



WELCOME

Welcome to Santa Monica Mountains National Recreation Area Southern California Fire Ecology: Wildfire Walkabout

The purpose of this guide is to prepare you and your students for your trip to the Santa Monica Mountains. This field trip is self-led. Please read this guide carefully and if you will be visiting, contact the Santa Monica Mountains National Recreation Area (SMMNRA) education team at samo_education@nps.gov.

FIELD TRIP LOCATION

The field trip can take place in any recent burn scar in your area or the Santa Monica Mountains. Suggested sites within the park include *Paramount Ranch*, *Rancho Sierra Vista/Satwiwa*, *Circle X Ranch*, *Rocky Oaks*, *Peter Strauss Ranch*, or *Solstice Canyon*. However, you must contact the park to make sure these sites are accessible and available for a field trip by calling (805) 370-2301 or email samo_education@nps.gov.

As this is a teacher-led field trip please feel free to visit any location that is convenient to you that has been affected by a recent wildfire. You may use or modify any of the activities suggested in this program to your needs.

DIRECTIONS

For directions to the sites above, call (805) 370-2301 or visit <https://www.nps.gov/samo/planyourvisit/placestogo.htm>

GOOD TO KNOW

Parking – The parking areas in the national park site locations are free. Other sites in the recreation area may require a fee. National Park Service (NPS) parking lots are open from 8:00 AM to sunset.

Restrooms are not available at all locations, check the website above for details.

Water fountains are not available at all locations, check the website above for details.

Pets are allowed on leash and under control on NPS land. Please pick up after your pet. Pets must remain on the trail. Pets are not allowed in other sites of the recreation area such as state park properties. Check the website of your chosen site for details.

Accessibility: Please check the website of your chosen site for details or call (805) 370-2301.

Cell phone service is available in some areas but unreliable in the canyons and backcountry areas of the park.

CONTACT US

Phone: (805) 370-2301

Email: samo_education@nps.gov

Web: <https://www.nps.gov/samo/planyourvisit/placestogo.htm>

WILDFIRE WALKABOUT HIKE

HIKE GOAL

The goal of the Santa Monica Mountains National Recreation Area Fire Ecology program is to give students the opportunity to explore the subject of wildland fires and introduce them to a natural area that has burned.

A trip to a burn scar has the potential to not only introduce students to their local wild lands, but also put them in direct contact with the subject of wildfire. Experiencing these together is essential to really understanding wildfires in southern California.

ESSENTIAL QUESTION

What is fire? What is a wildfire and how do wildfires affect plants, animals, and humans?

OBJECTIVES

- During this field trip, 100% of students will be able to identify one piece of evidence that a wildfire occurred.
- During this field trip, 75% of students will have a discussion about what burns and why it burns.
- During this field trip, 75% of students will be able to identify something that looks like it has grown back after a fire and discuss the impact of fire on the plants and animals.
- After this field trip, 90% of students will be able to identify one thing that can start a fire.
- After this field trip, 20% of students will discuss with their family the ways that they can prepare for a fire and take actions to prepare.

HIKE OPTIONS

There are many trails to hike in the Santa Monica Mountains. To plan your visit, please refer to this website:

<https://www.nps.gov/samo/planyourvisit/placestogo.htm>

Before hiking any trail in the park, call (805) 370-2301 to make sure the trails are open and safe.

Hiking maps are available on the above website or from the King Gillette Ranch visitor center. Call the number above for more information.

