28. Fern Canyon (Meier 1979)

Location

This established RNA is on the San Dimas Experimental Forest, within the Angeles National Forest. It is approximately 6 miles (10 km) N. of the city of Claremont. It occupies portions of seven sects. in T1N, R8W SBBM (34°12'N., 117°43'W.), USGS Mt. Baldy quad (*fig. 58*). Ecological subsection – San Gabriel Mountains (M261Bd).

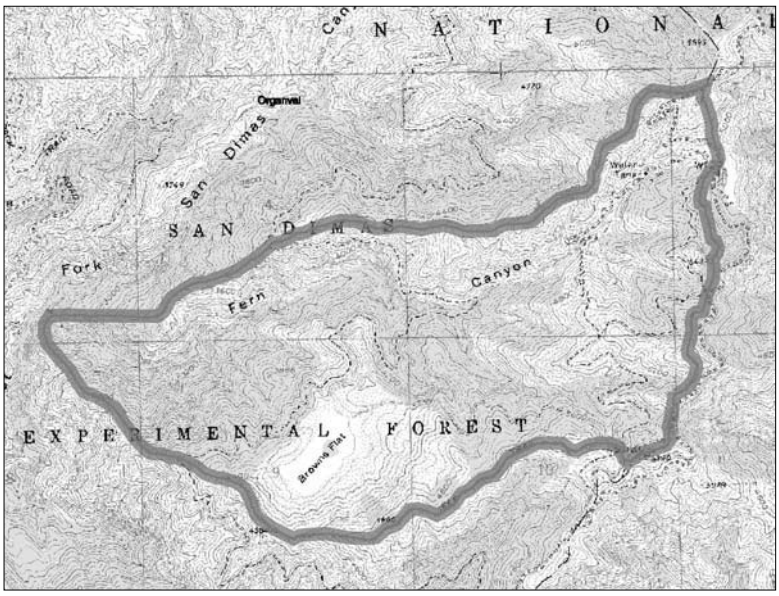

Figure 58—Fern Canyon RNA

Target Elements

Chamise Chaparral (*Adenostoma fasciculatum*) and Canyon Live Oak (*Quercus chrysolepis*)

Distinctive Features

Well-Monitored Site: The RNA is located within an experimental forest. There is a good record of the impact and extent of fires in the area dating back to 1914 (six major fires have occurred). This record extends to the relative volume of pre- and post-fire stream flow in the three subdrainages within the RNA. Stream flow has changed appreciably among the three drainages since a major fire in 1938.

Low-Elevation Ponderosa Pine: Brown's Flat, a shallow 80-acre (32-ha) bowl created by an ancient land slump, contains the lowest elevation stand of *Pinus ponderosa* in S. California (about 3900 ft, 1189 m). This relictual stand of 81 individuals is well-isolated from other ponderosa pine stands in the San Gabriel Mountains and strongly affected by air pollution. There is almost no recent reproduction.

Chaparral: This extensive vegetation formation occurs as chamise (*Adenostoma fasciculatum*) and *Ceanothus*-dominated types. It was extensively burned in 1975 and, thus, is vigorous (*fig. 59*).

Oak Woodlands: The area covered by this vegetation is extensive and varied. It occurs primarily on N.-facing exposures and in canyon bottoms. Much of the woodland was burned in 1975. The bottomland stands are dominated by coast live oak (*Quercus agrifolia*) with a significant mixture of riparian trees. Many of the upper-slope oaks are apparent hybrids between coast live oak and scrub oak (*Quercus dumosa*). At high, sheltered sites canyon live oak is dominant. On exposed sites at lower elevations, interior live oak (*Quercus wislizenii*) dominates a scrubby woodland with many chaparral shrubs. Hybrids between California black oak (*Quercus kelloggii*) and interior live oak, the so-called oracle oak (*Q.* x *morehus*), also occur at low elevations.

Bigcone Douglas-Fir (*Pseudotsuga macrocarpa*): The stands of bigcone Douglas-fir (BDF) at Fern Canyon have burned recently (1975). Poor reproduction suggests that the fire had a negative effect on seedling and sapling establishment. However, many of the larger trees, although scarred, survived the fire. The local stands should provide interesting comparisons with other stands in Millard Canyon and Falls Canyon RNAs, which have not been affected by fire for many years.

