# 2018 SANTA CRUZ FORESTRY CHALLENGE
<u>FOCUS TOPIC QUESTION</u>

<u>Introduction:</u>

The topic for 2018 is *The Multiple Benefits of Prescribed Fire in the Santa Cruz Sandhills*. Your team will collect data on a 9.3 acre unit in Henry Cowell Redwoods State Park and will use the data to run fire behavior models that will predict fire behavior in the event of a wildfire in the Park.

<u>Focus Topic Fieldtrip Location:</u>
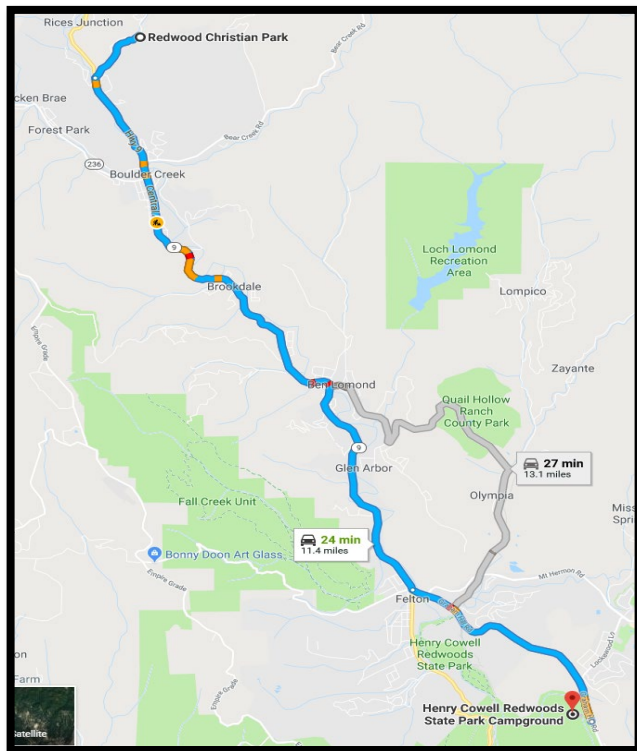
We will use school vehicles to travel 11.4 miles to the Henry Cowell Redwoods State Park Campground, 2591 Graham Hill Rd, Scotts Valley, CA 95060.

To the left is a map of the route. A map of the unit with plot locations will be provided upon arrival. After teams collect data at the unit, we compile the information and deliver it back to them with the information needed to simulate a fire with two types of modeling software.

<u>Background Information:</u>

<u>Henry Cowell Redwoods State Park</u>

Henry Cowell Redwoods State Park is located in the Santa Cruz Mountains and is most famous for its 40-acre grove of towering old-growth redwood trees. The Park has 4,650 acres of four diverse habitats: grasslands, river/riparian, sandhills, and redwoods. The park's campground is situated in a mixed evergreen forest and is near the Santa Cruz Sandhills habitat, with rare ancient marine deposits, that is home to several endangered animals and plants.

Santa Cruz Sandhills Ecosystem

The Santa Cruz Sandhills are a unique community of plants and animals found only on outcrops of Zayante sand soil in the central portion of Santa Cruz County, in central coastal California. The Zayante soils are derived from sediment deposited over 15 million years ago when the region was under a vast sea. As evidence of their origins, the inland Sandhills contain a variety of marine fossils, including deep beds of sand dollars. Due to their coarse texture, Zayante soils have low water holding capacity and nutrient availability. As a result, they support two endemic communities: the 'sand chaparral' and 'sand parkland', which are very different from the moisture-loving coast redwood and mixed evergreen forests that dominate the region.

CalFire's Vegetation Management Program (VMP)

The Vegetation Management Program (VMP) is a cost-sharing program that focuses on the use of prescribed fire, and some mechanical means, for addressing wildland fire fuel hazards and other resource management issues on State Responsibility Area (SRA) lands. The use of prescribed fire mimics natural processes, restores fire to its historic role in wildland ecosystems, and provides significant fire hazard reduction benefits that enhance public and firefighter safety.