Suggested hikes:

Rancho Sierra Vista / Satwiwa:

- Satwiwa Loop trail (1.5 miles)
- Burned in the 2013 Springs fire

Paramount Ranch:

- Coyote Canyon trail to Hacienda Trail Loop (1.0 mile)

- Burned in the 2018 Woolsey fire

Solstice Canyon:

- Solstice Canyon trail (2.1 miles round trip)

- Burned in 2018 Woolsey fire

Rocky Oaks:

- Rocky Oaks Loop trail (1.1 miles)
- Burned in the 2018 Woolsey fire

MATERIALS

DIGITAL DOCUMENTS SUPPLIED BY THE PARK:

- Elementary Student Journal
- Elementary Field Trip Teacher Guide
- Plant Community Key

OPTIONAL MATERIALS

SUPPLIED BY THE TEACHER:

- Magnifying glasses
- Binoculars

PREPARING FOR YOUR HIKE

SAFETY

REMEMBER WHILE YOU ARE HIKING:

1. Stay together as a group.
2. Stay on the trail.
3. Carry a first-aid kit.
4. Be aware of flora & fauna.
Remember TRIP.

Ticks are often found on tall grasses. Thoroughly check yourselves after your visit and stay on trails to try to avoid these little suckers!

Rattlesnakes live in this area. If you see a snake, step back to a safe distance and try to identify the snake. If it has a triangle shaped head and a rattle, it is a rattlesnake. These are the only venomous snakes in the mountains.



Insects that sting are present in the mountains. Be aware of students with allergies and try to avoid bothering hives .

Poison oak grows along the trails. Remember, leaves of three, let it be!



5. Everything is protected!

Do not pick any flowers or collect any souvenirs. **Leave no trace** that you were here and take only pictures and memories.

6. Do not have your electronic devices out while you are walking.

Only use them for pictures or assignments while you are stopped.

7. Know the name of the site you are visiting and call 911 on a cell phone in an emergency.

STUDENT FIELD JOURNAL

- The field journal is used by the students at stopping points on the hike.

HIKE STOPPING POINTS

- Stopping points will be at the discretion of the teacher.
- Feel free to add your own activities into the hike or simply walk along and experience the Mediterranean ecosystems.
- All activities are designed in a manner which allows teachers to take students on the hike without having to provide any additional materials. However, we have suggested optional materials that you can provide yourself to enhance the activities.

LUNCH

- You can have your lunch anywhere.
- Many sites do have picnic tables and restrooms available. Check the website <https://www.nps.gov/samo/planyourvisit/placestogo.htm> for specific information.

PROGRAM STANDARDS



NGSS STANDARDS

K-LS1-1, K-ESS2-2, K-ESS3-1

1-LS1-1, 1-LS3-1

2-PS1-1, 2-PS1-4, 2-LS2-1, 2-LS4-1

3-LS1-1, 3-LS4-3, 3-LS4-4

4-PS3-2

5-ESS2-1

FIRE STARTERS

SUMMARY

This activity is designed for students to think about what fire is and what can start a fire. Teachers can discuss what is needed to start fire: oxygen, heat, fuel.

WHERE SHOULD I STOP?

It is recommended that if time allows, you hike the trail ahead of your field trip to determine the best places for your activities.

Pick a location where students are comfortable.

FOCUS QUESTION

What is fire and what things can start a fire?

OBJECTIVES

During this activity, 100% of students will use their reasoning skills to determine the objects that could start a fire.

GUIDELINES

1. Have the students circle the objects on their journals that they think could start a fire.
2. Have a discussion about their answers and what fire needs to start: oxygen, fuel, heat.

MATERIALS

SUPPLIED BY THE PARK:

- Elementary Student Journal

OPTIONAL MATERIALS

SUPPLIED BY THE TEACHER:

- Crayons
- Colored Pencils

BACKGROUND

- Fire Triangle: Oxygen, Fuel, and Heat
- These three elements make up the fire triangle. Remove any one of them and the fire will not burn.
- Heat first comes from the ignition source that in nature is lightning or lava.
- Fuel is any material that will burn. Some fuels are more likely to burn than others. For instance, dead trees, leaves, needles and grasses have far less water in them than living ones. Dead plants usually burn sooner and hotter than live ones.
- At least 16 percent oxygen must be in the air for a fire to start. The air we breathe has 21 percent oxygen, more than enough to allow a fire to burn.

