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# PACIFIC SOUTHWEST
## Forest and Range Experiment Station

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE P.O. BOX 245, BERKELEY, CALIFORNIA 94701

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# Soils and Vegetation of the FRENCH GULCH QUADRANGLE (24D-1,2,3,4) Trinity and Shasta Counties, California

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CURRENT SERIAL RECORDS
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## FOREWORD

Basic information about soils and vegetation—their characteristics, location, extent, and relationships—is especially useful to the land manager. It provides him with a foundation for understanding and managing the ecosystem—the ecological community that includes soils, vegetation, animals, and climate. And by applying an ecological approach, he can make more efficient and productive use of the land. He can apply management procedures that have proved successful in areas of known soils and vegetation to other areas with the same characteristics. With basic information on hand, the land manager lessens his chances of having an extension of these procedures turn out to be hit-or-miss propositions or—at worst—an outright failure.

Soil vegetation surveys are designed to produce useful maps and information. The data are useful to both the practitioner as well as the researcher. In land management research, prior knowledge of the ecosystem is mandatory if the work is to succeed. If the vegetation is to be changed, the information from such surveys might be used to estimate probable results.

The maps and the accompanying information in this report were prepared by the State Cooperative Soil-Vegetation Survey project of the Pacific Southwest Forest and Range Experiment Station, Forest Service. The project is financed through appropriations of the California Legislature to the Division of Forestry, Department of Conservation, Resources Agency of California. Cooperating organizations in the Soil-Vegetation Survey are the Division of Forestry; the Department of Agronomy and Range Science and Department of Soils and Plant Nutrition, University of California, Davis; School of Forestry and Conservation, University of California, Berkeley; and the Pacific Southwest Forest and Range Experiment Station at Berkeley. Project Leader is Wilmer L. Colwell, Jr., Pacific Southwest Forest and Range Experiment Station at Berkeley.

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## ACKNOWLEDGMENTS

This survey of soils and vegetation in the area covered by the French Gulch Quadrangle used both intensive field investigations and aerial photo interpretation. Field work was done from 1961 to 1964 and in 1968. Analysis of data, cartography, and this report were completed in 1972.

We thank the following persons for their invaluable contributions to this work:

- Chester O. Stone, forester, California Division of Forestry, for aerial photo interpretation and soil and vegetation field mapping.
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The French Gulch Quadrangle (U.S. Geological Survey 1944) includes 145,000 acres of mountainous land, mostly forested with some chaparral and woodland grass, located between 7 and 25 miles west of Redding *(fig. 1)*. Most of this acreage is in Shasta County with part of it in Trinity County in the Trinity range of the Klamath Mountains in northern California. The most prominent landmarks are Shasta Bally Mountain (6,209 feet elevation) and Whiskeytown Reservoir *(fig. 2)*. State Highway 299, between Redding, Shasta County and Weaverville, Trinity County, crosses the quadrangle. Shasta County Highway A-16 crosses the southeast corner through the village of Igo between Redding and Platina. A main county road leads north from Highway 299 to the old mining town of French Gulch, which lies along Clear Creek in the north.

The land is used mostly for watershed, but timber production, outdoor recreation, and wildlife habitat are also important. Livestock grazing is dominant in the southeast, near and west of Igo. Mining for copper, zinc, gold, sulfur, and other ores was formerly important in the vicinity of French Gulch and is still an obvious, if not active, part of the area. Most of the land is privately owned. Public Land is administered by the U.S. Bureau of Land Management, U.S. National Park Service, and U.S. Forest Service.

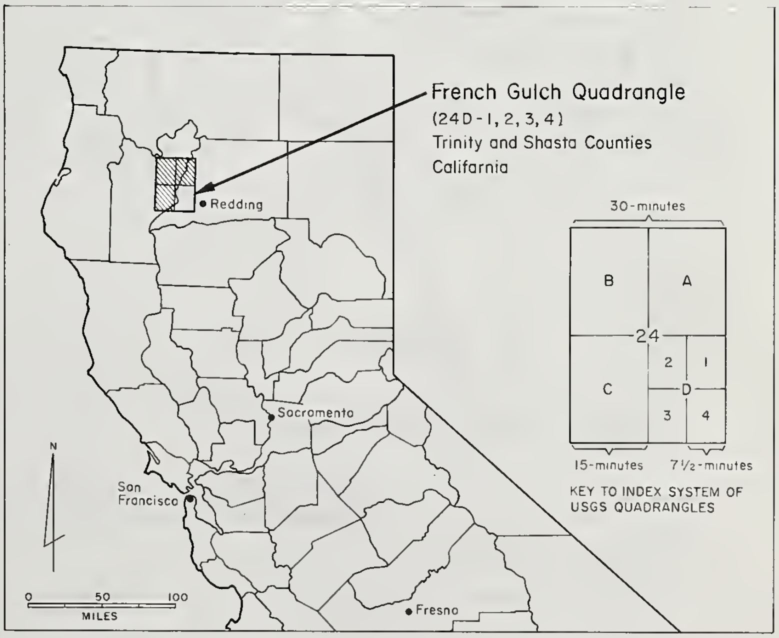



**Figure 1**—The French Gulch Quadrangle lies about 7 miles west of Redding, California.

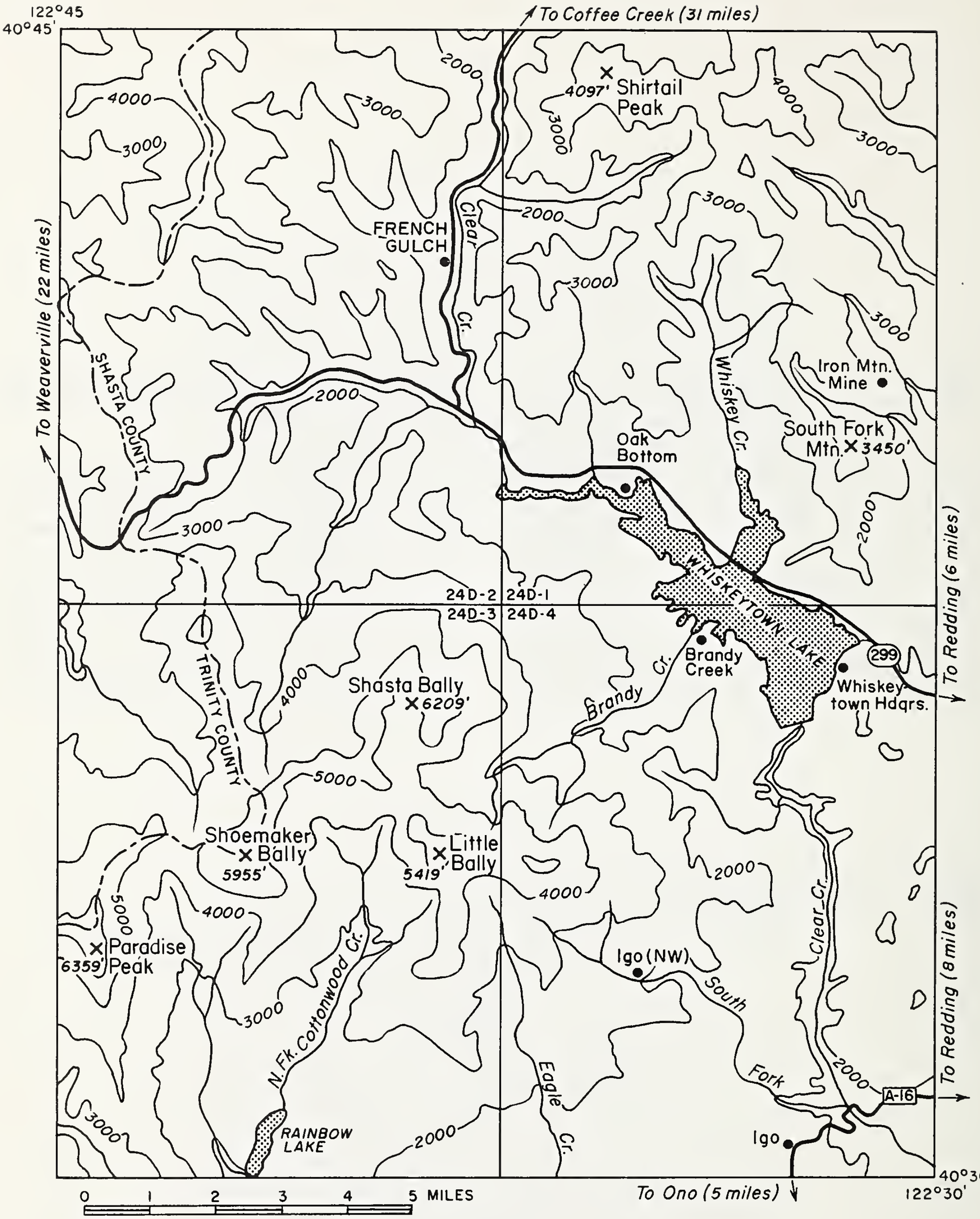



**Figure 2**—Topographic map of the French Gulch Quadrangle (U.S. Geological Survey 1964).

# SURVEY AREA

## Climate

The climate of the French Gulch area is hot and dry from late spring to mid-fall, when it turns cool with rain and snow falling intermittently. Below 2,000 feet elevation, snow seldom remains on the ground for more than 2 weeks; above 4,500 feet, a snowpack remains from December into April in most years. For example, on April 20, 1967, after a fairly normal winter, 8 feet of snow stood on the level ground and drifts were 20 feet deep at 6,200 feet elevation on Shasta Bally Mountain.[1]

The average annual precipitation *(fig. 3)* ranges from about 38 inches near Igo to more than 80 inches near Iron Mountain Mine (California Department of Water Resources 1964). Limited data[1] indicate wide variability in rainfall in short distances. For example, 24.8 inches were measured at Brandy Creek on the south shore of Whiskeytown Lake in January 1969. Only 13.9 inches were measured at Oak Bottom 2.5 miles to the northwest on the north shore of the Lake, and only 12.9 inches were measured at the summit of Shasta Bally Mountain 4.5 miles to the west and about 5,000 feet higher. Wide variability from season to season was demonstrated at Brandy Creek gauge, where 93 inches were measured in the 1966-67 season, 54 inches in the 1967-68 season, and 79 inches in the 1968-69 season. At French Gulch, the amount of rain was 43 inches in 1966-67; 26 inches in 1967-68; and 51 inches in 1968-69.

The average annual temperatures in the area range from 42°F. on Shasta Bally Mountain to 60°F. at National Park Service offices on the east shore of Whiskeytown Lake and a few degrees higher near Igo and on south-facing slopes below 2,000 feet elevation. The frost-free season varies from about 140 days in the higher elevations to about 250 days at most locations below 2,000 feet elevation (U.S. Weather Bureau 1965).

## Geology

The French Gulch Quadrangle lies entirely within the Klamath Mountains geologic province (Bailey 1966). The geology has been described in detail by Albers (1964); Albers, *et al.* (1964); and Kinkel, *et al.* (1956). The varied rock types in this quadrangle can be placed in 10 groups *(fig. 4),* seven of which are geologic formations ranging in age from pre-silurian to recent:

*Abrams Mica Schist:* The oldest rocks exposed in the Quadrangle are the Abrams schists in the southwest corner. Quartz-mica schists of probably pre-silurian age are extensive in the Weaverville Quadrangle to the west. Along the east edge of the schists is an intermittently exposed belt of serpentine and peridotite about one-fourth mile wide.

*Shasta Bally Batholith:* The next major formation to the east is the granitic Shasta Bally Batholith, which occupies more than one-third of the Quadrangle. The batholith is surrounded by a shell of gneissic rocks produced by contact metamorphism of the surrounding rocks at the time the granitic material was intruded.

*Copley Greenstone:* The Copley Greenstone of probable Devonian age lies in the west and north. It consists of massive basic and intermediate volcanic

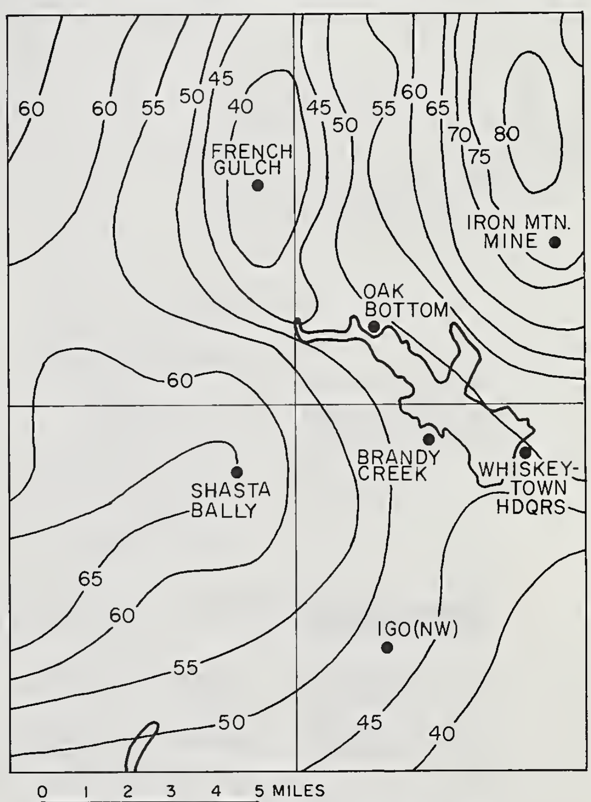



Figure 3—Isohyetal map shows distribution of equal mean seasonal precipitation (inches) in the French Gulch Quadrangle (California Department of Water Resources 1964). ● indicates rain gauge location.

[1]Data on file at U.S. National Park Service offices at Whiskeytown, California.

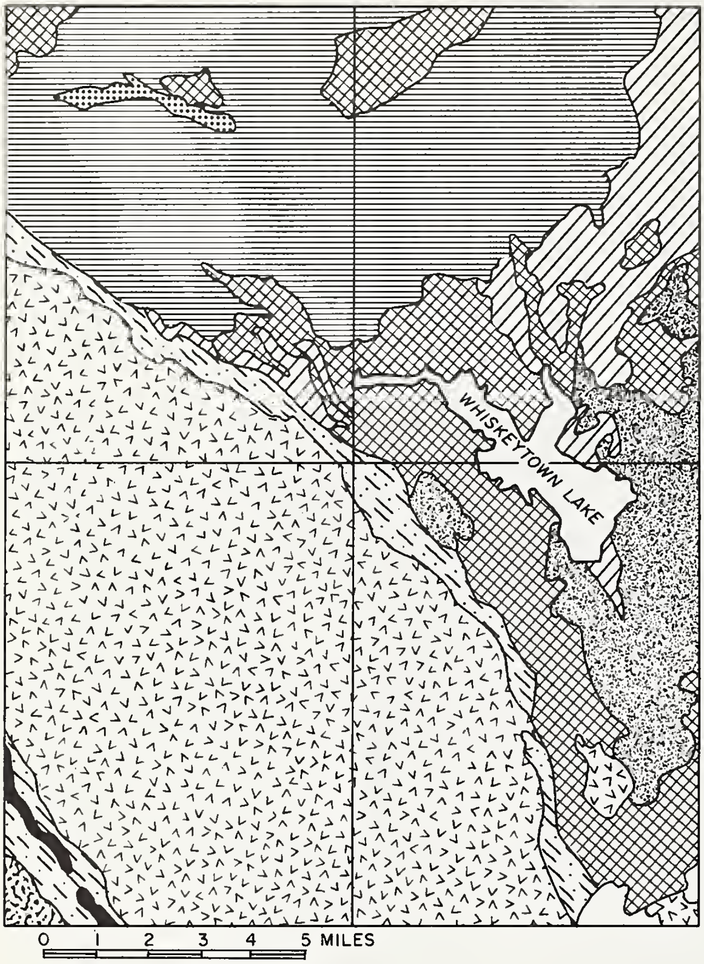



Figure 4—Geologic map shows rock types that are parent materials for the present soils. (Generalized from Albers, *et al.* 1964)

| *Rock Types* | *Formation* | *Epoch* |
|---|---|---|
| Semi consolidated gravels | Red Bluff | Quaternary (Pleistocene) |
| Birdseye porphyry | -- | Jurassic or Cretaceous |
| Quartz diorite and granodiorite | Shasta Bally Batholith | Jurassic or Cretaceous |
| Gneiss and amphibolite | -- | Jurassic or Cretaceous |
| Peridotite and serpentine | -- | Jurassic or Cretaceous |
| Trondhjemite and albite granite | Mule Mountain Stock | Jurassic or Cretaceous |
| Shale and conglomerate | Bragdon | Mississipian |
| Meta-rhyolite | Balaklala Rhyolite | Devonian |
| Meta-andesite | Copley Greenstone | Devonian |
| Mica schist | Abrams Mica Schist | Pre-Silurian |

rocks that have been hydrothermally altered to greenstone. Where the greenstone adjoins the Shasta Bally Batholith it has undergone contact metamorphism to gneiss and schist.

*Balaklala Rhyolite:* North and east of Whiskeytown Lake the Balaklala Rhyolite overlies the Copley Greenstone. In Devonian time it erupted on top of the Copley Greenstone with some interfingering. The Balaklala Rhyolite is light colored, massive to porphyritic, and is the host rock for the massive sulfide deposits which have been extensively mined, particularly for copper and sulfur (Kinkel, *et al.* 1956).

*Bragdon Formation:* The northern third of the Quadrangle west of the Balaklala Rhyolite is dominated by an extensive dark gray slaty shale and conglomerate, the Bragdon Formation, of Mississippian age. It overlies the Copley Greenstone. Where the Bragdon formation adjoins the Shasta Bally Batholith the shales have been metamorphosed to gneiss or schist. The Bragdon formation is widespread to the north and west of the Quadrangle.

*Mule Mountain Stock:* The only remaining formation of significant area is the Mule Mountain Stock. This body of light colored granitic rock lies along the east edge of the Quadrangle south of the Balaklala Rhyolite. It varies at short distances from less weatherable albite granite to more weatherable trondhjemite. The light colored albite granite is quite obvious in road cuts near the east end of Whiskeytown Lake. This stock appears to be partly an intrusion emplaced from below and partly a granitization of the Balaklala Rhyolite and possibly of the more felsic parts of the Copley Greenstone (Kinkel, *et. al.* 1956).

*Minor Features:* Many dikes and sills of various kinds of igneous rocks occur. West of French Gulch is a swarm of diorite porphyry dikes and in other areas quartz porphyry, altogether known locally as "birdseye porphyry," so called because the centers of the feldspar phenocrysts commonly weather out, leaving a depression that somewhat resembles the pupil of an eye. In the southeast corner just east of Clear Creek and south of Placer Road (County Highway A-16) lies an area of less than 100 acres of cretaceous marine conglomerate. This conglomerate appears to be an extension of the Rector member of the Budden Canyon Formation described by Murphy, *et al.* (1964). Coarse, poorly-to-well-cemented gravels making up benches and terraces cover about 500 acres, mainly south and east of Igo but also along Clear Creek near Tower House about 2½ miles south of French Gulch. Albers (1965) correlated these gravels with the Pleistocene Red Bluff formation.

### Physiography

Elevations range from about 625 feet along Clear Creek in the southeast corner of the Quadrangle to 6,359 feet at the summit of Paradise Peak *(fig. 2).* More than 80 percent of the area can be characterized as steep mountainous but with different general topographic forms for different geological formations. In the granitic areas, streams and ravines generally radiate away from the central ridge which extends from Paradise Peak to Shasta Bally. In the part of the Quadrangle dominated by the Bragdon shales and conglomerates, the pattern is a coarse herringbone type—particularly well seen between Trail Gulch and French Gulch. The metavolcanic portion of the Quadrangle has a similar but less well defined drainage pattern. The somewhat level areas include the pediment and dissected terraces in the southeast part of the Quadrangle near Igo, along Clear Creek below Whiskeytown Dam, and along Clear Creek upstream from Whiskeytown Lake. The upstream level area includes gold dredge tailings as well as dissected terraces and a minor amount of alluvial bottomland along streams.

## SOIL-VEGETATION ASSOCIATIONS

The many kinds of rocks, soils, and climate in this Quadrangle have resulted in a diverse and complex landscape. A total of 178 different phases of soils (disregarding slope) and 29 miscellaneous land types are mapped *(tables 1, 2),* along with over 100 species of woody plants *(table 3)* in different combinations of cover and composition (Soil-Vegetation Maps, 24D-1, -2, -3, and -4). Many of these soil-vegetation combinations occur in repeating patterns and can be grouped into broad ecosystem-like units of soils and vegetation with similar characteristics and productivity.