Fire management in the Santa Cruz Sandhills is needed to maintain open habitat required by many Sandhills plants and animals. The Observation Platform VMP was initiated in 2010 at Henry Cowell State Park, where small prescription burns have been conducted each year to create open habitat and reduce the risk of catastrophic fire. A map of the past and future burn units will be provided.

Brown's Transects

James K. Brown was a research scientist in the 1970's for the US Forest Service at the Northern Forest Fire Laboratory in Missoula, Montana. He developed a way to determine fuel load by sampling downed woody material that is still in use today.

The method is rapid and easy to use and can be applied to naturally fallen debris and activity generated slash. The method involves counting downed woody pieces that intersect sampling planes and measuring the diameters of pieces larger than 3 inches in diameter. The piece counts and diameters permit calculation of tons per acre. A "Go/No Go" gauge is used to classify the different size categories.

Fire Behavior Models

Fire behavior models are an important tool, allowing land managers to predict what will happen when they intentionally set a fire to the landscape, known as prescribed burns, as well as how fast, how hot, and in what direction a wildfire may move, given specific fuels conditions and seasonal weather conditions.

- BehavePlus is a fire modeling system and a Windows® based computer program that can be used for any fire management application that involves modeling fire behavior and fire effects. The system is composed of a collection of mathematical models that describe fire behavior, fire effects, and the fire environment. The program simulates rate of fire spread, spotting distance, scorch height, tree mortality, fuel moisture, wind adjustment factor, and many other fire behaviors and effects. It is commonly used to predict fire behavior in several situations (https://www.firelab.org/project/behaveplus).

  It was developed by Patricia Andrews, a US Forest Service researcher at the Rocky Mountain Research Station at Fort Collins, Colorado. It was originally designed for use with wildfire but is widely used for planning prescribed fire.

- FOFEM (a First Order Fire Effects Model) is a computer program for predicting tree mortality, fuel consumption, smoke production, and soil heating caused by prescribed fire or wildfire.

  First order fire effects are those that concern the direct or indirect or immediate consequences of fire. First order fire effects form an important basis for predicting secondary effects such as tree regeneration, plant succession, and changes in site productivity, but these long-term effects generally involve interaction with many variables (for example, weather, animal use, insects, and disease) and are not predicted by this program. Currently, FOFEM provides quantitative fire effects information for tree mortality, fuel consumption mineral soil exposure, smoke, and soil heating.

  It was developed by Robert Keane and Duncan Lutes, US Forest Service researchers for the Rocky Mountain Research Station (https://www.firelab.org/project/fofem).

Landowner Objectives:

The state's primary objective for this VMP is to restore the Santa Cruz Sandhills ecosystem through the use of prescribed fire. The secondary objective is to create fuelbreaks that will slow or stop a fire coming in from adjacent land. Understanding and communicating the difference in fire behavior between treated and untreated units in the Park will garner support of this VMP.

Resources:

You will be given resources on a flash drive to load onto your team's computer. Use these resources, plus anything you download from the internet, to help you answer the questions to be addressed in your presentation. Additionally, you can use photos you take during the fieldtrip and statements from foresters you work with and interview during Ask a Forester.

Items to be Addressed in Your Presentation:

1. Background information on Henry Cowell Redwood State Park
2. Santa Cruz Sandhills ecology and the importance of active habitat management
3. CalFire's Vegetation Management Program (VMP) and the specifics of the Observation Tower VMP
4. Brown's transects methodology
5. The data summary for the unit, and calculations to determine fuel load.
6. Results of running the fire models for the treated versus untreated units.
7. A summary for the public of the primary and secondary benefits of using prescribed fire to treat and restore the Santa Cruz Sandhills. The format can include one or more of the following:
   - Trail signage
   - Flyer/brochure
   - Facebook post
   - Instagram post

Final Product:

Your goal is to produce a 15 minute PowerPoint presentation that summarizes fuel loading and fire behavior on the treated versus untreated units, and the benefit of continuing this VMP. 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.