SCAVENGER HUNT

<p>SUMMARY</p>	<p>This activity is designed to encourage students to discover things that could burn in the natural area (fuels) and think about what might burn easier or faster.</p>						
<p>WHERE SHOULD I START THIS?</p>	<p>Pick a place along the trail to start and stop the scavenger hunt where they could find the items they are looking for. End the scavenger hunt at your discretion.</p>						
<p>FOCUS QUESTION</p>	<p>What kinds of things burn in nature and do some things burn faster than others?</p>						
<p>OBJECTIVES</p>	<ul style="list-style-type: none"> • During this activity, 75% of students will identify one thing that could burn and think about how it would burn. 						
<p>GUIDELINES</p>	<ol style="list-style-type: none"> 1. After a short rest, tell the students that they will be participating in a scavenger hunt. 2. Have a discussion about what they are looking for and after they find their items, discuss which ones may burn faster and why. Background information is included for your reference about the plant communities in the Santa Monica Mountains. 3. Continue the scavenger hunt along the trail until your next stop. 						
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<p>BACKGROUND</p>	<ul style="list-style-type: none"> • Weather, Topography, and Fuels are all variables that affect how a wildfire behaves. • A fuel's composition, including moisture level, chemical makeup, and density, determines its degree of flammability. • Chaparral—Generally, fuels are not as easily ignited as grass fuels, but once ignited will burn readily if conditions are right. • Fuel moisture is a measure of the amount of water in a fuel (vegetation) available to a fire, and is expressed as a percent of the dry weight of that specific fuel. • Moisture level is the most important consideration. Live trees usually contain a great deal of moisture and dead logs contain very little. The moisture content and distribution of these fuels define how quickly a fire can spread and how intense or hot a fire may become. • High moisture content will slow the burning process, because heat from the fire must first eliminate moisture. 						

BACKGROUND

CHAPARRAL AND THE ROLE OF FIRE

Due to its broad distribution and the high diversity of plant species and sub-vegetation types, chaparral experiences a variety of fire regimes and post-fire conditions. Most chaparral species are able to survive and/or soon recolonize an area following wildfire, if the fires are not too frequent, ideally 40 to 100 years or more. Many distinct plant strategies exist to accomplish this.

Plants that are classified as obligate seeders (e.g. some *Ceanothus* and *Arctostaphylos* species, *Helianthemum scoparium*, *Dendromecon rigida*) are not found in areas with high fire frequency (e.g. 2–10 years) since consecutive fires limit plants from growing to a mature age when they will set new seed. Or, low-intensity fires (due to the sparse vegetation conditions and lack of fuels) do not trigger seed germination. In the latter situation, just one intense fire will stimulate a flush of germination.

Obligate sprouters (e.g. *Prunus ilicifolia*, *Rhamnus* spp., *Cercocarpus betuloides*, *Heteromeles arbutifolia*) cannot survive frequent fires either because fires destroy the shoots and canopy every few years, and no viable seed crops are developed for at least 7–10 years. If winter rainfall is adequate or plentiful, obligate sprouters may withstand two or three wildfires occurring at intervals of 3–5 years before sustaining severe declines. However, frequent wildfires and post-fire browsing result in loss

of leaf canopies and new sprouts, which normally shade and supply nutrients to the plants during dry seasons. Then the plants' roots cannot supply their year-round needs in the locally nutrient-poor soils and summer-drought conditions. Without new stems and leaves or sufficient nutrients to produce new leaf canopy and feeder roots, obligate sprouters also disappear.

In contrast to these two groups, some plant species are found primarily within recent burn areas where they rapidly produce a lot of seed, replenishing their seed banks, or there are new shrubs taking advantage of open canopy, lack of competition, and perhaps extra nutrients to establish themselves before the obligate seeders and obligate sprouters shade them out. There are a few post-fire plant species, such as wild cucumber (*Marah macrocarpus*) and wild morning glory (*Calystegia macrostegia*), that sprout immediately after fire and cover burned areas like blankets, acting as effective erosion protection during the first few years following fire.