To group the variable landscape elements in the French Gulch Quadrangle into simpler units, the area can be divided into three broad vegetation types: conifer forest, chaparral, and woodland-grass *(fig. 5).* The forest occupies about 65 percent of the area, chaparral (shrub) type occupies about 25 percent,

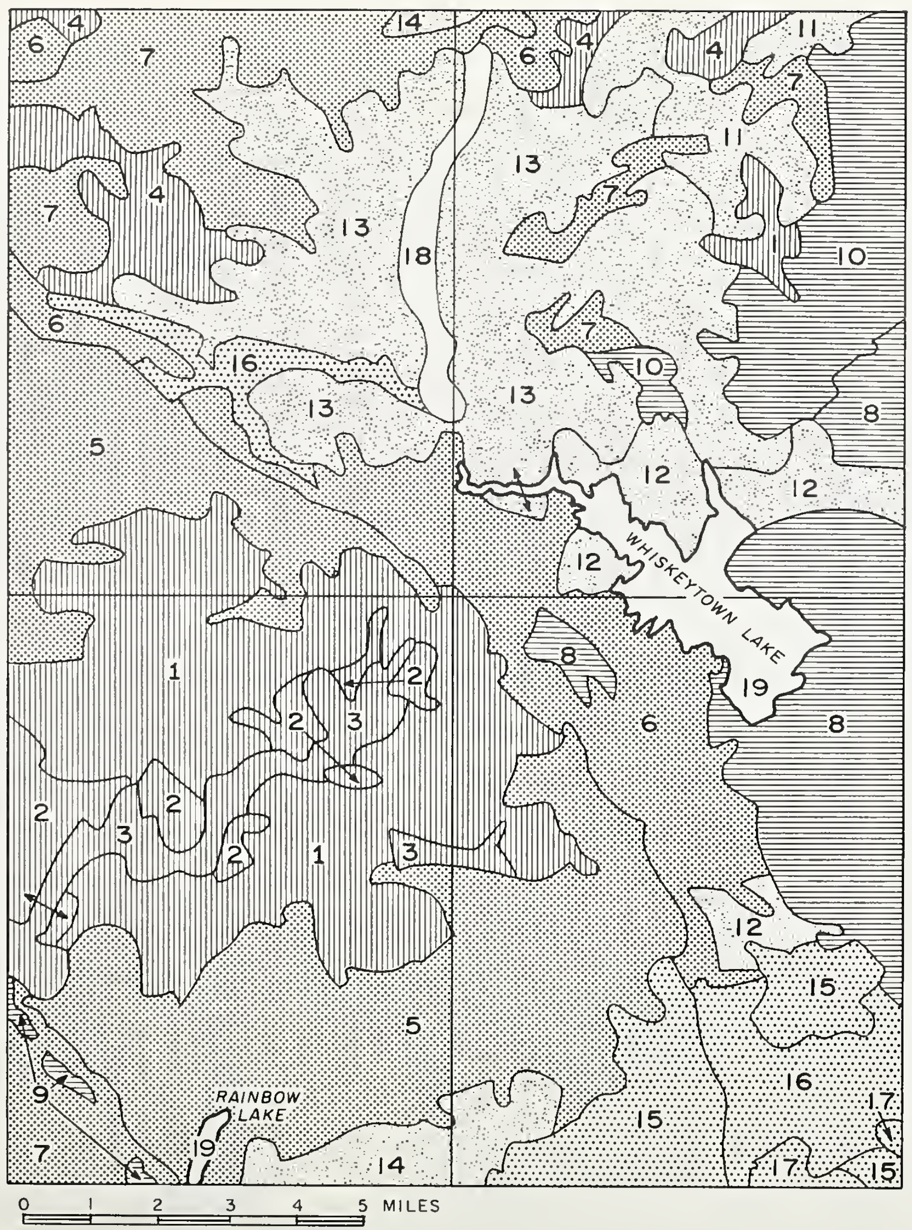



Figure 5—Soil-vegetation associations map provides identifying numbers for different combinations of soil types and vegetation types.

CONIFER FOREST TYPE

*Shrub-conifer associations*

1. Corbett / Shrub tanoak – mixed conifer
2. Corbett / True fir
3. Corbett / Ridge top chaparral
4. Colluvial and Rock land / Canyon live oak – Douglas-fir

*Conifer-hardwoods associations*

5. Chawanakee – Chaix – Holland / Ponderosa pine – Douglas-fir – California black oak
6. Neuns – Boomer / California black oak – canyon live oak – ponderosa pine
7. Sheetiron – Marpa – Josephine / Ponderosa pine – Douglas-fir – California black oak

*Conifer-hardwoods-shrub associations*

8. Modesty / Manzanita – California black oak – ponderosa pine
9. Huse – Dubakella / Jeffrey pine – leather oak
10. Kidd – Behemotosh / Ponderosa pine – Douglas-fir – California black oak – manzanita

CHAPARRAL TYPE

*Manzanita associations*

11. Maymen – Colluvial land / Manzanita – shrub oak
12. Goulding – Kidd / Manzanita – toyon

*Chamise-shrub oak-Ceanothus associations*

13. Maymen – Goulding – Stonyford – Los Gatos / north aspect Brewer oak, south aspect chamise
14. Eroded Chawanakee – eroded Sierra / Chamise – Lemmon ceanothus

WOODLAND-GRASS TYPE

*Oak-grass associations*

15. Kanaka – Sierra / Interior live oak – blue oak – annuals
16. Auburn – Millsholm – San Andreas / Blue oak – annuals – digger pine

*Shrub-grass-oak associations*

17. Newtown – Redding – Newville / Manzanita – annuals – blue oak

ALTERED AREAS

18. Gold dredge tailings, residential areas, and mined Horseshoe soils
19. Reservoirs – Whiskeytown Lake and Rainbow Lake

while woodland-grass occupies about 6 percent. The remaining area includes about 2.5 percent in reservoirs–Whiskeytown and Rainbow Lakes–and 1.5 percent in developed areas, including gold dredge tailings, roads, and the town of French Gulch.

Each broad type is subdivided into groups of soil-vegetation associations which have some characteristics of the soils or vegetation or both in common. The grouping of one or more soil series for each association is based on soil development, broad behavior characteristics, and major rock types, i.e., granitic, metavolcanic, sedimentary, and ultrabasic rocks (Zinke and Colwell 1965). Plant species are grouped on the basis of stature, environmental requirements, and relationships.

Seventeen associations and two altered units are mapped in the Quadrangle *(fig. 5)*. They consist of assemblages of species similar to some groups observed in the eastern Siskiyou Mountains, in the western Siskiyous (Waring 1969), in the interior valleys of southern Oregon (Franklin and Dyrness 1969), and on the north Coast Ranges, Sierra Nevada, and foothills of California (Munz and Keck 1959). These observations suggest that the vegetation of the French Gulch Quadrangle possesses elements from the north, south, east, and west not found together elsewhere.

## Conifer Forest Type

Ten associations, falling into three groups, comprise the conifer forest vegetation type. Groupings are based on soils, vegetation composition, and site quality. These associations occur generally above 1,500 feet elevation and the 40-inch rainfall zone. Most of the associations can grow commercial timber *(fig. 6)*, except the Corbett/ridgetop chaparral, and the Colluvial-Rock land/Canyon live oak–Douglas-fir associations.

The first of the three association groups consists of four associations occurring at the highest elevations in the area–mostly above 3,000 feet on the north-facing slopes and above 3,500 feet on the south-facing slopes. Only this part of this Quadrangle usually has snow cover from December into April. The dominant soil is the coarse loamy sand Corbett series, derived from granitic rocks, and having little, if any, development into horizons. Corbett soils are classified as Entisols. These highly erodible soils are the source of much of the sand which is causing problems in the Salmon spawning beds of the Trinity River near Lewiston (California Resources Agency 1970). The vegetation is mostly shrub mixed with a varying percent cover of conifers of low site quality. One association in this group, mostly canyon live oak, grows on land so steep that the soil is dominantly unstable colluvial land.

The second association group has three soil-vegetation associations at middle elevations below the first group. The soils here are deeper, more developed, and redder than those in the first group, and have a greater clay content in the subsoils. Each association has a soil development sequence on three different parent materials. The first soil series in each association has soil horizons just beginning to develop and is classified in the order Inceptisols. These soils are older than the Entisols, but younger than the Alfisols. The other soils in the associations are generally Alfisols and are progressively more developed, with clay enriched B horizons that have medium base saturation. The soils in these two orders comprise most of the forest soils in the southeastern part of the Klamath Mountains geologic province. The associations in this group are generally the most productive for commercial conifers in the Quadrangle. The combination of ponderosa pine and California black oak occurs in all associations of the group. The presence of black oak is a reliable indicator of the capability of the soil to grow commercial ponderosa pine. Wieslander (1935) was one of the first to observe the close association of California black oak with commercial conifer timber sites, and used this relationship to show evidence of former pine forests from remnant black oak stands.

The third association group also has three soil-vegetation associations. Manzanita shrubs are part of the conifer-hardwood vegetation.

### Shrub-Conifer Associations

*Corbett/Shrub tanoak-mixed conifer:* The sandy Corbett soils support an open cover of evergreen shrub species and conifers. The shrubs include shrub tanoak, canyon live oak, greenleaf manzanita, and an unusual form of squaw carpet. The conifers are dominantly ponderosa pine and sugar pine and of medium site quality. Douglas-fir, incense-cedar, and white fir are present but not as common as in the mixed conifer of the Sierra Nevada. Herbs and grasses usually cover 10 percent or less of the soil surface.

*Corbett/True fir:* Above about 5,000 feet elevation, white fir trees make up a larger part of the tree composition than at lower elevations. A few stands of red fir occupy north-facing slopes just below the summits of Paradise Peak, Shoemaker Bally, and Shasta Bally. Most stands are of medium site quality,


Figure 6—Generalized timber site quality map of the French Gulch Quadrangle.

a few are of low site. This association also contains shrub tanoak and non-sprouting pine manzanita, and much bush chinquapin.

*Corbett/Ridgetop chaparral:* Along the divide from Paradise Peak to Shasta Bally and Little Bally divide south of Brandy Creek, the Corbett soils are shallow and rocky and exposed to frequent strong winds. The association of evergreen shrubs here includes bush chinquapin, pine manzanita, greenleaf manzanita, huckleberry oak, and shrub tanoak. The few pines and firs growing in this unit are distorted by the strong winds. This association is mostly unsuitable for growing commercial timber stands economically.

*Colluvial and Rock land/Canyon live oak–Douglas-fir:* On steep slopes (generally over 70 percent) the soils in the forest are, in many places, loose enough so that they slide down slope at the slighest disturbance. In these areas the vegetation is dominated by either canyon live oak or Douglas-fir. In some places, the stand is a mixture of these two with California black oak and a number of shrub species as well. Most of these areas are unsuited for harvesting commercial timber crops.

## Conifer-Hardwoods Associations

*Chawanakee–Chaix–Holland/Ponderosa pine–Douglas-fir–California black oak:* Most of the granitic southwestern third of the French Gulch Quadrangle has the shallow Chawanakee and moderately deep Chaix soils on the steep slopes. Owing to their coarse texture and lack of cohesiveness these soils are highly erodible. When eroded they continue to produce large volumes of sand with every storm because of the highly decomposed nature of the underlying granitic rock. On the more gently sloping areas–ridges, spurs, and benches–soils occur in a sequence of development–Hotaw, Holland, Musick, and Hoda soil series–with their reddish clay loam to reddish clay subsoils. This development is in striking contrast to the pale sandy loams and included loamy sands of the Chawanakee and Chaix series. These soils have a cover of California black oak, ponderosa pine, Douglas-fir, and canyon live oak, with a lower shrub layer of deer brush, greenleaf manzanita, whiteleaf manzanita, and poison oak. Site quality for commercial conifers is generally medium. Some grassy areas are found on the Hotaw, Holland, Musick, and Hoda soils. In the canyons are many bigleaf maples and some tanoaks and madrones, particularly in Rich Gulch, Salt Gulch, and the headwaters of Paige Boulder Creek between 2,000 and 3,000 feet elevation. These canyon units closely resemble the Mixed Evergreen Forest (Munz and Keck 1959; Franklin and Dyrness 1969) except for a few species.

*Neuns–Boomer/California black oak–canyon live oak–ponderosa pine:* Neuns soils (Inceptisols) and Boomer soils (Alfisols) are formed on greenstone or other metamorphosed basic igneous rocks. Neuns soils are generally on the steeper slopes and have gravelly loam, yellowish brown subsoils, while Boomer soils are on benches and less steep slopes and have clay loam reddish brown subsoils. The vegetation is dominated by California black oak, canyon live oak, ponderosa pine, and Douglas-fir with much whiteleaf manzanita and toyon in openings and poison oak in the understory. The Neuns soils have more canyon live oaks than do the Boomer, although California black oak is the most abundant tree on both soils. Site quality ranges from low to medium (mostly site class 3). Shallow, gravelly soils and steep slopes, along with being the lowest association in this subtype (mostly less than 2,000 feet), contribute to lower productivity for commercial conifers. Minor amounts of sugar pine, knobcone pine, incense-cedar, and Lemmon ceanothus occur in the drier, warmer parts of the association. Bigleaf maple, tanoak, and pacific dogwood occur in more moist canyons and on north-facing slopes in addition to the prevailing tree species. This association is part of Munz and Keck's (1959) Yellow Pine Forest and more specifically part of Waring's (1969) Black Oak Vegetation Type.

*Sheetiron–Marpa–Josephine/Ponderosa pine–Douglas-fir–California black oak:* The forest soils derived from sedimentary and metasedimentary parent materials are dominated by the Inceptisol, Sheetiron, and the Alfisols, Marpa and Josephine. In developmental sequence, Sheetiron soils have pale brown gravelly loam textures throughout, while Marpa soils have light brown gravelly clay loam B horizons, and Josephine soils have reddish brown clay loam B horizons. On some of the less steep slopes on older land surfaces, soils with red clay B horizons have developed. These soils are in the Sites series and classified as Ultisols. They are the most developed and are considered the end member of a soil developmental sequence. The vegetation is usually dominated by Douglas-fir and ponderosa pine. California black oak and canyon live oak make up most of the remainder with occasional sugar pine, incense-cedar and white fir trees. The more moist sites often have bigleaf maple, California hazel nut, shrub tanoak, and pacific dogwood in abundance. On many north-facing slopes and some northern ridgetops, shrub California black oak dominates the vegetation. This is one of the few places where extensive growth of shrub California black oak is known (McDonald 1969). Medium to low site quality characterizes this association, while on the deeper Josephine soils in the southwest corner of the Quadrangle medium sites predominate.

### Conifer-Hardwoods-Shrub Associations

*Modesty/Manzanita–California black oak–ponderosa pine:* Along the east side of Whiskeytown Lake and Clear Creek from the northerly South Fork Mountain to Mule Mountain the dominant soils are the light brownish gray and very pale yellow Inceptisols of the Modesty series. These gravelly coarse sandy loams are formed from the granitic Mule Mountain Stock. The Chawanakee and Chaix soils west of Clear Creek are similar but are cooler and have more deeply weathered parent rock. The Kanaka soils to the south and east are similar, but have heavy loam subsoils, are more gently sloping, somewhat warmer, and support woodland-grass vegetation rather than forest. Included within the Modesty association are many small areas of Diamond Springs soils–Ultisols with very strongly acid reddish clay loam B horizons. These have similar vegetation, but are found at lower elevations and have gently sloping topography in contrast to the steep land common to most Modesty soils. The vegetation of this association consists of California black oak, canyon live oak, whiteleaf manzanita, poison oak, and Lemmon ceanothus with scattered ponderosa and sugar pines. On south-facing slopes whiteleaf manzanita dominates, but toyon, scattered Digger pine, some stands of knobcone pine, and a few ponderosa and sugar pines are present. Here site quality is low. The Modesty association is somewhat unusual in having ponderosa and sugar pines growing where the mean annual temperature is above 59°F. On gentle slopes and north aspects site quality is medium with mostly site class 3. The northern part of this association was subjected to sulfur dioxide smelter fumes from 1896 to 1906 (Kraebel 1955). The fumes destroyed most of the vegetation and very likely contributed to the strongly acid nature of the subsoils on the more gentle slopes. The vegetation is still recovering.

*Huse–Dubakella/Jeffrey pine–leather oak:* This distinctly different association–covering only a few hundred acres–is found on a narrow and interrupted belt of ultra-basic rocks across the southwest corner of the Quadrangle. The soils include the shallow rocky Inceptisols of the Huse series, the somewhat deeper Alfisols of the Dubakella series from the serpentinized part of the ultra-basic rock, and some colluvial land with a significant amount of ultra-basic soil material included. The vegetation consists of an open stand of Jeffrey pine and incense cedar with numerous leather oak bushes. A small amount of sugar pine and wedgeleaf ceanothus is also present as is a sparse bunchgrass ground cover. Leather oak is known to grow only on soils derived from ultra-basic rocks. Most soils from these parent materials support Jeffrey pine stands rather than ponderosa pine. Site quality ranges from unsuited to low and medium.

*Kidd–Behemotosh/Ponderosa pine–Douglas-fir–California black oak–manzanita:* Behemotosh and Kidd soils, Alfisols and Entisols, respectively, are formed on the Balaklala Rhyolite mainly in the north eastern part of the Quadrangle north of the northerly South Fork Mountain. The Behemotosh soils are gravelly loams over cobbly clay loams about 2 feet deep generally on ridges and steep slopes. On gentler slopes a deeper, non-gravelly, non-cobbly variant occurs. These soils have vegetation dominated by ponderosa pine, Douglas-fir, sugar pine, and California black oak. Site quality is mostly low, with some areas in the low-medium class. The many small openings in the tree canopy contain several species of manzanita, shrub tanoak, and sierra gooseberry. Below 2,500 feet elevation, the only manzanita species is whiteleaf manzanita. Above 3,000 feet, whiteleaf manzanita is absent. The only manzanitas present are greenleaf manzanita and a new hybrid which we are calling Balaklala manzanita. The new hybrid was discovered in 1968 by James I. Mallory.

## *Chaparral Type*

Chaparral, a dense thicket of stiff or thorny shrubs or dwarf trees (Sampson and Jesperson 1963), is well known in California and other areas that have a hot, dry season and a cool, wet season. These many kinds of shrubs–chamise, manzanitas, shrub oaks, and shrub forms of some tree species–grow on steep, rocky, slopes of shallow and colluvial soils that will not support tree vegetation. In some areas, near the margins of chaparral types, shrubs will encroach rapidly on the deeper, better soils that have been logged over or periodically burned and where accelerated erosion has begun.

The chaparral type in the French Gulch Quadrangle is divided into two association groups with two soil-vegetation associations (Nos. 11 through 14) in each. The associations are based on the soil properties, dominant vegetation, and slope aspect.

## Manzanita Associations

*Maymen–Colluvial land/Manzanita–shrub oak:* Maymen soils, gravelly loam Inceptisols, are found on the steep slopes and ridges of sedimentary rocks in close association with unstable very gravelly Entisols (unclassified as to series) on the adjacent colluvial land. The vegetation consists of a dense shrub cover on the Maymen soils and a more open shrub cover on the colluvial land. Greenleaf manzanita and shrub California black oak (McDonald 1969) dominate the vegetation in this association (as well as in part of the Sheetiron–Marpa–Josephine/Ponderosa pine–Douglas-fir–California black oak association). In parts of this association, Balaklala manzanita, Fremont silk tassel, shrub tanoak, knobcone pine, and canyon live oak are dominant. Herbaceous cover is practically nonexistent.

*Goulding–Kidd/Manzanita–toyon:* Below 2,000 feet elevation on the south-facing slopes near the Whiskey Creek arm of Whiskeytown Lake are shallow soils formed on metavolcanic rocks. These are the Goulding series and Kidd series (Inceptisols), formed from greenstone and meta-rhyolite. The vegetation is an open to semidense stand of shrubs–mostly whiteleaf manzanita and toyon. In places Brewer oak, shrub interior live oak, buck brush, knobcone pine, and canyon live oak are prominent.

## Chamise-Shrub Oak-Ceanothus Associations

*Maymen–Goulding–Stonyford–Los Gatos/north aspect Brewer oak:* This most extensive of the chaparral associations occupies the north-facing slopes in an area about 7 miles in diameter centered on the town of French Gulch. The Maymen and Goulding soils are Inceptisols formed on sedimentary and metavolcanic rocks respectively. Stonyford soils are shallow Alfisols with reddish brown gravelly clay loam subsoils in contrast to the yellowish brown gravelly loam subsoils of Maymen and Goulding. Los Gatos soils are similar to Stonyford soils but have dark brown surface horizons thicker than 10 inches (which places them among the Mollisols) and are formed from sedimentary rock. The vegetation is dominated by Brewer oak, shrub interior live oak, western mountain mahogany, and California black oak. Intertwined among these shrubs is poison oak, chaparral honeysuckle, and pipestem clematis. The understory consists of several species of annual and perennial grasses and forbs providing sparse ground cover (see plot 14, Quadrangle 24D-1, *table 4* and *table 5* for detailed information). At higher elevations the Maymen–colluvial land/Manzanita–shrub oak and the forest associations containing Marpa or Neuns soils are found in similar slope positions.

*Maymen–Goulding–Stonyford–Los Gatos/south aspect chamise:* Just over the ridges on the south-facing slopes, on the same kinds of soils but shallower and more eroded than in the association described above, the cover is an almost impenetrable brushfield of chamise with some associated buckbrush, whiteleaf manzanita, and toyon. Herbaceous vegetation is sparse (plots 1-3, Quadrangle 24D-1, *table 4 and 5*). Extensive areas of chamise, the most typical and widely known of the California chaparral types, are found from here south to Baja California. Chamise is found in a few small patches further north, but the very northernmost known natural growth is only 21 miles northeast of French Gulch, near Delta Point in the Sacramento River canyon (U.S. Forest Service 1939).

*Eroded Chawanakee–eroded Sierra/Chamise–Lemmon ceanothus:* Between Rainbow Lake and Eagle Creek, along the south edge of the Quadrangle is a steep, brush covered, eroded area with a rather unique bench or step topography. The vegetation is a semidense stand of chamise, manzanitas, and Lemmon ceanothus with widely scattered ponderosa pine and California black oak. Chawanakee and Chaix soils from the forest zone and Sierra soils from the woodland grass zone are intermingled in a unit differing from either of the normally associated vegetation types.

# Woodland-Grass Type

The Woodland-Grass, or Foothill-Woodland of Munz and Keck (1959), is an extensive zone in California completely encircling the central valley and covering much of the coast ranges and parts of southern California.

The Woodland-Grass area of the Quadrangle consists of about 9,000 acres of gently sloping to steep rangeland centered on Igo in the southeast corner and about 1,000 acres on very steep south-facing slopes along Highway 299 from the French Gulch junction to Trail Gulch and up Trail Gulch 2½ miles. Three soil-vegetation associations are recognized that differ in soil characteristics, vegetation, and forage production. A few areas within or adjacent to the Woodland-Grass type have been so altered by human activity that they are best considered just as "altered areas" rather than soil-vegetation associations.

### Oak—Grass Associations

*Kanaka—Sierra/Interior live oak-blue oak—annuals:* On the granitic pediment at the southeast end of the Shasta Bally batholith and the lower parts and south-facing slopes of the Mule Mountain stock three soil series with intergrading characteristics and contrasting profiles occur. These soils are highly erodible. Therefore, they need more careful management than nearby non-granitic soils to prevent soil loss and gullying. The Inceptisols are represented by the Kanaka series, brown sandy loams with very pale brown heavy loam or sandy loam subsoils grading into weathered granitic rock at 2 feet or more. The Alfisols include the Auberry series, similar to Kanaka but with brown sandy clay loam subsoils, and the more extensive Sierra series with their yellowish red sandy clay loam subsoils. The three soils represent a development sequence. Open to dense stands of interior live oak with scattered blue oak, Digger pine, valley oak, and a ground cover of annual grasses and forbs make up most of the vegetation. Estimated suitability for extensive range use would be medium except for the badly eroded areas which are unsuited for grazing (plot 1, Quadrangle 24D-4, *table 4*). A few small groups of ponderosa pines occur on the deeper soils.

