

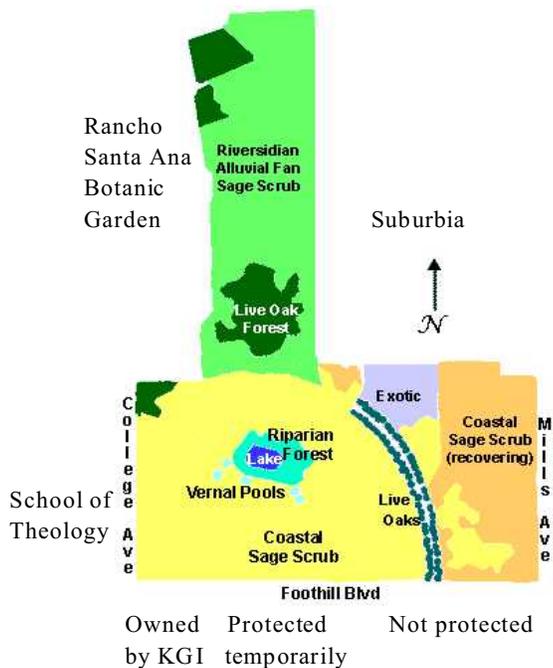
Friends of the Bernard Biological Field Station
P.O. Box 1101
Claremont, CA 91711
The Friends is a non-profit, grassroots organization.

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*“Dedicated to Education
and the Environment”*

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How big is big enough?

A field station is land left in its natural state for use in the study of complex interactions between plants and animals. The usefulness of such natural laboratories depends on size and shape. Extinctions occur frequently in small areas, due to smaller populations. The current 85 acres is just large enough to maintain reasonable stability in the existing ecosystems. Narrow shapes increase the amount of pollution by noise, air, water, and pesticides from surrounding areas, and increase the chances of competition from exotic (non-native) species.

Who uses it?

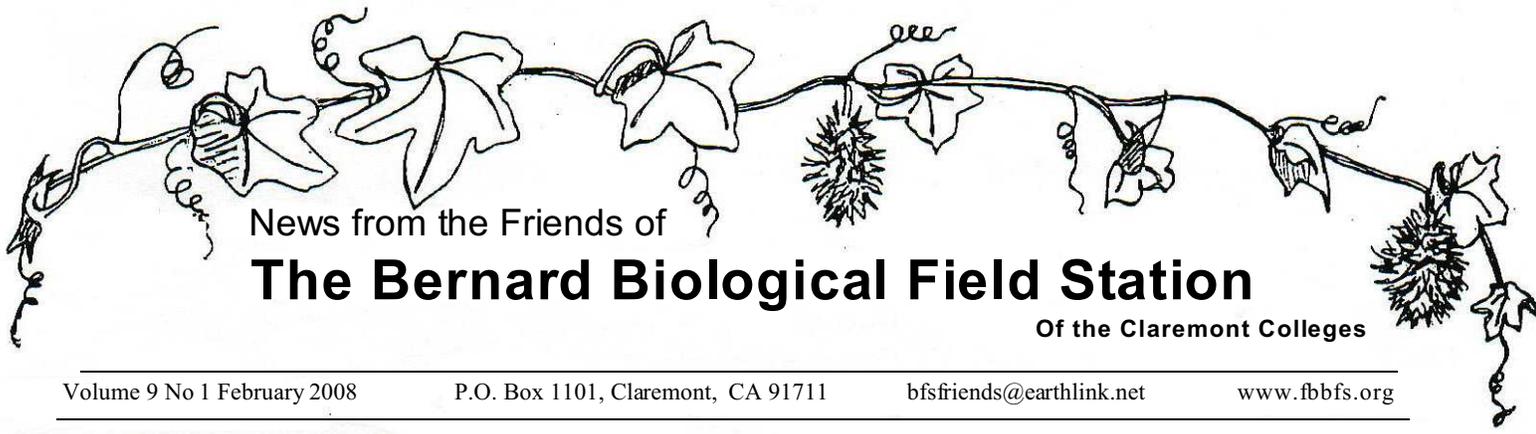
The BFS is used by Claremont Colleges faculty and hundreds of students every year, as well as by many schoolchildren from Claremont and the surrounding areas. It has also been used by college classes from as far away as Long Beach, by scout troops, and by members of the public.