As a result of these complex interactions, fire—especially its frequency and intensity—strongly influences the shaping of chaparral vegetation and the creation of diverse species associations across the landscape. Areas affected by multiple fires in short succession are likely to have fewer obligate seeders and sprouters, and instead to have a greater proportion of species that are able to recolonize

from outside seed sources. It follows that the size of a fire is an important influence on the stand's future species composition. Fire extent can affect the ability of chaparral to properly recover as the large perimeter-to-area ratio of small burns can make areas more vulnerable to invasion by non-natives than with larger fires.

CHAPARRAL PLANT RECOVERY STRATEGIES

Chaparral plant communities have important strategies for fire survival and regrowth, such as sprouting from the underground rootstock and the stimulation of seed germination by fire (heat). Some shrub species that usually reproduce by seeds are able to resprout from rootstock after fire; these plants are called facultative sprouters. Other shrub species either reproduce exclusively from seeds (obligate seeders) or from rootstock (obligate sprouters), as described above.

Herbaceous plants in chaparral, which are often “fire followers,” are usually conspicuous only during initial post-fire years. Many herbaceous plant seeds remain dormant in the soil until germination is triggered directly or indirectly by fire. Thus, soil seed banks are a significant source of plant diversity in chaparral systems. Examples of fire-related stimuli include heating of seeds for a particular amount of time or to a certain temperature in order to scar the seed coat and thereby allow germination and sunlight.

However, when fires burn too frequently and consume too much aboveground vegetation, a later fire may not have sufficient fuel to reach the temperatures necessary for seed stimulation, creating a delay in the recovery of native species with this requirement. Chemicals derived from smoke and charred wood can cause seed germination in many species, whereas it can be lethal to other species.

COASTAL SAGE SCRUB AND THE ROLE OF FIRE

Compared to chaparral, coastal sage scrub vegetation contains large amounts of fine fuel. Coastal sage scrub also tends to be partially or wholly drought-deciduous, so late in the dry season fuel moisture can be very low. For these reasons, coastal sage scrub can exhibit spectacularly intense fire behavior in the fall. Few obligate seeders are found in this vegetation type, with most of the species being facultative seeders/resprouters. This means species that are able to regenerate via seed production or existing seeds in the soil seed bank, or by resprouting from surviving rootstock after a fire destroys the upper plant. This characteristic may contribute to coastal sage scrub's resiliency to repeated fires. Plants surviving a fire or