*Auburn—Millsholm—San Andreas/Blue oak—annuals—Digger pine:* The three dominant soils in this association are formed from different parent materials, Auburn from greenstone, Millsholm from shale, and San Andreas from schist. The Auburn soils are reddish silt loam Inceptisols with hard bedrock between 1 and 2 feet down. Associated with the Auburn are small areas of Exchequer soils, similar but less than 1 foot deep, and Sobrante soils with clay loam B horizons and up to 40 inches deep to weathered greenstone or schist. Millsholm soils are brown silt loam Inceptisols with platy shale or slate at 10 to 20 inches. San Andreas soils have thick dark brown surface horizons (making them Mollisols) and fine sandy loam textures with schist bedrock at 20 to 40 inches. Depth to this bedrock is variable in short distances as the schist consists of vertical plates less than an inch thick of variable weatherability. This belt of schist lies along the east side of the Shasta Bally granitic mass. Vegetation in this association is an open to dense stand of blue oak, Digger pine, annual grasses and forbs, with varying amounts of shrubs from adjacent chaparral areas. Plot 5, Quadrangle 24D-2, in *tables 4 and 5,* represents this association but with somewhat less herbaceous matter and more brush than typical. For forage production, this association would be rated medium to low.

### Shrub-Grass-Oak Associations

*Newtown—Redding—Newville/Manzanita—annuals—blue oak:* Newtown and Newville soils have gravelly loam A horizons with clay B horizons starting at 10 to 20 inches, which grade into the weakly consolidated gravelly sediments of the Pleistocene Red Bluff formation. Newville soils differ from the Newtown soils in having darker surfaces, a more abrupt boundary between the A horizons and the B horizons, and in having greater percentage of clay in the B horizon. They were not separated on the map because of their close similarity. The Redding soils occur on the level tops of some of the terraces formed by the Red Bluff formation. In part of the area they have hummocky microrelief with mounds about 10 to 20 feet apart and a difference in elevation of 6 to 10 inches between the mounds and the level above which they rise. The most important characteristic of the Redding soils is the impenetrable iron-silica cemented hardpan which lies about 20 inches below the surface. The vegetation in this association consists of patches of whiteleaf manzanita, sparse cover of annual grasses and forbs, and scattered blue oaks. The cover is more open on the Redding soils than on the others in this association. Suitability for extensive range use is low. Powell (1965) found that Redding soils responded to nitrogen and phosphorous when added together but there was no response when added singly, and no response to added sulfur.

*Other Associations:* In this Quadrangle, several other shrub-grass-oak associations occur but are too small in size to include within the broader groupings of the soil-vegetation associations. However, these smaller units may occur extensively in other Quadrangles.

## Altered Areas

*Gold dredge tailings, residential areas, and mined Horseshoe soils:* The valley and terrace land along Clear Creek has been disturbed by mining activities producing ridges of cobbly dredger tailings and vertical red cliffs in the remnants of the dissected Horseshoe soils. Much of the tailings area has been leveled and is being used for building and mobile home sites.

*Reservoirs—Whiskeytown Lake and Rainbow Lake:* Whiskeytown Lake covers over 3,000 acres in the east central part of the Quadrangle. The reservoir covered the site of a stand of MacNab Cypress and is reputed to be the discovery site of this species. This particular stand was the only well publicized and easily accessible grove (Griffin and Stone 1967). At least one MacNab Cypress tree from the Whiskeytown grove remains, where it was transplanted, northeast of the Whiskey Creek arm of Whiskeytown Lake in Section 9, Township 32 North, Range 6 West, M. D. M. Most of the Whiskeytown Reservoir area was occupied by the Goulding–Kidd/Manzanita–toyon association, with additional stands of the MacNab Cypress and Knobcone pine.

Rainbow Lake, a reservoir of about 100 acres, in the southwest corner of the Quadrangle, appears to be filling with sand from the granitic soils in its watershed of about 8,000 acres.

# TIMBER SITE QUALITY

In the French Gulch Quadrangle, more than 71 percent (100,000 acres) of the land is suitable for growing commercial conifers *(fig. 6)*. The area has adequate rainfall, usually 40 inches or more, but the relative capacity of the land to grow timber as measured by site class will depend on such additional factors as soil depth, texture, stoniness, slope, aspect, and elevation.

The highest site (site class 5) occupies less than 1 percent of the commercial timber area. It occurs on the deep soils of less steep slopes, in draws, and on north-facing slopes. Of the medium sites, site class 4 occupies more than 30 percent of the commercial timber area. Located between 2,000 and 4,000 feet elevation, this site is characterized by the medium-textured soils of the conifer-hardwoods associations. The largest portion (59 percent) of the timber area is site class 3. Less deep, coarse-textured soils, south aspect and steep slopes are characteristics of this site. Many areas are transitional zones to the chaparral and woodland-grass types.

The balance of the commercial timber area—about 10 percent—is site class 2. This site reflects the adverse climatic conditions on high ridge tops that have erodible, shallow, sandy soils, and the hot, dry areas adjacent to chaparral types of southern exposure at lower elevations. Most all areas of site class 2 and 3 have shrubs associated with the conifer-hardwood vegetation.

# NEW SOILS AND PLANTS

In the investigation of the French Gulch Quadrangle, we discovered a number of new soils, and new or little-known shrubs. The new soils include a new series and three variants. The new shrub is a gray leaved, non-sprouting manzanita and the little-known shrubs include two other manzanitas, and a variety of squaw carpet.

## *New Soils*

### Modesty Series

The Modesty soil series *(tables 1, 2)* shown as map symbol 721 on the soil-vegetation maps is a distinctive new soil series described for this Quadrangle. Because it has not yet been correlated by the National Cooperative Soil Survey, a formal description of this group of soils is not available.

The soils of the Modesty series are classified in the coarse-loamy, mixed, thermic family of Typic Xerochrepts (Soil Survey Staff 1970). They are well to excessively drained, moderately coarse textured upland soils developed from weathered granitic rock. They occur on steep to very steep slopes, under mixed stands of shrubs, hardwoods, and conifers at elevations of 800 to 3,000 feet in the foothills of the Klamath Mountains and Sierra Nevada of northern California. Annual precipitation ranges from 40 to 70 inches. Mean annual temperature is about 60°F., average January temperature is 44°F., and average July temperature is about 79°F. Frost-free period is 180 to 240 days.

These soils are shallow to moderately deep and have light gray, strongly acid, gravelly sandy loam surface horizons and nearly white to light yellowish brown, strongly acid loam subsoils.

Commonly associated with the Modesty soils are other timber soils of the Chawanakee, Behemotosh, Diamond Springs, Neuns, and Boomer series and the woodland-grass shrub soils of the Kanaka, Kidd, Goulding, and Auburn series.

A representative soil profile on a 49 percent west-facing slope under a semidense stand of whiteleaf manzanita, toyon, California black and canyon live oaks, elevation 2,200 feet (1 mile south of South Fork Mountain Lookout in the southeast one-fourth of Section 10, T. 32N., R. 6W.) is described as follows:

O1–1 to 0 inch, scattered litter of shrubs and oaks, with some erosion pavement of gravels and a few small cobbles.

A1–0 to 3 inches, light brownish gray (2.5Y 6/2) gravelly sandy loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky to granular structure; slightly hard, friable, slightly sticky and slightly plastic; abundant very fine roots; few very fine tubular and many very fine interstitial pores; strongly acid (pH 5.5); gradual smooth boundary; 1 to 6 inches thick.

A3–3 to 6 inches, light gray (2.5Y 7/2) sandy loam, pale brown (10YR 6/3) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky to slightly plastic; few very fine, fine and medium roots; many very fine and fine interstitial and few very fine tubular pores; strongly acid (pH 5); gradual smooth boundary; 2 to 8 inches thick.

B2–6 to 20 inches, white (2.5Y 8/3) loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, firm to friable, slightly sticky to slightly plastic; few very fine, fine and medium roots; many very fine and fine interstitial and few very fine tubular pores; strongly acid (pH 5.5); abrupt irregular boundary; 10 to 25 inches thick.

C–20 to 40 inches, soft weathered albite granite, with few very fine roots and few thin clay bridges; strongly acid (pH 5.5); grades into hard albite granite at about 40 inches.

Colors range from gray to very pale brown in the 10YR and 2.5Y hues on the surface and from white to pale yellow and very pale brown in the 2.5Y and 10YR hues in the subsoil. Textures range from gravelly very coarse sandy loam to sandy loam in the surface, and from gravelly loam to coarse sandy loam in the subsoil. The soil reaction usually changes little with depth, but may range from slightly acid to strongly acid in the profile. Depth to weathered rock is variable in short distances, but normally ranges from 12 to 30 inches. Hard granitic rock may be found at depths from 30 inches to more than 30 feet.

Modesty gravelly sandy loam is usually excessively drained. Surface infiltration is rapid and the permeability is moderately rapid to rapid. Runoff is slow to moderate. Under dense vegetative cover and gentle slopes, erosion is slight to moderate. But on steep slopes that have heavy removal of vegetation either from fire or logging, the erosion hazard is high to very high. Available water-holding capacity is low to medium. Fertility is low.

The Modesty soils are of low to medium site quality for timber production. Because of the predominance of shrub and hardwood vegetation cover, the main use is for watershed and wildlife habitat.

### Tish Tang Variant 2

The Tish Tang Variant 2 soils differ from the typical Tish Tang soils primarily in being shallower (20 to 40 inches to bedrock rather than 72 to 120 or more). They differ from the Tish Tang Variant soils of the Hoopa Quadrangle (DeLapp and Skolmen 1961) in having the normal pale brown subsoils rather than mottled subsoils. The Tish Tang Variant 2 soils have a varying amount of shale fragments in the surface few inches derived from the adjacent Bragdon formation and some diorite porphyry fine gravels near the bedrock.

### Behemotosh Variant

Behemotosh Variant soils differ from typical Behemotosh soils in having clay loam textures rather than very gravelly or cobbly clay loams, and very strongly acid subsoils rather than moderately acid subsoils. They are usually found on gently sloping plateau-like areas above 3,000 feet in areas where rhyolite is the bedrock.

### Fiddletown Variant

Fiddletown Variant soils differ from Fiddletown soils in having clay loam subsoils rather than stony or gravelly loams as found in typical Fiddletown soils.

## *New and Little-Known Shrubs*

### Balaklala Manzanita

The new hybrid *Arctostaphylos canescens x viscida,* which we are calling Balaklala manzanita, is found in this Quadrangle *(table 3).* This shrub resembles *A. canescens* Eastwood, but is generally smaller (1 to 5 feet tall) and has bracts of the inflorescence distinctly shorter than the flower pedicels, a key character among manzanitas. Balaklala manzanita grows on the highland between Clear Creek and the Sacramento River above 2,500 feet in openings in the forest and in the upper part of the chaparral associations. Gankin[2] reports having found it on Red Mountain in Mendocino County, California.

### Other Manzanitas

Eight species and subspecies of manzanita were noted in the French Gulch Quadrangle. Two others

[2]Personal communication with Roman Gankin, formerly with University of California Arboretum, Davis, May 2, 1973.

have recently come to the attention of botanists. One individual of Roof manzanita, *A. Roofii* Gankin, was found on the Trinity divide within 200 yards south of Buckhorn summit and several shrubs that appear to be Shingletown manzanita, *A. manzanita* ssp. *Wieslanderi* Philip V. Wells, were seen along the ridge road west of Iron Mountain.

### Trinity Squaw Carpet

Trinity squaw carpet *(Ceanothus prostratus* Benth. var. *laxus* Jeps.*)* is an open, somewhat upright, form of the dense, prostrate *Ceanothus prostratus* Benth. It is distinctive in the shrub landscape of the Corbett/shrub tanoak-mixed conifer association. This variety was previously known only from Hot Springs Valley near Mount Lassen 70 miles to the east (Jepson 1925), from a few places on the Sierra Nevada (McMinn 1942), and from the headwaters of New River 40 miles to the northwest.[3] Although McMinn (1942) recognized the variety, his description says nothing about the open, upright, habit which Jepson apparently used to distinguish the variety. McMinn's concentration on fruit and leaf characters, which aren't greatly distinguishing in this case, may be the reason that Munz and Keck (1959) reduced the variety to synonmy under *C. prostratus.* Trinity squaw carpet is mapped on about 2,000 acres on Buckhorn Mountain and Shoemaker Bally *(table 3).*

# LEGEND TO THE MAPS

## *Base Maps*

Base maps used for the Soil-Vegetation maps are specially prepared by the Pacific Southwest Forest and Range Experiment Station, mostly from published sources. Each Soil-Vegetation map consists of a standard 7½-minute quadrangle unit at the scale of 2 inches = 1 mile.

Every effort has been made to fit the soil and vegetation boundaries to the topography of the base map. Land subdivisions have been positioned as accurately as source information and map control points permit. If a precise fit of the data to land subdivisions for small areas is required, ground checks against known corner locations, fence boundaries, or other features should be carried out, preferably by using aerial photographs.

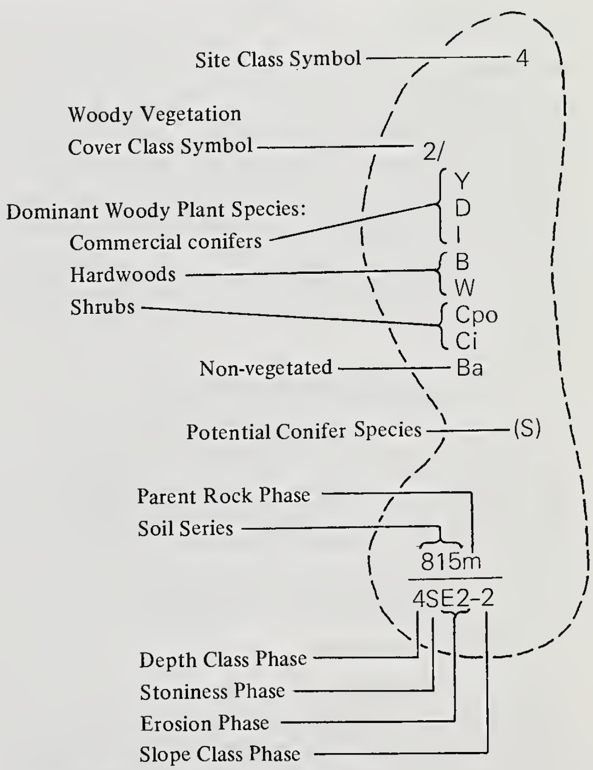
Contour lines, minor roads, small drainages, and other map details are not shown on the maps so as not to obliterate other data. If such map detail is required, refer to maps used as sources for the base information. These maps are listed in the lower right corner of each quadrangle map.

## *Soil Symbols*

Soils are mapped by soil series and phases (depth class, slope class, and certain other soil phases). The Soil Survey Manual (Soil Survey Staff 1951) has been used as a general standard of reference for terminology and concepts. Soils are designated by symbols written as fractions, e.g.:

$$\frac{815}{4S\text{–}1} = \frac{\text{Soil Series}}{\text{depth class/other phases/-slope class}}$$

The various symbols used in a delineated mapping area are shown in the diagram below:




Soil series names are designated by three or four digit numbers in the numerator of the fraction. Soil series variants are soils of limited extent which are

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[3] Personal communication with Helen K. Sharsmith, Senior Herbarium Botanist, University of California, Berkeley, Sept. 11, 1962.

distinctly different but similar and closely related to a known soil series. These are designated by the symbol "V" following the soil series symbol, e.g. 815V. *Parent rock* phases *(table 1)* are designated by a lower case letter symbol following the soil series symbol, e.g. 815m.

Other soil phases are designated by letters and numbers in the denominator of the fraction. Soil *depth class* is designated by the first digit. *Rockiness, stoniness, and/or erosion* are designated by letters and numbers immediately following the depth class symbol *(table 2)*. The *slope class* in the delineated area is represented by a letter or number symbol which is separated by a hyphen from the other phase symbols *(table 1)*.

In some areas an association of two soils occurs in such an intricate pattern that they cannot be indicated separately at the scale of mapping. Such a *soil complex* is designated by two fractional symbols separated by a vertical line, e.g.,

$$\frac{847 \mid 752}{2\text{-}2 \mid 3\text{-}2} \quad \text{or} \quad \frac{847 \mid 752}{3\text{-}2}$$

The dominant soil unit (51 to 80 percent of a delineated area) appears on the left.

*Unclassified soil* areas are usually agricultural or potentially agricultural lands for which, in many cases, soil surveys have already been made by other agencies, such as the U.S. Soil Conservation Service. Symbols for unclassified soils are "100," "200," or "400," but are not in fraction form; sometimes a letter follows the number indicating further breakdown of the general definition of the symbols, e.g., 200W *(table 1)*.

*Miscellaneous land types* have little or no soil, or soil that cannot feasibly be classified. They are distinguished as a group by the symbol "700," also not in fraction form. Subdivisions within the groups are shown by letter symbols in parentheses following the "700" symbol, e.g. 700(CK) *(table 1)*.

## Soil Classification

### Classification System

The soil classification system currently used was adopted for general use in the United States in 1965 (Basile 1971; Soil Survey Staff 1960). It has six categories. The broadest category is the order, followed by suborder, great group, subgroup, family, and the series. The criteria used as a basis for classification are soil properties that are observable and measurable. The placement of the smallest unit—the soil series—in the current system may change as more precise information becomes available.

The 10 soil orders recognized are defined as follows:

*Entisols:* young mineral soils that do not have genetic horizons or barely have the beginning of such horizons.

*Inceptisols:* mineral soils in which horizons have started to develop, and are young but not on recent land surfaces.

*Mollisols:* very dark colored and base-rich soils with a thick, friable, dark-colored surface layer.

*Alfisols:* soils that have clay-enriched B horizons with medium or high base saturation and usually have light-colored surface horizons.

*Ultisols:* well developed soils that have clay-enriched B horizons with low base supply or low base saturation decreasing with depth.

*Vertisols:* clayey soils that shrink and have wide deep cracks during dry periods and that swell closing the cracks, in moist seasons.

*Aridisols:* primarily soils in dry areas, pale in color and generally soft when dry or have distinct structure.

*Spodosols:* usually gray to light gray podzol or podzolic soils, generally infertile, and developed from siliceous parent materials in cool humid climates.

*Oxisols:* reddish, yellowish, or grayish soils of tropical and subtropical regions, are deeply weathered, and formed on gentle slopes on old surfaces.

*Histosols:* soils that are dominantly organic from bogs, peats, and mucks.

### Classification of Soils

The placement of the soil series of the French Gulch Quadrangle in the current soil classification system is still tentative because both the soils and the system are under continual study. Five orders are represented in the Quadrangle: Entisols, Inceptisols, Mollisols, Alfisols, and Ultisols. They are further classified by subgroup and family *(table 6)* (Soil Survey Staff 1972).

## Vegetation Symbols

*Plant species* are represented by letter symbols, such as Af for chamise *(Adenostoma fasciculatum)* and D for Douglas-fir *(Pseudotsuga menziesii) (table 3)*. Dominant species in a delineated area (excluding individual grass species and most associated herbs) are indicated by one or more symbols which may be grouped. Each group of symbols represents an element which may be either a broad kind of vegetation (commercial conifers, minor conifers, hardwoods, shrubs, bushy herbs, grass, marsh) or some other landscape unit (nonvegetated and rock, cultivated, urban-industrial). Each delineated area may have one or more elements occupying from 5 to 100 percent of the ground area. Elements can be determined on the map by grouping the appropriate symbols. For example, an area has the symbols Y D I B W Cpo Ci Ba. They represent four elements, respectively: commercial conifers (YDI), hardwoods (BW), shrubs (CpoCi), and non-vegetated (Ba).

Elements are listed in order of abundance with the one listed first making up the greatest proportion of the cover. Likewise, the order of symbols within an element indicates the relative abundance of the species within that element. Symbols of vegetation elements not classified as to species (grass, marsh, and bushy herbs) and the non-vegetation element (barren) are included among plant symbols in proper order of abundance of elements or may stand alone as the case may be.

In the above example, there is a greater proportion of commercial conifers than hardwoods, shrubs, or grass, and there is more Y than D, more D than I. But the proportion of I is not necessarily greater than B or Ba. If five or more species symbols appear in one group, the relative abundance of the species is variable within the delineated area. For further information on the classification system, see the folio titled "Timber Stand and Vegetation-Soil Maps of California," Jan. 15, 1949 (U.S. Forest Serv. California Forest and Range Exp. Stn. 1949), and the "Field Manual, Soil-Vegetation Surveys in California" (U.S. Forest Serv., California Forest and Range Exp. Stn. 1954).

A species must occupy 20 percent or more of the crown space of the element to which it belongs to be mapped in a delineated area. The individual element also must comprise the following minimum parts of a delineated area: crowns of commercial conifers—5 percent or more of the ground space; hardwoods and minor conifers—each at least 5 percent, or 20 percent when in combination with 20 percent or more of commercial conifers; shrubs—at least 5 percent, or 20 percent when in combination with 20 percent or more of a tree element; and all other elements—at least 20 percent if they appear on the map.

In some areas, logging, burning, or clearing may have eliminated one or more (or all) species of commercial conifer trees. In such areas, symbols of conifers eliminated or reduced to less than 5 percent cover are shown in parentheses.

The approximate percent of the ground covered by woody vegetation (i.e., canopy of all trees and shrubs combined) is shown as a *cover* class symbol which appears as a number above or to the left of the vegetation species symbols and separated from them by a line, e.g., 2/YDIBWCpoCiBa. The cover class symbols and explanation are:

| | *Cover class* | *Ground covered (percent)* |
|---|---|---|
| Cover symbol: | | |
| 1 | Dense | > 80 |
| 2 | Semidense | 50 - 80 |
| 3 | Open | 20 - 50 |
| 4 | Very open | 5 - 20 |
| 5 | Extremely open | < 5 |

In some areas, distinct vegetation units cannot be shown separately at the scale of mapping. In such cases, two groups of cover class and species symbols are shown with a vertical line separating them, e.g.,

| 1 | 2 |
|---|---|
| D | T |
| R | M |
| T | Ba |

Type-acre soil-vegetation sampling plots are established in a mapped area. These plots are not uniformly distributed because their locations are chosen to be representative of the more extensive (or sometimes unusual) combinations of soil and vegetation. A detailed soil profile description and intensive vegetation inventory are made at these sites. Plot locations *(tables 4, 5)* are shown on the map by circled numbers, e.g.,③.

