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Dying Trees Around Lake Gregory

STORY AND PHOTOS BY ZEV BLUMENFELD

Reporter

On an autumn afternoon, sunlight glistens off the waters of Lake Gregory. Joggers run along the path, circling the lake. Fishermen cast their lines from shore. It's a serene scene — the romanticism of the mountains come to life. But scattered around the perimeter of Lake Gregory and stretching into the residential neighborhoods of Crestline, pine trees have changed from green to brown. Sap oozes from their bark. In some areas, woodpeckers have tapped hundreds of holes into tree trunks. The trees are dying and the culprit behind the attacks is the bark beetle.

Concern about the reemergence of this supposed villain spreads beyond the aesthetics of Lake Gregory. Some believe dead trees mean more fuel during the fire season. Others fear the beetle will destroy the trees on their property. So what caused this seeming resurgence? Has the beetle been unfairly scapegoated while a larger issue remains neglected? Ultimately, what, if anything, can the community do to maintain the natural beauty of the area?

The Attack

In 2019, the U.S. Forest Service estimated that bark beetles killed 15 trees per acre around the Lake Gregory and downtown areas of Crestline. Among the trees affected were Ponderosa and Jeffery pines.

On the southside of Lake Gregory, ponderosa pines tower above San Moritz Drive. Their needles have turned brown. Others are slowly dying, evident by the



Jacob Ching chainsaws through a dead tree on Nov. 22.

fading tree crowns — the process of needles changing from green to yellow to red. Look more closely in the grooves of the bark. White and red sludge has hardened like dried, melted candle wax. These are called pitch tubes and are indicative of a bark beetle attack.

During an attack, bark beetles use their mandibles to chew pin-sized holes into the bark of a tree. In an attempt to combat the invasion, the tree responds by spewing sap back at the beetle.

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“A female beetle will fly to this tree. She’ll munch on it a little bit. And the tree will react,” said U.S. Forest Service, Forest Entomologist, Dr. Andrea R. Hefty. “The sap is extremely toxic to bark beetles.”

The beetle must continue eating and swimming through the sap to get to the phloem — the fleshy layer of nutrients inside the tree. Upon reaching this layer, the female devours the phloem, severing the movement of sugars from the tree’s crown to its roots. Then, the beetle begins defecating. Its feces combines with sawdust and sap to produce red frass, which oozes from the tree.

“It’s also a way for her to call in a mate. She’s basically pushing out pheromones at the same time (she’s eating),” Hefty said. “So once she attacks successfully, she’s now able to use the chemistry of the tree and also her own biology to call in a male.”

When the male arrives, the beetles mate and the female begins chewing winding, tunnel-like egg galleries in the tree’s cambium layer. Occasionally beetles will become lodged in these galleries and die. Others will lay their eggs here and the offspring will develop into adults by the following spring or early summer.

In addition to being overwhelmed by pheromones and severed tissue, the trees must combat a fungus carried by the beetle called Blue Stain. This fungi further inhibits the flow of nutrients from the crown to the roots of the tree.

The Gang of Five

But it isn’t just one species of bark beetle killing these trees.

“On one tree you could find up to four different species of beetles,” Hefty said while examining the bark on a dead ponderosa pine.



Bark beetle galleries.

The beetles, all which are native to the San Bernardino Mountains, have co-evolved with the pine trees and attack using a systematic method called “niche partitioning.” Through niche partitioning, each beetle species has hereditary directions to a specific section of the tree. This trait allows the beetles to avoid competing with other species for food, shelter and space to reproduction.

Often the first indicator of an infestation is “top kill” — the crowns, or tops of the trees, turning brown. Pine engravers are found here, targeting the

smaller diameter branches.

The middle portions of the trunk play host to western, Jeffrey and mountain pine beetles. Hefty said that much of the devastation around Lake Gregory was caused by these heavier-bodied beetles, with the most pervasive in Southern California being the western pine beetle.

On the lowest portions of the trunk, from the soil to about three feet up, feast red turpentine beetles.

To the casual observer, the fatalities around Lake Gregory may only be obvious after crown fading begins. But according to Hefty these infestations likely began over a year ago.

“If I had seen this tree last year, I may have been able to see the top starting to fade. If that were the case, then I would have known that there were Ips (Pine engravers) that were attacking at the crown,” Hefty said, glancing up at the tree. “We know that this tree has a bigger pine beetle in the main trunk because of the pitch tubes.”

At this point, the tree cannot be saved and it may be cut down. But is there any way to stop the spread of the beetle? The short answer is yes.

Combating the Spread

On Nov. 22, on the southside of the lake, chainsaws buzzed. Men in orange jumpsuits fed tree limbs into a woodchipper that sawed the wood into dust.

“C” Foresters from CAL FIRE’s Pilot Rock Conservation Camp #15, Travis Lemm and Jacob Ching stood at the base of a ponderosa pine, approximately 18 inches in diameter. Lemm sliced halfway into the pine with a chainsaw. Then, calculating the direction they wanted the tree to fall, Ching slid yellow felling wedges that looked like blocks of cheese, into the opening. Ching swung back the butt end of his 5-pound felling ax and struck the wedges while Lemm finished the cut.

