bores into it. But trees weakened by drought cannot muster enough pitch to fend off the invaders. As the sugar reaching the needles starts to diminish, the tree becomes what officials call a fader, slowly turning a reddish-brown, and then brown, until finally the needles fall off.

Biochemical warfare has proved effective in some experiments. When a beetle finds a suitably weakened tree it sends out a chemical called a pheromone to attract others. When the tree reaches capacity, the beetles sends out another chemical signal, warding off other beetles.

Here on the Lolo National Forest, entomologists are experimenting with a synthetic version of the second pheromone to repel beetles from healthy trees. It works relatively well, 75 to 80 percent of the time, said Ken Gibson, a Forest Service entomologist, adding, "It sends up a 'no vacancy' sign on a tree."