## Timber Site Symbols

Site quality (capacity of the land for growing timber) is indicated on the map by Arabic numbers. Pine, fir, pine–Douglas-fir, and pine–Douglas-fir–fir types are graded in terms of the total height that average dominant trees reach at 300 years of age, by 25-foot classes (Dunning 1942). These classes are designated by numbers 1 through 6:

| Class symbol: | *Site Index Height of dominant trees At 100 years* | *At 300 years* | *Site class symbol used by Forest Service, Calif. Region* |
|---|---|---|---|
| | *(feet)* | | |
| 1 | 52 | 75 | V |
| 2 | 67 | 100 | IV |
| 3 | 82 | 125 | III |
| 4 | 102 | 150 | II |
| 5 | 122 | 175 | I |
| 6 | 140 | 200 | IA |

In areas without climate and soil suitable for growing commercial conifer timber crops, the site index symbol is omitted.

## Soil and Vegetation Boundaries

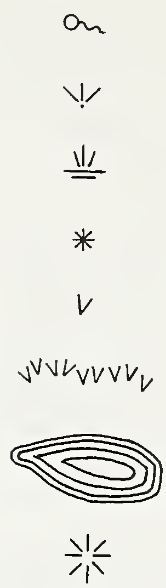
Soil or vegetation boundaries or both are normally shown on the map by dashed lines. In some places, however, it is necessary to show a soil boundary distinct from a vegetation boundary. Where this is done, a dotted line indicates a soil boundary. When needed, a double-headed arrow is used to show the appropriate adjacent soil.

## Other Features on Map

*Photo centers:* The locations of the centers of aerial photographs from which the map data are compiled are shown on the map by large dots. This will facilitate use of the map with aerial photos.

*Roads:* Some are shown for orientation purposes.

*Special features:* Features too small to delineate are shown by these symbols:



Spring

Wet spot

Small marsh or wet meadow

Severely eroded spot

Prominent rock outcrop

Rock escarpment

Pond or reservoir

Named peak

# TABLES TO ACCOMPANY MAPS

## Explanation of Tables

*Table 1* lists the soil series mapped in the Quadrangle and gives the more important characteristics of each. The soil series names used in this report are based on present concepts of the series and are subject to review and final correlation. Variations must be expected in characteristics listed, as terms (except slope class) apply to the soil series in general. Detailed descriptions of individual soil series are on file at the University of California, Departments of Soils and Plant Nutrition at Berkeley and Davis.

*Table 2* gives a legend for soil series, phases, and other units mapped, other than slope, including permeability, general drainage, erosion hazard, and suitability for commercial timber production, and for extensive range use.

*Table 3* lists the symbols of plant species and other landscape units occurring on the maps, and symbols of species not mapped due to scale of mapping, but recorded on type-acre plots or observed in the Quadrangle area. Common (Jepson 1923; McMinn 1939) and scientific names (Munz and Keck 1959; Munz 1968), growth habit, sprouting nature, and browse values are given for each species. Browse values are based on values reported by Sampson and Jespersen (1963).

*Table 4* presents a portion of the data taken from type-acre sampling plots that is principally concerned with livestock and wildlife use. It includes date of sampling, plot location, aspect and percent slope, soil series and phases, woody cover class (overstory), information on soft chess growing on the plot, percent of ground covered by various vegetation and landscape units as measured below a reference plane 4½ feet above the ground, and a list of woody species with available browse.

The soil series, soil phase, and woody cover class symbols may not correspond to those in the delineated areas of the map in which the plots are located because of scale of mapping. Detailed descriptions of soil profiles at these plot locations are on file at the Pacific Southwest Forest and Range Experiment Station, Berkeley, California.

Soft chess *(Bromus mollis)* is one of the most common annual range grasses in California. Height and stage of maturity of this grass together with date of sampling and other data give an indication of site and kind of season or year for the plot area.

*Table 5* lists scientific (Munz and Keck 1959) and common (Abrams 1923-1960; Jepson 1923; Munz and Keck 1959) names of herbaceous species found on the type-acre plots described in *table 4.* Because percent cover *(table 4)* and composition of herbaceous species often vary from year to year, these are preliminary data describing the plots at date of sampling. More data on percent composition and abundance of plants are on file at the Department of Agronomy and Range Science, University of California, Davis.

*Table 6* lists the five orders of soils found on the Quadrangle: Entisols, Inceptisols, Mollisols, Alfisols, and Ultisols, by soil series, family, and subgroup.

# Tables

Table 1 --Soil symbols and some important characteristics of soil series mapped

| Soil series symbol | Soil series name | Depth range (inches) | Color of surface/subsoil | Texture of surface/subsoil | Reaction of surface/subsoil | Parent material | Relief and slope classes mapped1/ |
|---|---|---|---|---|---|---|---|
| 200 | 2/ | | | | | | |
| 242 | Greenfield | 31-60+ | Brown/brown | Sandy loam/heavy sandy loam | Slightly acid to neutral/neutral to mildly alkaline | Granitic alluvium | Nearly level to gently sloping (A,B) |
| 400 | 2/ | | | | | | |
| 522 | Redding | 10-28 to hardpan, otherwise 60+ | Reddish brown/ red | Gravelly loam/ gravelly clay over hardpan | Strongly to slightly acid/ strongly acid | Old gravelly mixed alluvium | Nearly level to rolling, hummocky (A,AB,B,C) |
| 700 | 2/ | | | | | | |
| 7117 | Musick and Hoda3/ | 35-60+ | Grayish brown or brown/yellowish red or red | Sandy loam or loam/sandy clay or heavy clay loam | Moderately acid/ strongly acid | Granitic rock | Gently sloping to steep (C,CD,D,2) |
| 7118 | Boomer | 30-56 | Light brown/ reddish brown | Gravelly loam/ gravelly clay loam | Moderately acid/ moderately acid | Metamorphosed basic igneous rock4/ | Hilly to very steep (CD,D,1,2,3) |
| 7118m | Boomer (schist) | 30-56 | Light brown/ reddish brown | Sandy heavy loam/ gravelly sandy clay loam | Moderately acid/ moderately acid | Schist4/ | Hilly to very steep (3) |
| 7121 | Corbett | 24-60+ | Dark grayish brown/pale brown | Loamy coarse sand/loamy coarse sand | Strongly acid/ moderately acid | Granitic rock | Hilly to very steep (1,2,3, 4) |
| 7125V2 | Tish Tang variant 2 | 20-40 | Pale brown/very pale brown | Gravelly loam/ loam | Moderately acid/ strongly acid | Diorite porphyry | Steep to very steep (2,3,4) |
| 7129 | Chawanakee and Chaix3/ | 18-60 | Grayish brown/ very pale brown to light yellowish brown | Coarse sandy loam/coarse sandy loam | Moderately acid/ moderately to strongly acid | Granitic rock | Hilly to very steep (CD,D,2,3,4) |
| 7135 | Diamond Springs | 20-40 | Pale brown to grayish brown/ very pale brown to yellowish red | Very fine sandy loam/clay loam | Moderately to very strongly acid/strongly to very strongly acid | Fine grained acid igneous rock | Hilly to steep (CD,2) |
| 7136 | Behemotosh | 20-33 | Grayish brown/ reddish yellow | Gravelly loam/ cobbly light clay loam | Moderately acid/ moderately acid | Metamorphosed rhyolite | Sloping to very steep (D,2,3,4) |
| 7136L | Behemotosh (landslide)5/ | 20-60+ | Brown/reddish yellow | Fine sandy loam/ silty clay loam | Strongly acid/ very strongly acid | Fragmented rhyolite and soil material | Steep to very steep (2,3) |

Table 1 (continued)

| Soil series symbol | Soil series name | Depth range (inches) | Color of surface/subsoil | Texture of surface/subsoil | Reaction of surface/subsoil | Parent material | Relief and slope classes mapped1/ |
|---|---|---|---|---|---|---|---|
| 7136V | Behemotosh variant | 33-50 | Dark grayish brown/strong brown to pink | Loam/clay loam | Moderately acid/ very strongly acid | Deeply weathered acid igneous rock | Gently sloping to steep (2) |
| 716 | Holland and Hotaw3/ | 24-72+ | Grayish brown/ reddish brown to light brown | Loam to coarse sandy loam/clay loam to sandy clay loam | Slightly to moderately acid/ moderately to strongly acid | Granitic rock | Hilly to very steep (D,1,2,3,4) |
| 721 | Modesty | 17-30 | Light brownish gray/very pale yellow | Gravelly coarse sandy loam/ gravelly loam | Strongly acid/ strongly acid | Granitic rock | Hilly to very steep (CD,2,3) |
| 726 | Dubakella | 14-30 | Reddish brown/ yellowish brown | Gravelly loam/very gravelly clay loam | Neutral/neutral | Serpentine | Gently sloping to very steep (2) |
| 728 | Neuns | 20 - 40 | Dark brown/ yellowish brown | Gravelly sandy loam/gravelly sandy clay loam | Moderately acid/ moderately to strongly acid | Metamorphosed basic igneous rock 4/ | Hilly to very steep (CD,1,2,3,4) |
| 728L | Neuns (landslide)5/ | 24-60+ | Dark brown/ yellowish brown | Gravelly sandy loam/gravelly sandy clay loam | Moderately acid moderately to strongly acid | Fragmented basic igneous rock and soil material | Very steep (3) |
| 728m | Neuns (schist) | 15-50 | Dark brown/ yellowish brown | Gravelly sandy loam/gravelly sandy clay loam | Moderately acid moderately to strongly acid | Schist4/ | Hilly to very steep (2,3,4) |
| 741 | Auburn | 10-28 | Strong brown to yellowish red/ reddish brown to yellowish red | Silt loam/silt loam | Slightly to moderately acid/ slightly acid to neutral | Schistose to massive metamorphosed basic rocks4/ | Hilly to very steep (CD,2,3) |
| 7411 | Exchequer | 3-16 | Yellowish red/ | Rocky silt loam/ | Slightly acid/ | Schistose4/ or altered basic igneous rock | Rolling to steep (1) |
| 743 | Auberry | 30-60 | Grayish brown/ brown | Coarse sandy loam/sandy clay loam | Slightly to moderately acid/ moderately to strongly acid | Granitic rock | Rolling to very steep (B,C,CD,2,3) |
| 748 | Sobrante | 20-40 | Reddish brown/ yellowish red | Silt loam/clay loam | Moderately acid/ slightly acid | Schistose to massive metamorphosed basic rock4/ | Rolling to very steep (B,CD,2,3) |
| 757 | Sierra | 30- 60+ | Brown/yellowish red to red | Coarse sandy loam/loam to clay loam | Moderately acid slightly acid | Strongly weathered granitic rock | Rolling to very steep (B,C,CD,D,2,3) |
| 759 | Kanaka | 20-40+ | Brown/very pale brown | Sandy loam/ heavy loam | Moderately to strongly acid/ strongly acid | Granitic rock | Gently sloping to very steep (B,C,CD,D,2,3) |
| 771 | Henneke | 7-20 | Brown/brown | Gravelly loam/very gravelly clay loam | Slightly acid/ neutral | Serpentinite | Steep to very steep (2) |
| 775 | Kidd | 5-18 | Pale brown/ light gray | Gravelly sandy loam/gravelly sandy loam | Moderately acid/ strongly acid | Rhyolitic rock | Hilly to very steep (2,3,4) |
| 778 | Huse | 8-22 | Reddish brown/ brown | Stony clay loam/ very stony loam | Neutral/ neutral | Peridotite | Gently sloping to steep (2,3) |
| 779 | Stonyford | 12-28 | Brown/dark reddish brown | Gravelly clay loam/gravelly clay loam | neutral/ moderately acid to neutral | Metamorphosed basic igneous rock4/ | Hilly to very steep (CD,2,3) |
| 781 | Goulding | 8-25 | Brown/brown | Gravelly loam/ very gravelly loam | Slightly acid/ slightly acid | Metamorphosed basic igneous rock 4/ | Steep to very steep (CD,D,2,3,4) |

Table 1 (continued)

| Soil series symbol | Soil series name | Depth range (inches) | Color of surface/subsoil | Texture of surface/subsoil | Reaction of surface/subsoil | Parent material | Relief and slope classes mapped1/ |
|---|---|---|---|---|---|---|---|
| 784 | Tollhouse | 10-20 | Dark grayish brown/ | Coarse sandy loam/ | Neutral to moderately acid/ | Granitic rock | Steep to very steep (3) |
| 811 | Marpa | 20-40 | Brown/light brown | Very gravelly heavy loam/very gravelly clay loam | Slightly acid/ strongly acid | Shale and sandstone | Steep to very steep (1,2,3,4) |
| 815 | Josephine | 30-60+ | Brown to reddish brown/strong brown to yellowish red | Loam/clay loam | Moderately acid/ moderately to strongly acid | Sandstone and shale | Moderately steep to very steep (1,2,3) |
| 815m | Josephine (schist) | 30-60+ | Brown to reddish brown/strong brown to yellowish red | Loam/clay loam | Moderately acid/ moderately to strongly acid | Metamorphosed sedimentary rock | Moderately steep to very steep (2,3) |
| 816 | Sites | 36-60+ | Brown to reddish brown/red | Loam/clay | Slightly to moderately acid/ strongly acid | Metamorphosed sedimentary rock | Rolling to steep (1,2,3) |
| 820 | Sheetiron | 21-42 | Dark grayish brown/pale brown | Gravelly light loam/gravelly heavy loam | Moderately acid/ strongly acid | Metamorphosed sedimentary rocks | Hilly to very steep (2,3) |
| 824V | Fiddletown Variant | 20-60+ | Dark grayish brown/brown or dark brown | Loam/clay loam | Slightly acid/ moderately acid | Metamorphosed sedimentary rock | Very steep (3) |
| 8322 | San Andreas | 20-40 | Brown/brown to yellowish brown | Fine sandy loam/ fine sandy loam | Moderately acid/ moderately acid | Mica schist4/ | Sloping to steep (B,C,D,2,3,4) |
| 837 | Millsholm | 10-20 | Brown/brown | Silt loam/silt clay loam | Slightly acid/ neutral | Sandstone and shale | Hilly to very steep (3) |
| 837g | Millsholm (conglomerate) | 8-30 | Brown/brown | Gravelly loam/ gravelly loam | Slightly acid/ neutral | Conglomerate | Hilly to very steep (3) |
| 871 | Los Gatos | 24-48 | Brown/yellowish red or reddish brown | Light clay loam/ clay loam | Slightly acid/ moderately acid | Sandstone and shale | Hilly to very steep (2,3) |
| 871L | Los Gatos (landslide5/ | 24-60+ | Brown/yellowish red or reddish brown | Very gravelly loam/very gravelly clay loam | Slightly acid/ moderately acid | Sandstone and shale landslide debris | Gently sloping to very steep (1) |
| 871m | Los Gatos (schist) | 12-36 | Brown/reddish brown | Gravelly loam/ gravelly clay loam | Slightly acid/ slightly acid | Metamorphosed sedimentary rocks | Gently sloping to very steep (2,3) |
| 872 | Maymen | 4-20 | Brown/light yellowish brown | Gravelly sandy loam/gravelly loam | Moderately acid/ strongly acid | Sandstone and shale | Rolling to very steep (1,2,3,4) |
| 872m | Maymen (schist) | 4-20 | Pale brown/pale brown | Gravelly loam/ gravelly loam | Slightly acid/ moderately acid | Metamorphosed sedimentary rocks | Hilly to very steep (2,3) |
| 926 | Horseshoe | 48-60+ | Reddish brown to yellowish red/ yellowish red to red | Gravelly loam/ gravelly clay loam | Moderately acid/ very strongly to strongly acid | Weakly consolidated gravelly sediments | Nearly level to steep (C,CD,1,2) |
| 941 | Newville and Newtown3/ | 40-60+ | Brown/brown or pale brown | Gravelly loam/ clay | Slightly acid to neutral/strongly acid to slightly alkaline | Weakly consolidated gravelly sediments | Nearly level to steep (B,C,D) |

(Footnotes follow on the next page)

Table 1—Footnotes

1/ 

| Slope class symbol | Percent slope |
|---|---|
| A | 0-3 |
| B | 3-8 |
| C | 8-15 |
| D | 15-30 |
| AB | 0-8 |
| AC | 0-15 |
| CD | 8-30 |
| 1 | 0-30 |
| 2 | 30-50 |
| 3 | 50-70 |
| 4 | 70 and greater |

2/ Unclassified soils and miscellaneous land types mapped are:

| Symbol | |
|---|---|
| 200 | Alluvial land (secondary soils on bottomland) |
| 200 R | Alluvial land with 10-50 percent surface rock |
| 200 W | Wet alluvial land |
| 400 | Soils on terraces and benches |
| 700(AK) | Colluvial land of granitic rock material |
| 700(AK)R | Colluvial land of granitic rock material with 10-50 percent rock outcrop |
| 700(AP) | Mine dumps and pits of acid igneous rock material |
| 700(AR) | Rockland (50-90 percent rockiness) of granitic rock material |
| 700(AW) | River wash of acid igneous rock material |
| 700(BK) | Colluvial land of basic igneous rock material |
| 700(BK)R | Colluvial land of basic igneous rock material with 10-50 percent rock outcrop or surface rock |
| 700(BO) | Rock outcrop, basic igneous(90-100 percent rockiness). |
| 700(BR) | Rockland, basic igneous (50-90 percent rockiness) |
| 700(BR)K | Rockland, basic igneous (50-90 percent rockiness) with 10-50 percent colluvial soil material |
| 700(BS) | Landslide, soil and rock of basic igneous origin |
| 700(CK) | Colluvial land of sedimentary rock material |
| 700(CK)O | Colluvial land of sedimentary rock material with 10-50 percent rock outcrop |
| 700(CK)R | Colluvial land of sedimentary rock material with 10-50 percent rock outcrop or surface rock |
| 700(CO) | Rock outcrop, sedimentary |
| 700(CR) | Rockland, sedimentary (50-90 percent rockiness) |
| 700(DH) | Dredge tailings |
| 700(DK) | Colluvial land of mixed or undetermined rock material |
| 700(DK)R | Colluvial land of mixed or undetermined rock material with 10-15 percent rock outcrop or surface rock |
| 700(DP) | Mine dumps and pits of mixed or undetermined rock material |
| 700(DR) | Rockland, mixed or undetermined rock material (50-90 percent rockiness) |
| 700(DS) | Landslide, mixed or undetermined rock and soil material |
| 700(DW) | Riverwash of mixed or undetermined rock material |
| 700(MK) | Colluvial land of schistose rock and soil material |
| 700(MO) | Rock outcrop, schistose (90-100 percent rockiness) |

3/ The mapping units represented by these symbols have mixtures of the soil series designated. The second soil series named has been established since the time of field studies. The characteristics listed include those of both series as now defined.

4/ In this area rock may have been either igneous or sedimentary before metamorphism.

5/ The soil is formed on material that has undergone mass movement.