What's there?

There are over 30 acres of the fast-disappearing coastal sage scrub community along with a number of species of state or federal concern.

Since much of Claremont was originally covered with coastal sage scrub, it is a fascinating window into our past.

There is a stand of oak woodland in the north where water wells up along an earthquake fault, there is annual grassland slowly returning to coastal sage scrub in the east, and there is a one-acre, man-made lake excavated in 1978 which is a sanctuary for western pond turtles displaced by development.



News from the Friends of
The Bernard Biological Field Station

Of the Claremont Colleges

Volume 9 No 1 February 2008

P.O. Box 1101, Claremont, CA 91711

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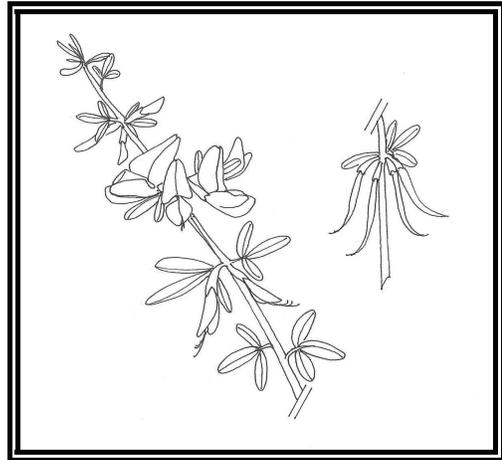
Auction Time Again!

Our major fundraising event is the annual arts and crafts silent auction. The proceeds fund this newsletter and our other outreach activities.

This year the auction will take place March 1st-29th and, as usual, items will be on display in the window of the Folk Music Center at 220 Yale Ave.

Please stop by and leave a bid! If you have paintings, jewelry, pottery, glass or other artworks you would like to donate, please let us know.

Meet the Inhabitants



Deerweed, California Broom
Lotus scoparius

Deerweed is a common small shrub growing up to 4 feet wide and tall but most often smaller, and plants typically live less than 10 years. Blossoming from March to August, it can be found on dry slopes and fans, especially after burns, and in disturbed areas below 5000 feet. It thrives in coastal sage scrub, chaparral, coastal strand areas and on the Channel Islands. Today it lines much of Highway 210 and many of our remaining open fields. It is common on the BFS.

Deerweed has thin, bright green stems with widely spaced branches, and tiny green leaves composed of 3 leaflets which give it a delicate look. It is, however, quite tough and colonizes open areas and disturbed patches, helping to prevent erosion. As do many members of the pea family, it harbors nitrogen-fixing bacteria in its roots. These change atmospheric nitrogen gas into nitrates, a form that plants can use to produce proteins, so deerweed is important in maintaining soil quality. Deerweed also provides food for hummingbirds, bees, butterfly larvae, deer, and other wildlife.

Sightings

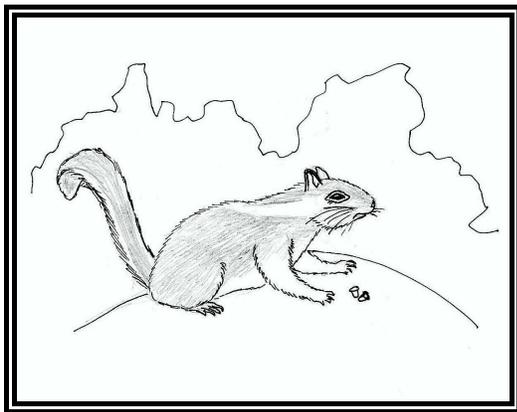
- ✓ Coots sailing around the lake, unexpectedly disappearing in dives
- ✓ Fluffy seeds of coyote brush dancing in the air
- ✓ Tiny yellow daisies blooming along the paths in spite of autumn drought
- ✓ Sagebrush greening after the rain
- ✓ Bright new leaves showing on the golden currants and elderberries
- ✓ Carpets of moss in shady areas
- ✓ Small, blue-green liverworts, some with deep purple edging
- ✓ Toyons stripped of berries
- ✓ Grasses growing, turning gold fields to green.
- ✓ Songs and scolding from unseen birds
- ✓ Laurel sumac recovering from the frosts of 2006
- ✓ Mystery animals stealing fruit and meat baits meant for insects
- ✓ Occasional spikes of yellow flowers still appearing on pinebush and scalebroom.

