

2016 SEQUOIA FORESTRY CHALLENGE

FOCUS TOPIC QUESTION

Introduction:

For the past several years, California has experienced a severe drought. A lack of water causes trees to become weak and unhealthy. Some trees die simply from a lack of water, and others die because of pests that can successfully attack because the trees are in a weakened state. The main pests that are killing trees in the mixed conifer forest of the Sierra Nevada are several species of bark beetles, most of which attack pine species such as Ponderosa Pine and Sugar Pine.

YMCA Camp Sequoia Lake is in the “epicenter” of the worst tree mortality in the state. Many trees have died on the 745-acre property, and the ones that are dead and within the developed areas have become hazardous to the safety of people using the facility. As this epidemic grows, the State of California has taken steps to address the problem. Grant funding is available to help pay for dead tree removal, and the Golden State YMCA has applied to CalFire for a hazardous tree removal grant.

For all of the trees that will remain after the dead ones have been removed, the Camp would like an inventory of the trees that will remain and the species mix so they can anticipate how many more trees could die in the future, with pines being the most likely candidates.

Focus Topic Fieldtrip Location:

We will walk to the east side of Sequoia Lake, where we will inventory trees **not** marked for immediate removal in 16 designated zones. A map of the fieldtrip location and data collection sheets will be provided.

Background Information:

Historic Condition of California’s Mixed Conifer Forest

Studies of what the Sierra Nevada forests were like before European settlement indicates that mixed conifer forests were composed of a randomly arranged, widely variable distribution of tree ages and sizes. An 1898 study in what is now the Sierra National Forest showed stands with between 16 and 36 trees per acre and basal areas of between 152 and 358 square feet per acre. An examination of photos taken of undisturbed forests indicates that forests in the Sierra National Forest were dominated by trees > 20 inches at

breast height. Photos show very few pole size or smaller trees. Photos taken in the early 1900s do indicate a dramatic increase in conifer regeneration following the removal of fire.

YMCA Camp Sequoia Lake

Golden State YMCA and YMCA Camp Sequoia Lake have been serving youth and families from California's Central Valley and beyond for over 100 years. In 2016, they served nearly 5,000 participants.

Camp Sequoia Lake is a 745-acre property on the western slope of the Sierra Nevada. The entire property is within CalFire's "Very High Fire Hazard Severity Zone" and is in the highest category for mortality severity according to the April 2016 aerial survey. Several timber harvests have occurred on the property starting as far back as the late 1800's. In 2005, The Camp hired Registered Professional Forester (RPF) Brian Rueger to write a Non-Industrial Timber Management Plan.

Nonindustrial Timber Management Plan (NTMP)

In California, all timber harvesting on State and private lands is subject to the State's Forest Practice Act and Rules. In 1991, the State Legislature amended the Forest Practices Act to create the Nonindustrial Timber Management Plan (NTMP). The purpose of the NTMP is to allow "nonindustrial" landowners; that is, those who own less than 2,500 acres and are not "primarily engaged" in the manufacture of forest products, to create a "forever" forest management plan which allows for the periodic harvest of trees without going through the environmental review process for each harvest.

Bark Beetle Biology

Bark beetles are a group of small but destructive insects that kill or damage trees by tunneling under the bark. Adults are dark colored and typically the size of a grain of rice. Most bark beetle species are fairly specific as to what species of tree they attack, and what part of the tree they prefer, with some species attacking the top and branches, some attacking the main trunk, and others attacking the tree base. Beetles attack the tree by tunneling through the bark to the wood surface. As the tunnels are extended under the bark, boring dust (frass) is expelled through the entrance hole. Trees fight off bark beetle attack by releasing pitch into the beetle's entry hole and essentially flushing or "pitching" the beetle out. If the tree is under any kind of stress, it may not be able to produce the amount of pitch necessary to expel the beetle, and the chances of the tree being killed increase dramatically.

Current Conditions for Tree Mortality in California

Based on aerials surveys done in April 2016, the US Forest Service estimated in June that 66 million trees have died in the South Sierra in the past few years, and more are expected to die in the next few years. "We know in the Sierra and Sequoia national forests east of Fresno, the beetles have killed at least 85 percent of the entire pine vegetative type and at least 20 percent of the mixed conifer type, which is pine and fir," said Steve Brink, California Forestry Association vice president of public resources. "By the end of this summer, essentially 100 percent of the pine type will be dead in the Sierra and Sequoia national forests."

Governor's Proclamation and the Tree Mortality Task Force

Last fall, Governor Jerry Brown declared a state of emergency on tree mortality in California and formed the Tree Mortality Task Force to help mobilize additional resources for the safe removal of dead and dying trees. The Tree Mortality Task Force is comprised of state and federal agencies, local governments, utilities, and various stakeholders that coordinate emergency protective actions, and monitor ongoing conditions to address the vast tree mortality resulting from four years of unprecedented drought and the resulting bark beetle infestations across large regions of the State.

Hazard Tree Removal Grant

CAL FIRE and the Office of Emergency Services, along with the Tree Mortality Task Force members, coordinate financial assistance to help the public remove trees on their property. A new round of grant funding has become available, and Camp Sequoia Lake has applied for \$190,000 to remove 262 trees in a 55-acre area designated as a high priority zone because of the number of dead trees in immediate proximity to habitable permanent structures and infrastructure. The target area includes over 70 habitable structures and numerous infrastructural facilities such as access roads, well pumps, power lines, and septic fields.

Fieldtrip: On Thursday, October 13, you will walk to the proposed project area to conduct a quantitative and qualitative analysis of the **live** trees that are **not** marked for removal.

Topics: Orientation of project area and zones within it, how to identify (by genus) common trees, and how to collect data

Activity: Collect data in pre-assigned zones in the project area: genus, diameter at breast height, presence or absence of bark beetle attack, overall tree health

Resources:

On Thursday evening, you will be given resources on a flash drive to load onto your team's computer. Additionally, you can use any information you brought with you, as well as photos and observations made in the field. Lastly, your data will be compiled with data from other teams and made available to you for analysis.

Preparing Your Presentation:

Your team will prepare a report for the landowner addressing the live trees in the grant project area. In order to do this, you will need to answer the following questions:

- What has precipitated the tree mortality epidemic in the Sierra Nevada?
- What area of the Camp Sequoia Lake property has been chosen for the current grant, and why?
- What is the action plan and timeline for the current grant?
- Why is it important to have data on the trees not included for removal in this grant?
- **What is the number of trees, average diameter, and species composition of the trees that will remain? How many of these trees show signs of insect infestation or drought-related stress?**
- If a subset of the remaining trees need to be removed in the future, what will the cost be, based on the average per-tree removal cost of the current grant?
- What should the landowner do regarding the remaining trees after the current grant project is completed?

Final Product:

Your goal is to produce a 15-minute PowerPoint presentation that **summarizes the tree mortality situation at Camp Sequoia Lake and tells the landowner what the forest will be like after the dead trees have been removed.** You are encouraged to use photos and information collected on the fieldtrip, interviews with resource professionals during the Challenge, and the maps, tables, and information in the resources provided. Additionally, use the judges' score sheet as a checklist, to make sure you cover the items on which you will be scored.