Table 2.--Selected behavior characteristics and productivity estimates for soil series and phases, unclassified soils, and miscellaneous land types

| Map symbol | Soil series name | Soil phase symbols [1] | Permeability [2] | General drainage [3] | Erosion hazard [4] | Estimated suitabilities for: Timber production [5] | Estimated suitabilities for: Extensive range use [6] |
|---|---|---|---|---|---|---|---|
| 200 | [7] | | Rapid | Good [8] | Slight [9] | Unsuited to high | Medium |
| 200R | [7] | | Rapid | Good [8] | Moderate [9] | High | Medium |
| 242 | Greenfield | 5 | Moderately rapid | Good | Moderate [9] | Unsuited | Medium |
| 400 | [7] | | Slow to moderate | Good | Slight [9] | Unsuited to high | Medium |
| 522 | Redding | 2,2S,3 | Slow | Good [10] | Moderate [9] | Unsuited | Low |
| 700 | [7] | | Rapid to impermeable | Excessive | Slight to very high | Unsuited to medium | Very low |
| 7117 | Musick and Hoda soils | 4,5 | Slow | Good | High | Medium | Low |
| 7117 | Musick and Hoda soils | 5E | Slow | Good | Very high | Medium | Very low |
| 7118 | Boomer | 3,3S,4,4S | Moderate | Good | Moderate | Medium | Medium to low |
| 7118 | Boomer | 3E | Moderate | Excessive | High [11] | Medium | Low [11] |
| 7118m | Boomer (schist) | 3,3S,4,4S | Moderately rapid | Good | High [11] | Medium | Low [11] |
| 7121 | Corbett | 1E,1RE,2E | Rapid | Excessive | Very high | Unsuited to medium | Unsuited |
| 7121 | Corbett | 2,2R,3R | Rapid | Excessive | High | Unsuited to medium | Unsuited |
| 7121 | Corbett | 2R1,2S,3,3R1,4 | Rapid | Excessive | High | Medium | Unsuited |
| 7121 | Corbett | 2RE,3E,3RE | Rapid | Excessive | Very high | Medium | Unsuited |
| 7125V2 | Tish Tang variant 2 | 2,2S,3 | Moderate | Good | Moderate | Unsuited to medium | Low to very low |
| 7125V2 | Tish Tang variant 2 | 2E | Moderate | Good | High [11] | Low | Very low [11] |
| 7129 | Chawanakee & Chaix | 1E,2E,2RE | Moderately rapid | Excessive | Very high | Unsuited to medium | Unsuited |
| 7129 | Chawanakee & Chaix | 2,2R,2R1,2S | Moderately rapid | Good to excessive | High | Low to medium | Low |
| 7129 | Chaix | 3,4,4R1,5 | Moderately rapid | Good to excessive | High | Medium | Low |
| 7129 | Chaix | 3E,3RE,4E | Moderately rapid | Good to excessive | Very high | Medium | Unsuited |
| 7135 | Diamond Springs | 2R,3,3S | Moderate | Good | Moderate to high | Medium | Low |
| 7135 | Diamond Springs | 3E,3RE | Moderate | Good | High | Low to medium | Very low |
| 7136 | Behemotosh | 2R,2R1,3R | Moderate | Good | High [11] | Low to medium | Low [11] |
| 7136 | Behemotosh | 2S,3S | Moderate | Good | Moderate | Low to medium | Low |
| 7136 | Behemotosh | 2SE | Moderate | Excessive | Very high [11] | Low | Very low [11] |

Table 2 (continued)

| Map symbol | Soil series name | Soil phase symbols[1] | Permeability | General drainage | Erosion hazard | Estimated suitabilities for: Timber production | Extensive range use |
|---|---|---|---|---|---|---|---|
| 7136L | Behemotosh (landslide) | 3S,5S | Moderate | Good | High[12] | Low to medium | Very low |
| 7136V | Behemotosh variant | 3,3S,4,4S | Moderate | Good | Moderate | Medium | Low |
| 716 | Holland & Hotaw | 3,4,5 | Moderate | Good | High | Medium | Medium to low |
| 721 | Modesty | 1RE | Moderately rapid | Excessive | Very high | Unsuited | Unsuited |
| 721 | Modesty | 2 | Moderately rapid | Good to excessive | High | Low to medium | Low |
| 721 | Modesty | 2E,2RE,2SE | Moderately rapid | Excessive | Very high | Unsuited to medium | Unsuited |
| 721 | Modesty | 2R,2S | Moderately rapid | Good to excessive | High | Unsuited to medium | Low |
| 721 | Modesty | 3,3S | Moderately rapid | Good to excessive | High | Medium | Low |
| 726 | Dubakella | 3Rl | Moderate | Good | Very high[11] | Medium | Low[11] |
| 728 | Neuns | 2,2R,2S,3,3S | Moderate | Good to excessive | Moderate | Low to medium | Low to medium |
| 728L | Neuns (landslide) | 3S | Moderate | Good | High[11,12] | Medium | Low[11] |
| 728m | Neuns (schist) | 2,3,3S,5S | Moderate | Good | Moderate to high | Medium | Low |
| 728m | Neuns (schist) | 2S | Moderate | Good | Moderate to high | Low to medium | Low |
| 741 | Auburn | 2,2S | Moderate | Good | Moderate | Unsuited | Medium |
| 7411 | Exchequer | 1 | Moderate | Good to excessive | Moderate[9] | Unsuited | Low |
| 743 | Auberry | 2E | Moderate | Good | Very high[11] | Unsuited | Unsuited[11] |
| 743 | Auberry | 3,4 | Moderate | Good | High | Unsuited to questionable | Medium |
| 748 | Sobrante | 3 | Moderate | Good | Moderate | Unsuited | Medium |
| 757 | Sierra | 3,3R,4,5 | Moderate | Good | Moderate to high | Unsuited to questionable | Medium |
| 757 | Sierra | 3E,4E | Moderate | Good | High to very high | Unsuited to questionable | Very low |
| 759 | Kanaka | 1RE | Moderately rapid | Excessive | Very high[11] | Unsuited | Unsuited[11] |
| 759 | Kanaka | 2,2Rl,2S,3,3Rl | Moderately rapid | Excessive | High | Unsuited | Medium |
| 759 | Kanaka | 2R,3R | Moderately rapid | Excessive | High | Unsuited | Medium to low |
| 771 | Henneke | 2R | Moderate | Good | Moderate | Unsuited | Low |
| 775 | Kidd | 1R,1S | Moderately rapid | Excessive | High | Unsuited | Low |
| 775 | Kidd | 1RE,1SE | Moderately rapid | Excessive | Very high[11] | Unsuited | Unsuited [11] |
| 775 | Kidd | 2R | Moderately rapid | Good to excessive | High | Unsuited to low | Low |

Table 2 (continued)

| Map symbol | Soil series name | Soil phase symbols[1] | Permeability | General drainage | Erosion hazard | Estimated suitabilities for: Timber production | Extensive range use |
|---|---|---|---|---|---|---|---|
| 775 | Kidd | 2S | Moderately rapid | Good to excessive | High | Unsuited to medium | Low |
| 778 | Huse | 2R | Rapid | Good to excessive | Moderate | Low | Very low |
| 779 | Stonyford | 2,2R,2S,3,3S | Moderate to slow | Good to excessive | Moderate to high | Unsuited | Very low |
| 779 | Stonyford | 2SE,3SE | Moderate to slow | Good to excessive | High | Unsuited | Unsuited |
| 781 | Goulding | 1R,1S,2R,2S | Moderate | Good to excessive | Moderate | Unsuited | Low to very low |
| 781 | Goulding | 2RE,2SE | Moderate | Good to excessive | High[11] | Unsuited | Unsuited[11] |
| 781 | Goulding | 3S | Moderate | Good | Moderate | Unsuited | Low to medium |
| 784 | Tollhouse | 1E | Rapid | Excessive | Very high[11] | Unsuited | Unsuited [11] |
| 811 | Marpa | 2R,2S,3S,4S | Moderate | Good | Moderate | Low to medium | Low to medium |
| 815 | Josephine | 3,3S,4,4S,5 | Moderate | Good | Moderate | Medium | Medium to low |
| 815m | Josephine (schist) | 3,3S | Moderate | Good | Moderate | Medium | Medium to low |
| 816 | Sites | 3S,4S | Moderate | Good | Moderate | Medium | Medium |
| 820 | Sheetiron | 2S | Moderate | Good to excessive | Moderate | Low to medium | Low |
| 820 | Sheetiron | 3S | Moderate | Good | Moderate | Medium | Low |
| 824V | Fiddletown variant | 3S | Moderately rapid | Good | Moderate[11] to high | Unsuited to medium | Low[11] |
| 8322 | San Andreas | 2 | Moderate | Good | Moderate | Unsuited to questionable | Medium |
| 8322 | San Andreas | 2R,2S | Moderate | Good to excessive | Moderate | Unsuited | Low to medium |
| 837 | Millsholm | 2S | Moderate | Good | Moderate[11] to high | Unsuited | Medium to[11] low |
| 837g | Millsholm (conglomerate) | 2S | Moderate | Good | Moderate[11] to high | Unsuited | Medium to[11] low |
| 871 | Los Gatos | 3S | Moderate | Good | Moderate | Unsuited | Low |
| 871L | Los Gatos (landslide) | 5S | Moderately rapid | Good | Slight[12] | Unsuited | Low |
| 871m | Los Gatos (schist) | 2S | Moderate | Good to excessive | Moderate to high | Unsuited | Very low |
| 871m | Los Gatos (schist) | 3 | Moderate | Good | Moderate[11] | Unsuited | Low[11] |
| 872 | Maymen | 1,1R,1S | Moderate to rapid | Excessive | High | Unsuited | Very low |
| 872 | Maymen | 1E,1SE,2SE | Rapid | Excessive | High[11] | Unsuited | Unsuited [11] |
| 872 | Maymen | 2,2R,2S | Moderate to rapid | Excessive | Moderate to high | Unsuited | Very low to low |
| 872m | Maymen (schist) | 1R,2R | Moderate to rapid | Excessive | High[11] | Unsuited | Very low[11] |

Table 2 (continued)

| Map symbol | Soil series name | Soil phase symbols[1] | Permeability | General drainage | Erosion hazard | Estimated suitabilities for Timber production | Extensive range use |
|---|---|---|---|---|---|---|---|
| 926 | Horseshoe | 5,5S | Moderate | Good | Moderate | Medium | Medium to low |
| 926 | Horseshoe | 5SE | Moderate | Good | Moderate[9] to high | Medium | Low |
| 941 | Newville & Newtown | 3S | Slow | Good | Moderate[9] | Unsuited | Low |
| 941 | Newville & Newtown | 3SE | Slow | Good | Moderate[9] to high | Unsuited | Low |
| 941 | Newville & Newtown | 5S | Slow | Good | Moderate[9] | Unsuited | Medium to low |

1/ Phase symbols listed here are:

| Symbol | Depth class | Depth (feet) | Symbol | Surface rock (percent) | Symbol | Stoniness | Symbol | Erosion |
|---|---|---|---|---|---|---|---|---|
| 1 | Very shallow | <1 | R | 10 - 50 | S | Coarse fragments in the soil (gravel, cobbles, or stones) making up 20 percent or more of the soil's volume. | E | Severe |
| 2 | Shallow | 1-2 | R1 | 2 - 10 | | | | |
| 3 | Moderately shallow | 2-3 | | | | | | |
| 4 | Moderately deep | 3-4 | | | | | | |
| 5 | Deep | >4 | | | | | | |

2/ Permeability: rate of water movement through the soil profile, based on the least permeable layer within the soil--slow, moderate, moderately rapid, rapid.

3/ General drainage: rate and extent of removal of water from the soil, either by runoff or by percolation--excessive, good (well-drained), imperfect, poor.

4/ Erosion hazard: probable susceptibility of a soil to erosion on a 30 to 50 percent slope (slope class 2) after significant disturbance of protective vegetative cover--slight, moderate, high, very high.

5/ Estimated suitability for commercial timber production: based on predominant site index determinations as related to soil and climatic characteristics regardless of current vegetative cover in an area. Relative terms are: unsuited = nontimberland; low = sites 1, 2; medium = sites 3, 4; high = site 5; questionable = conclusive evidence of suitability is lacking.

6/ Estimated suitability for extensive range use: based on observations of natural forage production, use experience over wide areas, and soil and climatic characteristics. Regardless of current vegetative cover, estimates are potential suitability applied to open areas, either natural or cleared, under extensive management (without seeding or fertilization) with average herbaceous cover conditions as related to soil type. Factors such as rockiness, topography, and erosion hazard are also considered. Estimates should not be interpreted as necessarily applying to suitability of soils for forage production under more intensive management involving seeding, fertilization or irrigation.
Relative terms are: unsuited, very low, low, medium, high, very high; unless otherwise indicated, they are applicable to soils of slope classes 1 and 2 (0 to 50 percent).

7/ Unclassified soils and miscellaneous land types mapped are listed in footnote 2 to table 1.

8/ Occasionally subject to flooding.

9/ For soils with slopes less than 30 percent.

10/ Soil rests abruptly on an impermeable iron-silica cemented hardpan.

11/ For soils with slopes steeper than 50 percent.

12/ May be subject to further movement, especially if disturbed or in years of above normal precipitation.

Table 3 --Plant species and miscellaneous elements mapped and observed including their growth habit, sprouting nature, and browse values

| Map symbol | Common name | Scientific name | Growth habit | Sprout nature[1] | Browse value[2] H | C | S | G | D |
|---|---|---|---|---|---|---|---|---|---|
| A | White alder | Alnus rhombifolia | Tree | S | 5 | 4-5 | 3-4 | 3-4 | 3-5 |
| Aa[4] | Western service berry | Amelanchier pallida | Shrub | S | 3-4 | 2-3 | 2-3 | 2 | 2-3 |
| Aci | Vine maple | Acer circinatum | Shrub | S | 4-5 | 3-4 | 3-4 | 3-4 | 2-4 |
| Aec | California buckeye (Shrub) | Aesculus californica | Shrub | S | 5 | 4 | 3-4 | 3-4 | 1-2 |
| Af | Chamise | Adenostoma fasciculatum | Shrub | S | 5 | 4-5 | 2-3 | 2-3 | 2-3 |
| Am | Common manzanita | Arctostaphylos manzanita | Shrub | N | 5 | 5 | 5 | 4-5 | 4-5 |
| Amx[5] | Shingletown manzanita | Arctostaphylos manzanita wieslanderi | Shrub | N-S | 5 | 5 | 5 | 4-5 | 4-5 |
| An | Pinemat manzanita | Arctostaphylos nevadensis | Shrub | S | 5 | 5 | 4-5 | 4-5 | 4-5 |
| Ap | Greenleaf manzanita | Arctostaphylos patula | Shrub | S | 5 | 5 | 4-5 | 4-5 | 3-4 |
| App | Pine manzanita | Arctostaphylos patula platyphylla | Shrub | N | 5 | 5 | 4-5 | 4-5 | 4-5 |
| Aro[6,7] | Roof manzanita | Arctostaphylos roofii | Shrub | S | 5 | 5 | 4 | 4-5 | 4-5 |
| Ate[4] | Mountain alder | Alnus tenuifolia | Shrub | U | 4-5 | 3-4 | 2-3 | 1-2 | 1-2 |
| Av | Whiteleaf manzanita | Arctostaphylos viscida | Shrub | N | 5 | 5 | 5 | 4-5 | 4-5 |
| Avc | Balaklala manzanita | Arctostaphylos canescens x viscida | Shrub | N | 5 | 5 | 5 | 4-5 | 4-5 |
| B | California black oak | Quercus kelloggii | Tree | S | 4-5 | 2-4 | 3-4 | 3-4 | 1-2 |
| Ba[3] | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| C | Canyon live oak | Quercus chrysolepis | Tree | S | 5 | 5 | 5 | 5 | 3-4 |
| Cao[5] | Spice-bush | Calycanthus occidentalis | Shrub | S | 5 | 5 | 5 | 5 | 5 |
| Cb | Western mountain mahogany | Cercocarpus betuloides | Shrub | S | 2-4 | 2 | 1-2 | 1-2 | 1 |
| Cc | Buck brush | Ceanothus cuneatus | Shrub | N | 5 | 4 | 2-3 | 2-3 | 3 |
| Cco | Mountain whitethorn | Ceanothus cordulatus | Shrub | S, N | 5 | 4 | 3 | 2-3 | 1-2 |
| Cec | California redbud | Cercis occidentalis | Shrub | S | 4-5 | 4-5 | 4 | 3-4 | 4-5 |
| Chb[4] | Bloomer goldenbush | Haplopappus bloomeri | Shrub | U | 5 | 5 | 4 | 4 | 4 |
| Ci[8] | Deer brush | Ceanothus integerrimus | Shrub | S, N | 3 | 2-3 | 1-2 | 1-2 | 1-2 |
| Cla[4] | Pipe-stem clematis | Clematis lasiantha | Vine | -- | -- | -- | -- | -- | -- |
| Cle | Lemmon ceanothus | Ceanothus lemmonii | Shrub | S | 5 | 4-5 | 3-4 | 3-4 | 3-4 |
| Cn | Pacific dogwood | Cornus nuttallii | Shrub | S | 5 | 5 | 3-4 | 3-4 | 3-4 |
| Cos[5] | Miners dogwood | Cornus sessilis | Shrub | S | 5 | 5 | 4-5 | 4-5 | 3-5 |
| Cpj | Trinity squaw carpet | Ceanothus prostratus laxus | Shrub | U | 5 | 5 | 4-5 | 3-4 | 2-4 |
| Cpo | Squaw carpet | Ceanothus prostratus | Shrub | N | 5 | 5 | 4-5 | 3-4 | 2-4 |
| Cr | California hazelnut | Corylus cornuta californica | Shrub | S | 4-5 | 4-5 | 4 | 3-4 | 3-4 |
| Cs | Bush chinquapin | Chrysolepsis sempervirens | Shrub | S | 5 | 5 | 4-5 | 4-5 | 4-5 |
| Cu[3] | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| D | Douglas-fir | Pseudotsuga menziesii | Tree | N | 5 | 5 | 4-5 | 4-5 | 4-5 |

Table 3 (continued)

| Map symbol | Common name | Scientific name | Growth habit | Sprout nature[1] | Browse value[2] H | C | S | G | D |
|---|---|---|---|---|---|---|---|---|---|
| D′ | Blue oak | Quercus douglasii | Tree | S | 4-5 | 4 | 3-4 | 3-4 | 1-2 |
| Dp | Digger pine | Pinus sabiniana | Tree | N | 5 | 5 | 5 | 5 | 5 |
| Dr | Bush poppy | Dendromecon rigida | Shrub | S | 5 | 4-5 | 3-4 | 3-4 | 3-4 |
| Ec | California yerba santa | Eriodictyon californicum | Shrub | S | 5 | 5 | 4-5 | 4-5 | 3-4 |
| Fd[4] | Foothill ash | Fraxinus dipetala | Shrub | S | 4-5 | 5 | 3-4 | 3 | 2-3 |
| G | Oregon oak | Quercus garryana | Tree | S | 5 | 4-5 | 4-5 | 4-5 | 2-3 |
| Gf | Fremont silktassel | Garrya fremontii | Shrub | S | 5 | 4-5 | 2-3 | 2-3 | 2-3 |
| Gr[3] | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| H[4] | California buckeye | Aesculus californica | Tree | S | 5 | 4 | 3-4 | 3-4 | 1-2 |
| Hb[3] | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Hp[4] | Klamath weed | Hypericum perforatum | Herb | S | 5 | 4-5 | 3-5 | 3-4 | 3-4 |
| I | Incense-cedar | Calocedrus decurrens | Tree | N | 5 | 4-5 | 4-5 | 3-5 | 3-5 |
| J | Jeffrey pine | Pinus jeffreyi | Tree | N | 5 | 5 | 4-5 | 3-5 | 3-5 |
| K | Knobcone pine | Pinus attenuata | Tree | N | 5 | 5 | 5 | 5 | 5 |
| Lcr | Big deervetch | Lotus crassifolius | Herb | U | 5 | 5 | 5 | 5 | 4-5 |
| Lde | Shrub tan oak | Lithocarpus densiflora echinoides | Shrub | S | 5 | 5 | 5 | 4-5 | 1-2 |
| Led[6] | Sierra-laurel | Leucothoe davisiae | Shrub | | | | | | |
| Li[4] | Chaparral honeysuckle | Lonicera interrupta | Shrub | N | 5 | 4-5 | 4 | 3-4 | 2-3 |
| M | Madrone | Arbutus menziesii | Tree | S | 5 | 4-5 | 4-5 | 4-5 | 3-5 |
| M̲ | Bigleaf maple | Acer macrophyllum | Tree | U | 5 | 4-5 | 4 | 4 | 3-4 |
| M′ [5] | Oracle oak | Quercus morehus | Tree | S | 4-5 | 2-4 | 3-4 | 3-4 | 1-2 |
| Md[3] | | | | | | | | | |
| Ny[5] | Macnab cypress | Cupressus macnabiana | Tree | N | 5 | 5 | 5 | 4-5 | 4-5 |
| Ō | Oregon ash | Fraxinus latifolia | | | | | | | |
| Pa | Toyon (Christmas berry) | Heteromeles arbutifolia | Shrub | S | 5 | 5 | 4-5 | 2-3 | 2-3 |
| Pe | Bitter cherry | Prunus emarginata | Shrub | S | 5 | 3 | 3-4 | 3 | 1-2 |
| Phc[6] | Pacific ninebark | Physocarpus capitatus | shrub | U | 4-5 | 4-5 | 3-4 | 4 | 4-5 |
| Pl[4] | California mock orange | Philadelphus lewisii californicus | Shrub | S, N | 5 | 4-5 | 3-4 | 3-4 | 3-4 |
| Pom[4] | Sword fern | Polystichum munitum | Herb | S | 5 | 5 | 5 | 4-5 | 3-4 |
| Psu[4] | Sierra plum | Prunus subcordata | Shrub | S | 5 | 2-3 | 2-3 | 2-3 | 1-2 |
| Pta | Bracken | Pteridium aquilinum pubescens | Herb | S | 5 | 5 | 5 | 5 | 5 |
| Qc | Scrub canyon live oak | Quercus chrysolepis nana | Shrub | S | 5 | 5 | 5 | 4 | 4 |
| Qdu | Leather oak | Quercus durata | Shrub | S | 5 | 5 | 4-5 | 4 | 3-5 |
| Qgb | Brewer oak | Quercus garryana breweri | Shrub | S | 5 | 4-5 | 4-5 | 4-5 | 3-4 |
| Qk | Scrub black oak | Quercus kelloggii cibata | Shrub | S | 4-5 | 2-4 | 3-4 | 3-4 | 1-2 |

Table 3 (continued)

| Map symbol | Common name | Scientific name | Growth habit | Sprout nature 1/ | Browse value 2/ H | C | S | G | D |
|---|---|---|---|---|---|---|---|---|---|
| Qv | Huckleberry oak | Quercus vaccinifolia | Shrub | S | 5 | 4-5 | 4-5 | 4-5 | 3-4 |
| Qw | Scrub interior live oak | Quercus wislizenii frutescens | Shrub | S | 5 | 4 | 3-5 | 3-4 | 1-2 |
| R 8/ | California red fir | Abies magnifica | Tree | N | 5 | 4-5 | 4-5 | 3-5 | 3-5 |
| Rcc | Thickleaf coffeeberry | Rhamnus californica crassifolia | Shrub | S | 5 | 3-4 | 2-4 | 2-4 | 2-4 |
| Rci 4/ | Hollyleaf redberry | Rhamnus crocea ilicifolia | Shrub | S | 5 | 2-3 | 2-3 | 1-2 | 1-2 |
| Rco 4/ | Sierra coffeeberry | Rhamnus rubra obtusissima | Shrub | S | 5 | 4-5 | 3-5 | 3-4 | 3-4 |
| Rct | Chaparral coffeeberry | Rhamnus californica tomentella | Shrub | S | 5 | 2-3 | 2-3 | 1-2 | 1-2 |
| Rd | Poison oak | Rhus diversiloba | Shrub | S | 2-3 | 3-4 | 3-4 | 3-4 | 2-3 |
| Rho 5/ | Western azalea | Rhododendron occidentale | Shrub | S | 5 | 5 | 5 | 5 | 5 |
| Rle 4/ | Western raspberry | Rubus leucodermis | Shrub | S | 5 | 5 | 4-5 | 3-5 | 3-4 |
| Rox 4/ | Rose | Rosa species | Shrub | S | 4-5 | 4-5 | 3 | 2-3 | 2-3 |
| Rp 4/ | Western thimbleberry | Rubus parviflorus | Shrub | S | 5 | 5 | 4 | 3-4 | 3-4 |
| Rpu 5/ | Cascara | Rhamnus purshiana | Shrub | S | 5 | 4-5 | 4-5 | 3-4 | 3-4 |
| Rr 4/ | Sierra gooseberry | Ribes roezlii | Shrub | S, N | 4-5 | 4 | 3 | 3 | 3-5 |
| Rru 4/ | Sierra coffeeberry | Rhamnus rubra | Shrub | S | 5 | 4-5 | 3-5 | 3-4 | 3-4 |
| Rt | Squaw bush | Rhus trilobata quinata | Shrub | S | 4 | 4-5 | 4 | 4 | 3-4 |
| Rx 4/ | Rubus species | Rubus species | Shrub | S | 5 | 5 | 4 | 3-4 | 3-4 |
| S | Sugar pine | Pinus lambertiana | Tree | N | 5 | 5 | 4-5 | 4-5 | 4-5 |
| Sal 5/ | Upright snowberry | Symphoricarpos rivularis | Shrub | U | 4 | 3-4 | 3 | 2-3 | 3 |
| Scu 4/ | Spreading snowberry | Symphoricarpos acutus | Shrub | U | 4 | 3-4 | 2-3 | 2-3 | 3-4 |
| Sg 4/ | Blue elderberry | Sambucus coerulea | Shrub | S | 3 | 3-4 | 2-3 | 2 | 1-2 |
| So | California storax | Styrax officinalis californica | Shrub | S | 5 | 5 | 5 | 4-5 | 4-5 |
| Sso | Creeping sage | Salvia sonomensis | Shrub | S | 4-5 | 5 | 4-5 | 4 | 3-4 |
| Sx | Willows | Salix species | S,T | S | 5 | 4-5 | 3-4 | 3-4 | 2-3 |
| Sxg 4/ | Parish nightshade | Solanum parishii | H,S | U | -- | -- | -- | -- | -- |
| T | Tan oak | Lithocarpus densiflora | Tree | S | 5 | 5 | 5 | 5 | 5 |
| Th 4/ | Tree of heaven | Ailanthus altissima | Tree | -- | -- | -- | -- | -- | -- |
| U 5/ | Pacific yew | Taxus brevifolia | Tree | U | 5 | 5 | 5 | 5 | 5 |
| Ui 3/ | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| V | Valley oak | Quercus lobata | Tree | S | 5 | 4 | 4-5 | 4-5 | 3-4 |
| Vc | California wild grape | Vitis californica | Shrub | S | 4-5 | 4-5 | 3-4 | 3-4 | 3-4 |
| Vec 4/ | California false-hellebore | Veratrum californicum | Herb | U | 5 | 4-5 | 4-5 | 5 | 5 |
| W | Interior live oak | Quercus wislizenii | Tree | S | 5 | 4 | 3-5 | 3-4 | 3-4 |

Table 3 (continued)

| Map symbol | Common name | Scientific name | Growth habit | Sprout nature 1/ | Browse value 2/ H | C | S | G | D |
|---|---|---|---|---|---|---|---|---|---|
| Ŵ | White fir | Abies concolor | Tree | N | 5 | 4-5 | 4-5 | 3-4 | 3-4 |
| Whm 4/ | Western whipplea | Whipplea modesta | Shrub | | | | | | |
| Xs | Nuttall willow | Salix scouleriana | Shrub | S | 4 | 3 | 2-3 | 2-3 | 3 |
| Y | Ponderosa pine | Pinus ponderosa | Tree | N | 5 | 5 | 4-5 | 4-5 | 4-5 |

1/ Sprout nature:

S =Sprouts after fire.