Physical Characteristics

The RNA covers 1460 acres (591 ha). Elevations range from 2592 to 5512 ft (790-1680 m). Fern Canyon drains E.-W. and is a tributary to San Dimas Canyon. The RNA contains the entire drainage of Fern Canyon. Slopes are primarily N.- and S.-facing, but some W.- and E.-facing slopes occur at the head of the drainage. Average slopes are steep (approximately 68 percent). The three previously mentioned subdrainages occupy the head of the main drainage below Sunset Peak. Rapids and falls occur along the main canyon. The distinctive Brown's Flat occupies a bench created by a massive landslide S. of the main canyon.

Geology is relative complex and includes schists and gneisses (derived from diorite), aplite, pegmatite dikes, and unaltered diorites. Soils are varied; five principal types occur in the RNA. Most are relatively fine textured and well drained. One type has much clay with high water retention. Climate is well monitored using recording stations close to the RNA. At the highest elevations, mean temperatures range from 41.9 °F (5.5 °C) in February to 73.9 °F (23.3 °C) in August. Low-elevation temperatures vary from 46 °F (7.8 °C) in January to 72 °F (22.2 °C) in August. Annual precipitation averages 34.3 inches (871 mm) at the upper elevations and 26.8 inches (680 mm) at the lower elevations. About 92 percent of the precipitation falls from November through April, with much as snow at the upper elevations.

Association Types

The line-intercept method was used to sample most of the vegetation of the area. In addition, diameters were taken of all individuals of ponderosa pine at Brown's Flat and a number of BDF. Acreage of the vegetation asso-ciations is not given.

Chaparral (37200, 37110, 37530): This extensive vegetation is represented by both *Adenostoma fasciculatum* and *Ceanothus*-dominated types. The *Adenostoma* (chamise) type dominates the xeric S.-facing slopes where it may occur as dense monospecific stands on steepest slopes or as a dominant on relatively gradual slopes. Transect data for *Adenostoma* include frequency, 100 percent; relative density, 54 percent; and relative cover, 76 percent. Associated species with their relative densities and covers include *Ceanothus leucodermis* (9 percent, 9 percent), *Salvia mellifera* (9 percent, 2.4 percent), *Salvia leucophylla* (18 percent, 14 percent), *Garrya veatchii* (3 percent, 4 percent), *Arctostaphylos glandulosa* (3 percent, 5 percent), *Yucca whipplei* (3 percent, 4 percent), and the post-fire invader *Turricula parryi* (3 percent, 1.8 percent). Eight other species are listed for this type.

Most of the chamise chaparral burned in 1975. However, taller stands (2.5 m) at the lower reaches of the canyon have not burned since 1960. Certain species such as *Toxicodendron diversilobum*, *Marah macrocarpus*, and *Pycnanthemum californicum* are characteristic of the understory. At the lowest elevations this vegetation grades into coast live oak woodland.

Ceanothus species dominate the chaparral on the exposed N.-facing slopes. This vegetation grows to 13 ft (4 m) tall, and much of it has not burned within the past century. The dominants include *Ceanothus integerrimus*, *C. leucodermis*, *C. tomentosus*, *C. oliganthus*, and a possibly hybrid *C. integerrimus* x *cordulatus*. Other shrubs include *Rhamnus crocea*, *Garrya fremontii*, *Arctostaphylos glauca*, *A. glandulosa*, *Cercocarpus betuloides*, *Prunus ilicifolia*, *Leptodactylon californicum*, California bay (*Umbellularia californica*), and *Quercus* x *morehus*. In openings, the mesophytic species *Solanum douglasii*, *Achillea millefolium*, *Cystopteris fragilis*, and *Polystichum munitum occur*.

Oak Woodland (71150, 71160, 81310, 81320, 81330, 37A00, 61310, 61330): Several subtypes occur in the drainage. On N.-facing slopes at the head of the canyon the putative hybrid between coast live and scrub oak dominates (relative cover 56 percent). Other species with their relative covers include *Turricula parryi*, 4

percent; *Lupinus adsurgens*, 27 percent; *Penstemon* spp., 8 percent; *Ceanothus leucodermis*, 2 percent; *Ceanothus integerrimus* x *C. cordulatus*, 12 percent; *Garrya veatchii*, 7 percent; *Arctostaphylos glandulosa*, 4 percent; *Lonicera subspicata*, 7 percent; and *Ribes amarum* (unspecified).