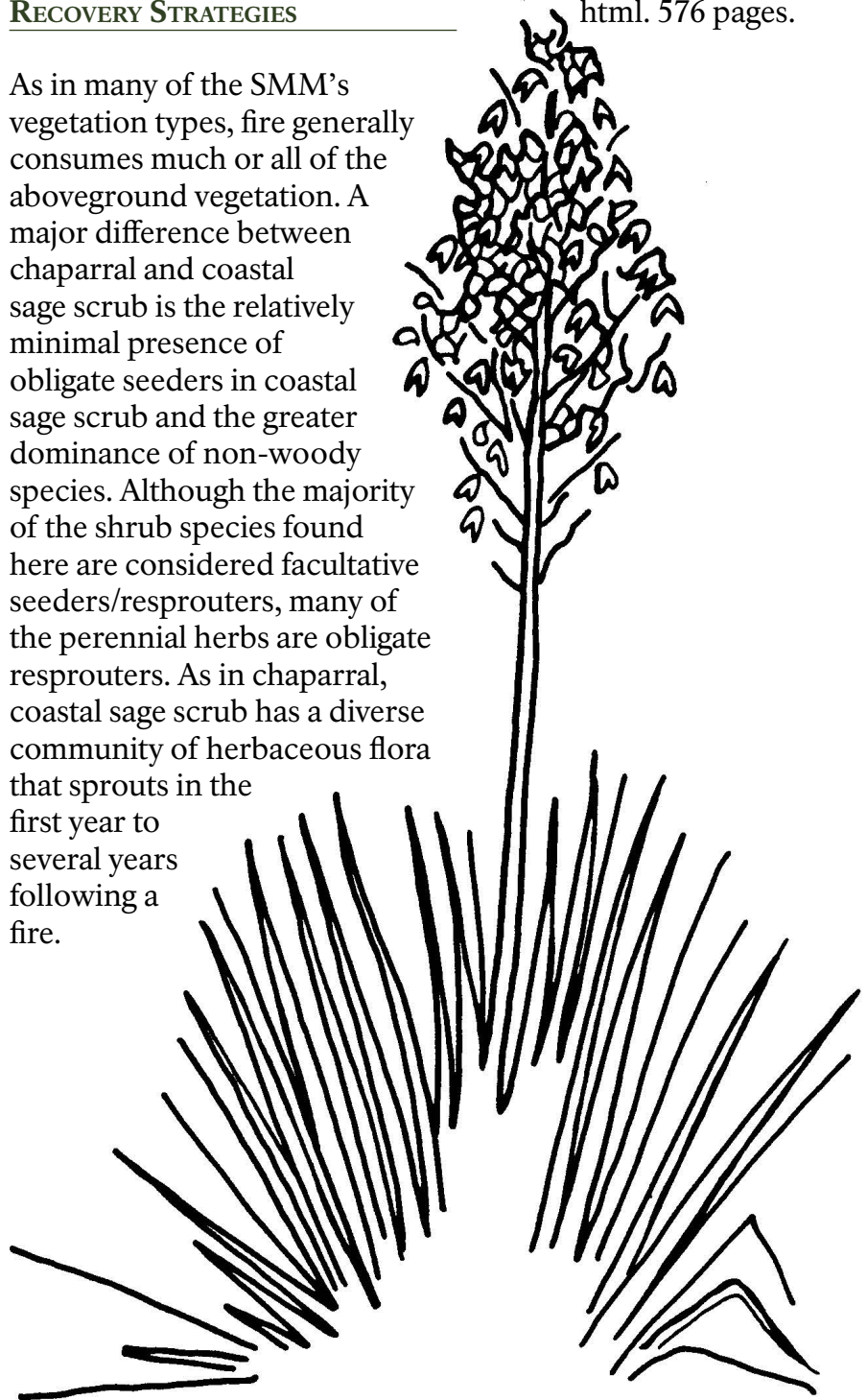
germinating from seed in the first year often produce large amounts of seed that contribute to the speedy reestablishment of native shrub cover in subsequent years.

COASTAL SAGE SCRUB PLANT RECOVERY STRATEGIES

As in many of the SMM's vegetation types, fire generally consumes much or all of the aboveground vegetation. A major difference between chaparral and coastal sage scrub is the relatively minimal presence of obligate seeders in coastal sage scrub and the greater dominance of non-woody species. Although the majority of the shrub species found here are considered facultative seeders/resprouters, many of the perennial herbs are obligate resprouters. As in chaparral, coastal sage scrub has a diverse community of herbaceous flora that sprouts in the first year to several years following a fire.

CITATION

Katelman, Tracy, et al. 2010. Santa Monica Mountains Community Wildfire Protection Plan. www.forevergreenforestry.com/SantaMonicaMountainsCWPP.html. 576 pages.



TIME TO GET CREATIVE!