N = Normally will not sprout if top is fire killed.

S,N = Sprouts after fire in some cases and is completely killed in others.

U = Post-fire sprouting capacity unknown.

Note: Some species though killed by fire, will stump sprout after cutting in the absence of fire.

2/ Browse value over-all ratings, including sprouts after burning or cutting:

1 = Very high

2 = High

3 = Medium

4 = Low

5 = Very low

Kind of animal:

H = Horses; C = Cattle; S = Sheep; G = Goats; D = Deer.

3/ Miscellaneous vegetation and landscape elements mapped are:

Symbol:

Ba Rock, bare, or litter-covered ground, essentially devoid of vegetation.

Cu Cultivated or fallow field, natural haylands, and irrigated pastures.

Gr Grasses and other associated herbaceous plants, includes meadows.

Hb Herbaceous plants that are bushy in size and character of growth.

Md Wet meadow.

Mr Unidentified marshland herbs.

Ui Urban or industrial areas, frequently with no mappable soil due to industrial activity.

4/ Species not mapped but recorded on type-acre plots.

5/ Species observed but not mapped or recorded on type-acre plots.

6/ Species collected but not mapped or recorded on type-acre plots.

7/ See reference--Gankin, R. 1966. A new species of Arctostaphylos from Glenn County, California. Leaflet Western Botany 10:329-331.

8/ Includes the species and all its varieties.

Table 4.--Data on type-acre sampling plots

| Plot No. | Location 1/ T | R | S | Aspect & percent slope | Soil symbol 2/ | Cover class 3/ | Date sampled | Soft chess 4/ Height (in.) | Stage | Ground cover 5/ (percent) H | L | B | RG | I | W | Woody species with available browse 6/ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QUADRANGLE 24D-1 | | | | | | | | | | | | | | | | |
| 1 | 33N | 7W | 13 | SW-65 | 872 / 2S-3 | 2 | 22 Jul 64 | - | - | (7/) | - | 25 | 5 | 40 | 30 | Af,Ap,Av,Cle,Rd,Cb,So |
| 2 | 33N | 7W | 13 | S-55 | 872 / 1S-3 | 4 | 22 Jul 64 | 8 | D | 5 | - | 65 | 10 | - | 20 | Af,Ec |
| 3 | 32N | 7W | 1 | SW-50 | 779 / 2S-3 | 2 | 22 Jul 64 | - | - | (7/) | (7/) | 20 | 5 | 40 | 35 | Af,Av,Pa,Ec,Rd,Qw,Cle,Li |
| 4 | 33N | 6W | 22 | NE-42 | 7136V / 4S-2 | 1 | 21 Jul 64 | - | - | (7/) | 75 | 15 | (7/) | 5 | 5 | D,Cn,B,I,Lde,Y,Scu,Qc |
| 5 | 33N | 6W | 26 | NE-30 | 7136L / 3S-2 | 2 | 21 Jul 64 | - | - | (7/) | 5 | 15 | (7/) | 40 | 40 | Qk,Ci,D,Y,Scu,Cn,Rct,Avc, B,Rd,Lde,M,Psu |
| 6 | 33N | 6W | 26 | S-65 | 7136 / 2R3-3 | 3 | 21 Jul 64 | - | - | (7/) | 5 | 35 | 40 | 10 | 10 | Av,C,I,D,Y,S,So,Rru,Pa |
| 7 | 33N | 6W | 35 | W-70 | 721 / 2S-3 | 1 | 13 Jul 64 | - | - | (7/) | 10 | 45 | (7/) | 10 | 35 | B,Av,C,Cb,Rd,D,Y,Aec,Pa, So,Rru,M |
| 8 | 33N | 6W | 34 | NE-55 | 7136 / 2S-3 | 1 | 22 Jul 64 | - | - | (7/) | 25 | 40 | 5 | 10 | 20 | Av,C,B,Y,S,Lde,I,Rd,Cn, So,Aa,Ci |
| 9 | 33N | 6W | 35 | S-65 | 721 / 2R1-3 | 3 | 13 Jul 64 | - | - | (7/) | (7/) | 45 | 20 | 15 | 20 | Pa,Av,C,Cb,Pl,Rct,Ci,Rd, Qw,Aec,Dp,So,Li,Rco,M |
| 10 | 32N | 6W | 10 | W-49 | 721 / 2E-2 | 3 | 22 Jul 64 | - | - | 15 | 10 | 45 | (7/) | 5 | 25 | Av,B,Pa,Rd,C,So,Cle |
| 11 | 32N | 6W | 13 | SE-46 | 721 / 2RE-2 | 3 | 22 Jul 64 | - | - | (7/) | 15 | 50 | 10 | 5 | 20 | Av,B,Aec,Sx,Pa,Cle |
| 12 | 32N | 6W | 16 | E-51 | 775 / 1S-3 | 2 | 22 Jul 64 | - | - | (7/) | (7/) | 30 | 5 | 35 | 30 | Av,C,Pa,Rd,Dp,So,Ec,Cle |
| 13 | 33N | 6W | 21 | NW-60 | 811 / 3S-3 | 1 | 21 Jul 64 | - | - | (7/) | (7/) | 10 | (7/) | 60 | 30 | B,Ci,Rd,D,Rr,M,Av,Scu,C, Ap,Cpo |
| 14 | 33N | 6W | 28 | NW-55 | 872 / 2S-3 | 1 | 21 Oct 66 | - | - | (7/) | 20 | 5 | 15 | 20 | 40 | Qgb,Cb,Fd,Qk,Whm,Ci,Ap, Av,Qc,K,Rd,Li |
| 15 | 33N | 6W | 14 | SE-15 | 7136V / 4-1 | 2 | 3 Apr 68 | - | - | 10 | 60 | - | - | 5 | 25 | Cn,T,D,I,S,B,Y,Avc,Ap |
| QUADRANGLE 24D-2 | | | | | | | | | | | | | | | | |
| 1 | 33N | 8W | 2 | N-68 | 820 / 3S-3 | 1 | 29 Jul 64 | - | - | (7/) | 10 | - | 5 | 60 | 25 | Cr,Lde,C,M,D,Xs,Rox,Scu |
| 2 | 33N | 8W | 12 | SW-60 | 7125V2 / 3-3 | 2 | 29 Jul 64 | - | - | 5 | 85 | 5 | - | - | 5 | B,D,Cr,Scu,Lde,Ci,Rox,S, Y,Pe |
| 3 | 33N | 7W | 16 | W-55 | 7125V2 / 3-3 | 2 | 30 Jul 64 | 9 | D | 15 | 25 | 45 | - | (7/) | 15 | Qgb,Qw,Cb,Rd,Cla,Ci,Aec |
| 4 | 33N | 8W | 26 | N-44 | 815 / 5-2 | 3 | 29 Jul 64 | - | - | 15 | 50 | 30 | - | (7/) | 5 | D,Scu,B,C,Lde,Rr,Cr |
| 5 | 33N | 7W | 29 | SW-66 | 837 / 2S-3 | 3 | 29 Jul 64 | 10 | D | 5 | (7/) | 70 | 10 | - | 5 | Cc,Af,Rd,Qw,D',Ec,Cec,Av, Sxg |
| 6 | 33N | 7W | 31 | S-55 | 815 / 5-3 | 3 | 24 Jul 64 | 12 | D | 15 | 35 | 45 | - | - | 5 | Rt,Rd,Aec,D',Cec,Li,Ci,C, Sg,G |
| 7 | 32N | 7W | 3 | SE-32 | 926 / 5S-2 | 1 | 24 Jul 64 | - | - | 5 | 10 | 25 | - | 30 | 30 | Av,C,Rt,Rd,Li,Cc,Pa,B, W,Cec,Cb,D',Th |

Table 4 (continued)

| Plot No. | Location[1/] T | R | S | Aspect & percent slope | Soil symbol[2/] | Cover class[3/] | Date sampled | Soft chess[4/] Height | Stage | Ground cover[5/] H | L | B | RG | I | W | Woody species with available browse[6/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | (in.) | | (percent) | | | | | | |
| | | | | | | | | QUADRANGLE 24D-2 | | | | | | | | |
| 8 | 32N | 7W | 6 | W-55 | 7117/5-3 | 2 | 24 Jul 64 | - | - | 5 | 20 | 65 | - | (7/) | 10 | Rd,Cb,Ci,Cec,Af,B,Aec,C,Cle,Av,Qw,Ap,Psu,Scu,Li |
| 9 | 32N | 8W | 11 | NW-15 | 716/5-1 | 2 | 30 Jul 64 | - | - | 20 | 40 | 35 | - | - | 5 | D,Y,B,Scu,S,C,Li,Rox |
| 10 | 32N | 8W | 12 | SE-80 | 7129/2-4 | 3 | 8 Jul 65 | - | - | 5 | 20 | 55 | - | 10 | 20 | C,M,Y,B,Cle,Rd,Ci,S,D,Av |
| 11 | 32N | 8W | 12 | NE-32 | 7158/3-2 | 2 | 30 Jul 64 | - | - | (7/) | 85 | 10 | - | (7/) | 5 | Rd,B,D,Y,C,S,Ci,Cr,Ate,Lde,Cn,Cle |
| 12 | 32N | 8W | 13 | NE-66 | 7121/2-3 | 1 | 28 Jul 64 | - | - | (7/) | 5 | 5 | - | 80 | 10 | Lde,Cn,C,D,M,B,Cb,Rox,Rp,S,Rr,Scu |
| 13 | 32N | 7W | 17 | N-20 | 716/5-1 | 1 | 28 Jul 64 | - | - | 5 | 20 | 70 | - | (7/) | 5 | Rd,Cle,D,B,Cec,C,Y,S,T,Ci |
| 14 | 33N | 7W | 7 | NE-65 | 7125V2/3-3 | 2 | 28 Apr 68 | - | - | 10 | 50 | 5 | 5 | 15 | 15 | Qk,Cr,As,Rox,Scu,Ci,C,D,M,T,Y,B,Cn,Rp,Rd,Rr |
| | | | | | | | | QUADRANGLE 24D-3 | | | | | | | | |
| 1 | 32N | 8W | 24 | NE-15 | 7121/2-1 | 2 | 28 Jul 64 | - | - | 10 | - | 70 | - | - | 20 | Cpj, Chb,Ap |
| 2 | 32M | 7W | 30 | N-6 | 7121/2-1 | 2 | 28 Jul 64 | - | - | 5 | 10 | 25 | - | 30 | 30 | Lde,Cpj,Ap,I,D,S,Cn,Ŵ,Y,Rr,Ate |
| 3 | 32N | 7W | 32 | E-20 | 7121/5-1 | 2 | 28 Jul 64 | - | - | 10 | 10 | 75 | - | (7/) | 5 | Lde,S,Ŵ,Cs,App,Led |
| 4 | 31N | 7W | 29 | S-15 | 716/5-1 | 2 | 23 Jul 64 | - | - | (7/) | 15 | 50 | - | 10 | 25 | Av,Am,Cle,Rd,Y,B,D,C,Ci |
| 5 | 31N | 7W | 28 | N-25 | 7129/5-1 | 2 | 29 Jul 64 | - | - | (7/) | 5 | 20 | - | 35 | 40 | Av,Cle,Rd,Rox,Ci,Am,Ec,B,Y,C |
| 6 | 31N | 7W | 30 | NE-34 | 7117/5-2 | 2 | 23 Jul 64 | - | - | 10 | 20 | 55 | - | (7/) | 15 | Av,Am,Cle,C,S,Y,B,Rd,Rox,Ci,Cn |
| 7 | 31N | 7W | 33 | S-16 | 757/2E-1 | 2 | 29 Jul 64 | - | - | (7/) | - | 20 | - | 30 | 50 | Af,Ap,Av,Cle,Qw,Ef,B,Qgb,Rd |
| 8 | 31N | 7W | 29 | W-25 | 7117/2E-1 | 2 | 23 Jul 64 | - | - | (7/) | 10 | 20 | - | 35 | 40 | Cle,B,Av,Ap,Qgb,C,Y,Rox,Ec |
| 9 | 31N | 7W | 30 | NE-55 | 7129/3-3 | 3 | 2 Jul 60 | - | - | 5 | 70 | 5 | - | 10 | 10 | Rd,C,B,D,M |
| 10 | 31N | 7W | 31 | SW-33 | 7129/3E2-2 | 2 | 23 Jul 64 | - | - | 10 | 5 | 25 | - | 15 | 40 | Av,Am,Cle,Y,I,M,Rd,D,Ci,Rox,B,C |
| | | | | | | | | QUADRANGLE 24D-4 | | | | | | | | |
| 1 | 31N | 6W | 32 | S-8 | 757/4-C | 3 | 3 May 72 | 20 | F | 20 | 59 | 16 | - | - | 5 | Am,D',Av,Rd,W,Li,V,Sg,Cc,Dp |
| 2 | 32N | 6W | 23 | W-40 | 721/2-2 | 2 | 27 Jul 64 | - | - | (7/) | 5 | 20 | 10 | 40 | 25 | Av,Pa,So,B,C,Rd,Cle,Ci |
| 3 | 32N | 6W | 27 | SW-30 | 775/2S-2 | 1 | 27 Jul 64 | - | - | (7/) | 30 | 30 | 5 | 10 | 25 | Av,Rd,Cle,B,So,Ec,C,Y,Qw,Pa,Li,Px |
| 4 | 32N | 6W | 21 | W-35 | 781/2S-2 | 1 | 27 Jul 64 | - | - | (7/) | 5 | 15 | 10 | 50 | 20 | Av,Qgb,Qw,So,Rd,Dp,Af,Pa,Ec,Cec,Rci,Li,Scu |
| 5 | 32N | 6W | 28 | NE-23 | 7118/4-1 | 2 | 25 Jun 64 | - | - | 5 | 60 | 10 | - | (7/) | 25 | Av,Pa,Rd,B,Rox,Y,Qc,D,Cle,S |

Table 4 (continued)

| Plot No. | Location[1/] T | R | S | Aspect & percent slope | Soil symbol[2/] | Cover class[3/] | Date sampled | Soft chess[4/] Height | Stage | Ground cover[5/] H | L | B | RG | I | W | Woody species with available browse[6/] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | (in.) | | --------(percent)--------- | | | | | | |
| QUADRANGLE 24D-4 | | | | | | | | | | | | | | | | |
| 6 | 32N | 6W | 29 | NW-60 | 728 / 2S-3 | 2 | 27 Jul 64 | - | - | 5 | 35 | 25 | - | 15 | 20 | B,C,Av,Rd,D,Y,Cn,Lde,Rox, Cle,K,S,Rru |
| 7 | 31N | 6W | 2 | SW-50 | 721 / 2S-3 | 3 | 20 Apr 72 | - | - | 5 | 10 | 55 | 15 | - | 15 | Pa,Av,Rd,Cle,W,So,B,Dp, Li,Rct,Cb,Aec |

1/ Plots shown on the map by circled numbers in the Township (T), Range (R), and Section (S) indicated.

2/ Soil series and phases, see Tables 1 and 2 for key. Detailed soil profile descriptions for these sites are on file at the Pacific Southwest Forest and Range Exp. Sta., Berkeley.

3/ Area covered by crowns of all woody plants:

| Symbol | Cover Class | Ground Covered (Percent) |
|---|---|---|
| 1 | Dense | > 80 |
| 2 | Semidense | 50-80 |
| 3 | Open | 20-50 |
| 4 | Very Open | 5-20 |
| 5 | Extremely Open | < 5 |

4/ Mean maximum height and stage of maturity of soft chess (Bromus mollis):

V = Vegetative stage (plant not yet flowering)
F = Flowering stage (plant has seed stalk and is still green)
D = Dry stage (plant is dead)

5/ Ground space covered or occupied by these vegetation and landscape units below a reference plane 4.5 feet above the ground:

H = Herbage--all herbaceous plant material of the current growing season.
L = Litter--dead plant material on the ground exclusive of heavy woody material.
B = Bare soil--particles less than 2 mm.
RG = Rock and gravel--surface coarse fragments greater than 2 mm and bedrock.
I = Inaccessible--space that grazing animals physically cannot occupy owing to presence of tree stems, logging debris, tall and dense brush, and other obstructions.
W = Woody vegetation available for browsing--small twigs and foliage of all woody plants regardless of palatability less than 4.5 feet tall and accessible to grazing animals.

Browse species are listed in last column of this table. Herbaceous and all woody species are listed in Table 5.

6/ Listed in decreasing order of abundance. See Table 3 for key to species symbols and browse values.

7/ Unit is present but too scarce to measure (usually less than 5 percent).