The tree leaned away from its base and fell to the ground with the swooshing sound of a seven-ton baseball bat. Pilot Rock inmates began trimming the tree and sawing it into pieces.

“This is the beginning of the process,” Ching said. “After the trees hit the ground, our crews come in and chip. We remove all of the branches off of ground trees. They chip anything up to 10 inches.”

The tree trunks are covered for six months under 6-millimeter plastic, creating a “greenhouse-like” environment to exterminate any of the surviving beetles. During this period, the California Department of Forestry and fire Protection (CAL FIRE) discourages members of the public from tampering with these piles. The reason for this is two-fold. Opening the plastic allows airflow into the “greenhouse” and consequently disrupts the extermination process. Secondly, if the wood is removed and transported during this period, then the beetle may infest new areas.

“After [the process] cooks off all the beetles, then you can burn it as firewood without spreading the beetle,” Ching said.

CAL FIRE is selective about which trees to maintain, including trees on private property.

“We will remove actively infested trees on private property,” said CAL FIRE Forester I, David Haas. “However if the trees are dead, then the responsibility falls upon the [home]owner to get rid of them.”

He also mentioned that sometimes Southern California Edison takes responsibility if the removal of the tree is near a power line. Haas stressed the importance of CAL FIRE’s good relationships with Southern California Edison and the California Department



CAL FIRE fells a pine tree to combat the bark beetle.



A tree destroyed by a bark beetle on the south side of Lake Gregory.



Forest Entomologist, Dr. Andrea R. Hefty holds a piece of bark with bark beetle egg galleries.



Pitch tubes reveal whether or not a bark beetle attack has been successful.

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Hefty points to a dead bark beetle. Galleries have been carved into the bark behind it.

of Transportation (Caltrans) to ensure public safety. As inmates worked, Ching said that he anticipates a lot more maintenance occurring before the spring due to the beetle's sluggish winter behavior. Then he pointed uphill to the residential area south of San Moritz Drive, noting that the goal would be to corral the beetle before it traveled any further south.

An Outbreak?

Underlying environmental causes determine which stands, or areas of trees, fall victim to the bark beetle cycle. Forest density, windthrow, and soil compaction are all key factors. "There's always more than one factor," Lemm said. "We had a big drought, and here, there are too many trees." Lemm, Ching and Hefty were all in agreeance that the sheer number, size and variety of trees ultimately weakened the overall health of the trees around Lake

Gregory. "There are too many trees. All the trees are fighting for the same amount of water. As they get bigger and bigger, they get stressed," Lemm said. "What you want to have in a healthy forest is proper tree spacing and you want multiple species of trees." Lemm said that CAL FIRE has spoken with the Lake Gregory Commission about the recommended tree dispersal and varying the type of trees in a given stand. Hefty gave another reason as to why a less dense stand is optimal. "The more open a stand is, the better. Bark beetles have a hard time communicating via pheromones when there is a lot of airflow through a stand," Hefty said. If trees are spaced farther apart, then the beetles have more difficulty receiving these chemical signals. Ultimately, the density and weather impact the amount of water per tree. Denser stands, like Lake

Gregory area, are more prone to bark beetle attacks. Hefty estimated that the trees per acre around Lake Gregory should be reduced by about 50%. A 2007 paper published on the Forest Service's website stated that "tree health in many of California's forests is seriously declining. Health is compromised when there are too many trees competing for limited resources, especially water." "I'm not surprised that this area could not support these pines," Hefty said, looking around at the pines. She pointed to trees nearby. "This area is not getting enough moisture to support this many large pines." Yet, in 2018, California experienced one of the wettest winters in recent memory – a winter that pulled the state out of a seven-year drought. California mountains saw an increase of precipitation by 150%, according to data collected by Meteorologist Alex Tardy of the National Oceanic and Atmospheric Administration. Consequently, the bark beetles around Lake Gregory are considered to be in an endemic year, not one of an outbreak. In other words, the tree loss due to bark beetles is at normal levels. Trees weakened by drought become optimal targets for bark beetles, and longer periods of drought mean higher reproduction success. "In California, whenever we have a drought, we will have a bark beetle outbreak," Hefty said. "We have years and years of data that tell us we will always have bark beetles outbreaking after a drought." Without proper management, the beetle will do its job of naturally thinning the forests. However, this could become problematic as unmanaged tree mortality will add to more fuel in California forests. Statewide the cumulative number of dead trees has risen from 40 million in 2015 to 147.6 million in 2018. "Our forests are going to look completely different after drought-driven bark beetle outbreaks. One of the effects that we are seeing in the Sierra Nevada right now is the giant amount of fuels that will burn at some point," Hefty continued. "I've walked through areas in the Sierra National Forest where I couldn't see the ground because there were so many dead branches and wood on the ground. That's going to burn at some point and it's going to be catastrophic if it's not managed."



Bark beetles have destroyed an average of 15 trees per acre in the Lake Gregory area.



Bark beetles carry blue fungi that spreads to the trees and further devastates the tree's ability to stay alive.



Frass—a combination of sawdust, sap and beetle feces—oozes from a tree near Lake Gregory.



Jacob Ching and Travis Lemm fell a tree that has been killed bark beetles.