Teachers and Group Leaders

To arrange a visit, call (909) 625-8701

The tiny flowers of deerweed occur in groups of 3-7 along the ends of the branches at the leaf bases. They resemble those of sweet peas and mature flowers are yellow. On many plants buds, pollinated flowers, and dying, unpollinated flowers are reddish orange. Bees learn quickly to visit only the unpollinated, mature yellow flowers. This saves the bees time and energy, and benefits the plant by having more bee visits result in fertilization. After fertilization, each flower produces a fruit like a miniature pea pod containing two seeds.

Deerweed (Migali) was used by the Gabrielleno-Tongva who lived in our area. It offers little in the way of food although its tiny leaves were gathered and eaten raw. However it offered much in the way of medicine. The whole plant was soaked in water providing a wash for pregnant women. And after giving birth, the mother was bathed ritually in Migali wash to purify her for her motherhood. A mild tea was made from the entire plant and drunk as a blood builder. The roots were used in a decoction for coughs and sometimes crushed for use as a “soap”. The leaves were gathered and brewed into a mild tea for chills and fevers and into a stronger brew or coughs. An excellent ‘weed’!



California Ground Squirrels

Spermophilus beecheyi

California ground squirrels have a body about 12 inches long, plus a 6 inch bushy tail. Their fur is gray and tan, with a mottled appearance on top and a buff one underneath. There is slightly darker fur on the head, shoulders, and down the back a bit that gives the appearance of a ‘cape’. All of this may help camouflage them from predators. There are narrow white rings around the eyes and black edges to the ears.

Ground squirrels are very common and can be found in almost all our local habitats except the desert. They like relatively open areas such as fields and oak woodlands and live in burrows. They may dig these away from other squirrels or several may dig communal tunnels. The tunnels may be several feet below ground

and up to 35 ft long. These longer ones may be branched and have several openings. One communal burrow on record had 33 openings and 741 feet of tunnels with the deepest 28 feet below ground! The same tunnels may be used by succeeding generations of squirrels—or by other animals if the squirrels no longer use them.

Ground squirrels are active during the day and rarely venture further than 50 yards from the nest opening. They eat assorted fruits and seeds, including acorns, and also relish insects such as grasshoppers and caterpillars. They can carry quite a lot in their cheek pouches and they bury extra food. They use sounds, tail signals, and scents to communicate with each other. They while away the time grooming, dust-bathing, and sometimes sprawling on the ground soaking up the sun, but always keeping a sharp eye out for predators. When they see one (hawks, foxes, coyotes, snakes, cats of all kinds), they usually make sharp, warning ‘clicks’ and dive into their burrows.

Where there are many rattlesnakes, some populations have developed an immunity to the venom, and some exhibit a number of interesting behaviors. Mothers may chew up shed rattlesnake skins and then lick their pups to disguise their smell. Rattlesnakes locate prey by its infra-red production. Squirrels may raise their body temperature and fluff out their tails and wave them vigorously near the snake, increasing their heat signature. This may signal to the snake that, although the squirrel is not a threat, it’s too big to be an easily-acquired snack. They may also kick sand at the snake.

California ground squirrels hibernate in the colder parts of their range for a large part of the year, waking up every few days and eating some of their stored food. The further south they live, the shorter this hibernation is. At the BFS, the squirrels probably hibernate for a very short time or not at all. Mating occurs in early spring. The females may mate with several males which means their offspring can have different fathers. The fathers do not care for the young, leaving that to the mothers. About a month after mating, half a dozen or so young are born. At 5 weeks their eyes open and at 8 weeks they are ready to venture outside, closely watched by the mother. In the wild, California ground squirrels usually live no more than 6 years.



“A tour of the property readily convinces visitors of the importance of keeping such a beautiful expanse of land, shrubs, and trees for scientific purposes .”

Robert J. Bemard in “An Unfinished Dream” pg 708

So, what's coastal sage scrub?