<p>SUMMARY</p>	<p>This activity is designed to encourage students to explore, as a naturalist would, the natural burned area and record their findings with drawings.</p> <p>The questions at the bottom of the page could spark a conversation about what burns, why, and how is the land recovering.</p>				
<p>WHERE SHOULD I STOP?</p>	<p>If available, choose a location where students can see plants or other materials that have burned, have not burned, and plants that are resprouting.</p>				
<p>FOCUS QUESTION</p>	<p>What are the different items we see in a burned area and what can we learn from them?</p>				
<p>OBJECTIVES</p>	<p>During this activity, 100% of students will draw things they see and discuss what these things may mean.</p>				
<p>GUIDELINES</p>	<ol style="list-style-type: none"> 1. Find a nice, comfortable spot where the students can explore their surroundings closely and create nature drawings in their journals following the guidance in the boxes. 2. Use the questions at the bottom to spark a conversation about what burns in a wildfire, why, and how the land recovers. 				
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TIME TO GET CREATIVE!

BACKGROUND

The first spring following a fire there is dramatic vegetation recovery on barren, blackened hillsides from resprouting shrubs and herbaceous perennials, germinating shrub seedlings, and an abundance of colorful native annuals. Within about 10 years at coastal sites and 20 years at inland sites, the canopy of the dominant shrubs begins to close and short lived fire-following annuals and perennials disappear and are present only in the soil seed bank.

Normal postfire recovery in chaparral is autosuccessional, that is, the same plant community will recover and reassemble after the fire, from in situ seedlings or resprouts. Postfire recovery depends on spring-germinating seedlings and postfire resprouts surviving the summer dry season in the first year after fire, a period of 4-6 months without rain.

There are non-sprouters (obligate seeders), species which are killed and regenerate only from seed; facultative seeders, species which regenerate partly from seed and partly from a percentage of the plant population which resprouts; and obligate resprouters, which regenerate only from resprouts with no postfire seedling recruitment.



HOME FIRE QUESTIONS

<p>SUMMARY</p>	<p>This activity should be done at home with the student’s guardians. The goal is to empower the students to take their new fire knowledge home and engage in a conversation with their guardians about wildfires and house fires and what they can do to prepare for either.</p>
<p>FOCUS QUESTION</p>	<p>What can we do at home to prepare for a wildfire or house fire?</p>
<p>OBJECTIVES</p>	<ul style="list-style-type: none"> • During this activity, 75% of the students will complete the activity with their guardians and 25% will create a fire plan and put an emergency supply kit together.
<p>GUIDELINES</p>	<ol style="list-style-type: none"> 1. Discuss the activity with the students in the classroom before sending it home to complete with their guardians. 2. Discuss the fire plan for your school with the students. 3. Optional: Put together an example Emergency Supply Kit in the classroom.
<p>MATERIALS</p>	<p>SUPPLIED BY THE PARK:</p> <ul style="list-style-type: none"> • Elementary Student Journal

BACKGROUND

Put together your emergency supply kit long before a wildfire or other disaster occurs and keep it easily accessible so you can take it with you when you have to evacuate.

Plan to be away from your home for an extended period of time. Each person should have a readily accessible emergency supply kit.

Backpacks work great for storing these items (except food and water) and are quick to grab. Storing food and water in a tub or chest on wheels will make it easier to transport. Keep it light enough to be able to lift it into your car.

EMERGENCY SUPPLY KIT CHECKLIST

- Three-day supply of non-perishable food and three gallons of water per person.
- Map marked with at least two evacuation routes
- Prescriptions or special medications
- Change of clothing
- Extra eyeglasses or contact lenses
- An extra set of car keys, credit cards, cash or traveler’s checks
- First aid kit
- Flashlight
- Battery-powered radio and extra batteries
- Sanitation supplies
- Copies of important documents (birth certificates, passports, etc.)
- Don’t forget pet food and water!

ITEMS TO TAKE IF TIME ALLOWS:

- Easily carried valuables
- Family photos and other irreplaceable items
- Personal computer information on hard drives and disks
- Chargers for cell phones, laptops, etc.
- Always keep a sturdy pair of shoes and a flashlight near your bed and handy in case of a sudden evacuation at night.
- *Reference: Cal Fire. (2017). Assemble an emergency supply kit. Retrieved May 5, 2018, from <http://www.readyforwildfire.org/Emergency-Supply-Kit/>*