

Ecological Impacts from the Santiago Fire of October 2007

Copyright© 2008 by Tom Morris. All rights reserved.

Introduction

In October 2007, someone started a wildfire in Santiago Canyon. The fire burned over 28,000 acres of wilderness and several homes in the Santa Ana Mountains. About 1100 firefighters risked their lives to control this gigantic wildfire. The person(s) responsible for starting this fire remain at large despite the \$250,000 reward offered for information leading to their capture and conviction.

Modjeska Canyon was one of several “box” canyons menaced by the Santiago fire. Box canyons have only one way in and out, and pose fatal risks to firefighters should they get trapped in the canyon – if the fire blocks their only escape route. Despite the risks, firefighters were able to save nearly all structures in the community of Modjeska Canyon – while the fire raged in the surrounding canyon walls.



Tucker Wildlife Sanctuary is a popular nature center located deep in Modjeska Canyon. Firefighters protected it from this fierce fire. The facility is located on the canyon floor, as is the bulk of the Modjeska Canyon human community. But while the canyon floor generally escaped harm, the canyon walls of chaparral and coastal sage scrub suffered from the fire.

Fire Ecology

Fires that threaten human settlements or property are bad because they can kill people and destroy their property. But some natural communities have coexisted with fire for millions of years. In these ecological communities, fires are still destructive in the short-term, but the fires also provide certain services to the natural community that can have long-term benefits.

Fires can improve biological productivity in arid climates. In arid climates, the rate of decomposition is low. Leaves, twigs and branches fall off living plants and accumulate on the ground below. Since moisture is needed for decomposition to proceed, the nutrients embedded in the dry plant materials do not decompose and do not get recycled back into the soil. Eventually, they may be blown away by the wind, leaving the ecosystem altogether. Ultimately, there is a shortage of soil nutrients.

When soil nutrients are in short supply, plant growth is slower. Since plants form the base of the food webs in terrestrial ecosystems, like the ones in Modjeska Canyon, when plant growth slows down, food production slows down. So, over time, the chaparral and the coastal sage scrub ecosystems become old and senile – covered in old “dead wood.” Fires change this situation.

When a fire burns these ecosystems, many plants and animals die. But afterwards, the prospects are improved for more productivity and a livelier future. For example, when the fire burns the accumulated plant debris that covers the ground, the nutrients (salts) are released from their organic bondage. The ash that covers the ground is filled with these nutrient salts that are now free to be easily absorbed by nearby plant roots. So, after a fire, there is an instantaneous surplus of plant nutrients. When the rains come, new and surviving plants use these nutrients to support rapid plant growth. As long as the ash remains, the ecosystem taps this abundance to produce new, healthy growth. As a result, food production (biological productivity) can soon exceed pre-fire levels.

The fire burns off the old growth that previously shaded the ground. Shade can help conserve water, but it also can inhibit the growth of new plants from seeds. With the old plants gone, seeds and young plants have full access to the sky and the sun’s useful energy.

Some plants produce seeds that won't germinate unless they are exposed to fire. Think about this. In between fires, all these seeds are produced year-after-year, but they won't germinate during the rainy season. Then a fire comes. The fire's heat triggers a "switch" in the seed allowing it to germinate when the rains come. This timing operation has a greater chance for successful germination since soil nutrients (ash) and sunlight are plentiful after a fire.

Purpose

We will map fire impacts to the plant communities adjacent to the trail from Tucker Wildlife Sanctuary to Harding Canyon.

We will distinguish between two different conditions :	We will distinguish between two different plant communities :
<p>Unharmed Condition: Plants generally undisturbed. Ground surface generally hidden from view by normal plant growth. No evidence of ash or blackened, burned plants. No evidence of heat damage such as contiguous patches of unnaturally brown or dark colored leaves.</p> <p>Fire-Damaged Condition: Plants largely absent after being burned by the fire. Blackened plant remains. Ground covered with large amounts of ash.</p>	<p>Coastal sage scrub community Dominant plants of coastal sage scrub:</p> <ul style="list-style-type: none"> • Coastal sagebrush • Black sage • California buckwheat • Prickly pear cactus • Lemonade berry • Laurel sumac • Sugarbush • Coyote brush • California encelia <p>Chaparral community Dominant plants of the chaparral:</p> <ul style="list-style-type: none"> • Scrub oak • Chaparral holly (Toyon) • Poison oak • Holly leafed cherry • Wild cucumber

Materials

1. You will need colored pencils of four different colors.
2. Attached map

Procedures

1. Accompany your instructor along the trail from Tucker Wildlife Sanctuary to Harding Canyon.
2. Identify instances of both plant communities in terms of both conditions.
3. Indicate these locations on your map according to the map's colored legend.

Grading Criteria

Maps will be graded according to the following criteria:

1. Neatness – student shows obvious care and pride in preparing the map.
2. Accuracy – map locations reflect actual conditions in the field.
3. Completeness – map includes all areas requested by the instructor.

**Ecological Community Impacts from
Fire of October 2007.
Modjeska and Harding Canyons**



Harding Canyon 11

Flores
Peak

Modjeska Canyon Rd
Tucker Wildlife Sanctuary

9

10

8

7

6

3

4

5

2

1



0

<input type="checkbox"/>	Coastal sage scrub (unharmed)	Coastal sagebrush, black sage, Calif. buckwheat, prickly pear cactus, lemonade berry, laural sumac, sugarbush, coyote brush, Calif. encelia
<input type="checkbox"/>	Coastal sage scrub (fire damaged)	
<input type="checkbox"/>	Chaparral (unharmed)	Scrub oak, chaparral holly, poison oak, wild cucumber
<input type="checkbox"/>	Chaparral (fire damaged)	