“Scrub” refers to areas covered primarily by short shrubs. “Sage” refers to the presence of true sages such as black (*Salvia mellifera*) and white (*Salvia apiana*) sage, as well as to sagebrush (*Artemisia californica*). “Coastal” is a bit misleading since much of this habitat is found in the foothills. Coastal sage scrub (CSS) shrubs are generally under 6 feet tall, not as stiff or as tall or as densely packed together as the shrubs in chaparral. Many of them are aromatic making a walk through CSS an olfactory treat. To some people, coastal sage scrub looks pretty scruffy, but this threatened habitat is home to almost a hundred rare and endangered plants and animals.

Areas of CSS can be found from central California south to Baja and from the coast through Riverside county. This was never a common habitat and over 85% of it has been destroyed by development. It continues to be lost to buildings, golf courses, and agriculture. The remaining areas are under frequent threat. The California Department of Fish and Game aimed the first efforts of its Natural Community Conservation Planning program at preserving coastal sage scrub.

The coastal sage scrub plant community has evolved in areas which now receive under 20 inches of rain (our average is about 14), mostly in the winter, and rarely experience frost. Until about 14 million years ago our rainfall was in excess of 80 inches, but as the climate changed and rainfall decreased, those plants that exhibited differences which allowed them to thrive and reproduce better than other individuals in the new conditions left more offspring. Repetition of this process eventually produced the plants we see today.

Evaporation of water from the leaves is the force that pulls water up from the soil into the plant. This occurs mainly through openings called stomates located primarily on the undersurface of leaves. Coastal sage scrub plants must be able to balance water loss with the need for acquiring water and the nutrients it contains. Most coastal sage scrub plants can be divided into ‘drought resistors’ or ‘drought evaders’. Some plants that resist drought have mechanisms to store moisture. Others have leaves with tough, leathery leaves or waxy coatings that reduce water loss. Many are light in color and reflect sunlight, thus reducing leaf temperature. Others are covered with tiny hairs that help trap moisture leaving the leaf and also reduce the effect of drying winds. Some plants, such as cacti, have reduced their leaves to spines and give photosynthesis over to expanded stems, thus reducing the surface area from which water can be lost. Other plants, such as

California sagebrush, drop the majority of their leaves and go semi-dormant in the hot summer. Some just produce small leaves in summer and larger ones in winter. Extensive root systems help some plants gain access to water even in the summer. Many annual plants, ones that complete their life cycle within a year, simply avoid the problems by germinating in the late winter or early spring rains and dying by the time the summer heat sets in, leaving seeds in the soil to begin growth the following spring.

Coastal sage scrub is not only adapted to long periods of drought but to fire. Natural fires tend to move quickly, scorching the growth above ground and leaving the base and roots of many shrubs undamaged. These shrubs then sprout from the ‘crown’ that is left and the new growth is often healthier than the old with pests and diseases burned away. The reduction in cover also allows more sun to hit the ground around the shrubs, and the burned material acts as a fertilizer. This makes perfect conditions for the seeds which lie in the soil to begin growth and produce magnificent wildflower displays. Fire allows for a greater diversity of plants to coexist. It also results in an increase in animals that prefer more open areas. Coastal sage scrub and chaparral both benefit from the rejuvenating effects of burning every 20-40 years.

CSS shrubs found at the BFS include California sagebrush, white sage, yerba santa, golden currant, deerweed, toyon, buckwheat, pinebush, scalebroom, coyote brush, laural sumac, elderberry, lemonadeberry, Catalina cherry, and sugarbush. There are also cacti and many annuals, including grasses. The California Gnatcatcher is a critically endangered bird species endemic to coastal sage. While it is not found at the BFS, the threatened coastal cactus wren and coast horned lizard are, along with ground squirrels, rabbits, woodrats, gopher snakes, legless lizards, and countless insect species all adapted to life in a dry climate. CSS animals may conserve energy and water by living in cool burrows, resting and staying out of the sun during the hottest parts of the day, or by going dormant. One of the drought-adapted animals at the BFS is the Kangaroo rat which hops on its back legs, using its tail for balance. This small animal eats seeds from which it gets most of its water and has specialized kidneys that allow very little output of water. Plant and animal lists are available on the BFS website.

About 40% of the Bernard Field Station is coastal sage scrub, a reminder of what used to be, and a sanctuary for many species and individuals.