Table 5.—Plant species on type-acre sampling plots [1/]

| Scientific name | Common name | 7.5-minute quadrangle numbers: 24D-1 | 24D-2 | 24D-3 | 24D-4 |
|---|---|---|---|---|---|
| | | Plot numbers where found | | | |
| ANNUAL GRASSES: | | | | | |
| Aira caryophyllea | Silver hairgrass | 10,11,12. | 6,7,9,10,13. | 4,5,6,8,10. | 1,2,3,4,7. |
| Avena barbata | Slender wild oats | | 3,5,6,8. | | 1,3. |
| Avena fatua | Common wild oats | | | | 1. |
| Briza minor | Little quakinggrass | | | | 3. |
| Bromus carinatus | California brome | 13. | 6,8,9,10,13. | 9,10. | |
| Bromus commutatus | Hairy chess | | | | 1. |
| Bromus madritensis | Spanish brome | | 7. | | 1,4,7. |
| Bromus mollis | Soft chess | 2. | 3,5,6. | | 1,4. |
| Bromus racemosus | Smooth soft chess | | 6. | | 1. |
| Bromus rigidus | Ripgut | | 3,5,6,8. | 9,10. | 1. |
| Bromus rubens | Red brome | 2,9. | 5,7. | 7. | 7. |
| Bromus tectorum | Cheatgrass, Downy brome | 2. | 3,5,7,9,10,12. | 1. | |
| Cynosurus echinatus | Annual dogtail | | | | 1. |
| Festuca spp. | Annual fescue | 14. | | 9. | |
| Festuca bromoides | European foxtail fescue | 2. | 5. | 5. | 1,4. |
| Festuca confusa | Confusing fescue | | 10. | | |
| Festuca megalura | Foxtail fescue | | 13. | 5. | 1, 7. |
| Festuca microstachys | Pubescent reflex fescue | 9. | 8,13. | 4,6. | 3. |
| Festuca myuros | False foxtail fescue | 1,2,7,9,10,11, 12,13. | 3,5,6,7,8,13. | 4,5,6,7,8,10. | 2,3,4,5. |
| Festuca pacifica | Pacific fescue | | 6. | 6,10. | 7. |
| Festuca reflexa | Reflex fescue | 7,12. | 3,9,10. | | 3. |
| Gastridium ventricosum | Nitgrass | 2,9. | 7,13. | 4,10. | 3,4. |
| Hordeum leporinum | Foxtail, mouse barley | | | | 1. |
| Lolium multiflorum | Italian ryegrass | | | | 1. |
| PERENNIAL GRASSES AND GRASS-LIKE PLANTS: | | | | | |
| Agropyron parishii laeve | Parish wheatgrass | | 6,10. | | |
| Agropyron spicatum | Bluebunch wheatgrass | | 9. | | |
| Agrostis diegoensis | Leafy redtop | 7. | | | |
| Agrostis exarata | Spike redtop | 10. | | 6,10. | 3,5,6. |
| Bromus laevipes | Woodland brome | | 3,8,13. | | 5. |
| Bromus orcuttianus | Orcutt brome | 4,13. | 12. | 1,2,3. | |
| Carex spp. | Sedge | 5,6,14. | 4. | 1,2,3. | |
| Carex multicaulis | Many-stem sedge | 4,5,7,13. | 2,9,10,11,14. | 2,5,9. | 5. |
| Elymus glaucus glaucus | Blue wild rye | | 2,4,6,7,8,9. | 5,6,9,10. | |
| Elymus glaucus jepsonii | Jepson wild rye | 4,13. | | | |
| Festuca californica | California fescue | 4,5,8. | 2,4,9,12,13. | | |
| Festuca occidentalis | Western fescue | 7. | 4,9,11,12,13, 14. | 9. | 5. |
| Luzula comosa | Common wood rush | | 10. | | |
| Luzula subsessilis | Foothill wood rush | 10. | 4,8,9,13. | 4,6. | 1,5,6. |
| Melica aristata | Awned melic | | 10,11,12. | 2. | |
| Melica geyeri | Geyer oniongrass | | 4. | | |
| Melica harfordii | Harford melic | | 8,13. | | |
| Poa pratensis | Kentucky bluegrass | 13. | | | 1. |
| Poa scabrella | Pine bluegrass | 7. | 3,6,7,8,9, 10,11,13. | 9. | |
| Sitanion hystrix californicum | Squirreltail | 9,13. | 5,7. | 1,2,4. | 4,5. |
| Stipa californica | California stipa | | | 1,2. | |
| Stipa lemmonii | Lemmon stipa | 7,13. | 5,6,13. | 4,6,8,10. | 3,5. |
| Stipa stillmanii | Stillman stipa | | | 2,3. | |
| Trisetum cernuum canescens | Tall trisetum | 4. | 11. | | |

Table 5 (continued)

| Scientific name | Common name | 7.5-minute quadrangle numbers<br>24D-1 | 24D-2 | 24D-3 | 24D-4 |
|---|---|---|---|---|---|
| | | Plot numbers where found | | | |
| ANNUAL FORBS: | | | | | |
| Allophyllum divaricatum | | 2. | | | |
| Calycadenia truncata scabrella | | 9. | 6. | | |
| Centaurea melitensis | Napa star thistle | 2. | 5. | | |
| Centaurea solstitialis | Yellow star thistle | | | | 1. |
| Cerastium viscosum | Mouse-ear chickweed | | 3. | | 1. |
| Cirsium pastoris | Snowy thistle | | 8,10. | | |
| Cirsium proteanum | Venus thistle | 2. | 5. | | |
| Clarkia sp. | Farewell-to-spring | | | | 1. |
| Clarkia rhomboidea | Forest clarkia | | 3,10,11. | | 7. |
| Collomia sp. | Collomia | | 7. | | |
| Crucianella angustifolia | Crucianella | | 6. | | |
| Cryptantha sp. | Cryptantha | | 8,10. | 1. | |
| Daucus pusillus | Rattlesnake weed | | 3,5,6. | | 1,4,7. |
| Epilobium minutum | Slender annual fireweed | 1,7. | 7,10,12. | | |
| Eriogonum vimineum | Wicker buckwheat | 2. | 10. | | |
| Erodium cicutarium | Red-stem filaree | | 6. | | |
| Erodium obtusiplicatum | Foothill Filaree | | 5. | | |
| Euphorbia spathulata | Spurge | | 6. | | |
| Evax acaulis | | | | | 7. |
| Filago gallica | Filago | 2,9,11,12. | | 4,7. | 1,2. |
| Galium aparine | Goosegrass | | 4,9,10,12. | | 1. |
| Galium divaricatum | Lamark bedstraw | | 6. | | |
| Galium parisiense | Wall bedstraw | | | | 1. |
| Gayophytum diffusum diffusum | Gayophytum | | 12. | 1,2,3. | |
| Geranium dissectum | Common wild geranium | | | | 1. |
| Gilia capitata pedemontana | Blue field gilia | 9. | 10. | 1. | |
| Githopsis specularioides | Common blue-cup | | 10. | | |
| Hypochoeris glabra | Smooth catsear | | | | 7. |
| Lactuca serriola | Prickly lettuce | | | | 1. |
| Lessingia nemaclada | | 9. | 5,6,8. | | |
| Linanthus bicolor | Linanthus | | 6. | | 1. |
| Linanthus ciliatus | Whisker linanthus | | 5. | 1. | |
| Lotus micranthus | Small-flower lotus | | 3,5,7,10. | 4. | 1,2,7. |
| Lotus purshianus | Spanish clover | 1,11,12. | | | |
| Lotus subpinnatus | Calf lotus | | 7,8. | 10. | 7. |
| Lupinus sp. | Annual Lupine | | 5. | | |
| Lupinus bicolor microphyllus | Bicolor annual lupine | | | | 1. |
| Lupinus vallicola apricus | Foothill lupine | | | | 7. |
| Madia elegans | Common madia | | 10. | | |
| Madia exigua | Little tarweed | | 3,6,10. | 8,10. | |
| Madia gracilis | Gumweed madia | 2. | 2,3,5,6,8,<br>9,10,13. | 1,10. | |
| Medicago hispida | Bur medic, bur clover | | | | 1. |
| Micropus californicus | Micropus | | 5. | | 1. |
| Microsteris gracilis | Microsteris | | 2,4,10. | | |
| Montia perfoliata | Miners lettuce | | 2,3,12. | 10. | 1. |
| Moss and moss-like plants | | 1,3,9,10. | 1,8,12. | 5,7,8,10. | 1,2,3,6,7. |
| Nemophila pedunculata | Meadow nemophila | | | | 1. |
| Plagiobothrys sp. | Popcorn flower | | | | 7. |
| Silene gallica | Windmill pink | | 5. | | |
| Sisymbrium officinale | Hedge mustard | | | | 1. |
| Stellaria media | Common checkweed | | | | 1. |
| Stephanomeria virgata | Tall stephanomeria | 2. | 3,5,6. | | |
| Streptanthus tortuosus | | 6. | | | |
| Thysanocarpus curvipes elegans | Lace pod | | | | 7. |
| Torillis arvensis | Field hedge parsley | | | | 1. |

Table 5 (continued)

| Scientific name | Common name | 24D-1 | 24D-2 | 24D-3 | 24D-4 |
|---|---|---|---|---|---|
| | | 7.5-minute quadrangle numbers / Plot numbers where found | | | |
| ANNUAL FORBS: (continued) | | | | | |
| Torilis nodosa | Knotted hedge parsley | | | | 1. |
| Trifolium bifidum | Pinole clover | | 6. | | |
| Trifolium ciliolatum | Tree clover | | 5,6. | | 1. |
| Trifolium dubium | Shamrock clover | | | | 1. |
| Trifolium hirtum | Rose clover | | 3. | | 1. |
| Trifolium microcephalum | Maiden clover | | 5,6. | | 1,7. |
| Trifolium olivaceum columbinum | Dove clover | | 5. | | |
| Trifolium tridentatum | Tomcat clover | | | | 7. |
| Tunica prolifera | Tunica | | | | 1. |
| Vivia angustifolia | Common vetch | | | | 1. |
| PERENNIAL FORBS: | | | | | |
| Achillea borealis californica | Common yarrow | | | | 5. |
| Achillea lanulosa lanulosa | Mountain yarrow | | 2,6,7,8,9, 10,13. | 9. | |
| Adenocaulon bicolor | Trail plant | | 4,14. | | |
| Agoseris grandiflora | Grand mountain dandelion | | 3,6,8,9. | | 3. |
| Agoseris retrorsa | Spear-leaf mountain dandelion | | | 6. | |
| Allium sp. | Onion | | 3. | | |
| Apocynum pumilum | Mountain hemp | 4,5,8,10. | 9,10,13. | 2,4,8. | 5,6. |
| Aquilegia formosa | Columbine | | 14. | | |
| Aralia californica | | | 12. | | |
| Arnica discoidea eradiata | | | 1,4. | | |
| Arnica venosa | | | | | 6. |
| Asarum hartwegii | Hartweg wild ginger | 4. | 1,14. | | |
| Asclepias cordifolia | Purple milkweed | | 10. | | |
| Aster oregonensis | | 11. | | | |
| Balsamorhiza deltoidea | Deltoid balsamroot | | 10. | | |
| Brodiaea spp. | Brodiaea | 10. | 4. | 8. | 6. |
| Brodiaea congesta | Ookow | | 8. | | |
| Brodiaea ida-maia | Firecracker flower | | 6. | 9. | |
| Brodiaea lutea analina | Golden brodiaea | | | 6,9. | |
| Brodiaea pulchella | Wild-hyacinth | | 6. | | 1,5. |
| Calochortus spp. | Mariposa Lily | | 2. | 6,10. | |
| Calochortus tolmiei | Tolmie star-tulip | | | | 7. |
| Calystegia polymorpha | Modoc morning-glory | 4,7. | 2,8,9,13. | | 3,5,6. |
| Campanula prenanthoides | California harebell | 4,5. | 4,11,12,14. | | 6. |
| Castilleja sp. | Paint brush | | | | 6. |
| Chlorogalum pomeridianum | Soap plant | | | 6,10. | 7. |
| Comandra umbellata californica | Bastard toad-flax | 8. | 2. | | 2,6. |
| Cynoglossum grande | Western houndstongue | | 2,4. | | |
| Cynoglossum occidentale | Houndstongue | | | | 6. |
| Delphinium sp. | Larkspur | | 2,3. | | |
| Dentaria sp. | | | 4. | | |
| Disporum hookeri trachyandrum | Sierra fairy bells | | 4. | | |
| Dodecatheon sp. | Shooting stars | | 2,4. | 9. | 6,7. |
| Erigeron inornatus | California rayless daisy | | 8,10. | | |
| Eriogonum nudum pubiflorum | | 13. | 5,10. | 1. | 1,7. |
| Eriogonum umbellatum umbellatum | Sulfur buckwheat | | | 1. | |
| Eriophyllum lanatum grandiflorum | Common Woolly-sunflower | 9. | 5,8,10. | 10. | 3,4,7. |
| Erythronium sp. | | 4. | | | |
| Frasera albicaulis nitida | Shining frasera | 5,8,10. | 9,13. | 2,4,8. | 6. |
| Fritillaria sp. | Fritillary | | 2. | | |
| Galium sp. | | 14. | 14. | | |
| Galium bolanderi | Bolander galium | | 2,10,11,13. | 4,6. | 3,4,5,6. |
| Galium nuttallii tenue | Climbing galium | 5,9,10,12. | 3,5,6,7,8,10. | 5,9,10. | 2,3,7. |
| Gnaphalium sp. | Everlasting | 2,12. | 9,13. | | 7. |
| Habenaria elegans | | | | 6. | |

| Scientific name | Common name | 7.5-minute quadrangle numbers<br>24D-1 | <br>24D-2 | <br>24D-3 | <br>24D-4 |
|---|---|---|---|---|---|
| | | Plot numbers where found | | | |
| PERENNIAL FORBS: (continued) | | | | | |
| Helianthella californica nevadensis | Sierra helianthella | 5,8,10,12. | 2,4,9,11. | 4,6,8. | 5,6. |
| Hieracium albiflorum | White-flower hawkweed | 6,7,8. | 2,4,9,12,14. | 6,10. | 5,6. |
| Horkelia tridentata | Three-tooth horkelia | | | | 3. |
| Hypericum concinnum | Goldwire | 7,9,10,11,12. | | 4,5,6,8. | 2,3,4,5,6. |
| Hypericum perforatum | Klamath weed | | 7. | 10. | 1,3,5. |
| Iris hartwegii | Iris | 4. | | | |
| Iris tenuissima | Iris | 4,5,6,8,10,15. | 2,4,9,10,11, 12,13,14. | 1,2,3,5,6,9, 10. | 6. |
| Iris tenuissima purdyiformis | Iris | 7. | | | 5. |
| Kelloggia galioides | Kelloggia | | | 1,2. | |
| Lathyrus sulphureus | Sulfur pea | 2,4,8,9,10,13. | 4,6. | | |
| Lithospermum californicum | Shasta puccoon | | | | 5,6. |
| Lomatium utriculatum | Common lomatium | | 8. | | |
| Lotus crassifolius | Big deervetch | | 9,10. | 2,3. | |
| Lupinus spp. | Lupine | 5,7,15. | 2,4,9. | 1,4,10. | 6. |
| Lupinus andersonii | Anderson lupine | | | 3. | |
| Lupinus latifolius | Lupine | | 3,5. | | |
| Marah sp. | Wild cucumber | 14. | 6,8. | | |
| Monardella odoratissima | Mountain monardella | 9. | 13. | 4,6,10. | |
| Monardella villosa sheltonii | Monardella | | 10. | | 6. |
| Onychium densum | Cliff-brake | | | | 7. |
| Osmorhiza chilensis | Mountain sweet-cicely | 4,7. | 2,4,8,9,11, 13,14. | 9. | 5,6. |
| Pedicularis densiflora | Indian warrior | 8,15. | 2,9. | | 6. |
| Pellaea mucronata | Birdsfoot fern | 9,12. | | | |
| Perideridia sp. | | | 9. | | |
| Phacelia sp. | Phacelia | 2. | 5. | 1. | |
| Pityrogramma triangularis | Goldenback fern | | | | 3,7. |
| Polygala cornuta | Sierra milkwort | 5,10. | 11,14. | 2. | 2. |
| Polystichum munitum | Sword fern | 6,7,13. | 1,14. | | 6. |
| Potentilla glandulosa | Common cinquefoil | | 8. | | |
| Pteridium aquilinum pubescens | Bracken fern | 4,7,8,15. | 2,4,9,10,11, 14. | 2,4,5,6,9. | 5,6. |
| Pyrola picta picta | White-vein shinleaf | 15. | | | |
| Ranunculus occidentalis eisenii | Western buttercup | | 6. | 10. | 1. |
| Rumex acetosella | Sheep-sorrel | | | | 1. |
| Salvia sonomensis | Creeping sage | 1,3. | | | 4. |
| Sanicula bipinnatifida | Purple Sanicle | | 6,8,9,10. | 9,10. | 4,5. |
| Senecio aronicoides | California groundsel | | 12. | | |
| Silene californica | Calif. scarlet campion | 7. | 11. | | 6. |
| Smilacina racemosa amplexicaulis | Fat solomon | | 1,4,12,14. | | |
| Thermopsis gracilis | Slender false-lupine | 15. | 2,4. | | |
| Trientalis latifolia | Star flower | 5,15. | 1,12,14. | | 2,5,6. |
| Veratrum californicum | Western false hellebore | | 4,14. | | |
| Vicia americana oregana | American vetch | | | 4. | |
| Vicia californica | California vetch | | 2,4,6,9,14. | 5,6. | |
| Viola spp. | Violet | 15. | 2. | 5. | 3. |
| Viola lobata lobata | Pine violet | 4. | 14. | | |
| Viola lobata integrifolia | Pine violet | 4. | | | |
| Viola purpurea | Mountain violet | | 10. | | |
| Viola sheltonii | Shelton violet | | 12. | | |
| Wyethia angustifolia | Narrow-leaf mule ears | 10. | 5,11. | 4. | 6. |
| Zigadenus fremontii | Star-lily | | | | 7. |
| TREES AND SHRUBS: | | | | | |
| Abies concolor | White fir | | | 2,3. | |

Table 5 (continued)

| | | 7.5-minute quadrangle numbers | | | |
|---|---|---|---|---|---|
| | | 24D-1 | 24D-2 | 24D-3 | 24D-4 |
| Scientific name | Common name | Plot numbers where found | | | |
| TREES AND SHRUBS: (continued) | | | | | |
| Acer macrophyllum | Bigleaf maple | 5,7,9,13. | 1,10,12,14. | 9. | |
| Adenostoma fasciculatum | Chamise | 1,2,3. | 5,8. | 7. | 4. |
| Aesculus californica | Shrub california buckeye | 7,9,11. | 3,6,8. | | 7. |
| Ailanthus altissima | Tree of heaven | | 7. | | |
| Alnus rhombifolia | White alder | (3/) | (3/) | (3/) | (3/) |
| Alnus tenuifolia | Mountain alder | | 11. | 2. | |
| Amelanchier pallida | Western serviceberry | 8. | 14. | | |
| Arbutus menziesii | Madrone | | | 10. | |
| Arctostaphylos canescens x viscida | Balaklala manzanita | 5,15. | | | |
| Arctostaphylos manzanita manzanita | Common manzanita | | | 4,5,6,10. | 1. |
| Arctostaphylos manzanita wieslanderi | Shingletown manzanita | (4/) | | | |
| Arctostaphylos nevadensis | Pinemat manzanita | | | (3/) | |
| Arctostaphylos patula patula | Greenleaf manzanita | 1,13,14,15. | 8. | 1,2,7,8. | |
| Arctostaphylos patula platyphylla | Pine manzanita | | | 3. | |
| Arctostaphylos roofii | Roof manzanita | | (5/) | | |
| Arctostaphylos viscida | Whiteleaf manzanita | 1,3,6,7,8, 9,10,11,12, 13,14. | 5,7,8,10. | 4,5,6,7,8,10. | 1,2,3,4,5,6,7. |
| Calocedrus decurrens | Incense-cedar | 4,6,8,15. | | 1,2,3,10. | |
| Calycanthus occidentalis | Spice-bush | | (4/) | | (4/) |
| Ceanothus cordulatus | Mountain whitethorn | | | (3/) | |
| Ceanothus cuneatus | Wedgeleaf ceanothus | | 5,7. | | 1. |
| Ceanothus integerrimus 2/ | Deerbrush | 5,8,9,13,14. | 2,3,6,8,10, 11,13,14. | 4,5,6,10. | 2. |
| Ceanothus lemmonii | Lemmon ceanothus | 1,3,10,11,12. | 8,10,11,13. | 4,5,6,7,8,10. | 2,3,5,6,7. |
| Ceanothus prostratus laxus | Upright squaw carpet | | | 1,2. | |
| Ceanothus prostratus prostratus | Squaw carpet | 13. | | | |
| Cercis occidentalis | California redbud | | 5,6,7,8,13. | | 4. |
| Cercocarpus betuloides | Birchleaf mountain mohogany | 1,7,9,14. | 3,7,8. | | 7. |
| Chrysolepis sempervirens | Bush chinquapin | | | 3. | |
| Clematis lasiantha | Pipe-stem clematis | | 3. | | |
| Cornus nuttallii | Pacific dogwood | 4,5,8,15. | 11,12,14. | 2,6. | 6. |
| Cornus sessilis | Miners dogwood | | | | (4/) |
| Corylus cornuta californica | California hazelnut | | 1,2,4,11,12,14. | | |
| Cupressus macnabiana | Macnab cypress | (4/) | | | |
| Dendromecon rigida | Bush poppy | | (3/) | | |
| Eriodictyon californicum | California yerba santa | 2,3,12. | 5. | 5,7,8. | 3,4. |
| Fraxinus dipetala | Foothill ash | 14. | | | |
| Fraxinus latifolia | Oregon ash | (3/) | | | |
| Garrya fremontii | Fremont silktassel | (3/) | (3/) | | |
| Haplopappus bloomeri | Bloomer goldenbush | | | 1. | |
| Heteromeles arbutifolia | Toyon, christmas berry | 3,6,7,9,10, 11,12. | 7. | | 2,3,4,5,7. |
| Leucothoe davisiae | Sierra-laurel | | | 3. | |
| Lithocarpus densiflora densiflora | Tan-oak | 15. | 13,14. | | |
| Lithocarpus densiflora echinoides | Shrub tan-oak | 4,5,8. | 1,2,4,11,12. | 2,3. | 6. |
| Lonicera interrupta | Chaparral honeysuckle | 3,9,14. | 6,7,8,9. | | 1,3,4,7. |
| Penstemon breviflorus glabrisepalus | Penstemon | | | | 3. |
| Philadelphus lewisii californicus | California mock orange | 9. | | | |
| Physocarpus capitatus | Pacific nine bark | (5/) | (4/) | | |
| Pinus attenuata | Knobcone pine | 5,6,8,11,14. | 7. | | 3,6,7. |
| Pinus lambertiana | Sugar pine | 4,6,8,13,15. | 2,9,10,11,12, 13. | 2,3,6. | 5,6. |
| Pinus ponderosa | Ponderosa pine | 4,5,6,7,8, 11,13,15. | 2,4,6,7,8,9, 10,11,13,14. | 1,2,3,4,5,6, 8,9,10. | 3,5,6,7. |

Table 5 (continued)

| Scientific name | Common name | 7.5-minute quadrangle numbers 24D-1 | 24D-2 | 24D-3 | 24D-4 |
|---|---|---|---|---|---|
| | | Plot numbers where found | | | |
| TREES AND SHRUBS: (continued) | | | | | |
| Pinus sabiniana | Digger Pine | 9,12. | 3,5,7,8. | | 1,2,4,7. |
| Prunus emarginata | Bitter cherry | | 2. | | |
| Prunus subcordata | Sierra plum | 5. | 8. | | |
| Pseudotsuga menziesii | Douglas-fir | 4,5,6,7,8, 13,15. | 1,2,4,8,9,10, 11,12,13,14. | 2,4,9,10 | 5,6. |
| Quercus chrysolepis chrysolepis | Canyon live oak | 6,7,8,9,10, | 1,4,6,7,8,9, 12,13. | 4,5,6,8,9,10. 10,11,12,13,14. | 2,3,6. |
| Quercus chrysolepis nana | Shrub canyon live oak | 4,14. | | | 5. |
| Quercus douglasii | Blue oak | | 5,6,7. | | 1. |
| Quercus durata | Leather oak | | | (3/) | |
| Quercus garryana breweri | Brewer oak | 14. | 3. | 7,8. | 4. |
| Quercus garryana garryana | Oregon oak, garry oak | | 6. | | |
| Quercus kelloggii cibata | Shrub Calif. black oak | 5,14. | 14. | | |
| Quercus kelloggii kelloggii | California black oak | 4,5,7,8,10, 11,13,15. | 2,4,6,7,8,9, 10,11,12,13,14. | 4,5,6,7,8,9, 10. | 2,3,5,6,7. |
| Quercus lobata | Valley oak | | | | 1. |
| Quercus morehus | Oracle oak | (4/) | | | |
| Quercus vaccinifolia | Huckleberry oak | | | (3/) | |
| Quercus wislizenii frutescens | Shrub interior live oak | 3,9. | 3,5,8. | 7. | 3,4. |
| Quercus wislizenii wislizenii | Interior live oak | | 7. | | 1,7. |
| Rhamnus californica crassifolia | Thick-leaf coffeeberry | | | (3/) | |
| Rhamnus californica tomentella | Chaparral coffeeberry | 5,9. | | | 7. |
| Rhamnus crocea ilicifolia | Hollyleaf redberry | | | | 4. |
| Rhamnus purshiana | Cascara sagrada | (4/) | | | |
| Rhamnus rubra obtusissima | Sierra coffeeberry | 9. | | | |
| Rhamnus rubra rubra | Sierra coffeeberry | 6,7. | | | 6. |
| Rhododendron occidentale | Western azalea | | | | (4/) |
| Rhus diversiloba | Poison-oak | 1,3,5,7,8,9, 10,12,13,14. | 3,5,6,7,8,10, 11,13,14. | 4,5,6,7,9,10. | 1,2,3,4,5,6,7. |
| Rhus trilobata quinata | Common squaw bush | | 6,7. | | |
| Ribes roezlii | Sierra gooseberry | 13. | 4,12,14. | 2. | |
| Rosa sp. | Rose | | 1,2,9,12,14. | 5,6,8,10. | 5,6. |
| Rubus spp. | Blackberry | (4/) | | | |
| Rubus leucodermis | Western raspberry | (4/) | (4/) | | (4/) |
| Rubus parviflorus | Western thimbleberry | | 12,14. | | |
| Salix sp. | Willow | 11. | | | |
| Salix scouleriana | Nuttall willow | | 1. | | |
| Sambucus caerulea | Mountain blue elderberry | | 6. | | 1. |
| Solanum parishii | Parish nightshade | | 5. | | |
| Styrax officinalis californica | California storax | 1,6,7,8,9,10, 12. | | | 2,3,4,7. |
| Symphoricarpos acutus | Spreading snowberry | 4,5,13. | 1,2,4,8,9,12, 14. | | 4. |
| Symphoricarpos rivularis | Snowberry | | | | (4/) |
| Taxus brevifolia | Pacific Yew | | | (4/) | (4/) |
| Vitis californica | California wild grape | | | | (3/) |
| Whipplea modesta | Whipplea | 14. | | | |

1/ More data on percent composition and abundance of plants are on file at the Department of Agronomy and Range Science, University of California, Davis.

