Fire! (cont'd)

19th century settlers concentrated on permanent husbandry of the forests to protect watersheds and forest products. Crops were also of concern when wildfire control was discussed. As fences began to create a patchwork across the once open landscape, fire became an enemy. Therefore, as European settlers advanced across the continent, the frequency of fire declined.

Fire Ecology

Fire ecology is a branch of ecology that concentrates on the origins of wildland fires and their relationship to the living and non-living environment. This school of thought recognizes that fire is a natural process operating as a component of an ecosystem. To understand an ecosystem requires looking beyond the system's current state. Full understanding includes investigation of the ecosystem's origin, possible future stages of the ecosystem and the cycles of progression. Fire, similar to floods, earthquakes, extreme weather events, etc., is viewed as yet another catalyst of change.

Fire dependence, found within some ecosystems, is the first concept of fire ecology. Fire dependence applies to species of plants that rely on the effects of fire to make the environment more hospitable for regeneration and growth. For example, within the chaparral community, fire prepares the soil for seeding by making the nutrients more available for plant uptake. As a result, competition from other species is reduced.

The second concept of fire ecology is fire history. Fire history is described as how often fires occur in a given geographical area. Trees record fire history. Each year a tree adds a layer of cells, increasing the width of its trunk. When a fire passes through a forest, trees may be only scorched. A layer of charcoal remains on a living tree. In time, a new layer of growth envelopes the charcoal. These fire scars leave a record that can determine a region's fire history.

The role fire plays in an ecosystem varies with the characteristics under which the ecosystem evolved. This is the third concept in fire ecology, fire regime. The interactions of humidity, fuels, and ignition sources determine the fire regime for a particular area. This is a function of the frequency of fire occurrence, the intensity of fires in the area, and the amount of fuel consumed. Both frequency and intensity are interdependent. The fuel and the duration and character of weather conditions largely determine frequency. Intensity is determined by the quantity of available fuel and the fuel's combustion rate. Both frequency and intensity are influenced by wind and topography.

Living with Fire

Contributing to the risk of wildland fires are the lack of rainfall in summer and fall due to our Mediterranean climate, and increasingly high spring and summer temperatures due to global warming. The result is that currently, this region lacks sufficient moisture to prevent vegetation and soils from drying out throughout the summer and fall. In addition, California is meant to burn. Most of our native plants, especially in the chaparral and grassland communities, are adapted to fire as part of their life cycle. Scrub oak and chamise, for example, resprout from roots or branches after fire has incinerated their outer limbs.

Until the mid-20th century, wildfires weren't much of an issue. Most people lived in cities in compact small town and on farms. The forested areas were sparsely populated. Grasslands supported grazing animals and there were many miles between subdivisions. When fires burned, they generally consumed nothing more than trees and scrub. But things are different now. And the fire danger is extremely high.

Fire Interpretive Trail

Fire, generated by a lightning strike, devastated much of Mt. Diablo's chaparral community in the summer of 1977. Yet little evidence of the devastation remains today. You can take a walk around Mt. Diablo's summit and view the spectacular landscape that has changed over time. There are 14 stops along the trail following the Fire Interpretive Trail Guide, available at the trailhead. This easy trail introduces you to the diverse plant communities and geology of Mt. Diablo's summit.

Trailhead: Access is on the north side of the road, where Summit Road splits into two one-way routes, just past the lower summit parking lot. There is a small picnic site, with a table, at the entrance to the trail. Drinking water and restrooms are available at the lower summit parking area. The trailhead is within grid F4 on the Trail Map of Mt. Diablo State Park.

Trail statistics: This is approximately a one-mile trail that encircles the summit. The first one third of the trail is paved and wheelchair accessible. Paving ends at the Ransom Point overlook. Allow 20 to 30 minutes without stops. Most of the trail is relatively flat.

Stop 1: The trail begins in a grove of scrubby oaks. There are two species here. Most common is the interior live oak. Its leaves are flat and oblong rather than convex and round. The acorns of this oak take two years to ripen. The other species found along the trail is the canyon or maul oak. Its leaves can be identified by the color and texture of the undersides, light blue-green or golden, never shiny. Unlike the oaks found on the lower slopes of the mountain, these species are small and scrubby.

Stop 2: Leaves of three - Let it be! Nearby is poison oak, a plant whose parts can give you a serious skin rash. Native Californians used the slender stems in woven baskets. They also used the juice from the stems to cure ringworm and get rid of warts. Early settlers used baking powder to relive the irritating itch.