Canyon live oak dominates on upper N.-facing slopes forming dense stands with virtually complete canopy cover in some areas. This type does not appear to have been affected strongly by the 1975 fire (about 25 percent suffered critical stem damage). Average relative cover is 43 percent for canyon live oak; relative frequency is 19 percent. Other species (with percent relative frequency and percent relative cover, respectively) include *Turricula parryi* (15, 14), *Ceanothus integerrimus* x *cordulatus* (28, 29), *Ribes amarum* (22, 13), *Ceanothus leucodermis* (10, 2), *Ribes speciosum* (4, 1), and *Solanum xantii* (2, 1). Typically this vegetation occurs at sufficiently high and sheltered sites to receive winter snow. However, it may also occur in low gullies associated with bigcone Douglas-fir.

A dense scrubby woodland of interior live oak surrounds much of the Brown's Flat area. *Ceanothus integerrimus* x *cordulatus*, *Ribes amarum*, *Lupinus longifolius*, *Rhamnus crocea*, California bay, and *Prunus ilicifolia* are associated with this species. *Toxicodendron diversilobum* is common at the lower elevations of this type (<4200 ft, 1280 m). This type was largely spared from the 1975 fire.

Between 3510 and 3937 ft (1070-1200 m) on the S. boundary ridge, *Quercus* x *morehus* dominates a scrubby woodland with many of the same species as the interior live oak woodland.

Along the canyon bottom, coast live oak dominates with riparian species such as bigleaf maple (*Acer macrophyllum*) and white alder (*Alnus rhombifolia*) and moisture-tolerant species such as California bay and bigcone Douglas-fir (Holland 61310). Beneath these trees, a mesophytic understory of such species as *Adiantum jordanii*, *Cystopteris fragilis*, *Dryopteris arguta*, *Ribes speciosum*, *Holodiscus discolor*, *Marah macrocarpus*, *Arabis glabra*, *Delphinium parryi*, and *Heuchera elegans* occurs.

Mixed Conifer Association (84150): This association is dominated by BDF and includes rare individuals of white fir (*Abies concolor*) and sugar pine (*Pinus lambertiana*) at the uppermost elevations. BDF occurs principally on N.-facing slopes at the upper elevations or in sheltered canyon bottoms. At the upper elevations BDF forms an overstory (65-82 ft, 20-25 m) over canyon live oak and *Quercus agrifolia* x *dumosa*. Many trees have suffered fire damage. The paucity of young BDF in this forest also reflects the effect of the recent 1975 fire. The larger BDF (3.2-8.2 ft, 1-2.5 m dbh) are well represented and, although scarred, survived the fire. Associated species are similar to the understory of the canyon live oak forest.

Ponderosa Pine (84210, 42110): This type is restricted to the area of Brown's Flat and is an open stand of ponderosa pine up to 164 ft (50 m) tall over a grassy understory dominated by *Agropyron elongatum*, *A. intermedium*, *Elymus condensatus*, *Festuca megalura*, and *Poa scabrella*. There has been poor reproduction in recent years, but the size-class structure of more mature trees (>16 inches, 40 cm dbh) suggests that this stand has been reproducing normally up until recently. Air pollution combined with marginal habitat and possibly high seed predation may have caused the recent decline in reproduction.

Plant Diversity

One hundred eighty-nine taxa are listed.

Conflicting Impacts

Air pollution has a strong effect on the ponderosa pine stand at Brown's Flat. The frequency of natural fire appears high enough to maintain chaparral and oak woodland associations without intervention for several years.

Figure 59—Fern Canyon, view of Brown's Flat from 5100 ft (1554 m) contour trail on the south side of Fern Canyon. Notice the big cone Douglas-fir in the foreground. Also notice how Brown's Flat is formed by sediment deposition in the hollow created by a landslide that slipped toward the right and off of the picture. (D. Cheatham, around 1970/71)