2/ Varieties not differentiated.

3/ Mapped in quadrangle indicated but not recorded on plots.

4/ Observed in quadrangle indicated but not recorded on plots.

5/ Collected in quadrangle indicated but not recorded on plots.

Table 6--Five orders of soils in the French Gulch Quadrangle, by series, family, and subgroup

| Series | Family | Subgroup |
|---|---|---|
| | Entisols | |
| Exchequer | Loamy, mixed, nonacid, thermic | Lithic Xerorthents |
| Corbett | Mixed, frigid | Typic Xeropsamments |
| | Inceptisols | |
| Kidd | Medial, mesic 1/ | Lithic Vitrandepts |
| Modesty | Coarse-loamy, mixed, thermic | Typic Xerochrepts |
| Tish Tang Variant 2 | Fine-loamy, mixed, mesic | Dystric Xerochrepts |
| Neuns | Loamy-skeletal, mixed, mesic | Dystric Xerochrepts |
| Chawanakee | Loamy, mixed, mesic, shallow | Dystric Xerochrepts |
| Chaix | Coarse-loamy, mixed, mesic | Dystric Xerochrepts |
| Kanaka | Coarse-loamy, mixed, thermic | Dystric Xerochrepts |
| Sheetiron | Loamy-skeletal, micaceous, mesic | Dystric Xerochrepts |
| Maymen | Loamy, mixed, mesic | Dystric Lithic Xerochrepts |
| Goulding | Loamy-skeletal, mixed, mesic | Lithic Xerochrepts |
| Millsholm | Loamy, mixed, thermic | Lithic Xerochrepts |
| Huse | Clayey, mixed, mesic | Lithic Xerochrepts |
| Auburn | Loamy, mixed, thermic | Ruptic-Lithic Xerochrepts |
| | Mollisols | |
| Los Gatos | Fine-loamy, mixed, mesic | Typic Argixerolls |
| Fiddletown Variant | Fine-loamy, mixed, mesic | Pachic Ultic Argixerolls |
| Henneke | Clayey-skeletal, serpentinitic, thermic | Lithic Argixerolls |
| San Andreas | Coarse-loamy, mixed, thermic | Typic Haploxerolls |
| Tollhouse | Loamy, mixed, mesic, shallow | Entic Haploxerolls |
| | Alfisols | |
| Redding | Fine, kaolinitic, thermic | Abruptic Durixeralfs |
| Greenfield | Coarse-loamy, mixed, thermic | Typic Haploxeralfs |
| Stonyford | Loamy, mixed, thermic | Lithic Mollic Haploxeralfs |
| Dubakella | Clayey-skeletal, serpentinitic, mesic | Mollic Haploxeralfs |
| Sobrante | Fine-loamy, mixed, thermic | Mollic Haploxeralfs |
| Behemotosh | Loamy-skeletal, mixed, mesic | Ultic Haploxeralfs |
| Marpa | Loamy-skeletal, mixed, mesic | Ultic Haploxeralfs |
| Boomer | Fine-loamy, mixed, mesic | Ultic Haploxeralfs |
| Holland | Fine-loamy, mixed, mesic | Ultic Haploxeralfs |
| Hotaw | Fine-loamy, mixed, mesic | Ultic Haploxeralfs |
| Musick | Fine-loamy, mixed, mesic | Ultic Haploxeralfs |
| Auberry | Fine-loamy, mixed, thermic | Ultic Haploxeralfs |
| Sierra | Fine-loamy, mixed, thermic | Ultic Haploxeralfs |
| Hoda | Fine, kaolinitic, mesic | Ultic Haploxeralfs |
| Newtown | Fine, montmorillonitic, thermic | Ultic Haploxeralfs |
| Newville | Fine, montmorillonitic, thermic | Mollic Palexeralfs |
| | Ultisols | |
| Horseshoe | Fine-loamy, mixed, mesic | Xeric Haplohumults |
| Sites | Clayey, kaolinitic mesic | Xeric Haplohumults |
| Diamond Springs | Fine-loamy, mixed, mesic 1/ | Typic Haploxerults |
| Behemotosh Variant | Fine-loamy, mixed, mesic | Typic Haploxerults |
| Josephine | Fine-loamy, mixed, mesic | Typic Haploxerults |

1/ Mapped as "thermic" in French Gulch Quadrangle.

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☆ GPO 792-322

24D-1

SOIL-VEGETATION SURVEY

COOPERATING AGENCIES
PACIFIC SOUTHWEST FOREST & RANGE EXPERIMENT STATION—
FOREST SERVICE—U.S. DEPT. OF AGRICULTURE
DIVISION OF AGRICULTURAL SCIENCES—UNIVERSITY OF CALIFORNIA—
DIVISION OF FORESTRY—DEPARTMENT OF CONSERVATION—
THE RESOURCES AGENCY—STATE OF CALIFORNIA

# SOIL-VEGETATION MAP

by

Ben F. Smith, Earl B. Alexander and James I Mallory

SOIL SERIES AND PHASES
COVER PERCENT CLASSES OF WOODY VEGETATION
SPECIES COMPOSITION OF DOMINANT VEGETATION
SITE QUALITY OF TIMBER CROPLANDS
SOIL-VEGETATION PLOT LOCATIONS

FRENCH GULCH QUADRANGLE
(Northeast Quarter)
SHASTA COUNTY
CALIFORNIA


Accompanies report SOILS and VEGETATION of the FRENCH GULCH QUADRANGLE —(24D-1,2,3,4) Shasta and Trinity Counties, California.
Classification and mapping, 1962 to 1964 & 1968.
Map compilation by J. Klingensmith, 1963.
Edition of December 1973.

Scale: 1:31680

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Major Roads
Aerial Photo Center

Base map: N.E. $\frac{1}{4}$ U.S.G.S. French Gulch Quadrangle, 15' series. Edition of 1957. Mt. Diablo Meridian.
Land grid compiled from U.S.F.S., N.P.S., and C.D.F. source maps. No final accuracy claimed.
Aerial photography: BUY 1952, EJG 1961, SC 1962.

*Soil names subject to final correlation.*

SOIL-VEGETATION SURVEY
COOPERATING AGENCIES
PACIFIC SOUTHWEST FOREST & RANGE EXPERIMENT STATION —— FOREST SERVICE —— U.S. DEPT. OF AGRICULTURE
DIVISION OF AGRICULTURAL SCIENCES —— UNIVERSITY OF CALIFORNIA ——
DIVISION OF FORESTRY —— DEPARTMENT OF CONSERVATION
THE RESOURCES AGENCY —— STATE OF CALIFORNIA

# SOIL-VEGETATION MAP

by

Chester O. Stone, James M. Crawford and James I. Mallory

SOIL SERIES AND PHASES
COVER PERCENT CLASSES OF WOODY VEGETATION
SPECIES COMPOSITION OF DOMINANT VEGETATION
SITE QUALITY OF TIMBER CROPLANDS
SOIL-VEGETATION PLOT LOCATIONS

24D-2

FRENCH GULCH QUADRANGLE
(Northwest Quarter)
SHASTA COUNTY
and
TRINITY COUNTY
CALIFORNIA


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Classification and mapping, 1962 to 1964 & 1968.
Map compilation by J. Klingensmith, 1963.
Edition of December 1973

Scale: 1:31680

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Base map: N.W. ¼ U.S.G.S. French Gulch Quadrangle, 15' series. Edition of 1957. Mt. Diablo Meridian.
Land grid compiled from U.S.F.S., N.P.S. and C.D.F. source maps. No final accuracy claimed.
Aerial photography: BUY 1952, EJG 1961, SC 1962.

Soil names subject to final correlation.

24D-3

SOIL-VEGETATION SURVEY
COOPERATING AGENCIES:
PACIFIC SOUTHWEST FOREST & RANGE EXPERIMENT STATION——
FOREST SERVICE——U.S. DEPT OF AGRICULTURE
DIVISION OF AGRICULTURAL SCIENCES——UNIVERSITY OF CALIFORNIA——
DIVISION OF FORESTRY——DEPARTMENT OF CONSERVATION——
THE RESOURCES AGENCY——STATE OF CALIFORNIA

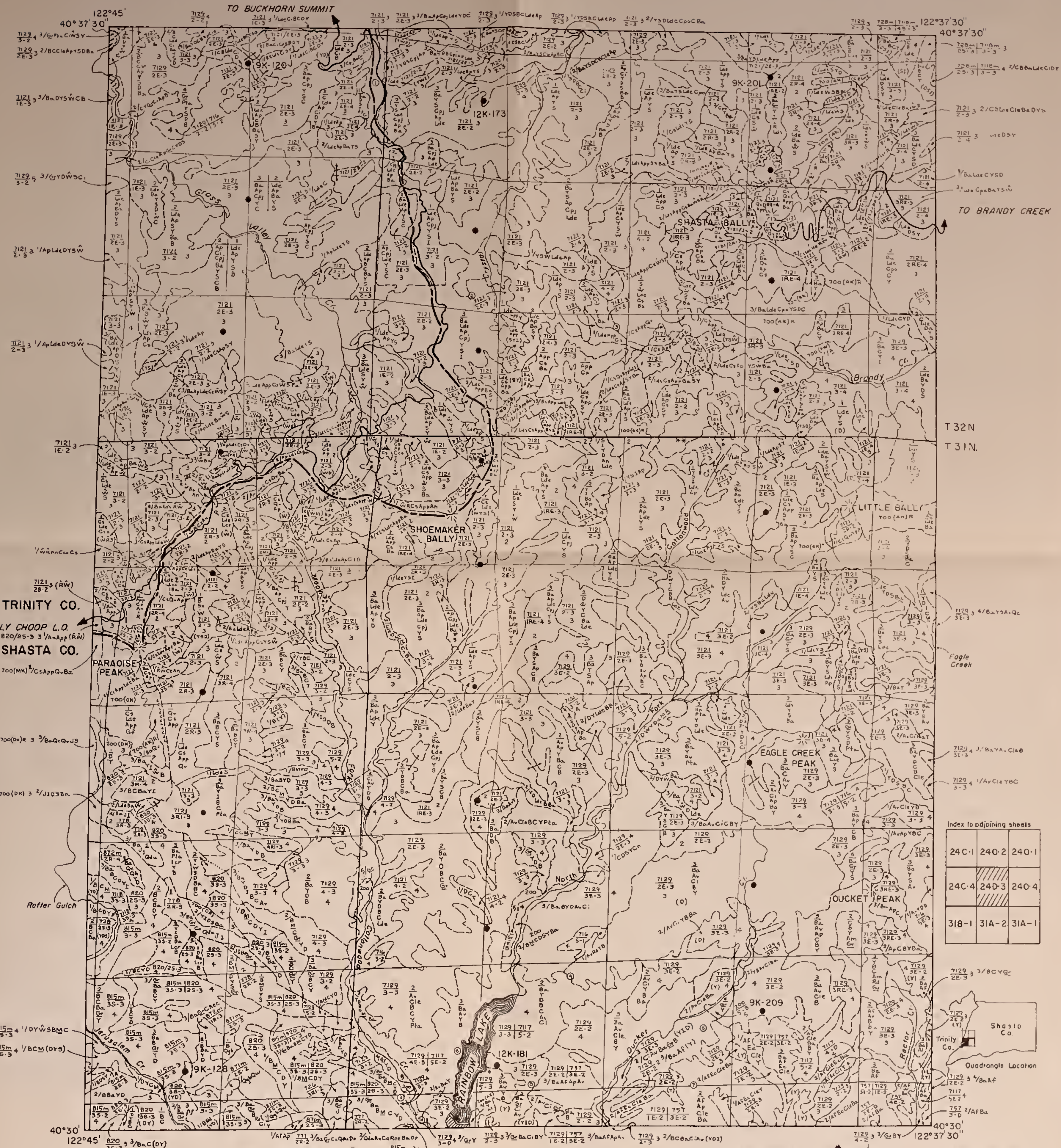
# SOIL-VEGETATION MAP

By

James M. Crawford, Chester O. Stone and James I. Mallory

SOIL SERIES AND PHASES
COVER PERCENT CLASSES OF WOODY VEGETATION
SPECIES COMPOSITION OF DOMINANT VEGETATION
SITE QUALITY OF TIMBER CROPLANDS
SOIL-VEGETATION PLOT LOCATIONS

FRENCH GULCH
QUADRANGLE
(Southwest Quarter)
SHASTA COUNTY
and
TRINITY COUNTY
CALIFORNIA




Accompanies report: SOILS and VEGETATION of the FRENCH GULCH QUADRANGLE—(24D-1, 2, 3, 4), Shasta and Trinity Counties, California.

Classification and mapping, 1961 to 1964 & 1968. Map compilation by O. Johnson, 1962; J. Klingensmith, 1966. Edition of December 1973.

Scale 1:31680

½ 0 1 2 Miles

← Major Roads
● Aerial Photo Center

Base map and land grid*: S.W. ¼ U.S.G.S. French Gulch Quadrangle, 15" series, Edition of 1957. Mt. Diablo Meridian.
Aerial photography: BUY 1952.
*Land grid compiled from U.S.F.S., N.P.S., and C.O.F. source maps. No final accuracy claimed.
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SOIL-VEGETATION SURVEY
COOPERATING AGENCIES:
PACIFIC SOUTHWEST FOREST & RANGE EXPERIMENT STATION — FOREST SERVICE — U.S. DEPT. OF AGRICULTURE
DIVISION OF AGRICULTURAL SCIENCES — UNIVERSITY OF CALIFORNIA
DIVISION OF FORESTRY — DEPT. OF CONSERVATION — THE RESOURCES AGENCY — STATE OF CALIFORNIA

# SOIL-VEGETATION MAP

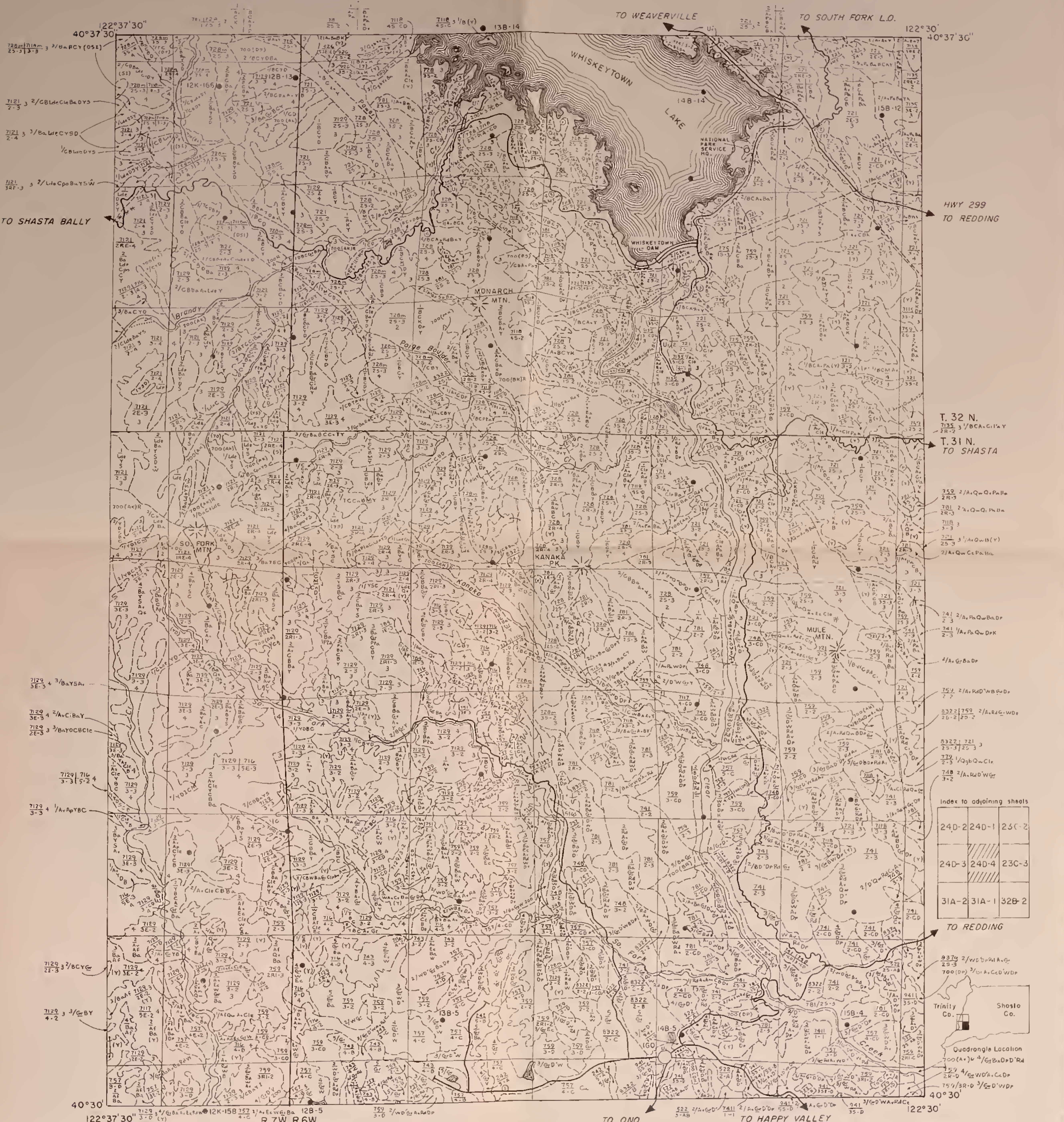
by

James I. Mallory and Theodore A. Klaseen

SOIL SERIES AND PHASES
COVER PERCENT CLASSES OF WOODY VEGETATION
SPECIES COMPOSITION OF DOMINANT VEGETATION
SITE QUALITY OF TIMBER CROPLANDS
SOIL-VEGETATION PLOT LOCATIONS

**24D-4**

FRENCH GULCH QUADRANGLE (Southeast Quarter)
SHASTA COUNTY
CALIFORNIA

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Scale: 1:31680

½ 0 1 2 Miles

Major Roads
Aerial Photo Center

Base map: N.E. ¼ U.S.G.S. French Gulch Quadrangle, 15' series. Edition of 1957. Mt. Diablo Meridian.
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Aerial photography: BUY 1952, EJG 1961, SC 1962.

*Soil names subject to final correlation.*

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1973. **Soils and vegetation of the French Gulch quadrangle (24-D,1,2,3,4) Trinity and Shasta Counties, California**. Pacific Southwest Forest and Range Exp. Stn., Berkeley, Calif. 42 p., illus. (USDA Forest Serv. Resour. Bull. PSW-12)

This bulletin summarizes results of a soil-vegetation survey of 145,000 acres comprising the French Gulch quadrangle in Trinity and Shasta Counties, in northern California. The data supplement maps of the area. Described are the survey area, soil-vegetation associations, timber site quality, new soils and plants, and explanatory legends that accompany the maps. The report was issued in cooperation with the California Division of Forestry and the University of California Division of Agricultural Sciences.

*Oxford:* 182.58(794) + 114.7(794).
*Retrieval Terms:* soil surveys; vegetation surveys; French Gulch quadrangle; Klamath Mountains; Trinity County; Shasta County; California.

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Mallory, James L., Wilmer L. Colwell, Jr., and W. Robert Powell.
1973. **Soils and vegetation of the French Gulch quadrangle (24-D,1,2,3,4) Trinity and Shasta Counties, California**. Pacific Southwest Forest and Range Exp. Stn., Berkeley, Calif. 42 p., illus. (USDA Forest Serv. Resour. Bull. PSW-12)

This bulletin summarizes results of a soil-vegetation survey of 145,000 acres comprising the French Gulch quadrangle in Trinity and Shasta Counties, in northern California. The data supplement maps of the area. Described are the survey area, soil-vegetation associations, timber site quality, new soils and plants, and explanatory legends that accompany the maps. The report was issued in cooperation with the California Division of Forestry and the University of California Division of Agricultural Sciences.

*Oxford:* 182.58(794) + 114.7(794).
*Retrieval Terms:* soil surveys; vegetation surveys; French Gulch quadrangle; Klamath Mountains; Trinity County; Shasta County; California.

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