Poison Oak

Stop 3: The rocks along this part of the trail are greenstone. Greenstone is an altered submarine volcanic rock that was deposited on the ancient seafloor about 100 million years ago. The green color appears only on freshly broken surfaces. Weathering will eventually change the surface color to gray or brown. Notice the crumbly appearance of the greenstone and compare to other kinds of rocks that you will soon encounter on the trail.

Stop 4: The rocks on the right side of the trail here are greywacke, a type of sandstone. It formed from sediments deposited on the ocean floor. Note the smooth fractures in the greywacke, unlike the crumbly appearance of the greenstone encountered previously. Now turn and look down the hill. The patch of bunchgrass immediately below the trail represents some of the few native grasses remaining on the mountain. Most of the grasses found today are exotic. They were introduced to California in the late 18th century with the arrival of the Spanish.

Stop 5: The rock on the uphill side of the trail is chert, a sedimentary rock formed from the skeletons of ancient marine organisms. It has a distinctive red-brown color and a smoother looking structure than greenstone or sandstone. The red-brown chert is rhythmically interbedded with thin shale beds. The white material here is quartz.

Stop 6: This is a good place to rest. The quarry that you see to the northwest is the Lone Star Quarry and the rock that is being mined is diabase. Diabase was part of the ancient sea floor about 165 million years ago. It is used in roadbeds and in concrete pad house foundations. The quarry has been in operation since the 1940s. Now look at the cliff behind you. Here, greenstone, chert, and shale are present. The shale is at the bottom right as you look toward the hill. It is gray or brown and splits into thin chips. There are fewer trees here. There is a twisted gray pine on the hill. There are small California bay laurels here too. The fragrant leaves of bay laurels are used as herb in soups and stews.

Stop 7: As you turn the corner you move from viewing the north side of Mt. Diablo to viewing eastward facing slopes. North Peak is directly in front of you and there is a view of the Sacramento-San Joaquin Delta to the left of North Peak. To the right of North Peak (to the southeast) are folded hills that dip away from the summit of the mountain. The hills are composed of layers of sediment that was deposited on top of the chert, greenstone, and other rocks found on the summit.

Stop 8: You are entering a chaparral plant community. Looking both uphill and downhill you might see remnants of the fire that swept the area in 1977. Chaparral plants depend on fire. It is a means of rejuvenation. Some chaparral plants require the heat generated by fire for seed germination. Others sprout anew from the crown of roots after a fire. Chaparral soils are poor in nutrients and do not soak up water like other soils. Therefore, because of the stresses of high summer temperatures and low soil moisture, many species show adaptations that reduce water loss. Small gray-colored or waxy leaves, often held vertically to the sun's rays, keep water loss at a minimum. The plants are also evergreen, so they do not use extra nutrients to grow leaves anew each year. If left untended, this area would burn naturally every several times a century.

Stop 9: The great rocky monolith on your left as you turn onto the south side of the mountain is called the "Devil's Pulpit". There is a great view of the Central Valley from this area. The Devil's Pulpit is made of chert that for some reason has resisted the erosional processes that affected the surrounding area. Geologists do not know why.

Devil's Pulpit

Stop 10: Here, on the sunny south side of the mountain, there are wild oats, foxtails, and other grasses. You have moved through oak woodland along the north side, chaparral on the east, and now grassland on the south side. Walking along this part of the trail, watch for sagebrush lizards. This species is larger than the fence lizards you may have seen elsewhere, and has no orange under the arms. This is the only place on Mt. Diablo that you will see sagebrush lizards. As the name implies, they are frequently found in desert areas.

Stop 11: Notice the irregular polished surface on the rock that glints in the sun. Look closely and you can see striations (sets of parallel lines) on the surface. These features were made when rocks broke and scraped past each other over millions of years. Rub your hand over the surface. If it feels smooth, the rock was moving in that direction. The opposite direction is rougher.

Stop 12: There are three new plants between here and the end of the trail. The first is yerba santa, a weedy growth of stems two feet high or more with glistening or varnished leaves. Native Californians drank a tea made from the leaves to cure respiratory diseases. The Spanish named the plant: yerba santa means "holy weed". The second plant is California's native juniper. This evergreen plant has flat, scale-like leaves. Although seen as a shrub here, junipers can reach tree-like proportions where conditions for growth are more favorable. The third plant is chamise, perhaps the most common shrub on Mt. Diablo, especially in chaparral areas. It is a stiff-stemmed plant with tiny, fragrant, needle-like leaves.